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Generative AI as a Thinking Partner in Doctoral Education: An Autoethnographic Exploration

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Introduction

Teaching doctoral students in interdisciplinary PhD programs presents unique pedagogical challenges that demand deliberate and innovative approaches from faculty [1]. The instructor must simultaneously support students with varying methodological backgrounds and research paradigms, navigate different levels of preparedness, establish legitimacy across multiple disciplines, and provide individualized mentoring - all while potentially lacking disciplinary colleagues for collaboration and pedagogical support. As Holley [1, p. 241] notes, such programs "not only...require collaboration among faculty who traditionally have been highly invested in their individual discipline or department, but they also require an active, deliberate process to foster interdisciplinary integration and student learning." These challenges are amplified in required courses during the early stages of doctoral education [2], where the instructor bears sole responsibility for helping students develop as scholars across disciplinary boundaries, including guiding them to articulate their own scholarly perspectives within an increasingly complex academic landscape [3].

Generative Artificial Intellection (AI) systems offer intriguing possibilities for faculty teaching doctoral students [4]. These AI systems can serve as an intellectual support for doctoral educators who must simultaneously manage multiple roles: subject matter expert, research mentor, writing coach, and methodological guide. AI's ability to assist with tasks like explaining complex concepts, suggesting different pedagogical approaches, or helping parse student work could provide valuable support for faculty managing the intense demands of doctoral education. Yet little is known about how faculty can effectively incorporate AI as a teaching support while maintaining their pedagogical authority and ensuring quality doctoral education.

While recent editorials in engineering education journals highlight AI's potential impact on teaching [4], [5], and emerging studies explore how educators experiment with AI in undergraduate contexts [6], deeper examination of AI's role in supporting doctoral education remains limited. Notably, in systematic reviews of AI in higher education, the focus has primarily been on large-scale undergraduate education, with minimal attention to doctoral contexts or the educator perspective [7]. The complex demands of doctoral education - particularly in interdisciplinary contexts where faculty must span multiple disciplines and methodological approaches - create unique challenges and opportunities that warrant careful investigation. There is a pressing need to understand how faculty can leverage AI support while navigating the intense intellectual and mentoring demands of doctoral education.

Against this backdrop, this paper examines how one faculty member navigated these complex demands while incorporating artificial intelligence as a conversation partner in a required doctoral course. Drawing on three interviews conducted across the academic term, we explore the lived experience of adapting doctoral education to emerging technological possibilities while addressing the persistent challenges of interdisciplinary doctoral education. These interviews,

selected from a larger longitudinal dataset, surface initial themes that can orient future analysis while providing timely insights for educators considering similar innovations. By detailing our methodological choices in documenting and analyzing this experience, we offer a template that other educators might adapt for systematic reflection on their own pedagogical innovations in doctoral education.

Approach

Autoethnography, an established methodological approach in social science [8], emerged as a particularly appropriate choice for examining AI integration in doctoral education for several reasons. First, autoethnography provides a way to center and make productive use of both the emotional and intellectual dimensions of a faculty member navigating pedagogical innovation and the persistent challenges of interdisciplinary doctoral education. Second, the choice of autoethnography builds on growing recognition in engineering education of autoethnography's value for examining faculty experiences and educational innovations [9], [10].

As with any methodology, doing autoethnography well involves attending to details and potential challenges. Those writing about autoethnography have identified challenges such as balancing lived experience with analytic perspectives [12], [13] and anticipating/addressing reviewer concerns [14]. Awareness of these considerations influenced decisions made in collecting data, analyzing data, and crafting results. For example, the methodological approach, as discussed below, was strengthened through careful attention to documentary practices [11] and leveraging a collaborative flavor [9], and the choice of a third-person telling of the results supports analytic distance.

This study focuses on a required first-year doctoral course structured as an inverted seminar that serves multiple critical functions in students' doctoral journeys. To the point of autoethnography, the course is one that I (the first author) have taught for over 15 years, and my teaching of the course is the center of the autoethnography in this manuscript. Because I am both a senior faculty member and have the trust of my colleagues, I have been willing to innovate extensively in the course over time, including the term that is the focus of this autoethnography.

Returning to the course, its inverted seminar format shares much in common with journal club pedagogy [15], [16] and courses with foundational readings [17], but with a distinctive twist. The course introduces students to research literature while simultaneously providing a gateway experience into doctoral-level analysis and critique. In this inverted format, students play an active role in selecting readings that report on research studies, while carefully designed parameters ensure exposure to diverse methodological approaches and theoretical frameworks. Class sessions and assignments then focus on analyzing these self-selected readings through different analytical lenses (such as epistemology, findings, consequences, citations, and participants). The course and its approach have been the subject of previous scholarship (see [18] and [19]).

During the Autumn 2024 iteration of the course, which is the focus of this autoethnography, I introduced significant experimental elements that expanded student agency. Students not only chose their own readings but also participated in selecting the analytical lenses through which they would examine the literature. To complement this enhanced student agency, I changed the

course's reflection component to focus on broader cross-cutting "big ideas:" argument, genre, trustworthiness, significance, and ethics. This teaching context provides a particularly rich site for examining AI integration because it combines my deep familiarity with the course's core academic functions with active pedagogical experimentation, allowing for consideration of how AI might support both established practices and innovative approaches.

Data. Autoethnography, as a form of ethnography, involves both participation in events of the space being studied and observation of that space as well. In the context of autoethnography, participation involves the researcher doing what they are already doing, while observation can take many forms. In this case, traces of the participation represented the core of the data collection. These traces included educator planning and reflection documents, conversations with the generative AI tool “Claude” (managed by Anthropic at the time of the data collection), and jointly editable course documents that captured the collaborative work of students and the educator. To ground these traces of practice, a collaborative dialogue component was added (similar to the interviewing done in other ethnographies). In this case, I (the educator researcher and first author) met with the second author on 8 separate occasions to debrief what was being tried with generative AI, with the second author responding with follow-up questions and prompting deeper reflection. This comprehensive documentation approach captured both the immediacy of daily teaching decisions and space for structured reflection on emerging practices.

Analysis. While this rich dataset will support multiple analyses, this paper focuses on four collaborative dialogues conducted at key points across the academic term. These dialogues, which took place at the beginning, middle, and end of the semester, capture a breadth of experience while providing sufficient analytical depth for an initial examination of the use of generative AI .

Analysis of these dialogues focused on identifying elements of lived experience that carried cultural significance within doctoral education, moving beyond pure phenomenological description to examine the broader implications of AI integration. Initial open coding revealed an overwhelming volume of pedagogical experimentation - dozens of different attempts to integrate AI across various teaching activities - and intense emotional responses ranging from excitement to uncertainty to concern. Faced with this richness of data, we sought an analytical framework that could honor both the experimental nature and emotional weight of the experience. These patterns ultimately coalesced into two fundamental themes that characterized the faculty member's experience: questions of 'Can I?' - exploring the technical and pedagogical possibilities of AI integration - and 'Should I?' - wrestling with the ethical and educational implications of these choices. These themes reflect not just personal deliberation, but deeper tensions within doctoral education about innovation, responsibility, and maintaining educational quality while adapting to technological change.

Results

Our findings trace four pivotal moments across the semester where AI integration sparked both possibilities and deeper pedagogical reflection. We present each chronological moment through dual lenses: first examining the 'Can I?' dimension - what was attempted and how it unfolded - followed by the 'Should I?' considerations that emerged. The first moment centers on early-semester experimentation with using AI to generate draft assignments based on student

choices, intended to increase student ownership through refinement and co-creation. The second and third moments capture mid-semester efforts to make learning visible by using AI to synthesize students' reflective essays about big ideas in research, culminating in an intensive free-writing session. The final moment reveals both humor and insight as the instructor attempted to use AI to envision an ambitious final class session, leading to a revealing encounter with AI's limitations and assumptions about doctoral education. Each of these moments illuminates different aspects of AI integration while raising important questions about pedagogy, student agency, and the role of technology in doctoral education. While these findings are part of an autoethnography and potentially could be written in first-person, they are purposefully written in third person for readability.

Moment 1: Co-constructing Assignments with AI Support

The first significant moment of AI integration emerged early in the academic term as the instructor wrestled with how to give students agency in assignment design while maintaining pedagogical rigor. The experience reveals both the technical possibilities and pedagogical implications of using AI in doctoral education:

> "I wanted to co-construct the next assignment... I asked Claude, 'If you were gonna make an assignment like this, what would it look like?' And I was like, that's a pretty good starting point. It's not how I would have written it. But actually, that's okay... So then I like made Claude make one live in class... And I said, 'We're going to sit here and we're going to critique this and iterate this and refine it until all 6 of you are happy with it.'... Claude made it, which then de-centered me--like they weren't critiquing me." Dialogue on 17 October 2024

The 'Can I' dimension of this moment centers on the discovery that AI could serve as an initial assignment generator, creating drafts that were both serviceable starting points and malleable enough for revision. The instructor moved beyond simple prompting to more sophisticated engagement, first practicing with Claude privately to understand its capabilities, then bringing it into the classroom for live generation. This experimentation revealed that AI could produce assignment descriptions that captured basic structural elements while leaving room for refinement.

The 'Should I' reflections reveal deeper insights about power dynamics in doctoral education. The instructor's realization that having Claude generate the assignment "decentered" the critique process highlights a subtle but significant shift in classroom dynamics. Rather than students critiquing their professor's work - a potentially fraught interaction in doctoral education - they could collectively critique and refine AI-generated content. This created a more collaborative space for co-construction while maintaining the instructor's ability to guide the process through her careful prompting of Claude. The experience suggested new possibilities for balancing student agency with instructor expertise in doctoral education.

This moment also reveals the emotional journey of pedagogical innovation. The instructor's progression from uncertainty ("how am I gonna do this?") to discovery of new possibilities reflects the complex process of integrating AI while maintaining educational quality. The emphasis on collective refinement ("until all 6 of you are happy with it") suggests a way to blend technological support with human judgment in service of doctoral education.

Moment 2: Leveraging AI for Real-time Analysis of Student Learning, Part 1

This mid-semester moment reveals how AI could support real-time analysis of student learning while raising questions about collective meaning-making in doctoral education. The instructor faced a complex pedagogical challenge with students' varied approaches to reflecting on big ideas in the course:

> "So when they had said, 'Well, how many should we write about?' I was like, probably in the beginning, I should have just said, write about all of them, but because I hadn't, I was like fine 3 for 3... And then, when I had a chance to look at what they were writing, it was very different... R had written longer things... she had taken like epistemology, and had written about things inside of writing about... but most people had done more literally what I'd asked." Dialogue on 19 November 2024

In this passage, the educator is describing what happened when (a) she invited students to reflect on what they were learning about the **four** big ideas of the course, but also (b) the consequence of her having invited students to choose **three** of the four big ideas. In addition, the context of the passage is that the educator had allocated class time to go over their reflections in order to create communal learning, but she also realized that her instruction to have them focus on three of the four ideas led to a difficult synthesis situation.

The 'Can I' dimension emerged through experimentation with using Claude for real-time synthesis of student writing. The educator asked students "if it was okay to take all of their answers and dump them into Claude" and then she crafted prompts requesting "summaries about what the people had to say about genre... Please create multiple discussion points and please use direct quotes from the work the students had done." This technical possibility led to an unexpected outcome: "it smoothed over the way different people had approached it at different levels of depth. So people that wrote more ended up being quoted a little bit more, but everybody was quoted at least once or twice or three times."

The 'Should I' dimension of this reveals deeper questions about collective learning in doctoral education. The AI-generated synthesis "moved us away from the individual contributions" while still honoring each student's voice. The experience highlighted tensions around attribution and acknowledgment. Yet it also created new possibilities for collective insight: "it bubbled us back up" and enabled conversations about all the big ideas that "we never could have pulled off without something like Claude to do it fast."

This moment illuminates both the practical potential of AI for supporting real-time analysis and deeper questions about how to balance individual and collective learning in doctoral education. The instructor's reflection reveals ongoing tension between the efficiency AI offers and the need to thoughtfully structure how students engage with AI-mediated analysis of their own work.

Moment 3: Leveraging AI for Real-time Analysis of Student Learning, Part 2

This second mid-semester experience focused on using AI to capture learning as it emerged during class discussion of research papers. The instructor structured multiple points of reflection through freewriting:

> "everybody pre-wrote for 2 min about what are you curious about... and then, after the first 3 people shared their papers and we had clarification questions, everybody wrote, what's going through your mind... then after we discussed like 20 min, everyone free wrote... [and] in the last probably 7 min of class, we spent 2 min free writing."

The 'Can I' dimension centered on using Claude to analyze these multiple layers of student writing in real time: "I took everything and I gave it to Claude." The prompt asked for "themes identified in the starting expectations, and then themes that were noticed through the rest of the exercise." This revealed the possibility of tracking the evolution of understanding across a single class session.

The 'Should I' reflections emerged through what this real-time analysis revealed - particularly around the concept of "findings" in research. The AI analysis helped surface what the educator noted was "something I've always sensed was a problem, which is, it's not really clear what counts as a finding, and this came out as the first theme of the whole thing." This realization led to deeper insights about threshold concepts in doctoral education: "I feel like I solved a problem that I knew all along that I had. But I've never really had a good platform for making it really obvious just how complicated it is."

Moment 4: When AI's Limitations Spark Pedagogical Insight

The final moment centers on the instructor's attempt to use AI to plan a class session that needed to be jointly about backstory in academic research and theory in academic research. The context was that the students had been given a choice for their final paper analysis. They could choose to explore what kinds of questions they might ask the author if they were going to explore the backstory of the publication, or they could explore the role of theory in the publication. Initially, the plan had been for the group of six students to collectively make the same choice. Due to student interest, however, the decision was left to the students and three chose backstory and the other three chose theory. The educator then needed to plan a class session that honored these choices within the 2 hour time period. The educator turned to Claude to imagine possibilities, and the experience revealed both the limitations and unexpected benefits of AI as a planning partner:

> "Claude is actually quite good at making the look of an activity, but when it comes to being very realistic about what can be done. It just sort of assigns minutes to things, and I'm like, you can't do that in that many minutes... it's quite another thing to just be amused when... the scoping in front of your face is so unrealistic."

The 'Can I' dimension revealed AI's capabilities and limitations in session planning. While Claude could generate structured outlines and timing suggestions ("personal theory, reflection, 5 min... Student experience with theory, 10 min"), these plans were judged unrealistic by the educator. However, the interaction with Claude did offer useful analytical insights: "It did help me have a sense of their questions that R's questions focus on process, while the first set focuses on decisions."

The 'Should I' reflections emerge through the instructor's realization that AI could serve as a thinking partner even when its direct suggestions weren't implementable. Rather than seeing

Claude's unrealistic timing as a failure, it became an opportunity for amusement and reflection: "that was when I laughed. And I was like, Okay, I gotta go figure something... very unequivocally like classic thinking partner stuff like I eventually did my own thing." This suggests a more nuanced way of working with AI - not as a solution provider but as a catalyst for the educator's own planning process.

This final moment illustrates a nuanced relationship with AI as a pedagogical tool - one where its limitations become features rather than bugs, spurring human creativity and judgment rather than replacing it. The instructor's ability to laugh at AI's ambitious timeframes while still finding value in the interaction suggests an evolution in understanding how to productively integrate AI into teaching practice.

Discussion

Across the semester, four key moments illuminated how AI supported an educator teaching in interdisciplinary doctoral education. Early in the term, AI served as an assignment generator, creating drafts that students could collectively critique and refine, effectively decentering the instructor's authority. Mid-semester experiences revealed AI's capacity for real-time analysis of student writing, both synthesizing varied reflections on course concepts and tracking emerging understanding during class discussions. The final moment showed how even AI's limitations - particularly its unrealistic session planning - could prompt productive faculty reflection and decision-making.

These findings suggest a reframing of AI's role in doctoral education: rather than simply helping faculty manage the challenges of interdisciplinary teaching, AI can help make these challenges productive. The 'trouble' of establishing authority across disciplines, managing diverse approaches to learning, and lacking disciplinary colleagues became opportunities rather than obstacles when mediated through AI interaction. This aligns with Haraway's concept of 'staying with the trouble' concept popularized by [20] but suggests that AI can make such trouble more manageable by creating spaces for collective critique, surfacing varied disciplinary perspectives, and prompting faculty reflection. The technology's very limitations became features rather than bugs, supporting rather than replacing faculty judgment in navigating complex pedagogical situations.

A second insight is a twist on thinking about how technology can impact cognitive load. While adding technology to teaching practice can be sought as a way to reduce complexity for faculty, our findings suggest that AI actually served to change complexity - not simplifying the teaching itself, but by creating productive constraints that made it possible to navigate more complex tasks. When AI generated initial assignment drafts, it freed mental energy that could be used to focus on facilitating student critique. When synthesizing student reflections, it created manageable entry points into complex collective thinking without losing individual voices. Even AI's unrealistic session planning helped clarify the instructor's own judgment by providing a foil for decision-making. This suggests that AI can serve as a form of cognitive scaffolding for faculty, where its structures and limitations create moments where technology supports rather than burdens faculty thinking and decision-making. This reframing has important implications for how we approach AI integration in doctoral education, suggesting that we should look for ways AI can make more complex thinking feasible.

Two methodological insights emerged from this study that may benefit future research on faculty experiences with AI integration. First, our decision to add regular recorded conversations to our data collection strategy proved invaluable. These conversations created structured opportunities for reflection that captured both the immediacy of pedagogical decision-making and the evolution of understanding across the term. The conversational format allowed for exploration of emerging ideas and captured emotional elements of the experience that might have been lost in written reflection alone. Second, while this paper's focus on four key moments provides important initial insights, the broader dataset offers opportunities for more comprehensive analysis. Future work could examine patterns across the full term of AI integration, trace specific pedagogical strategies as they evolved, or analyze the relationship between planned and emergent uses of AI in doctoral teaching. Such analyses could further illuminate how faculty develop productive ways of integrating AI into their teaching practice while maintaining pedagogical integrity.

Conclusion

This study traces one faculty member's journey of integrating AI into doctoral teaching, revealing how technology can support rather than supplant pedagogical judgment while making the inherent complexity of interdisciplinary doctoral education more manageable. Rather than focusing solely on AI's capabilities, attention should be paid to how it can create productive constraints, support collective learning, and turn pedagogical challenges into opportunities. As doctoral education adapts to an era of AI availability, this study suggests that the technology's value lies not in reducing teaching complexity, but in helping faculty productively navigate that complexity while maintaining pedagogical integrity and strengthening connections with students. The resulting insights offer both practical guidance for faculty considering AI integration and theoretical contributions to our understanding of doctoral education in an AI-enhanced future.

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