GENERATIVE AI FOR HIGHER EDUCATION: PRACTICAL EXAMPLE TO SUPPORT FACULTY IN CREATING AN ENGAGING LEARNING ENVIRONMENT

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ABSTRACT

Following the advent of Generative Artificial Intelligence (GenAI) in late 2022, a significant shift occurred in the academic realm, leading to both challenges and opportunities. This research delves into the patterns of university students using GenAI tools for academic tasks in higher education. Through a collection of real-world use cases, the study offers insights into the growing influence of GenAI in educational settings and its broader implications. Central to this examination is the potential misuse of GenAI for academic gains, contrasted with its beneficial role in enhancing genuine learning experiences. In response to these identified trends, the discussion introduces an overview for designing a framework that enables faculties to seamlessly integrate GenAI into their courses. This proposed structure seeks to uphold academic integrity, foster the productive use of GenAI resources, and capitalize on GenAI's capabilities to augment the educational journey. By adopting this approach, faculty and educational institutions can navigate the challenges presented by GenAI.

Keywords: Engaging Pedagogy, Formative Feedback, LLM, Generative AI, Empowering Faculty

INTRODUCTION

Artificial Intelligence (AI) holds the potential to transform higher education in ways reminiscent of how the introduction of computers enabled self-paced learning and the internet expanded access to digital information, fostering digital literacy. As a result, the structure, reach, and outcomes of education have evolved. The study involves faculty members from various academic disciplines such as Media Arts, Engineering, Communication, and English. The participants are from Qatar, and the U.S. states of California, Colorado, and New York.

Drawing on a wealth of teaching experience and supported by qualitative case-based research, the authors advocate for a pedagogical shift. This shift emphasizes the strategic incorporation of AI as a learning tool, aimed at its ethical and impactful application. Such an approach encourages students to engage deeply with coherent conceptual frameworks, rather than merely averting misuse. By integrating AI, we can better prepare students to excel in a progressively digital world, arming them with the critical skills to both navigate and influence the future realms of work and society. This premise underpins the foundation of our research.

Research Question (RQ)

- How can Generative Artificial Intelligence (GenAI) be integrated in higher education pedagogy/andragogy course design [learning outcomes, assessment, methods] to empower instructors to integrate GenAI in a functional, meaningful way to create accessible learning environments for all students?

To best address this shift in the appropriate use of technology, such as GenAI, an emphasis on effective course design should be a priority. A common framework for universal course design follows Wiggins and McTighe's (2011) model that encompasses three major steps. These steps include learning outcomes, assessment, and teaching methods. The initial question we ask is how or should assessment change when integrating functional AI? Regular, timely formative assessment with critical feedback loops is essential for deep learning. AI can support this approach by creating an efficiency model for instructors and learners, providing regular and ongoing assessments, which will allow instructors to modify concepts on an individual basis. Additional options include creating opportunities for adaptive assessment, competency-based assessment, project-based learning, and real-time feedback.Keeping in mind that the complete cycle of learner feedback includes assessment, measurement, and evaluation. Assessment is a process of gathering information from multiple and diverse sources to understand learner knowledge, skills, and dispositions (Huba & Freed, 2000). Measurement is an assignment of marks based on an explicit set of criteria (rubrics) (Sadler, 2005). Evaluation is the process of making judgments on the level of performance, based on assessment and a set of criteria (Macquarie University Learning & Teaching Centre, 2010).

Effective learning is supported when students are actively engaged in the learning process. (Chickering & Gamson, 1987). Effective learning is supported by a climate of inquiry where students feel appropriately challenged and activities are linked to research (Jenkins, Blackman, Lindsay, & Paton-Salzberg, 1998). Learning is more effective when prior experience and knowledge are recognized and built on (Bransford, Brown, & Cocking, 1999). If dialogue is encouraged between students and teachers and among students, thus creating a community of learners, student motivation and engagement can be increased (Stefanou & Salisbury-Glennon, 2002). Clearly articulated outcomes and requirements increase student motivation and improve learning (Race, 2001). When students are encouraged to take responsibility for their own learning, they are more likely to develop higher-order thinking skills such as analysis, synthesis, and evaluation (Zimmerman, 1998). Learning can be enhanced and independent learning skills developed through the appropriate use of technologies (Housego, & Freeman, 2000). Effective learning is facilitated by assessment practices and other student learning activities that are designed to support the achievement of desired outcomes (Biggs, 2002).

Setting the Stage: Example Participant Background and Philosophy on GenAI

Participant #1 (P1) is an interdisciplinary expert who focuses on the intersection of technology, art, and business, leveraging his broad experience to develop innovative products and technologies. Their takeaways include the idea of GenAI as idea growth and refinement, not as an idea germination at least in the areas of problem/solution ideation.

The following are two examples from P1's spring 2023 course:

1. **Generative AI Ideation for Energy Overuse Solutions**

- Students were tasked with using ChatGPT, to produce potential product solutions addressing energy overuse.
- Students found that AI-generated solutions were typically 'obvious' and 'mundane'.
- The activity revealed the limitations of GenAI as a principal ideation tool, leading to the consideration of inverting the process for future iterations— students will use traditional ideation methods first and then engage GenAI as an 'assistant' to refine ideas.

2. **AI-Augmented Marketing Campaign Creation**

- Leveraging the capabilities of Midjourney and ChatGPT, students were tasked with writing a marketing campaign and pitch for their ideated solutions.
- This activity illustrated the supportive role of GenAI in enhancing the creative process by providing instant feedback, facilitating more nuanced and effective campaigns.
- The role of GenAI affirmed its capacity as a 'helpful assistant' rather than a sole creator, thereby underscoring its value in augmenting human creativity.

The aim of this paper is to investigate how GenAI can be meaningfully integrated into higher education pedagogy with particular attention to course design elements such as learning outcomes, assessment practices, and teaching methods. Through qualitative case studies with faculty participants across diverse disciplines and institutions, the study examines both the opportunities and challenges associated with incorporating GenAI into teaching and learning. By analyzing real-world use cases and participant reflections, the paper seeks to provide a framework for faculty to ethically and effectively leverage GenAI as a pedagogical tool. In doing so, the research aims to support the creation of inclusive and accessible learning environments that uphold academic integrity while fostering innovation, student engagement, and critical thinking in an increasingly AI-mediated educational landscape.

LITERATURE REVIEW

The theoretical construct of this research is based on the Technological Pedagogical and Content Knowledge (TPaCK) model, originated by Shulman (1987), later enhanced by Mishra and Koehler (2009). The model offers a framework to understand the intersection of technology, pedagogy, and content in education. This model emphasizes the integration of these three components in effective teaching.

The TPaCK model has been extensively researched and applied in education, reinforcing its credibility as a useful model for integrating technology. Graham et al. (2009) used the TPaCK framework to assess the confidence of science teachers in integrating technology. They found that understanding and utilizing the model could enhance teachers' confidence and competence in using technology in teaching. Hammond and Manfra (2009) discussed aligning technology and pedagogy within TPaCK for social studies instruction. They demonstrated that the framework facilitates the integration of technology effectively, leading to improved teaching and learning outcomes. Hargis et al. (2013; 2014) used the TPaCK framework to evaluate the effectiveness of a mobile learning initiative in higher education. They showed how the model can be applied to assess the intersection of the technological tool, pedagogy, and content.

In a more recent exploration, Park and Hargis (2018) extended the TPaCK framework by introducing an Affective dimension (hence Technological Pedagogical Affective Content Knowledge, TPaCK). They emphasized considering students' emotional states and motivational aspects, illustrating the adaptability of the model. Considering the substantial body of research supporting the TPaCK model, it provides an ideal framework for our study. We aim to examine how GenAI can be integrated into higher education pedagogy to create accessible and inclusive learning environments. TPaCK's emphasis on the intersection of technology, pedagogy, and content aligns perfectly with our research goals. Furthermore, the model's broad application and proven effectiveness assure its relevance to our study.

The TPaCK model supports our approach to integrating emerging educational technology in the form of GenAI by providing a comprehensive schema to discern the intricate intersections between technology, pedagogy, and content. In the face of AI's sweeping augmentation of higher educational practices, TPaCK's inherent structure and philosophy elucidate its indispensability for such an evaluation. TPaCK’s triadic construction ensures a balanced consideration of technology, the pedagogical processes it enhances, and the content it seeks to deliver. This comprehensive approach ensures that the evaluation does not overemphasize technology at the cost of pedagogy or content but seeks harmony between all components (Mishra & Koehler, 2006). TPaCK's foundational principle revolves around the centrality of pedagogy. In a landscape where GenAI can easily overshadow traditional pedagogical considerations, TPaCK ensures that technology serves pedagogical objectives, rather than dictating them. This aligns with Voogt et al. (2013) who argue for the need to prioritize pedagogical intent even in technologically advanced settings. While GenAI offers revolutionary capabilities, TPaCK necessitates that such innovations must be aligned with the intrinsic nature of the educational content. This ensures that GenAI tools are tailored to enhance content delivery and comprehension rather than merely being integrated for their novelty (Graesser et al., 2018).

The dynamism of TPaCK lies in its emphasis on the intersections of Technological Knowledge (TK), Pedagogical Knowledge (PK), and Content Knowledge (CK). As GenAI reshapes higher education, understanding these intersections becomes paramount. Harris et al. (2010) affirm that truly transformative educational practices emerge from these interplays, making TPaCK the ideal lens for such an exploration. The model recognizes the fluidity of technological advancements and pedagogical evolutions. As GenAI continues to burgeon, TPaCK remains adaptable and relevant, ensuring evaluations remain congruent with evolving educational landscapes (Luckin, 2017). An inclusive, accessible pedagogy aims to create an equitable learning environment that accommodates the diverse needs of all learners. This pedagogical approach utilizes strategies and technology to ensure that learning experiences are inclusive and accessible to all, irrespective of their physical, sensory, or cognitive abilities (Park & Hargis, 2018). AI, especially GenAI tools like ChatGPT, are gaining prominence in facilitating an inclusive, accessible pedagogy. For instance, GenAI can enhance accessibility by transcribing lectures in real-time, offering personalized learning experiences, and providing additional resources for learners with special needs (Hadi et al., 2023). The intersection of inclusive pedagogy, GenAI, and active learning has opened up new possibilities for creating a universally accessible learning environment (Rodriguez & Koubek, 2019).

Formative Feedback

Formative feedback is a crucial component of effective pedagogy and course design (Lockard & Hargis, 2017), it provides learners with timely and constructive criticism that helps them improve their understanding and performance, formative feedback has been associated with elevated student engagement and improved learning outcomes (Troisi, 2014), with the rise of GenAI in education, formative feedback has been reshaped. The AI tools can now provide instant, personalized feedback, promoting a better understanding of the subject matter and facilitating self-regulated learning (Chun & Hargis, 2020). The integration of GenAI, like ChatGPT, in formative feedback, can also allow for just-in-time adjustments to instruction based on student performance (OpenAI, 2023).

Large Language Models (LLM)

Large Language Models (LLMs), like Open AI ChatGPT, Google Bard, and Anthropic Claude, represent a significant advancement in the field of GenAI (Kasneci et al., 2023), those models leverage large amounts of text data to generate human-like prose and accurately perform language-related tasks. The LLMs are transforming the educational landscape by enabling personalized learning, automating grading, and assisting with research tasks like hypothesis generation and data collection (OpenAI, 2023). Despite their potential, LLMs integration in higher education is still in its infancy, with the need for more research to understand their optimal use.

Generative Artificial Intelligence (GenAI)

The incorporation of GenAI into curriculum development is becoming a more common subject of research in higher education (Chen et al., 2023; Lee et al., 2023). It is a rapidly advancing field with potential to significantly alter pedagogical and andragogical practices (Kumar et al., 2023). Research has identified that GenAI can assist in the design of adaptable and personalized curricula, thus maximizing the efficiency of the learning process (Zhang et al., 2023; Liu et al. 2023). Nonetheless, a comprehensive understanding of the possible challenges and benefits is paramount to effectively integrating GenAI into course design (Wang et al., 2023).

Generative AI can facilitate personalized learning pathways, provide supplementary resources for learners with special needs, and create a more equitable learning environment (Singh et al., 2023; Sharma et al., 2023). However, it is important to note the ongoing debate around accessibility, data privacy, and ethical considerations in GenAI usage in education (Gupta et al., 2023; Patel et al., 2023). Generative AI in education has the potential to break down barriers and promote inclusivity by catering to the diverse learning needs of students (Khan et al., 2023). The interplay between pedagogy, andragogy, and GenAI presents a complex landscape for educators (Rao et al., 2023). Research suggests GenAI can support adult learners' needs for self-directed and experiential learning, by providing adaptive resources and feedback (Choi et al., 2023). In parallel, AI-powered tools are being increasingly adopted, though educators and institutions may face challenges in understanding and implementing them (Kim et al., 2023)

METHOD

A study with four faculty participants (two male, two female) was conducted during the summer of 2023 to assess, measure, and evaluate updates on how to integrate functional GenAI into higher education teaching and learning. The four participants were selected in an attempt to gain a range of backgrounds. They included faculty members from different institutions and academic areas. The faculty were coded for anonymity using the codes for participants (P), number one (1) through four (4), therefore, P1, P2, P3, and P4 (Table 1).

Table 1.
Participant Information

P	Rank	Academic Area	Location	Institution	Gender
1	Associate Professor	Arts and Media	New York USA	Private	Male
2	Associate Professor	Engineering	California USA	Public	Female
3	Instructor	Communications	Doha Qatar	Public	Female
4	Instructor	English	Colorado USA	Public	Male

Research Design
This study employed a qualitative case study design to explore how faculty in higher education are preparing to integrate Generative Artificial Intelligence (GenAI) into their pedagogy and andragogy. The case study approach was chosen because it allows for in-depth examination of participants' perspectives, teaching philosophies, and practical strategies in authentic instructional contexts. While primarily qualitative, the study incorporated structured prompts (e.g., self-ranking of technology comfort levels) to facilitate reflective responses and to guide deeper narrative exploration. The intent was not to quantify results but to generate rich, descriptive data aligned with the central research question.

Research Setting and Participants
The study was conducted during the summer of 2023 and involved four higher education faculty members from diverse institutional and disciplinary contexts. Participants represented academic areas including Media Arts, Engineering, Communication, and English, and were affiliated with universities in the United States (New York, California, and Colorado) and Qatar. To maintain confidentiality, each participant was assigned a code (P1–P4). The group included two male and two female instructors across both public and private institutions. This diversity in geography, discipline, and institutional type provided a range of perspectives on the adoption of GenAI in teaching.

Data Collection
Data were collected through paired interviews, in which participants interviewed one another via videoconference platforms. These conversations, lasting approximately two hours, were recorded and transcribed using automated transcription tools. The interview protocol included six open-ended prompts that asked participants to reflect on their experiences with technology integration, current and evolving teaching philosophies, perspectives on GenAI, planned syllabus updates, instructional strategies, and long-term visions for GenAI in higher education. The prompts were drafted by the primary author, shared and discussed with the other authors and colleagues to achieve acceptable face validity. Additional materials, such as draft syllabus language, were collected to provide concrete examples of intended pedagogical shifts.

Data Analysis
A modified case study analysis approach (Yuan et al., 2022) was used. Transcripts were analyzed using OpenAI's ChatGPT (free public version, August 2023) to generate keyword extraction, sentiment analysis, topic modeling, and thematic clustering. To ensure validity, approximately 15% of the transcripts were manually coded by the research team and compared to the AI-generated themes. This triangulation process confirmed consistency between manual and AI-assisted coding. Findings were synthesized into thematic clusters and aligned with the research questions and theoretical framework (TPaCK). Table 2 presents a synthesis of interview prompts, emergent themes, and thematic clusters derived from this analysis.

Trustworthiness and Ethical Considerations
Trustworthiness was enhanced by employing multiple strategies: triangulation of AI-assisted and manual coding, member checking through follow-up clarifications with participants, and maintaining an audit trail of analytic decisions. Although GenAI was used for preliminary data analysis, final interpretations were made by the researchers to ensure alignment with the study's qualitative orientation. Ethical considerations were addressed by securing informed consent from all participants, de-identifying data, and ensuring confidentiality through the use of participant codes. The study adhered to institutional ethical standards for qualitative research. Given the early adoption of GenAI in higher

education, the use of AI in analysis was conducted transparently and is reported as both a methodological innovation and a limitation, acknowledging ongoing debates about validity, transparency, and potential bias in AI-supported research.

The four participants interviewed each other in two paired groups. The verbal conversations were collected via audio and automatically transcribed through a videoconference application. The data was de-identified and analyzed. A modified case study approach of Yuan et al. (2022) to the design of the study and question prompts was used. This included one stage of data collection that summarized individual participant reflections.

- Paired reflection oral interview with two researchers at a time.

This study was conducted using personal computers equipped with Internet access. Data was gathered using electronic mail, shared Google Documents, and video-conferencing.

The data collection approach involved asking participants to conduct one-on-one video conferences with each other and capture their voice responses via text. The following questions drafted by the primary author, shared and discussed with the other authors and colleagues. Since the faculty are seasoned instructors with several publications in the area of teaching research using survey and qualitative design, there is an acceptable level of expert validity achieved. The discussion resulted in the following prompts which were used as a guide to collect the data for the 2-hour interview:

1. What is your current experience and comfort level for integrating any type of technology into your teaching (rank from 1-10; 1 being very low, 10 being very high - also try to describe how you came to this rating by sharing a specific example of integrating tech)?
2. Please summarize your current Teaching Philosophy, followed by specific ways in which it might be updated by using GenAI in your teaching.
3. What is your perspective of GenAI for teaching (pedagogy or policing; embrace or ban; Academic Integrity, Intellectual Property, etc.)?
4. What additions will you make to the technology section of your syllabus (how you will use, encourage, ban, support GenAI for learning)?
5. What specific GenAI strategies will you be integrating this coming term (share a sample template, activity and how do you plan to measure the impacts on learning outcomes; how do you anticipate your students will use GenAI to further engage in your course)?
6. What is your vision for GenAI in higher ed pedagogy for the future?

DATA ANALYSIS

In developing this methodology, we incorporated GenAI in the process of analyzing the data. In August 2023, the research team used the free public version of OpenAI ChatGPT to ask it to: "Analyze the following text for keyword extraction, sentiment analysis, topic modeling, text analysis and summarization, comparison, thematic analysis, and clustering [for all of the text created by the four participants]."

This process was taken over a six-day period in August 2023 using the free public version of OpenAI ChatGPT. This was followed up with an analysis of a portion of the data to verify the accuracy of the output. The responses were analyzed, coded, and compared. The authors reviewed 15% of the interviews to check that the themes identified by GPT were similar to standard qualitative analysis. It was determined that there was consistency between the themes identified manually and the themes generated in GenAI. We concluded that GPT's deductions were a reliable qualitative analysis.

The use of GenAI for qualitative analysis is innovative but can raise concerns about validity and transparency. The authors attempted to verify an acceptable portion of the output, although for some readers, this may not be sufficient on its own. Since this study occurred early in the practical use of GenAI in higher education, a more detailed explanation of how AI-generated results were reviewed and interpreted was not possible at this time. A review of potential biases will be included in the Discussion section.

A qualitative analysis was performed on the direct measures using the free public version of OpenAI ChatGPT for the following:

- Current experience and comfort for integrating any type of technology into your teaching (rank from 1-10; 1 being very low, 10 being very high - also try to describe how you came to this rating by sharing a specific example of integrating tech).
- Current and updated Teaching Philosophy, including specific ways GenAI will be used.
- Perspective of GenAI for teaching (pedagogy or policing; embrace or ban; Academic Integrity, Intellectual Property, etc.).
- Syllabus technology section.
- Specific GenAI strategies integrated (sample template, activity, or lesson).
- Vision for GenAI in higher ed pedagogy for the future.

RESULTS

The qualitative data derived from the direct measures were analyzed using OpenAI ChatGPT. All participants' raw qualitative data responses are provided in Appendix A. Data analysis of their responses is provided below for each participant, followed by the aggregate data for all participants. We approached this research as a qualitative case study using ChatGPT to analyze the qualitative data for keyword extraction, sentiment analysis, topic modeling, text analysis and summarization, comparison, thematic analysis, and clustering. We then analyzed the ChatGPT thematic analysis and clustering to identify general patterns and key themes. We aligned the Interview Prompts with RQ and these themes (Table 2). We used a modified "describing, classifying, and interpreting loop" (Creswell, 1998, p. 144) to interpret our findings.

The research question is "How do we prepare and facilitate Generative Artificial Intelligence (GenAI) in higher education pedagogy/andragogy course design [learning outcomes, assessment, methods] to empower instructors to integrate GenAI in a functional, meaningful way to create accessible and inclusive environments for ALL students?"

Table 2.

Aggregate Interview Responses Aligned with Themes and Clusters Generated by ChatGPT

Prompt	Thematic Analysis	Clusters
Current experience and comfort for integrating any type of technology into your teaching (share a specific example of integrating tech).	• Backgrounds, experiences, and approaches to incorporating various forms of technology, from augmented reality to generative AI, into their teaching practices. • Adapting teaching methods to enhance student engagement, critical thinking, and decision-making skills also emerges. • The importance of choosing the right technology for specific learning outcomes is a recurring idea throughout the conversation.	• Background and Comfort with Technology: • Specific Examples of Integration: LMS, QR codes, virtual reality, and GenAI. • Pedagogical Approaches importance of aligning technology with outcomes. • Challenges and Learning: importance of adapting teaching methods for optimal learning outcomes. • Student Engagement and Learning.
Current and updated Teaching Philosophy including specific ways GenAI will be used.	• Intersection of teaching philosophies and technology integration to foster independent thinking, critical thinking, and lifelong learning. • Creating an environment that prepares students for real-world challenges, with technology. • Developing students' skills and promoting active engagement, using GenAI to aid in learning.	• Teaching Philosophies: focused on creating an environment that fosters independent thinking. • Technology tools like Voicethread, Twitter, Instagram, Google & GenAI. • Impact of Technology: technology aiding in outcomes and encouraging proactive learners.

		- Student-Centered Approach: as independent learners and contributors to society. - GenAI and Writing: support in writing, speaking, and communication.
Perspective of GenAI for teaching (pedagogy or policing; embrace or ban; Academic Integrity, Intellectual Property, etc.).	- Embracing Technology for Learning Enhancement: GenAI to enhance learning, critical thinking skills, and problem-solving abilities. - Ethical Considerations: Concerns about academic integrity, plagiarism, and intellectual property. - Contextual Adaptation: Relevance of context in determining the appropriateness of using GenAI. - Pedagogical Evolution: Role of GenAI in transforming pedagogical approaches.	- Positive Perspectives: GenAI to enhance learning, promote critical thinking, and prepare students for the evolving tech landscape. - Ethical Concerns: Related to plagiarism, academic integrity, and intellectual property. - Contextual Application: Where creative and critical thinking are crucial. - Pedagogical Innovation: Focus on how GenAI can transform teaching practices. - Intellectual Property: Use of copyrighted material for training AI models.
Syllabus technology section	- Balancing GenAI Use: There is a consensus that while AI can be a valuable tool, students must understand conceptual foundations, not rely on GenAI. - Communication Skills: Shift towards communication-based assessment methods and the importance of articulating ideas. - Impact on Creativity: Concerns raised about AI's limitations in tasks requiring creativity and lacking depth. - Pedagogical Changes: How educators should adapt their methods to incorporate GenAI effectively.	- Introduction: Set the context and acknowledge GenAI benefits and challenges. - Sharing limitations of Gen AI and the importance of understanding foundations. - Discuss changes in assessment and focusing on communication skills. - Using GenAI to promote integrity highlighting the value of understanding. - Expressing enthusiasm for further collaboration on creating guidelines for students about GenAI.
Specific GenAI strategies integrated (sample template, activity or lesson)?	- Integrating GenAI into teaching methods and assessment strategies, - Introduce students to the concept of GenAI, - GenAI history, and its use in creative tasks, - Acknowledge the potential limitations of GenAI, and - Need to guide students in understanding its role.	- Introducing GenAI in teaching strategies. - Focusing on fundamental tech courses, - Using GenAI to solve real-world issues, - Apply GenAI to creative tasks, - Discussing the role of communication skills, - Utilizing GenAI to analyze research papers, - Reflecting on the outcomes and limitations of GenAI.
Vision for GenAI in higher ed	Transformative potential of GenAI in education,	- Potential of GenAI in education, - Strategies for teaching and assessing with GenAI,

pedagogy for the future.	• The importance of critical thinking and questioning, • Shift in teaching philosophies, • The role of educators in guiding GenAI usage, • The integration of GenAI into various disciplines.	• Student engagement, critical thinking, • Impact on learning outcomes • Future visions for education.

Table 2 serves as a synthesis tool that connects participant responses to thematic clusters generated through the qualitative analysis. Rather than presenting raw data, the table is intended to help readers quickly identify patterns across faculty reflections on technology use, teaching philosophy, perspectives on GenAI, syllabus adjustments, specific strategies, and future visions. By aligning the interview prompts with emergent themes, the table highlights areas of convergence and divergence among participants, showing both shared commitments (e.g., integrating GenAI as a pedagogical tool rather than a policing mechanism) and individual nuances (e.g., varied approaches to syllabus language or assessment redesign). This organization allows readers to see how faculty are negotiating the practical realities of GenAI integration in higher education across multiple domains.

The findings in Table 2 should therefore be interpreted not as definitive categorizations but as a structured overview of how faculty sense-making aligns with the study's central research question. The thematic clusters illustrate the dynamic interplay between opportunities and challenges, revealing a common emphasis on student-centered pedagogy, critical evaluation of AI outputs, and the need to maintain disciplinary integrity while adopting new tools. At the same time, the table provides a springboard for further discussion, enabling readers to trace connections between the empirical data and the TPaCK framework, as well as to identify areas where future research should probe more deeply—such as the long-term impacts of GenAI on assessment practices or the ethical boundaries of its classroom use.

DISCUSSION

The qualitative method allowed the researchers to explore ways in which GenAI could be used in practical ways to enhance teaching in higher education. We used a modified "describing, classifying, and interpreting loop" (Creswell, 1998) to connect the results to the research question, "how do we prepare and facilitate GenAI in higher education pedagogy course design [learning outcomes, assessment, methods] to empower instructors to integrate GenAI in a functional, meaningful way to create accessible and inclusive environments for ALL students?"

Before we begin discussing the findings,we will share a review of potential biases when using new technology such as GenAI. AI-generated outputs are shaped by the data on which the models are trained, as well as the algorithms' interpretive processes, which may inadvertently amplify or obscure particular themes. Although the research team attempted to verify an acceptable portion of the AI-generated results against manual coding, this validation may not fully alleviate concerns for readers who prioritize traditional approaches to qualitative rigor. The early stage of GenAI adoption in higher education limited the ability to provide a more detailed explanation of how AI-generated findings were reviewed, triangulated, and interpreted. Future studies should expand on these procedures by offering clearer documentation of verification processes, criteria for judging alignment between human and AI analysis, and strategies to mitigate potential biases introduced by algorithmic tools. Such attention to methodological transparency will be critical as AI becomes more deeply embedded in qualitative research practices.

The TPaCK framework was introduced as the theoretical foundation of this study because it provides a robust lens through which to examine the integration of technology, pedagogy, and content knowledge in higher education. While the model has been widely validated across multiple contexts, the present findings illustrate its continued relevance for understanding how faculty navigate the opportunities and challenges of GenAI. By situating participant responses within each of TPaCK's core dimensions, we can highlight how their reflections and practices demonstrate alignment with the model and offer guidance for broader adoption. Participant responses consistently reflected the technological knowledge (TK) dimension of TPaCK. Faculty described both enthusiasm and caution regarding their use of GenAI tools, ranging from classroom applications such as ideation exercises and communication support to concerns about creativity and academic integrity. These responses highlight how instructors are grappling with the affordances and limitations of emerging tools while considering their fit within disciplinary and institutional contexts. Importantly, several participants emphasized the importance of understanding GenAI's constraints and teaching students to critically evaluate outputs, which reflects a sophisticated form of technological literacy consistent with TK.

The pedagogical knowledge (PK) component was evident in participants' reflections on teaching philosophies and course design. Instructors stressed the need to maintain active, student-centered learning approaches, including formative feedback, communication-based assessment, and experiential tasks that promote critical thinking. Faculty positioned GenAI not as a replacement for pedagogy but as a complement that can enhance inquiry, scaffold student learning, and democratize access to ideas. This alignment underscores that the pedagogical core of TPaCK remains central even as instructors experiment with novel technologies. The content knowledge (CK) dimension was reflected in participants' emphasis on grounding GenAI applications in disciplinary knowledge and core skills. Faculty cautioned that students must not bypass foundational content in favor of AI-generated outputs, noting that deep engagement with subject matter is essential for meaningful learning. For example, participants highlighted the need for students to understand the fundamentals of programming or communication before relying on GenAI assistance. These responses reinforce the TPaCK principle that technology integration should always be tethered to the integrity of disciplinary content.

Finally, the intersections of TPaCK were evident in participants' strategies for embedding GenAI into curricula. The combination of TK, PK, and CK surfaced when faculty described redesigning syllabi to include guidelines on GenAI, developing assignments that integrate AI as a dialogic partner, and envisioning its role in fostering independent and lifelong learning. These practices demonstrate how instructors are negotiating the complex interplay of knowledge domains in real time, offering empirical support for TPaCK's explanatory power. Taken together, these alignments suggest that the TPaCK framework not only provided a conceptual foundation for the study but also offers a meaningful structure for interpreting faculty experiences with GenAI. By explicitly linking participant responses to the framework, the analysis underscores that successful integration of emerging technologies in higher education requires balanced attention to technological affordances, pedagogical intent, and disciplinary integrity. This connection strengthens the study's contribution by situating early experiences with GenAI within a well-established theoretical model while pointing toward future refinements that consider affective and ethical dimensions of technology integration.

Although this study is grounded in a qualitative research design, we acknowledge that certain terms such as "measure," "evaluate," and the use of numerical ranking scales may convey a quantitative orientation. These terms were intentionally incorporated to capture faculty participants' self-assessments of their comfort levels with technology integration. The purpose of including ranking scales was not to generate statistically significant comparisons but rather to serve as entry points into reflective dialogue. In this sense, the rankings functioned as prompts for richer narrative responses, allowing participants to contextualize their scores with examples and explanations. This approach aligns with qualitative traditions that use structured prompts or ordinal indicators to elicit deeper, more descriptive data rather than to quantify phenomena.

The interpretation of these data therefore remained qualitative. For example, when participants rated their comfort level with technology between seven and nine, the emphasis was not on the numerical distribution itself but on the stories, experiences, and philosophies that accompanied those ratings. The subsequent analysis drew from thematic coding and clustering, supported by GenAI tools and validated through manual checks, to identify patterns across participants' reflections. Thus, while the language of "measure" or "evaluate" appears in the reporting, the analytic process privileged meaning-making, interpretation, and contextualization over numeric generalization. Future research could make this distinction more explicit by clarifying how hybrid prompts—those with quantitative features—are interpreted qualitatively, ensuring readers recognize that the core methodological orientation remains firmly qualitative.

The data will be discussed through the following categories, which were used for data collection:

1. **What is your current experience and comfort level for integrating any type of technology into your teaching** (rank from 1-10; 1 being very low, 10 being very high - also try to describe how you came to this rating by sharing a specific example of integrating technology)**?**

All participating faculty demonstrated a high level of comfort in integrating technology into their classrooms. While the comfort levels ranged from 7 to 9, each educator expressed the belief that technology serves as a vital tool in enhancing the educational experience. While some expressed a strong degree of comfort integrating technology into their teaching, their collective view converges on the need for purposeful and contextual integration of technology, emphasizing its role as a means to an end rather than the end itself.

P1: "I try to integrate the most emerging technologies if I can."

P2: "The spaces in which I've played some examples more specifically of that include things like I've been using probably since 2015, Twitter and Instagram in my classes."

P3: "I believe tech is the future, and if we do not integrate tech as part of our classroom, we are limiting our students' capabilities."

P4: "Our students are supposed to be trained to be decision-makers, to be evaluators, critical thinkers."

While integrating technology brings transformative changes to teaching methodologies, faculty underline the importance of not sacrificing foundational learning. They stress the obvious, that **technology should complement, not replace, traditional educational methods.** Faculty recognize the need for pedagogical adjustments to accommodate the rapid advancements in technology. Aiming to create a dynamic learning environment that encourages students to critically engage with technology while understanding its limitations. For example, the quote points to the idea that technology is one of many tools students should learn to use judiciously, reinforcing the need for a balanced, well-rounded education.

P4: "Our students are supposed to be trained to be decision-makers, to be evaluators, critical thinkers. And so, they know which tool to use at what time?"

2. **Please summarize your current Teaching Philosophy, followed by specific ways in which it might be updated by using GenAI in your teaching.**

Across the discussions, several key themes emerged, providing a comprehensive view of educators' relationship with technology and its integration into their teaching philosophies. Firstly, there's a pronounced emphasis on the Constructivist approach, with participants championing "learning by doing" and the importance of hands-on experiences. This idea is further supplemented by the belief that students benefit most when they actively engage with their education, whether that's through building projects or critically analyzing topics. As one participant remarked,

P2: "The overarching philosophy might not change, but the methods and tools integrated into teaching would."

The evolution and adaptation of teaching methodologies with the emergence of new technologies, particularly GenAI tools, stood out as another dominant theme. While participants recognized technology as a means to an end, there was a shared sentiment on the importance of its context and the desired learning outcomes. As another participant noted,

P3: "I see [GenAI] as another road that you might be taking,"

suggesting that while GenAI and other technology tools have their place, they should be used judiciously and in alignment with broader educational goals.

Furthermore, there is a strong emphasis on nurturing critical thinkers. Educators encourage students to be inquisitive, to question existing knowledge, and to evaluate the tools they use, including GenAI. The goal is not just to integrate technology for its own sake but to ensure it aids in achieving desired learning outcomes. The introduction of GenAI and other such tools are viewed as beneficial, complementing existing teaching methods, and offering personalized assistance. However, they are also seen as tools to be critically evaluated, with one educator stressing the importance of questioning and understanding,

P4: "Don't take everything I've said at face value, question everything."

Lastly, while participants see the potential of GenAI tools to aid in their teaching, they also emphasize their core focus: the student. They aim to foster independent, lifelong learners and to adapt their methodologies to best serve their students' evolving needs in the rapidly changing technological landscape. As one participant insightfully put it,

P1: "My goal is always centered around the students. They can become the best of themselves."

3. **What is your perspective of GenAI for teaching** (pedagogy or policing; embrace or ban; Academic Integrity, Intellectual Property, etc.)**?**

All of the participating faculty agreed that **GenAI will emerge as a powerful tool to enhance learning**. They would like to embrace it into their pedagogy instead of banning, even some of them are aware that schools have a policy banning GenAI for academic work. The participants believe GenAI has the potential to empower students with improved critical thinking skills and problem-solving abilities, and improve their learning.

P1: "I'm more on the side of pedagogy than policing, I see this as a better Google in many ways. I see it as a productivity enhancer for students."

P3: "I feel strongly, positively towards it because it is a tool that can enhance the learning process. I believe it will benefit us and our students because they will use more advanced technology."

However, the participating faculty all emphasized the importance of **contextual adaptation of the employment of GenAI in education**. The challenge of integrating GenAI into the classroom teaching lies in striking a balance between utilizing AI as a valuable tool and ensuring that students comprehend the foundational principles of their subjects. While GenAI offers unprecedented efficiencies, educators emphasize the importance of students developing a deep understanding of the core concepts underlying their disciplines. Students should not solely rely on GenAI content, but rather employ it as a supplementary resource alongside traditional learning methods. Students have to have the domain knowledge and critical thinking skills to create great work. Some of the foundational knowledge will be critical to use GenAI. Instructors need to ensure this fundamental knowledge is learned and mastered rigorously.

P1: "But just taking whatever GenAI generates is not enough. If you don't know the fundamentals, the structure, the syntax (of a programming code), you don't really understand. So we can't embrace it to the detriment of having our work product out of our own hands."

The participating faculty also acknowledge that while the incorporation of GenAI in teaching brings transformative potential, educators and institutions must grapple with **ethical concerns**. Academic integrity and intellectual property are paramount considerations. The ease with which AI-generated content can be misconstrued as original work raises concerns about maintaining academic honesty. Faculty play a vital role in **educating about the responsible use of GenAI-generated materials, emphasizing the importance of proper citation and original thinking**. Striking a balance between the benefits of GenAI and the preservation of ethical academic standards remains an ongoing challenge.

P1: "There are a lot of lawsuits currently ongoing against the company behind ChatGPT and others related to its training data. Many artists are actually getting together and suing Microsoft and OpenAI."

The participants stressed that pedagogical adjustments become imperative to effectively incorporate GenAI content into curricula. Educators are tasked with guiding students on how to interact with GenAI tools, interpret their outputs, and critically evaluate their validity. This involves adapting teaching methodologies to integrate GenAI resources seamlessly. Instructors play a pivotal role in fostering a dynamic learning environment where students explore GenAI's potential while understanding its limitations. Faculty should focus on actively understanding how GenAI can be used effectively in teaching.

P2: "I would ask the students to provide a list of the prompts they used for GenAI."

P2: "I would use more assessment methods that can reveal students' thought-process, not just the final work product. I have been using oral exams to carry a one-on-one conversation to probe students' understanding. For assignments, I ask students to write about their problem-solving strategies along with the work they present."

4. **What additions will you make to the technology section of your syllabus (how you will use, encourage, ban, support GenAI for learning)?**

All participating faculty members claimed that they will adjust their syllabi to include AI-related information, reflecting the assessment and pedagogy shifts driven by GenAI.

P2: "I would clearly mention in my syllabus that students are encouraged to use GenAI. But I would ask them to provide an appendix or list of the prompts they use. Depending on the class, I may also teach my students how to generate good prompts."

There was a consensus that **an introduction** to set the context for the conversation and acknowledging the benefits and challenges of GenAI would be necessary. They all believe it is critical to share with students **the limitations of Gen AI** and **the importance of understanding foundational knowledge** to use GenAI effectively. The participants expressed enthusiasm for collaboration on creating guidelines about the appropriate use of GenAI.

P3: "At the beginning, I would let students know that I know that (GenAI) is available. I use it myself and understand that it has benefits, but I'd like you to know what it doesn't do, or what it gets wrong, so that you're informed. I would like them to give me a list of prompts."

The participants mentioned that it is also important to help students understand that while GenAI holds transformative potential, concerns emerge regarding its limitations in tasks requiring creativity. Educators should address the potential shortcomings of AI-driven solutions in terms of generating innovative and imaginative outputs. The depth of creativity remains distinct human attributes that GenAI struggles to replicate. Discussions should highlight the necessity for students to cultivate their creative thinking abilities, emphasizing that GenAI should complement rather than supplant human ingenuity.

P1: "For example, try to have GenAI write a good song like a songwriter would write."

All the participating faculty agreed that incorporating GenAI-related content also prompts **a shift in assessment methods** towards communication-based evaluations to ensure students can articulate their ideas. The participants recognize the significance of students being able to articulate complex ideas, theories, and solutions clearly and coherently. Assessments that require students to explain the reasoning behind their AI-related decisions encourage effective communication and foster a deeper engagement. This shift in assessment should also be communicated in the syllabus.

5. **What specific GenAI strategies will you be integrating this coming term** (share a sample template or activity, and how do you plan to measure the impacts on learning outcomes; how do you anticipate your students will use GenAI to further engage in your course)**?**

Faculty participating in this study shared several specific examples of how they would integrate GenAI in this upcoming course, along with the verbiage that they will include in Appendix C:

Integrative Approach to GenAI in Curriculum

The unanimous consensus among participants is the elevation of GenAI from merely an ancillary tool to a central component within their courses. This encompassing shift warrants modifications to the anticipated learning outcomes, ensuring learners not only assimilate the theoretical facets of GenAI but also engage with its tangible utilities.

P1: "I'm planning on using at least introducing the major categories of generative AI... then I'll have them use it."

P4: "I'm asking them to start by asking ChatGPT to do that to share the prompt and then to share what's generated. GenAI in pedagogy is a necessity. It has to be there. It has to be engaged. It has to be involved."

Advancing Pedagogical Paradigms via GenAI

Beyond the confines of traditional pedagogy, learners will immerse in experiential sessions, engaging with AI-infused assignments shaped by GenAI insights. Furthermore, the prospect of students refining GenAI strategies highlights the transformative impact of this integration.

P1: "So I'll be integrating GenAI. I like to have them try to develop new ideas for ways that they can solve certain issues."

P4: "This is really about the way that technology is dialogic. One of my colleagues did a ChatGPT presentation and he explained that it can be democratizing for people."

Fostering Analytical Acumen with GenAI

GenAI's introduction is postulated as an impetus to cultivate students' analytical prowess. Engaging with GenAI outputs—comprehending, interrogating, and critically appraising them—students will be afforded unique analytical opportunities.

P1: "One example [of GenAI] I like to do is have them try to develop new ideas for ways that they can solve certain issues. Using GenAI to produce artifacts goes along with this process of thinking about how technology helps your government or your business or your neighborhood. It tests what they produce and what this technology is producing."

P4: "I have four assessments, and four papers, and all of those papers will use as part of that process our experience and students' individual experience with creating a prompt for that same response, instead of writing their own and then sharing that prompt."

GenAI: A Collaborative Beacon in Learning

Moving beyond its conventional role, AI is envisioned as a proactive collaborator in the educational journey. Be it through dynamic interactions, tailored learning suggestions, or cooperative endeavors, learners can be an engaged liaison with GenAI.

P2: "I want to make it clear that I'm aware they can use GenAI, and they are encouraged. But I want to know how they are using it, and I want to teach them how they can use it."

P4: "This is really about the way that technology is dialogic, that we, with the technology, do something. And what might that mean for us? Not just intellectual property or academic integrity, but also the idea of superficiality."

Persistent Engagement and Exploratory Avenues in GenAI

Recurring workshops, seminars, and collective debates centered on GenAI will bolster academic awareness.

P1: "I plan on at least introducing the major categories of GenAI. One example I like to do is have them try to develop new ideas for ways that they can solve certain issues."

P4: "Ask students to write a bibliography about the space of loneliness. All of these are building out of that approach."

GenAI's Foray into Ideation

The aspiration is to channel GenAI's aptitude into an iterative approach where students can be creative and observe the cause and effect.

P1: "I like to have them try to develop new ideas for ways that they can solve certain issues. So let's say, aspects of climate change. It could be reducing your own personal energy use, as an example."

GenAI: A Dialogic Protagonist

The portrayal of GenAI as a dialogic entity, championing an ongoing discourse between tech and user, carries important implications.

P3: "What I want to do in terms of an activity is to show them how GenAI works with dialogue. If we can suggest the idea that ChatGPT can make teaching more efficient because it offers alternative methods for interacting with conceptual frameworks."

Navigating the Quandaries of GenAI

In an era teeming with GenAI marvels, the looming risk of learners leveraging AI shortcuts necessitates a renewed commitment to genuine understanding beyond mere accomplishment.

P4: "There will be some students who take a different approach, especially because we're not asking them to actually turn in the research paper, but we're asking them to in the prompts."

6. **What is your vision for GenAI in higher ed pedagogy for the future?**

A common argument might suggest that the evolution of GenAI to write efficient code could make the discipline of computer science redundant. Such an assertion parallels historical apprehensions that arose with the introduction of calculators, suggesting that they might endanger the field of mathematics. However, just as calculators did not diminish the need for mathematicians but instead amplified their efficiency and scope, GenAI promises to act as a universal enhancer rather than a substitute.

Dynamic Curriculum Development

With the ability to tap into a comprehensive knowledge reservoir, educators can harness GenAI to revamp curricula, ensuring they remain current.

P4: "Pedagogy is a necessity. It has to be there. It has to be engaged. It has to be involved."

Fostering Deep Engagement

GenAI, as a participative educational tool, has the potential to pique student intrigue, eliciting more engagement through its ability to provide tailored illustrations and auxiliary resources.

P2: "The students can build learning relationships with the AI when we know how to use it."

Promotion of Multidisciplinary Exploration

GenAI's unique capacity to weave connections across diverse academic terrains can pave the way for innovative interdisciplinary endeavors, offering a new lens.

P4: *"They're going to be nurses or geologists... wherein they can deal with this kind of technology. It will make them better."*

Facilitating Personalized Learning Pathways

Embracing the multifaceted learning trajectories of students, GenAI can offer bespoke educational experiences, helping learners navigate through varied learning spaces.

P2: "We have to be able to manage as if GenAI is another party in this learning environment."

Enhancing Capabilities and Democratizing Education

GenAI emerges as a dual-edged asset – for educators, it's an avenue to refine pedagogical strategies, and for students, a reservoir of tailored resources. Its potential to democratize content holds the promise of going beyond traditional boundaries, be they geographical or socio-economic.

P4: "It's important to remind ourselves that we need to work with and that we continue learning with technology."

Limitations

The study is limited because integrating GenAI into higher ed pedagogy is new; the goal was not to answer all questions, but to provide empirical evidence of how faculty are integrating GenAI into teaching. This includes comparing teaching philosophies, updating technology requirements in syllabi, and exploring the correlation between experience/comfort with technology integration. The study also examines how faculty perceive the impact of GenAI on teaching and student performance, as well as its relationship to academic integrity. Identifying unknown variables that may affect instructor and student behaviors when GenAI is implemented on a larger scale is difficult. The study purposely highlights various ways faculty can integrate GenAI without limiting their use or motivation, but emphasizes the need for appropriate integration considering context, student knowledge, and technology accessibility.

CONCLUSION

This study contributes to the growing body of scholarship on GenAI in higher education by documenting how faculty from diverse disciplines and institutions are beginning to integrate these tools into their teaching philosophies, syllabi, and classroom practices. Through a qualitative case study design, supported by AI-assisted analysis, the research highlights both the enthusiasm and caution with which instructors approach GenAI. Faculty emphasized the importance of aligning technology with pedagogy and disciplinary content, consistent with the TPaCK framework, while also raising concerns about creativity, academic integrity, and foundational learning.

The findings suggest that GenAI has significant potential to support more inclusive, accessible, and engaging learning environments when thoughtfully integrated into course design. Participants envisioned AI as a dialogic partner rather than a substitute for human instruction, underscoring its value in scaffolding student inquiry, personalizing feedback, and democratizing access to knowledge. At the same time, the study acknowledges the limitations of relying on emerging technologies for qualitative analysis and the need for continued methodological transparency and ethical scrutiny.

As one of the early empirical examinations of GenAI in higher education, this study offers a foundation for future research on how faculty can responsibly adopt AI tools to enhance learning. Future work should expand the sample size, incorporate longitudinal data on student outcomes, and establish clearer protocols for verifying AI-generated analyses. By doing so, scholars and practitioners can advance the development of evidence-based frameworks that maximize the benefits of GenAI while safeguarding the integrity of teaching and learning.

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APPENDICES

A. Participants' Qualitative Data Responses
B. Raw Qualitative Data Analysis
C. Participant Syllabus Verbiage Addressing Generative Artificial Intelligence.

P1: Associate Professor New York University (NYU): Syllabus and AI-Assisted Activities
P4: Instructor English Colorado Mesa University (CMU) (link to updated syllabus verbiage

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