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Applying Stimulated Recall Interviewing to Understand How Engineering College Students with Attention-Deficit/Hyperactivity Disorder Use GenAI for Course-Related Learning Activities

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Abstract

This research methods paper describes the application of stimulated recall (SR) interviewing to examine how engineering undergraduates with Attention-Deficit/Hyperactivity Disorder (ADHD) interact with generative artificial intelligence (GenAI) during course-related learning. Although GenAI is widely used in higher education, less is known about how engineering students, particularly those with ADHD, engage with GenAI in authentic coursework contexts, limiting evidence-based guidance and instructional support. Across two academic semesters at a research-intensive university, this study uses SR interviewing to elicit participants' lived experiences of GenAI use without interrupting ongoing coursework. SR interviews draw on participant-provided stimuli (e.g., student-GenAI dialogue logs and structured post-activity reflections) to reconstruct learning experiences proximal to specific learning activities. Recognizing ADHD-related variability in executive functioning (e.g., attention regulation), data-collection procedures were designed to reduce cognitive load and participation barriers while maintaining authentic coursework contexts. The paper explains the rationale for SR interviewing and outlines the study workflow, including the intake survey, initial interviews, and SR interviews. By sharing methodological insights (e.g., strengths and challenges) on implementing this approach, this paper offers methodological guidance for researchers examining learning processes involving GenAI, particularly among students with ADHD.

Keywords

Engineering undergraduates, ADHD, GenAI, stimulated recall interviewing, coursework

Introduction

Using generative artificial intelligence (GenAI) in higher education has become increasingly common as students, faculty, and staff adopt these tools in a wide range of contexts, creating both opportunities and challenges that continue to fuel debate worldwide [1]-[3]. Some studies suggest that GenAI can support personalized learning for students [1], [4]-[5], while others raise concerns, such as students' overreliance on GenAI, ethical use, and responsible GenAI integration in pedagogy [2], [6]-[8].

These challenges partly reflect a gap between the rapid, largely unregulated adoption of GenAI in higher education and the development of comprehensive policies and guidelines. This gap underscores the need to understand how and why college students engage with GenAI in their learning, as such insights can inform policies that optimize GenAI's benefits while mitigating risks [4], [10].

Although some studies have investigated why students adopt GenAI (e.g., [11], [12]), fewer studies focus on how using GenAI shapes students' actual course-related learning processes over time (e.g., [13], [14]). This limited understanding hinders the development of evidence-based policies for effective and ethical GenAI use in higher education. Addressing this gap is important for determining whether GenAI enhances learning rather than replacing essential cognitive and metacognitive processes. In addition, existing literature on college students' GenAI use has relied primarily on cross-sectional questionnaire-based surveys and semi-

structured interviews, with relatively little use of longitudinal or process-oriented qualitative and quantitative methods [10], [15]-[18].

This study

This study examines how students' interactions with GenAI shape their learning experiences across affective, behavioral, and cognitive dimensions over the course of an academic semester, with a particular focus on engineering students with Attention-Deficit/Hyperactivity Disorder (ADHD). ADHD is a persistent neurodevelopmental condition characterized by inattention and/or hyperactivity-impulsivity, which can influence students' learning experiences and academic outcomes [19], [20]. Engineering students with ADHD are often creative and willing to take intellectual risks, yet they frequently encounter academic challenges that hinder their success [21]. Despite these distinct learning experiences, this population remains under-researched, and little is known about how engineering students with ADHD engage with GenAI in course-related learning contexts.

This research applies stimulated recall (SR) interviews to examine students' learning processes during course-related learning activities (i.e., coursework in this paper) that involve GenAI. It describes the research design used to explore how engineering undergraduates with ADHD use GenAI in their course-related learning activities and reflects on methodological insights gained during data collection. In addition to SR interviews, the study draws on intake survey data and initial interviews to provide context on participants' prior GenAI use and learning experiences. Across data-collection stages, procedures were intentionally structured to accommodate ADHD-related variability in attention, energy, and executive functioning while minimizing disruption to participants' coursework.

This study contributes to scholarship on GenAI in higher education by centering the experiences of engineering undergraduates with ADHD, an underexamined population in current research, and by demonstrating the value of a process-oriented qualitative approach for studying learning activities involving GenAI over time. By detailing key design decisions, implementation practices, and trade-offs in SR interviewing, this methods-focused conference paper provides methodological guidance for researchers and advances ongoing conversations about how to study GenAI use in engineering education and higher education more broadly. The insights also have practical value for educators, instructors, and administrators developing evidence-informed strategies to support engineering students with ADHD in leveraging GenAI effectively as a learning resource.

Methods

Why choose stimulated recall interviewing for this study?

Regarding students' learning experiences and processes, this study focuses on student engagement because enhancing engagement is a primary goal of teaching, a key indicator of instructional effectiveness, and strongly associated with learning outcomes [22]-[24]. Student engagement is a multidimensional construct [23], [25], defined here as the intensity of students' affective, behavioral, and cognitive involvement in course-related learning activities [26]. Guided by the Interactive-Constructive-Active-Passive (ICAP) framework [22], this study foregrounds behavioral and cognitive engagement in course-related learning activities and also attends to affective engagement [23], given that some students with ADHD may experience comorbid conditions (e.g., anxiety disorders) that can shape learning experiences. Examining these three dimensions enables a more comprehensive understanding of students'

learning experiences and supports deeper insight into their knowledge acquisition and skill development.

This study employs SR interviewing, using student-GenAI dialogue logs as stimulus materials, to elicit participants' lived experiences of using GenAI for course-related learning activities. SR interviewing typically involves two phases: (1) revisiting stimuli generated before the interview and (2) prompting participants to recall their thoughts and feelings at those moments [27], [28]. This approach helps capture participants' cognitive and affective processes while reducing cognitive load, especially when the stimuli are closely aligned with the original learning activity [28]-[30].

SR interviewing has long been used in educational research, including in studies of GenAI in higher education. For example, [31] used mixed methods, including SR interviews and surveys, to explore behavioral, cognitive, and affective engagement with ChatGPT among six STEM graduate students revising academic research proposals during a writing workshop focused on ChatGPT use. The authors first asked participants to screen record their computer interactions with ChatGPT to capture behavioral engagement and then conducted SR interviews to explore participants' cognitive and affective engagement using the recordings as stimuli [31]. During these interviews, each participant reviewed their screen recordings and answered a series of questions about their thoughts and feelings, followed by a semi-structured interview probing more deeply into their reactions to and attitudes toward ChatGPT's feedback. Participants also completed follow-up surveys three weeks after using ChatGPT for their writing tasks in the workshop [31].

While other approaches, such as cognitive think-aloud protocols, can provide valuable real-time insights into learners' cognitive processes and decision-making [32], they also present notable challenges. These include participant discomfort, difficulty verbalizing automatic or complex thought processes, and potential interference with task performance [33]. Such challenges can be pronounced for some individuals with ADHD, who often experience differences in executive functioning (e.g., working memory and verbal encoding), making concurrent verbalization methods particularly taxing [34]-[35].

In engineering and broader STEM education, other process-oriented methods include experience sampling (e.g., [36]), trace data (e.g., [37]), and multimodal learning analytics (e.g., [38], [39]). This study selected SR interviewing, using participant-provided GenAI dialogue logs as stimuli, because it offers a low-interference way to elicit authentic, course-based GenAI use while eliciting learners' behaviors, thoughts, and affective experiences. Although experience sampling methodology provides high temporal resolution through intensive in-situ assessments [40], [41], it requires repeated prompts during ongoing activities, which may increase burden or disrupt learning. Trace data and learning analytics approaches can unobtrusively capture behavioral patterns at scale [42], but they often depend on substantial technical infrastructure and institutionally controlled systems [43]. Moreover, digital trace data alone may be insufficient to understand learners' cognitive and affective processes without complementary qualitative or multimodal approaches [42], [44].

Given this study's exploratory aim, emphasis on in-depth understanding, and resource constraints, SR interviewing offers a practical compromise. It preserves real-world course contexts, supports process-level interpretation, and may be especially appropriate for students with ADHD because it separates engagement in the learning activity from later verbal recall and reflection on that activity. This structure may reduce disruption during learning while still supporting recall and reflection afterward. Consistent with evidence that long-term

memory difficulties in adults with ADHD are more strongly linked to encoding than retrieval, recognition-based cues such as dialogue logs may further support recall [35]. Thus, SR interviewing may be well-suited to documenting how students with ADHD engage with GenAI in authentic coursework and to identifying emergent patterns without requiring continuous data capture across all learning activities.

A common concern with SR interviews is that participants may inaccurately describe their experiences because of the time gap between engaging in the learning activity and participating in the interview. However, previous research suggests that conducting SR interviews within 48 hours of the learning experience helps minimize memory bias and supports accurate recall [31], [45]. To address this issue, this study uses two strategies: (1) inviting participants to respond to brief prompts immediately after completing the learning activity and (2) conducting the SR interview within 48 hours of their stimuli collection submission through Google Form.

How stimulated recall interviewing unfolds in this study

After drafting the consent form and study protocols and obtaining IRB approval (HUM00262776), I invited two engineering undergraduates with ADHD (see Appendix 1 for demographic information) to pilot these protocols and the data collection procedure. We discussed the design rationale, the wording of each question, the overall length, and whether the protocols adequately captured affective, behavioral, and cognitive engagement during interactions with GenAI.

Data collection spanned two academic semesters (August 2025-April 2026), with each semester comprising four stages (see Figure 1): (1) recruitment, electronic consent, and the intake survey; (2) participant selection; (3) initial interviews; and (4) SR interviews. Stages 1-3 were completed, and SR interviews are ongoing. Participants received $20 for the initial interview, $40 for each SR round (up to three rounds; $120 maximum for SR rounds), and a $10 bonus for completing all three SR rounds. Compensation was provided as digital gift cards emailed directly to participants. The following subsections describe each stage.

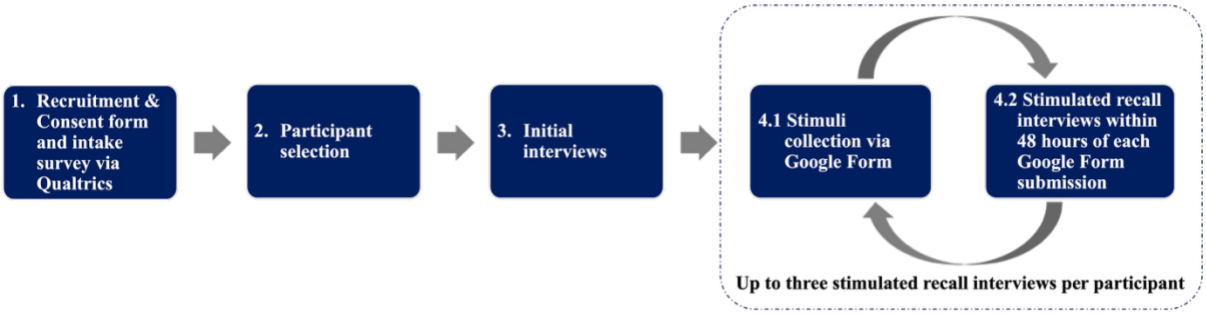

Figure 1. Data collection overview

Recruitment and consent form and intake survey

I recruited engineering undergraduates with a clinical ADHD diagnosis at a research-intensive university through email outreach to engineering departments, student organizations, and campus centers, as well as physical flyers posted on campus. Eligible participants were engineering undergraduates aged 18 or older who were not expected to graduate before May 2026 and who reported using GenAI tools for course-related learning activities (e.g., homework assignments and exam preparation).

Participants accessed a Qualtrics form through a direct link in recruitment emails or a QR code on recruitment flyers. The form included both the consent form and the intake survey. Only participants who electronically signed the consent form could proceed to the intake survey, which took less than 10 minutes to complete. After submitting the survey, Qualtrics automatically emailed participants a copy of the signed consent form and their survey responses for their records.

The intake survey (Appendix 2) included four parts: (1) demographic and academic information (e.g., gender identity, race/ethnicity, discipline, year in college, and cumulative GPA); (2) ADHD-related information, including diagnosis status and perceived influence of ADHD on academic work and relationships; (3) GenAI experience and use, including tools used, frequency of use, learning activities involving GenAI, motivation for using GenAI (adapted from [10], [12], [15], [46]), and a GenAI addiction/reliance instrument adapted from [47]; and (4) willingness to participate in the study.

A total of 67 participants self-reported a clinical ADHD diagnosis, met the inclusion criteria, and completed the intake survey (Table 1). Participants came from all engineering programs offered at the university, including computer science engineering (n = 13; 19.4%) and mechanical engineering (n = 12; 17.9%). The sample was majority female (n = 38; 56.7%), included many fourth-year students (n = 24; 35.8%), and most reported a cumulative GPA of 3.20 or higher (n = 40; 59.7%). Regarding ADHD, participants primarily reported Combined (n = 31; 46.3%) and Inattentive (n = 30; 44.8%) presentations, with Hyperactive-Impulsive reported less frequently (n = 5; 7.5%).

Table 1. Participant self-identified characteristics (N = 67)

	Number (*n*)	**Percent**
Gender identity		
Man	27	40.3%
Woman	38	56.7%
Other	2	3.0%
Race		
American Indian or Alaska Native	0	0.0%
Asian	22	32.8%
Black or African American	4	6.0%
Hispanic or Latino	5	7.5%
Native Hawaiian or Other Pacific Islander	0	0.0%
White	28	41.8%
Two and more	6	9.0%
Other (Lebanese; White & Middle Eastern)	2	3.0%
International Student		
No	61	91.0%
Yes	6	9.0%
Year in college		
First year	14	20.9%
Second year	9	13.4%
Third year	17	25.4%

Fourth year	24	35.8%
Fifth year and higher	3	4.5%
Cumulative GPA		
3.60 or higher	21	31.3%
3.20-3.59	19	28.4%
2.80-3.19	13	19.4%
Below 2.80	5	7.5%
Prefer not to say	9	13.4%
How would you characterize your overall courseload for this semester?		
Very light	0	0.0%
Light	4	6.0%
Moderate	25	37.3%
Heavy	31	46.3%
Very heavy	7	10.4%
ADHD type diagnosed		
Combined	31	46.3%
Hyperactive-impulsive	5	7.5%
Inattentive	30	44.8%
Not applicable	1	1.5%

Participant selection

I selected participants for initial interviews from the broader pool (N = 67) using maximum variation sampling [48]. The main considerations in participant selection were ADHD types, GenAI use experience, and demographic characteristics (e.g., gender, race, engineering discipline, year in college, and cumulative GPA). I invited 35 participants to the initial interview.

Initial interviews

In the initial interview (approximately 45 minutes; see Appendix 3 for the protocol), I introduced the study purpose and procedures and built rapport. I then invited participants to discuss their ADHD experiences and to map their current courses and upcoming course-related learning activities where they might use GenAI (e.g., homework assignment deadlines and exam dates). I also collected contextual information about course structures, instructional practices, and course-level GenAI policies. In total, 25 participants participated in the initial interview.

Stimulated recall interviews

Each SR interview includes two steps: (1) stimuli collection via Google Form (approximately 15 minutes) and (2) a follow-up interview conducted within 48 hours (approximately 60 minutes). The Google Form collects stimuli, such as student-GenAI dialogue logs, and near-real-time information about participants' interactions with GenAI during specific learning activities, including the prompts they entered and GenAI's responses. Participants complete one Google Form per learning activity (e.g., a weekly homework assignment or a course project). Participants are provided a sample of the Google Form before deciding whether to participate in SR interviews.

The Google Form includes three parts: (1) participant information like name and email address; (2) reflection on the usage of GenAI for a specific learning activity; and (3) availability for the within-48-hour interview. The reflection section includes multiple-choice items because some college students with ADHD may find it challenging to write extended responses [49], [50], and pilot participants preferred multiple-choice prompts to fully open-ended prompts. These items ask participants to evaluate GenAI responses [51] and perceived competence, report benefits and challenges of using GenAI [13], [52], and rate their interest and feelings in using GenAI, aligning with affective engagement [13], [53].

At the beginning of each follow-up interview, the participant and the interviewer review the collected stimuli, including student-GenAI dialogue logs and responses to the Google Form items. I then guide the participant to recall thoughts (cognitive engagement) and feelings (affective engagement) during the learning activity and to describe their actions (behavioral engagement) during that activity, including how they used GenAI and what actions they took in response. This process supports participants in re-engaging with the prior learning activity and articulating their cognitive and affective experiences during GenAI use. Participants also discuss how course context (e.g., instructional practices and course-level GenAI policies) relates to their GenAI use. Each month, I email participants reminders to encourage them to complete up to three SR interviews to share their experiences using GenAI across different learning activities.

To date, 16 participants have completed at least one SR interview and have shared 28 learning activities. These activities include completing homework assignments (10), preparing for exams (9), completing a course project (8; 3 individual projects and 5 group projects), and taking lecture notes (1).

Reflection on using stimulated recall interviewing

This study provides an opportunity to reflect on the use of SR interviewing as a methodological approach for understanding learning processes involving GenAI in authentic course contexts, particularly for students with ADHD. Either at the end of SR interviews or in brief follow-up questions after the interview, I invited six participants who had completed at least one SR interview to provide feedback on the data collection methods, such as "*How did you feel about the process of submitting a Google form, followed by an interview? Is there anything you can think of that can improve the collection of the data?"* Participants described the approach as effective and minimally intrusive. In the subsections below, I summarize key strengths, drawing on these reflections, and describe the challenges encountered during implementation. All participant names below are pseudonyms (see Appendix Table 1).

Strengths

One key strength of SR interviewing in this study is its ability to elicit participants' retrospective accounts of their thoughts, feelings, and actions during course-related learning activities involving GenAI. The use of stimuli, including student-GenAI dialogue logs and participants' responses to structured Google Form items, supports recall of specific moments of GenAI use. These cues help participants re-engage with prior cognitive and affective states and articulate their thought processes with reduced cognitive burden. One participant, Jessica, reflected, "*I think the process you are using effectively captures my thoughts, feelings, and actions while using GenAI. I am able to fully articulate what I am looking for from GenAI at each step with sufficient detail.*" Steven shared a similar opinion to Jessica. In practice, using student-GenAI dialogue logs as stimuli also reduced technical burden compared with approaches such as hours-long screen recordings because participants did not need to

generate, upload, or troubleshoot large files. Emma and Austin also noted this practical advantage.

SR interviewing allows participants to engage naturally with GenAI during learning activities and to reflect on those experiences retrospectively, without interrupting the learning process itself. Participant feedback further supports the appropriateness of this approach. One participant, Sam, shared that *"this current study method did not interfere at all with any of my lived experiences.*" This feedback highlights the non-intrusive nature of SR interviewing and suggests that the method preserves the authenticity of students' learning experiences while enabling the collection of rich data.

The timing of the interviews also emerges as a methodological strength. Conducting SR interviews within 48 hours of stimuli submission offers participants flexibility while remaining sufficiently proximal to the learning activity to support accurate recall. Regarding memory bias, Austin noted that *"as long as they record it within, like, 48 hours after they finish it, they still have a very good memory of what they did during this interaction.*" Participants also described the interview process as timely and supportive. This flexibility is particularly important for students with ADHD, whose schedules, energy levels, and cognitive capacity may fluctuate, and it supports participants' willingness to engage in multiple interview rounds.

Participants described the two-step workflow (i.e., immediate post-activity Google Form prompts followed by SR interviews) as balancing structure and flexibility to support focused recall and reflection. For example, Emma said the Google Form prompts supported in-the-moment reflection and created a record for later recall, while the interview enabled her to focus on the most meaningful parts of her experience instead of becoming overwhelmed by details. Josh similarly reflected, "*The Google Form prompted me to reflect on specific aspects of my experiences with GenAI, while the follow-up interview allowed me to expand on those responses and provide deeper context. Together, this approach captured not only my actions but also my thoughts and feelings while interacting with GenAI.*" Participants also valued the approach's balance of structure and flexibility. As Steven reported, "*I can see it being effective for other students for ADHD as it provides structure in the beginning and becomes more open ended and allows for more tangents from the interviewee,*" which can help participants make sense of their experiences while still providing scaffolding for recall.

Initial interviews further strengthen the study by providing an opportunity to build rapport and develop contextual understanding. These early conversations allow me to better understand participants' ADHD experiences, course contexts, anticipated GenAI use, and course-level GenAI policies, which in turn inform subsequent SR interviews and support a more open and reflective interview environment. In addition, the initial interviews provide an opportunity to introduce participants to the stimuli-collection Google Form and to discuss flexible scheduling of SR interviews based on participants' preferred times of day, accommodating variations in ADHD medication effectiveness and cognitive energy. This time-sensitive flexibility highlights the importance of aligning interview practices with the cognitive rhythms of students with ADHD rather than imposing uniform data-collection windows.

Challenges

Despite these strengths, several challenges remain in applying this research approach. From a researcher's perspective, SR interviewing is resource-intensive, particularly when a single

researcher is responsible for recruitment, scheduling, stimulus management, interviewing, and data tracking across multiple participants and time points. Maintaining detailed tables to monitor data collection stages is essential for managing this complexity and ensuring procedural consistency.

Beyond workload, collecting student-GenAI dialogue logs as stimuli also required additional IRB and data-governance considerations beyond those of an interview-only protocol. Because GenAI expectations are often set by instructors and departments, course-related GenAI policies varied across participants' courses. Accordingly, during initial interviews, participants described relevant course policies to contextualize their learning opportunities involving GenAI rather than to evaluate compliance. Stimuli collection (via Google Form) emphasized voluntariness and participant autonomy by allowing participants to self-select which course-related learning activity to share and by inviting them to submit the complete student-GenAI dialogue log generated during that activity rather than comprehensive logs across all courses. Participants were also asked to anonymize instructors and peers, who were excluded under the IRB protocol, when discussing course contexts.

However, this emphasis on voluntariness and participant autonomy introduces a limitation. Although participant autonomy supports ethical participation and comfort, it also means that the collected data may not fully represent all instances of GenAI use across participants' courses. Some learning activities involving GenAI may remain unreported because of concerns about course policies, academic integrity, or personal discretion. As a result, SR interviewing may elicit salient and shareable learning experiences rather than an exhaustive account of all GenAI use.

In addition, the study excluded students who reported ADHD-like characteristics without a formal clinical diagnosis because the study design did not include a validated ADHD screening measure. Therefore, eligibility was limited to participants who self-reported a prior ADHD diagnosis from a qualified health professional. This decision strengthened construct clarity and reduced the risk of misclassification, but it may have excluded students who face financial, logistical, or systemic barriers to obtaining formal evaluation. Future research could examine whether students with suspected (but undiagnosed) ADHD show similar or different GenAI-supported learning practices and engagement patterns as students with diagnosed ADHD.

Overall, these reflections indicate that SR interviewing is a powerful and adaptable method for examining learning processes involving GenAI, particularly among students with ADHD. At the same time, careful attention to researcher workload, data management, participant autonomy, and ethical boundaries is essential to maintaining methodological rigor and transparency throughout data collection.

Summary and future directions

This conference paper presents a methods-focused study examining how engineering undergraduates with ADHD engage with GenAI in course-related learning activities over time and suggests that the study's SR-interviewing-based data collection procedure can provide a more inclusive research approach. Addressing a gap in GenAI-in-higher-education research, particularly the limited use of process-oriented methods over time, the study applies SR interviewing to elicit participants' affective, behavioral, and cognitive engagement without interrupting authentic learning experiences. Drawing on student-GenAI dialogue logs, structured reflection prompts, intake surveys, and repeated interviews conducted over

one academic semester per participant, the paper demonstrates how SR interviewing can be adapted to study learning processes involving GenAI among students with ADHD. It contributes methodologically by outlining design considerations, strengths, and limitations of SR interviewing in this context and offers practical insights for researchers and educators seeking to understand and support ethical, effective GenAI use in engineering higher education. More broadly, the paper highlights neurodivergence as an important research-design consideration that can shape both participation and the interpretation of learning involving GenAI in authentic settings.

As a next step, the study will apply inductive thematic analysis within affective, behavioral, and cognitive engagement dimensions to identify patterns in how engineering undergraduates with ADHD use GenAI for course-related learning activities. The methodological takeaways are intended to be transferable and may inform similar studies at other institutions, as well as future discussions of multi-institutional designs. In larger or multi-institutional projects, SR interviewing could serve as an intensive qualitative component alongside scalable measures such as surveys or platform trace data. Future work could also extend SR interviewing to a comparative exploratory design within a single institution, including students with and without ADHD, to generate process-level hypotheses about course-related learning involving GenAI. These hypotheses could then be examined in larger-scale explanatory or confirmatory studies using more scalable methods. Across institutions, SR studies using harmonized protocols could enable comparisons of shared and context-dependent patterns, further informing subsequent explanatory or confirmatory research.

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GenAI uses disclosure

The author used ChatGPT ([54], [55]) and Grammarly [56] solely for language polishing and grammatical enhancements. All research content, data, and summaries included in this paper are the author's original work.

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Appendix 1.

Table A1. Participant demographic information

Pseudonym	Gender	Race	Engineering Discipline	Year in Program	Cumulative GPA	Semester Course Load	International Student	Age at ADHD Diagnosis	ADHD type	Length of GenAI Use	Paid GenAI Subscription
Ally	Woman	Asian	Electrical engineering	Fourth	2.80-3.19	Heavy	Yes	18 or older	Inattentive	Less than 2 years	No
Austin	Man	Asian	Computer engineering	Third	3.60 or higher	Moderate	Yes	7-12 years old	Combined	Less than 2 years	Yes
Emma	Woman	Hispanic or Latino	Nuclear engineering & Radiological sciences	Second	3.20-3.59	Heavy	No	13-17 years old	Combined	Less than 2 years	No
Jassica	Other: Non-binary/ genderfluid	White	Computer engineering	Third	3.60 or higher	Heavy	No	7-12 years old	Combined	Less than 8 months (2 semesters)	Yes
Josh	Man	Hispanic or Latino	Computer science engineering	Second	2.80-3.19	Heavy	No	18 or older	Inattentive	Less than 8 months (2 semesters)	Yes
Sam	Woman	Asian, Hispanic or Latino, White	Mechanical engineering	Fourth	3.20-3.59	Heavy	No	18 or older	Hyperactive -Impulsive	Less than 8 months (2 semesters)	No
Steven	Man	Black or African American, Hispanic or Latino, White	Robotics & Biomedical engineering	First	3.2-3.59	Heavy	Yes	7-12 years old	Combined	Less than 4 months (1 semester)	No
Winter	Man	White	Chemical engineering	Second	3.60 or higher	Heavy	No	7-12 years old	Combined	Less than 8 months (2 semesters)	No

Note: Ally and Winter tested the study protocols and data collection procedures. In Fall 2025, Austin, Emma, and Josh each participated in three SR interviews, while Sam participated in two. In Winter 2026, Jassica and Steven participated in one SR interview.

Appendix 2.

Intake Survey

Thank you for your consent. **Please complete the intake survey to help us assess your eligibility for this study.** Please note that completing this survey will not guarantee your participation in the subsequent research activities and your responses maybe used in related data analysis.

Kindly answer all questions to the best of your ability; **the survey should take less than 10 minutes**. After you submit the survey, you will automatically receive a copy of the consent and your responses.

Part 1: Basic information (Demographic and academic information)

1. What is your first name?
2. What is your last name?
3. Your email address. (used only for research-related purposes)
4. What is your gender?
    a. Man
    b. Woman
    c. Other:___
5. Your race? (Please select all that apply)
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. Native Hawaiian or Other Pacific Islander
    f. White
    g. Other:____
6. What is your major/program?
    a. Aerospace engineering
    b. Biomedical engineering
    c. Chemical engineering
    d. Civil engineering
    e. Climate & Meteorology
    f. Computer engineering
    g. Computer science
    h. Data science
    i. Electrical engineering
    j. Engineering physics
    k. Environmental engineering
    l. Industrial & operations engineering
    m. Materials science & engineering
    n. Mechanical engineering
    o. Naval architecture & marine engineering
    p. Nuclear engineering & radiological sciences
    q. Robotics
    r. Space science & engineering
    s. Other _____
7. What year are you in?
    a. First year
    b. Second year
    c. Third year
    d. Fourth year
    e. Fifth year or higher
8. What is your cumulative GPA?
    a. 3.6 or higher
    b. 3.2-3.59
    c. 2.8-3.19
    d. Below 2.8
    e. Prefer not to say
9. How many engineering courses do you enroll in this semester?

a. One
b. Two
c. Three
d. Four
e. Five or more

10. How would you characterize your overall courseload for this semester?
    a. Very light
    b. Light
    c. Moderate
    d. Heavy
    e. Very heavy
11. Do you work part-time?
    a. Yes
    b. No
12. Are you an international student?
    a. Yes
    b. No, I am a domestic student.

Part 2: ADHD diagnosis

1. Have you ever received a clinical ADHD diagnosis?
    a. Yes
    b. No
    c. No, but I think I have ADHD symptoms.
2. If applicable, at what age were you diagnosed with ADHD (Choose the closest range)?
    a. Up to and including 6 years old
    b. 7-12 years old
    c. 13-17 years old
    d. 18 or older
    e. Not applicable
3. What type(s) of ADHD have you been diagnosed with (or do you suspect you have)?
    a. Inattentive
    b. Hyperactive-impulsive
    c. Combined
    d. Not applicable

4. To what extent do you think having ADHD influence	Very Negatively	Negatively	No influence	Positively	Very Positively
4-1. Your academic work?					
4-2. Your relationships with peers?					
4-3. Your relationships with professors?					

Part 3: Experience of using Generative AI tools

1. Have you used generative AI tools to support your course-related learning (e.g., understanding concepts)?
    a. Yes
    b. No
2. Which generative AI tools have you used? (Select all that apply):
    a. OpenAI ChatGPT
    b. DeepSeek
    c. Google Bard/Gemini
    d. Claude
    e. UM-GPT
    f. Generative AI tools integrated by instructors in specific courses
    g. DALL-E, Midjourney, Stable Diffusion, or similar image-generation tools
    h. GitHub Copilot or similar coding assistants
    i. Grammarly, Quillbot, HyperWrite, Jasper.ai, or other writing enhancement tools
    j. Microsoft Copilot
    k. Other Generative AI-powered learning tools (e.g., Tutor AI, Quizlet, AFFiNE AI, XMind.ai)
    l. Other (please specify):_____
3. How do you agree with the following statements related to generative AI? (From strongly disagree to strongly agree):

How do you agree with the following statements related to generative AI tools ?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3-1. Using generative AI is common among my peers.					
3-2. My peers encourage my use of generative AI tools.					
3-3. Learning how to use generative AI tools is important for my future career.					
3-4. Generative AI can improve my overall academic performance.					
3-5. I feel left behind if I do not use generative AI tools.					
3-6. I can manipulate generative AI tools (e.g., through prompting or settings) to produce tailored responses for my needs.					
3-7. I think I am better at using generative AI than my peers.					
3-8. I believe I can effectively use generative AI to solve learning problems or assist others.					
3-9. I am confident in my ability to troubleshoot issues that arise when using generative AI.					

4. For what purposes did you use generative AI tools for course-related learning in the past two weeks? (Select all that apply):
    a. Understanding complex concepts
    b. Assisting with coding or programming (e.g., debugging)
    c. Supporting writing tasks (e.g., paraphrasing and improving grammar)
    d. Receiving step-by-step guidance for complex problems
    e. Assisting with teamwork or group project tasks
    f. Collecting feedback on assignments
    g. Preparing for exams
    h. Summarizing learning materials
    i. Finding or reviewing course-related information
    j. Other: _____
5. How long have you used generative AI tools to support your course-related learning?
    a. Less than 4 months (1 semester)
    b. Less than 8 months (2 semesters)
    c. Less than 1 year
    d. Less than 2 years
    e. More than 2 years
6. How frequently have you used generative AI tools for course learning activities in the past two weeks? (Please select the option that best describes your usage.)
    a. Daily (more than once per day)
    b. More than once every 2 days
    c. More than once every 3 days
    d. More than once every 5 days
    e. More than once every week/7days
    f. Once or less in the past two weeks
7. Do you personally pay for subscriptions to generative AI tools or services (e.g., ChatGPT Plus, Grammarly Premium) that you use for course-related work or activities?
    a. Yes
    b. No
8. How do you agree with the following statements related to generative AI?

How do you agree with the following statements related to generative AI?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8-1. I feel curious about course-related content when I use generative AI.					
8-2. I become fully immersed when using generative AI for course-related learning activities.					
8-3. I feel comfortable using generative AI for course-related learning because they do not judge me.					
8-4. I like using generative AI because I can ask any question without feeling embarrassed.					
8-5. My daily learning experience would feel less enjoyable without generative AI.					
8-6. Even when I am tired, using generative AI motivates me to engage in learning activities.					
8-7. Generative AI responses help me think in new ways.					

8-8. When I generate ideas or solutions, generative AI helps validate or refine them.					
8-9. Generative AI saves me time on coursework.					
8-10. Generative AI improves the quality of my coursework.					
8-11. Generative AI provides me with useful, personalized feedback and suggestions.					
8-12. Generative AI helps me understand course materials more easily.					
8-13. I am interested in learning how to use generative AI more effectively.					
8-14. I can use generative AI tools for course-related learning activities whenever I cannot access my instructors and GSIs.					
8-15. In the future, I would like to continue using generative AI for course-related learning.					
8-16. I often use generative AI longer than I originally planned, even when it disrupts other activities.					
8-17. I feel uneasy when I cannot use generative AI for a certain period.					
8-18. I become restless or irritable when I do not have access to generative AI for course-related learning.					
8-19. I feel like I am missing an important step if I do not consult generative AI while completing coursework.					

Part 4: Study Participation Interest

1. How likely are you to participate in this study (Data collection will occur from September 2025 to December 2025 (or January 2026 to April 2026), requiring less than 5 hours of total effort from you)?
    a. I am willing to submit stimuli collection Google forms and participate in the following interviews.
    b. I am willing to submit stimuli collection Google forms only.
    c. I am willing to participate in interviews only.
    d. I would like to know more about this study before deciding.
    e. I am not interested in this study

(End the survey)

Appendix 3.

Initial interview protocol

Part 1: Background [5 minutes]

[A gentle icebreaker: "How are you today?" & Talk anything fun to build rapport]

Thank you for participating in this study and attending this initial interview. This interview is part of a study to understand how engineering college students from diverse backgrounds interact with generative AI tools (e.g., ChatGPT). Your participation will greatly enhance teaching and learning in engineering higher education. In the intake survey, you mentioned having been diagnosed with ADHD at some point. Is that right? *(brief pause)*

To ensure consistency across our interviews, I will follow a script. This interview will last for approximately 45 minutes. Also, to recall the conversation, we will be recording today's interview. Do you have any questions about that? *[If not, enable the recording now.]*

(Activate recording)

Okay, thanks. I want to begin by letting you know that your participation in this interview is **voluntary,** and you may choose not to answer any of the questions. In addition, your participation will be **confidential** to everyone outside of our research team. We may use your comments for our research, but your specific comments will not be attributed to you by name. Do you have any concerns about that?

Thank you. To begin, please introduce yourself by sharing your name, preferred pronouns (if comfortable), college year, and program. Additionally, please randomly choose a pseudonym for confidentiality. For instance, *"I'm Xiaping Li, I use She/Her, I am a fourth-year PhD student in engineering education research. And, I choose Summer for my pseudonym."*

(allow the participant to identify themselves)

Thank you for doing that.

Part 2: General information on having ADHD & GenAI usage [10-15 minutes]

1. First, I guess you clearly understood the purpose of this research since you read and signed the consent form. I would like to ask whether you have any questions about this study regarding the research purposes, study activities, and lengths after completing the intake survey. You can find your responses to the intake survey in your email by searching "Qualtrics" and "ADHD."
   [Waiting for the participant to find it if they want.]

   [Based on the participant's response, I will decide whether to explain further this study regarding the research purposes, activities, and lengths.]

2. In your intake survey, you mentioned you were diagnosed with [Inattentive/hyperactivity/combined] when you were [in college/under six].

    a. Are there any ways you feel ADHD gives you strengths or unique perspectives? How does it influence you? In positive, negative, or both ways.
    b. According to existing research, individuals with ADHD often have other comorbid conditions. Do you have any, if you don't mind sharing?
    c. Are you currently using any accommodations or support services? If so, how do they assist you?
3. You also mentioned that having ADHD [Negatively/positively] influences your [academic work/relationships].
    a. Can you please elaborate on that?
    b. How do you think GenAI can influence the situation?
4. Thank you. Let's talk more about your experience of using GenAI. You have used it for more than ____. Can you please share how you use it generally?
    a. It seems like you have used different kinds of GenAI tools, such as [ChatGPT and Claude]. How do you think about these tools?
    b. It seems like your peers motivate you to use GenAI. Can you please share a bit more about that?
    c. It is said that GenAI can support students' personalized learning, such as for students with ADHD. How do you think about the statement?

Part 3: Experiences in current courses [25-30 minutes]

1. In the intake survey, you mentioned that you registered for ____ courses this semester. What are they? How many are the engineering courses?
2. Now, let's talk about them one by one. *[Using the Appendix table to jot down key information]* By the way, is it okay if I take some notes while you share?
3. *[Motivation]* Why did you enroll in the course ____? Could you talk more about what motivated you to enroll? For example, you were hoping to master the material or gain a deep understanding of the subject. You were worried about missing important content or not learning enough if you didn't take this course. You were aiming to achieve high grades or stand out academically, or you were trying to avoid falling behind others *[Based on the participant's sharing, I click the items below]*
    a. It is a program requirement.
    b. To gain/master knowledge and practical skills for a future career.
    c. Interest in the course content.
    d. The course is easier to earn higher grades than others.
    e. The teaching methods or instructors are effective.
    f. The class format or policies (e.g., online, flexible schedule).
    g. The coursework is easier compared to other options.
    h. To enroll with friends.
    i. The materials are affordable or easy to access.
    j. Other:_____
4. *[Self-efficacy]* What is your target GPA for this course, and how confident are you in achieving it?
    a. Do you have any prior skills or experience related to this course that might help you succeed?
    b. What challenges do you foresee in this course, and what helps you feel prepared to tackle them?
5. Thank you. Let's talk about the course content, class format, and policy (such as attendance, assignment deadlines, and exam format).

    a. What is the course content? Is it easy or difficult?
    b. Is attendance required? How many students are enrolled in the course? Whether each session is recorded?
    c. What are the course assignments? What are the schedules? How do you enjoy taking them?
6. Can you please describe what the instructor generally does during class?
7. What do you usually do during the class? Do you take any notes? Do you interact with peers or the instructor?
8. How do you enjoy this course, like the instructor's teaching, class environment, coursework, and so on?
9. Can you please talk about the instructors' attitudes toward students using GenAI? What are the course policies related to GenAI?
    a. Your intake survey indicated a [positive/negative] motivation about using GenAI [Part 3-Q3]. Do you think instructors' attitudes or the course policies related to GenAI influence your motivation to use GenAI? How?
    b. Your intake survey indicated a [positive/negative] self-efficacy about using GenAI [Part 3-Q3]. Do you think instructors' attitudes or the course policies related to GenAI influence your self-efficacy in using GenAI? How?
10. Based on the intake survey, you have used GenAI for your coursework, right? Have you used GenAI for all the courses that you just talked about?
    a. *[If yes]* Can you please talk a little bit more about which GenAI tools you have used and what kinds of learning activities you used for each course?
    b. *[If no]* Which course you have not used GenAI for coursework? Why? (Maybe course policy, course content difficulties, etc.)
11. Can you talk about how you have used GenAI for learning activities in this course? It would be great if you could provide one or two examples.
    a. GenAI tools:
    b. Learning activities:
    c. When they usually use GenAI tools:
12. Besides GenAI, do you use any other additional sources? Which sources do you rely on to learn the course materials for this class? How would you rank them? *[Based on the participant's sharing, I click the items below]*
    a. Instructor (e.g., lectures, notes, office hours) *No.*____
    b. Peers (e.g., study groups, class discussions) *No.*____
    c. Graduate student instructors or teaching assistants *No.*____
    d. Self-study (e.g., learning independently using resources like watching class recordings, textbooks, personal notes) *No.*____
    e. Online resources (e.g., YouTube tutorials, online courses, websites) *No.*____
    f. GenAI tools (e.g., ChatGPT, Bard) *No.*____
    g. Other (please specify): _____ *No.*____

It is almost the end of the interview. Do you have any experiences related to this topic that you would like to share but haven't yet?

Great! You will receive an email with a sample of the Google Form. You can confirm your participation in the upcoming research activities by responding to that email. Please note that each follow-up interview must be conducted within 48 hours of submitting each Google Form, as this helps us minimize memory bias. Do you have any concerns about this?

Before I end this interview, do you have any questions or concerns about this study and the subsequent research activities?

(end the recording)

Thank you for your candid feedback, and have a nice day!

Table: Notes for Course Information

Date:____/____/_____ **Interviewee pseudonym:_____** **# of courses taking: _____**

Time: ____:____AM/PM **Interview Location:_____**

ID & Course Schedule	**Why take this course & Learning goal**	**Class Content, Format, & Policy**	**Potential learning activities like assignments (including schedules)**	**General experiences of taking this course (using any additional learning resource?)**	**Using GenAI allowed? (if yes, which GenAI tools and for what)**
Course 1					
Course 2					

Course 3					
Course 4					