

The Use of Generative AI for the Rapid Development of Qualitative Interview Transcripts for a Human-Centered Design Problem

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Abstract

This paper describes how generative AI (i.e., ChatGPT) was used to rapidly develop fictitious, yet realistic, qualitative interview transcripts for industrial engineering undergraduates to use as part of a human-centered design (HCD) problem. The curriculum for undergraduate engineering students is heavily focused on developing quantitative skills. However, engineering professionals may want or need to expand their skill set to also include qualitative methods. To that end, this research project introduces and provides qualitative methods training included in an existing industrial engineering course. A comparison group of students who received standard quantitative-only methods training (Fall 2024), were asked to work through an HCD problem that includes both quantitative and qualitative data. A mixed-methods group (Fall 2025), who will receive qualitative methods training in addition to the standard quantitative methods training, will work through the same HCD problem.

For the given design problem, students are provided with 10 qualitative interview summaries in addition to standard quantitative anthropometric data tables to support their work on a design problem focused on workstation design. Collecting real qualitative interviews to support the design problem for this project was time and resource prohibitive. Instead, we used generative AI to rapidly simulate the fictitious interviews, adjusting the prompts as needed to construct realistic looking interview transcripts. After editing the transcripts to introduce more variability and distinction across the 10 interviews, intentional “design seeds” were planted within the interview texts for students to potentially discover during their qualitative analysis. Our goal was to have recurrent themes (e.g., comments about the desire for dual monitors to enhance productivity), appearing across multiple interview transcripts in a variety of conversational ways. Students could then potentially discover these during their analysis of the interviews and include them in their workstation designs.

The human-AI teaming aspect of this work is especially notable as the research team and ChatGPT uniquely contributed to the creation of the interview transcripts that resulted in a final product that could not have been achieved alone in the time frame needed for the project. ChatGPT was able to produce rich, detailed interview transcripts to support the design problem by adjusting the prompts in a way that generated the detail needed to appear authentic. An example prompt was, *“Write 500 word interview notes with a person sitting at workstation in a private office who seems frustrated with ability to concentrate, with that person answering questions about what is good and bad about their workstation, including the chair, desk, computer, and other workstation components.”* We could then produce additional interview transcripts by changing the wording to *“...a person...who seems intensely focused...”*, or by using the same prompt but asking ChatGPT to generate different answers. Final editing of the transcripts by the research team was needed to introduce more variability across the interviews in terms of wording, as well as plant specific, recurrent “design seeds” across multiple interview transcripts for students to potentially discover. This project may inform industrial engineering and other faculty who wish to supplement their course design work for students with supporting materials using generative AI.

Introduction

The integration of generative artificial intelligence (AI) into industrial engineering education marks a transformative shift in pedagogical strategies and the preparation of future engineers. Generative AI, recognized for its capability to generate content such as text, images, and designs, holds substantial promise for enhancing educational experiences [1], [2]. It fosters creativity, enables personalized learning, and supports the resolution of complex problems, preparing students for the evolving landscape of engineering practices. This is potentially impactful for addressing human-centered design (HCD) challenges, and perhaps advancing the field of industrial engineering education.

Generative AI tools, such as ChatGPT and image generation models like Stable Diffusion [3], have the potential to substantially enhance creativity and innovation in industrial engineering education. These tools enable the generation of diverse design alternatives based on initial input parameters, providing students with opportunities to explore a wide range of solutions to human-centered design challenges. For instance, in a design course, students may leverage generative AI to create multiple iterations of a product design, each with unique features and aesthetics. This approach not only expands the scope of potential solutions but also fosters creative thinking, encouraging students to consider unconventional and innovative design strategies [4].

One of the primary benefits of integrating generative AI into industrial engineering education is its capacity to analyze qualitative data. Generative AI is reshaping ways of carrying out qualitative analysis, providing tools capable of automating transcription, summarization, and content creation [4], [5], [6], [7]. In HCD process, qualitative methods are vital for understanding user needs, identifying design opportunities, and generating actionable insights [8], [9]. Traditionally, these methods rely on real-world data collection, including interviews, observations, and thematic analysis to uncover user frustrations, identify gaps, and highlight opportunities for innovation [10]. However, these methods are time-consuming and resource-intensive, especially transcription and analysis, which require significant effort to identify themes and patterns [11], [12] [13]. These challenges may hinder the iterative processes central to HCD, which relies on the ability to quickly gather, analyze, and integrate user feedback. The emergence of generative AI tools like ChatGPT offers an opportunity to simulate aspects of these processes, enabling scalable, controlled, and efficient approaches to training and learning. To overcome the challenges, generative AI has proven useful in automating the transcription of qualitative data and providing insights through pattern recognition and thematic categorization [14], [15], [16], [17]. During the transcription process, generative AI tools such as OpenAI's Whisper [18], Otter.ai [15], and other GPT models are capable of transcribing spoken language into text with remarkable accuracy and speed [19], [20]. AI also effectively handles multiple interviews by transcribing, identifying speakers, and summarizing key points, reducing human error and streamlining data preparation [21]. While challenges such as data privacy, poor audio quality, and transcription accuracy remain [22],[19] these can be mitigated with high-quality recordings and robust data management.

Previous studies have utilized generative AI for tasks such as design ideation [23], transcribing qualitative interviews [19], responding to interview questions [24], analyzing qualitative data

[25], and identifying patterns or recurrent themes [14]. These applications primarily focus on enhancing the efficiency and accuracy of analyzing existing data. However, this study adopts a novel approach, using generative AI not to analyze data but to create fictitious qualitative interview transcripts. Then, we planted "design seeds" into these transcripts to introduce variability and complexity to mimic real-world scenarios. The objective is to provide qualitative data ready for students to use in a work design course. The use of generative AI for the development of qualitative transcripts within industrial engineering education in human-centered design problems is a nascent approach. This was necessary to eliminate the prohibitive time it would have taken to provide real interview data for the course.

Industrial engineering undergraduates traditionally receive training that prioritizes quantitative problem-solving. Yet, addressing complex real-world challenges requires a more holistic approach, integrating both qualitative and quantitative perspectives. This study employs generative AI, specifically ChatGPT, to rapidly develop fictitious yet realistic qualitative interview transcripts for use in an HCD problem. The context focuses on industrial engineering education, where curricula often emphasize quantitative skills. However, there is growing recognition of the need for engineering professionals to incorporate qualitative methods into their skill set. Therefore, this research introduces qualitative methods training into an existing industrial engineering course. This unique approach highlights the potential of generative AI as a pedagogical tool, offering a controlled, reproducible, and resource-efficient method for teaching qualitative methods in HCD.

Literature Review

Generative AI has emerged as a transformative tool in enhancing design processes through automation of repetitive tasks, enablement of rapid ideation, and generation of user-centered insights. Generative AI refers to artificial intelligence models capable of creating new content, including text, images, and designs, based on learned patterns from existing data [26]. This technology leverages advanced computational methods to generate creative outputs, optimize design processes, and enhance user experiences. Generative AI's substantial impact in HCD addresses the need for customization, and user-centric solutions, offering potential to revolutionize the way designers approach complex design problems. Integrating these technologies into industrial engineering curricula necessitates a structured and deliberate approach to ensure effective application. Several studies have explored the application of generative AI in various design contexts to explore a vast array of design alternatives efficiently and effectively to understand user needs.

Generative AI algorithms have shown promise in human-centered product development by incorporating human factors and ergonomics into the design process. Urquhart et al. [27] studied the ability of generative design to automate the customization of design variations according to individual user requirements. This approach leverages 3D printing technology to produce bespoke forms tailored to user anatomy and usability needs. For instance, one study utilized generative AI using PRIME-VR2 [28] as a case study to create customized versions of a standard controller device based on user scan data, demonstrating the potential for personalized and ergonomic product designs.

Despite AI's ability to generate design ideas to augment designs, understanding of user needs/requirements is crucial. Understanding user requirements in the design process benefits significantly from qualitative methods, as these approaches provide in-depth insights into user needs, behaviors, and experiences. Qualitative data, such as interviews, ethnographic observations, and user feedback, enable the identification of patterns, themes, and underlying user needs critical to the human-HCD process. The use of AI in qualitative research further complements its application in design processes. A growing number of studies have used large language models (LLMs), such as ChatGPT, as proxies for human behavior, mirroring human-like preferences in qualitative research across various contexts, including social science [29], market research [30], income finance [24], and computer science education [31]. Hamilton et al. [4] explored ChatGPT's potential to support qualitative research by comparing AI-generated themes with human-generated themes from interviews conducted with guaranteed income recipients. The findings revealed both similarities and differences in thematic identification. The study concludes that while AI can efficiently process large datasets and identify patterns, human analysis provides deeper contextual understanding.

Mason [31] employed large language models such as ChatGPT and BARD as an interview partner in qualitative research, focusing on generating answers to semi-structured interviews in computer science education. The findings indicated that model responses heavily depend on context, with the same model yielding varying results for identical questions. Wang [32] examined the application of OpenAI's GPT models (GPT-3.5, GPT-4.0, and GPT-4o) in answering semi-structured interview questions related to the impact of generative AI on risk management. The study found that GPT models are effective in generating realistic interview responses, enabling researchers to refine questions and methodologies before engaging human participants.

Despite the benefits of generative AI, its use presents several challenges, including hallucination, sensitivity to prompt phrasing, algorithmic bias, and ethical concerns. Nonetheless, most studies have utilized it to respond to interview questions, identify themes in qualitative analysis, and compare its performance to human-generated themes. However, to the best of our knowledge, no study has used generative AI to generate qualitative data and plant design seeds for equipping students with qualitative research skills. Our study creates a novel approach in using qualitative data generated by generative AI for an HCD problem in coursework.

Methodology

This paper introduces and integrates qualitative methods training into an existing industrial engineering course at the university. The participants were undergraduate industrial engineering students enrolled in a work design course. Students in the mixed-methods group will receive combined training (qualitative and quantitative) in the Fall 2025 semester; a comparison group of students received standard quantitative-only methods training in the Fall 2024 semester. Both groups are tasked with addressing a HCD problem that may benefit from the analysis and application of both quantitative and qualitative data. Twenty-eight (28) students in the first cohort who consented to participate were provided with a workstation design problem, anthropometrics data tables, and detailed transcripts of end-user interviews and observations of workstations in use. Generative AI, specifically ChatGPT-4.0, was used to generate ten (10) fictitious, but realistic interview transcripts because it is the most utilized AI tool in various

studies and is renowned for its ability to track and respond to nuanced queries effectively. These transcripts served as a practical resource for students to analyze and apply qualitative methods within the HCD framework. The use of ChatGPT was to eliminate manual development of qualitative interview transcripts to support a design problem, which may be time-consuming to produce otherwise, allowing the students to focus on finding recurrent design ideas within the provided transcripts. Participants were given three full 50-minute class periods (2.5 hours) to identify recurrent design ideas and analyze the design problem. After the analysis, students submitted a complete schematic diagram showing the engineering anthropometric data used, and a detailed summary justifying their design decisions on anthropometric dimensions, placement and arrangement of workstations items, and other human-centered design considerations. Three students did not submit the assignment; thus, the final sample size for the Fall 2024 cohort was 25. Based on historical course enrollments, we expect a similar sample size for the Fall 2025 cohort.

Description of Human Centered Design Problem- Workstation Design

The workstation design problem was introduced to students enrolled in a work design course, a required course in the undergraduate industrial engineering curriculum at the university. This course exposes students to HCD principles, including early user focus, empirical measurement, iterative design processes, and the importance of aligning designs with human capabilities and limitations. Students were tasked with designing workstations to be constructed in private offices for industrial engineering faculty and staff in a new building on campus. Each private office was specified to include a window, accommodate a seated individual working with a desktop computer, and cater equally to male and female users. Although there was no strict budget limit for the project, students were expected to prioritize cost-effectiveness in their design decisions. The design process required students to account for relevant anthropometric dimensions and other HCD considerations to produce high-quality workstation designs. To support their efforts, students were provided with handouts containing anthropometric data tables and detailed transcripts of end-user interviews. The Appendix shows a full description of the design problem administered to students.

Prompt Design for HCD problem

The prompt was designed such that the generative AI elicited responses that reflect user experiences in the workstation according to the four elements of a prompt [33]; **instruction, context, input data, and output indicator**, while also integrating **emotional state cues**. These elements ensure clarity, and specificity in generating insights to usability, user experience, and emotional responses to system interactions. For instance, this approach was applied to the following prompt: *"Write 500-word interview notes with a person sitting at a workstation in a private office who seems frustrated with their ability to concentrate, with that person answering questions about what is good and bad about their workstation, including the chair, desk, computer, and other workstation components."*

The **instruction** clearly defines the task, directing the response to take the form of **500-word interview notes**. This ensures that the output is qualitative, capturing the user's direct reflections on their workstation experience. The context provides essential background information by describing a **real-world scenario** in which an individual is struggling to concentrate while

working at a **private office workstation**. The **input data** specifies the **key components** of the workstation that should be evaluated during the interview, ensuring that the response explores both **positive and negative aspects** of the **chair, desk, computer, and other workstation components**. This structured focus ensures that usability challenges related to **ergonomics, functionality, and other factors** are captured in detail. Additionally, emotional state cues play a critical role in HCD as it provides insights into user satisfaction, frustration, cognitive load, and engagement. The presence of **emotional state cues** in the prompt ensures that the interview notes document **observable behavioral signals** such as **changes in posture, facial expressions, or tone of voice** which can indicate frustration, discomfort, or fatigue. These cues enhance the depth of user feedback and help in identifying pain points that may not be explicitly stated but are **reflected in user emotions and behaviors**. We also incorporated emotional cues to ensure responses focus not only on functionality but also on how users feel when utilizing the system.

Finally, the **output indicator** ensures that the response is presented as **qualitative interview notes**, emphasizing a **narrative, user-driven format**. This format ensures the collection of **rich, first-person insights** that capture both **cognitive and emotional aspects** of the user's experience, providing a holistic understanding of **how workstation design impacts users' productivity and well-being**.

Harnessing Generative AI to Plant Design Seeds

Figure 1 shows how generative AI, with research team input, was used to help to plant design seeds for students in this study. Generative AI was employed to rapidly simulate fictitious interviews, with prompts adjusted as needed to construct realistic and contextually appropriate interview transcripts. Following the initial generation, the transcripts were edited to introduce greater variability and distinction across the 10 interview samples. Additionally, intentional "design seeds" were embedded within the transcripts to serve as potential insights for students to uncover during their qualitative analysis. These design seeds included recurrent themes, such as remarks about the preference for dual monitors to enhance productivity, easier access to outlets, stool for their feet, sufficient lumbar support, etc., which appeared across multiple transcripts. The aim was to enable students to identify these recurring themes during their analysis and integrate them into their workstation designs.

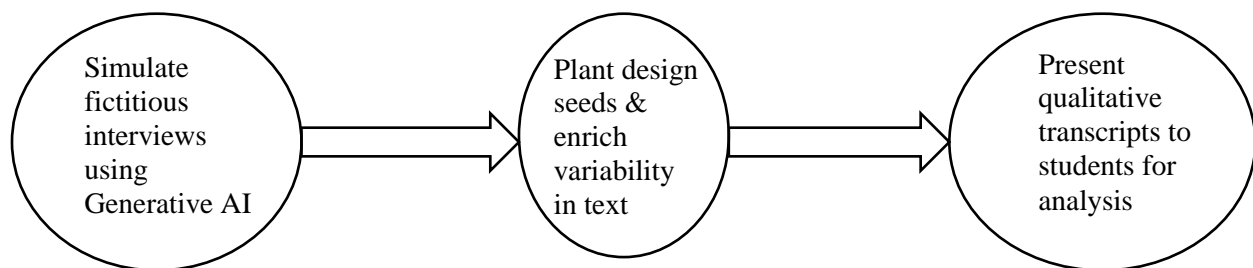


Figure 1: Harnessing AI to Generate Qualitative Data with Human Creativity to Plant Design Seeds

Discussion

This study presents the use of generative AI to create simulated qualitative interview data or transcripts for a HCD problem. The purpose was to provide training in qualitative methods to industrial engineering undergraduates. To achieve this objective, qualitative interview data were generated, design seeds were strategically embedded, and the resulting qualitative transcripts were presented to students as depicted in Figure 1. The process of generating qualitative interview data with generative AI involved three key steps: prompt design, contextual conditioning, and response generation.

We conducted the prompt design and contextual conditioning, while response generation was handled by ChatGPT 4.0. The process began with prompt design, which involves crafting detailed and specific instructions to guide the AI's output. This step included defining the interviewee's emotional state (e.g., "frustrated" or "intensely focused"), describing the physical environment (e.g., a private office workstation), and identifying workstation components to be evaluated, such as the chair, desk, and computer.

During the contextual conditioning step, we provided contextual information to shape the AI's understanding of the environment and the interviewee's mindset. This was achieved by including mood descriptors and specifying which elements to focus on, effectively priming the AI to simulate the interviewee's perspective. Additionally, this step involved setting the tone of responses to authentically express frustrations or sources of satisfaction while preparing the AI to deliver outputs that align with the defined variability in follow-up prompts.

Then, generative AI produced responses by executing the instructions provided by the research team. It synthesized the given context to produce detailed, realistic, and contextually relevant interview notes, adhering to the specified emotional tone and workstation components. The AI evaluated both positive and negative aspects implied by the interviewee's mood and strictly followed structural guidelines, such as omitting designated sections. When presented with follow-up prompts, the AI adapted by generating new, non-repetitive responses, ensuring a diverse and dynamic set of outputs. This division of responsibilities leveraged the researchers' expertise in problem framing and contextualization while utilizing the AI's efficiency and capacity for high-quality content generation.

The human-AI collaboration was evident in the seamless delivery of outputs aligned with the research objectives. The final prompts and ChatGPT responses, as shown in Tables 1 and 2, were used to create ten (10) qualitative interview datasets with four interview questions and conclusions. Based on our objective, we removed the third and fourth questions, as well as the conclusion. The selected questions were used to further develop and expand upon the initial ChatGPT responses presented in Tables 1 and 2, culminating in the final response shown in Table 3. ChatGPT was instructed to generate responses to the two questions associated with the prompts in Tables 1 and 2 in an alternating order: 1, 3, 5, 7, 9 for the first prompt, and 2, 4, 6, 8, 10 for the second prompt in the final outcome.

These ten datasets represent interviews from 10 participants, each responding to two interview questions formulated by ChatGPT, as presented in Table 3 for the first participant: *Can you share what you find positive about your workstation?* and *What specific aspects of your*

workstation contribute to your frustration? Then, the research team cleaned and strategically introduced variability by embedding design seeds shown in Table 4 into the qualitative transcripts developed using ChatGPT. These design seeds for the first interview transcript are highlighted in Table 3. Additional design seeds appear in the other interview transcripts. Similar design seeds were worded in different ways, but conveyed the same concept to create recurrent design suggestions across participant transcripts, potentially discoverable by students reviewing them for the workstation design problem. Designing and cleaning the prompt took about 2 to 3 hours; the process of "cleaning up" the ten ChatGPT transcripts took about 12 hours. Although this process worked relatively well, there were certain limitations with using ChatGPT for generating the fictitious interview transcripts. When asked to produce additional interview transcripts using different answers to the same prompt, some similarities between the generated transcripts required a research team member to edit them to appear more distinct. Further, text that seemed nonsensical occasionally appeared in a raw ChatGPT transcript, requiring a research team member to carefully review the text and remove or reword such occurrences. However, overall, the benefits of leveraging ChatGPT to help produce the interview transcripts, including substantial time savings, far outweighed the added effort of a research team member to review the text for such anomalies.

After finalizing the fictitious interview transcripts, they were provided to 28 students enrolled in the work design course as part of a workstation design problem, along with other relevant materials, such as quantitative anthropometric data relevant to workstation design. We are currently evaluating student responses from the Fall 2024 cohort to score their quantitative analysis (application of engineering anthropometry) and to determine if the **design seeds (presented in Table 4)** embedded in the qualitative interview transcripts by the research team were picked and implemented in the workstation design. This is done based on a three-level scoring system: level 0 if the seed is absent or not considered at all, level 1 if it is minimally considered but not fully developed or justified, and level 2 if it is adequately considered with a reasonable justification. Also, there is an extra point when students used design seeds planted by ChatGPT in the qualitative transcripts in the workstation design. This scoring system allows us to assess how effectively students identified and analyzed the embedded themes within the AI-generated transcripts. To determine how useful these transcripts were for students, we are evaluating whether they were able to recognize all the design seeds implemented in the workstation-related interview responses. Since our focus was to present qualitative data to students irrespective of the source, we did not inform them that the transcripts were generated using ChatGPT. This approach ensured that students engaged with the data without bias, allowing us to evaluate their qualitative analysis skills based on content rather than their perceptions of AI-generated qualitative transcripts.

To date we have analyzed fifteen (15) of the student submissions from the Fall 2024 cohort. Our preliminary analysis of the initial fifteen (15) design submissions shows that these students were partially successful in identifying the recurring design seeds that were planted across several of the interview transcripts. Also, we found that some students were able to pick design seeds generated by ChatGPT presented in Table 5. Based on our three-level scoring system described above, a total of 12 points is possible for the research-team planted design seeds (6 design seeds x 2 points each), as well as an additional point each time the student used the design seed planted by ChatGPT in the qualitative data to inform the workstation design. The maximum possible points each student can earn is 16 points. The fifteen (15) students averaged a score of 6.53 out

of a possible 16 points for identifying these design seeds and incorporating them into their designs with justification, despite having received no instruction on how to systematically analyze qualitative interview transcripts. We expect the Fall 2025 cohort, after receiving instruction on analysis of qualitative interview transcripts, to score higher.

Table 1: First Prompt and ChatGPT Response

<p>“Write 500-word interview notes with a person sitting at workstation in a private office who seems frustrated with ability to concentrate, with that person answering questions about what is good and bad about their workstation, including the chair, desk, computer, and other workstation components.”</p>
<p>ChatGPT Response:</p> <p>The interviewee is seated at a computer workstation in a large, open-plan office. They appear visibly frustrated, often rubbing their temples and sighing heavily. When asked about their work environment, they immediately express difficulty in concentrating due to the constant noise and distractions. Conversations, phone calls, and the general buzz of activity make it hard to focus on complex tasks. They appreciate the natural light from the large windows but mention that the glare on their screen is sometimes bothersome. The adjustable chair is comfortable, but the desk is cluttered, adding to their sense of disorganization. They express frustration with the lack of privacy, noting that they feel self-conscious about being watched and overheard, which adds to their stress.</p> <p>On the positive side, they appreciate the easy access to colleagues for quick questions and collaboration. However, they wish there were more private spaces for focused work. They suggest that noise-canceling options, better desk organization, and designated quiet zones could significantly improve their productivity and well-being. Overall, the interviewee feels that while the environment is conducive to collaboration, it is not supportive of tasks requiring deep concentration.</p>

Table 2: Second Prompt and ChatGPT Response

<p>“Write 500-word interview notes with a person sitting at workstation in a private office who seems intensely focused, with that person answering questions about what is good and bad about their workstation, including the chair, desk, computer, and other workstation components.”</p>
<p>ChatGPT Response:</p> <p>The interviewee describes their working environment as mostly conducive to productivity. They appreciate the quietness of the private office, which allows them to focus without distractions. The ergonomic design of their workstation, including an adjustable chair and monitor, is praised for reducing physical discomfort during long periods of work. They also value the natural light from a nearby window, which they feel positively impacts their mood and energy levels.</p> <p>However, the interviewee points out some areas for improvement. They express concern about the air quality and temperature control in the office, mentioning that the air often feels stale and the room can become too warm, especially in the afternoons. This affects their comfort and concentration. Additionally, they mention that while they appreciate the quiet, the isolation can sometimes feel stifling, leading to a lack of spontaneous interaction with colleagues. They suggest more opportunities for social engagement and collaborative spaces as a potential enhancement.</p> <p>Overall, the interviewee seems satisfied with their environment but highlights the need for better air circulation and opportunities for occasional social interaction.</p>

Table 3: Interview Notes for Participant 1

Setting and Initial Observations:
The interviewee is seated at their workstation within a private office. The room is moderately furnished with a desk, chair, computer, and various office supplies. They appear slightly agitated, frequently shifting in their chair and rubbing their temples, indicating some level of frustration. Their body language suggests discomfort or dissatisfaction with their current working conditions.
Question 1: Can you share what you find positive about your workstation?
The interviewee starts by highlighting a few positives. They appreciate the size of the desk, noting that it provides ample space for their computer, documents, and other work materials. The desk also has a few drawers, which they find useful for storing items they don't need on hand all the time, helping to keep the surface relatively uncluttered. The computer is another component they mention positively. It's fast and reliable, which is crucial for their work. They appreciate the large monitor, which makes it easier to manage multiple tasks at once. Additionally, they note that the computer is set up ergonomically, with the monitor at eye level, which helps reduce neck strain. In addition, the interviewee likes having a cold water bottle within reach.
Question 2: What specific aspects of your workstation contribute to your frustration?
When discussing the negatives, the interviewee's frustration becomes more evident. The first issue they bring up is the chair. They describe it as uncomfortable, particularly during long periods of sitting. They mention that the chair lacks adequate lumbar support and doesn't adjust well to their height, leading to back pain and discomfort after only a few hours of work. Despite attempts to adjust it, they have not found a position that feels truly comfortable. Next, they discuss the desk, specifically its height. While they appreciate the desk's size, they find the height to be less than ideal. It's too low for them, which causes them to hunch over slightly when typing or writing. This posture exacerbates their discomfort, particularly in their shoulders and upper back. They express a desire for a height-adjustable desk that would allow them to work in a more natural position. In addition, they note that there does not seem to be enough electrical outlets and some of the ones that are available are not easily accessed. That is, they need to crouch down underneath the desk to plug something in. The interviewee also touches on the placement of some of their workstation items. Some of the items that the interviewee uses frequently are too far apart, which forces them to stretch uncomfortably to reach them. This awkward positioning has led to strain in their wrists and forearms. Finally, condensation on the desk can be a problem sometimes.

Note. The highlighted parts of Table 3 are design seeds planted by the research team.

Table 4: Discoverable Design Seeds from the Qualitative Interview Transcripts

Tier	Design Seed	Example	Recurrence across transcripts
Explicit	Fan placement	<i>...sometimes the fan will blow their papers off the desk and they find themselves having to use paper weights and move loose papers out of range of the fan's air flow.</i>	6
Explicit	Account for condensation	<i>The warm temperature also seems to produce some condensation on the desk, perhaps their relatively cold water bottle.</i>	6
Implicit	Lumbar support	<i>The chair lacks sufficient lumbar support, causing lower back pain after a few hours of sitting.</i>	7
Implicit	Dual monitors	<i>...the desk has enough room for their dual-monitor setup, which they say is the one thing that keeps their productivity up.</i>	7
External	Adequate electrical outlets	<i>They state that the desk also has more than enough electrical outlets that are integrated in the desk itself and easy to access.</i>	6
External	Stool or footrest	<i>They also mention a stool for their feet would be useful for their relatively short legs.</i>	6

Table 5: Chat GPT generated design seeds

Tier	Design Seed	Example	Recurrence across transcripts
External	Lamp for controlled lighting	<i>They also have a desk lamp that allows them to control lighting intensity depending on the time of day or the type of work they're doing.</i>	3
Implicit	Need for temperature control	<i>Lastly, they note that the office temperature tends to fluctuate, particularly in the afternoon. While they generally prefer a cooler environment, the inconsistent temperature occasionally distracts them from their work.</i>	3
Implicit	Adequate chair cushioning	<i>The seat cushion is worn out, making it difficult to sit comfortably for extended periods.</i>	5
Implicit	Drawers for storing important items	<i>The desk also has several drawers, which they find useful for organizing materials, helping to keep the workspace relatively uncluttered.</i>	6

Conclusion

This study demonstrates the innovative use of generative AI, specifically ChatGPT 4.0, to create simulated qualitative interview data to support qualitative training for industrial engineering undergraduates. While previous studies have employed generative AI to analyze qualitative data, transcribe interviews, respond to qualitative interview questions, or identify patterns and recurrent themes, our study takes a novel approach by using generative AI to create fictitious qualitative data. This data was further enhanced with strategically embedded design seeds and presented to students for analysis, bypassing the need for students to directly interact with AI when addressing HCD design problem.

The process involved a structured methodology of prompt design, contextual conditioning, and response generation, enabling the creation of ten (10) realistic and contextually rich interview transcripts. The research team successfully enriched the generated ten qualitative interview transcripts with design seeds to reflect real-world data. These transcripts were utilized by twenty eight (28) students in a work design course to identify themes and user needs to address a workstation design problem, demonstrating the viability of using AI-generated data as a pedagogical tool. Analysis of the submissions so far reveals a potential limitation of students to apply qualitative data to inform their design, necessitating the need for qualitative training. Future work will involve equipping Fall 2025 cohort will qualitative training and compare the outcome with Fall 2024 cohort.

The collaborative efforts of the research team and generative AI exemplify the value of human-AI teaming, showcasing how AI can be effectively leveraged to introduce variability in the

generated content. This initiative serves as a way of integrating generative AI into engineering education, providing students with a richer, multidimensional learning experience. Moreover, the study reveals how generative AI can be utilized to support the teaching of qualitative methods, equipping future engineers with qualitative skills that in addition to quantitative approaches holds exciting possibilities to solve human-centered designs. Finally, interdisciplinary collaboration between AI researchers, educators, and industry professionals can drive innovation and create new opportunities for integrating AI into industrial engineering education.

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Appendix: Human-centered Design (HCD) Problem

Human-centered Design (HCD) Problem – Workstation Design

Workstation Design: You have been asked to design the workstations that will be constructed in each faculty and staff private office for a brand-new Industrial Engineering building at the university. Each private office will have a window. This is a workstation meant for a sitting individual while working with a desktop computer. There are about the same number of male and females that will be using these workstations. There is no strict budget limit for this design problem, but you should aim make it cost effective when considering your design decisions. Account for the relevant anthropometric dimensions for your workstation design and any other human-centered design (HCD) considerations to produce a high-quality workstation design. Available for informing your design are handouts that include:

- anthropometric data tables
- detailed transcripts of end-user interviews and observations of workstations in use

The workstation, at a minimum, should account for:

- University assigned desktop computer and monitor(s),
 - placement of the computer tower / central processing unit (CPU)
 - the height of the center of the monitor(s) in relation to eye level
 - placement of the monitor(s) to reduce likelihood of glare from the window on the screen
- Chair
- Desk dimensions
- Placement and arrangement of the following items:
 - Keyboard and mouse for the university assigned desktop computer
 - Printed course materials and textbooks
 - Research folders and documents
 - Personal items (smart phone, charger)
 - Personal laptop
 - Fan
 - Water bottle

The workstation may also include other items or elements that you decide are important to include.

Consider component arrangement principles (e.g., frequency of use, importance, functional grouping). The desk may be designed as you wish (any shape, with storage, etc.). You can make any assumptions you wish for this design problem, as long as you justify your assumptions. You may use any computer programs you wish to work on this problem (e.g., OneNote). You can even use paper, but you will need to take a picture of your work in order to submit it through Blackboard.

Deliverables consisting of two main products detailed below: (1) schematic, and (2) justification.

1. A complete schematic diagram or drawing with dimensions for the desk, chair, computer components, and placement of all other workstation items. The diagram does not need to

be drawn precisely. However, it should be clearly labelled with relevant dimensions. You must use engineering anthropometric data and any other human-centered design (HCD) considerations to show how the workstation is designed to accommodate the person using it.

2. A summary **and justification** of each of your decisions, including:
 - Anthropometric dimensions used to inform your design
 - Any other human-centered design (HCD) considerations used to inform your design
 - Placement and arrangement of workstation items
 - Why certain items or elements or positions are included for your workstation design
- You will upload your completed deliverables to Blackboard.