

Utilizing Generative AI to Counter Learner Groupthink by Introducing Controversy in Collaborative Problem Based Learning Settings

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Abstract

This article highlights the foundational challenge of rapid interprofessional student team formation and the potential challenges that groupthink poses for newly formed teams participating in collaborative problem based learning activities. This article describes a mixed-methods study that addresses groupthink by introducing a generative artificial intelligence-based agent (genAI agent) into the small group processes of student teams engaging in a session of a well-established virtual interprofessional education methodology. The integration of this novel genAI tool into each student team was an intentional pedagogical technique, introduced in response to the challenges that newly formed student teams may encounter as they rapidly come together and potentially contend with the many factors that may contribute to a state of groupthink. The research team observed that the introduction of the genAI agent positively influenced the dynamics of student groups and limited their potential for groupthink, providing a

catalyst for engaged discussion through the introduction of novel and potentially controversial perspectives into their discussion.

Keywords: Generative AI agents (genAI), artificial intelligence in education, Groupthink, controversy, Interprofessional Education (IPE), Virtual Interprofessional Education (VIPE)

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Introduction

The landscape of interprofessional education (IPE) offerings for health professions students is populated with a highly varied set of pedagogical approaches with the goal of bringing students from various professions together in some form to explore professional roles, responsibilities, and areas where mutual support and collaboration might be found in collaborative workforce settings (Oudbier et al., 2024). IPE activities aim to bring vocationally disparate groups of learners together to practice team building and collaboration with members of different professions. In many cases, IPE is a short-term team experiential learning activity, with small groups of students being asked to rapidly engage in the well-established cycle of group: “forming, storming, norming, performing, and adjourning” (Hansen, 2006; Tuckman, 1977). These students are often new to one another yet have been given the task of rapidly moving into a state of successful team collaboration and performance.

One of the well-documented challenges for groups that have not worked through the early phases of small group formation is a potential for the phenomenon of *groupthink* (Janis, 1982, 1972). Groupthink refers to a psychological phenomenon that occurs when a group of well-intentioned people make irrational or non-optimal decisions due to social pressures that lead to conformity (Janis, 1982, 1972). Members of a team suffering from groupthink tend to minimize conflict and reach consensus without critically testing, analyzing, or evaluating ideas, and can occur in educational settings and student teams (Fong, 2010). This state of agreement for its own sake, with either the first or most strongly presented ideas emerging from the group’s collaborative process (Robinson & Held, 2024), does not allow a safe space to raise contrary or confounding points, may impede the collaborative process, and can negatively influence the group’s conclusions and work product.

These challenges of rapid student team formation and the potential for groupthink in newly formed teams are a common occurrence in both physical and virtual classrooms (McGowan-Kirsch & Lohiser, 2021; Soboleva et al., 2021) and is a phenomenon difficult for both faculty and students to identify as it emerges and even more difficult to address.

In this study, we introduced an experiment to counter groupthink by introducing a generative artificial intelligent agent (genAI agent) into small virtual teams of students from varying disciplines engaging in a problem based experiential learning case study activity. This session was conducted using the well-established VIPE instructional methodology for delivering virtual interprofessional education experiences (Showstark et al., 2023).

The essential feature of the genAI agent was its regular introduction of potentially controversial responses to discussion questions being posed to student teams. These generated controversial responses aimed to stimulate individual thinking and introduce divergent viewpoints surrounding complex issues. The desired effect was to move student group discussion to a more productive state where differentiated thought could be more comfortably introduced and explored, reducing groupthink. Furthermore, it was hypothesized that these small student groups would be influenced by their small group faculty facilitator's behaviors and any potential bias, positive or negative, they may possess when integrating the genAI agent into the session.

Literature Review

Setting: Collaborative Training for Health Professions Programs Students

IPE is a required curricular component of United States-based clinical health, allied health professions, and public health academic programs (Grbic et al., 2014). The specific requirements for what constitutes IPE varies between the different professional program competency models (Havyer et al., 2016), meaning that students training for two different roles (e.g., Doctor of Medicine and Master of Public Health) may have differing IPE requirements. Regardless of specific differences between academic programs, all U.S.-based health programs utilize the same shared core interprofessional education competencies developed by the Interprofessional Education Collaborative (IPEC), informed by expert representatives from over 15 core academic degree program associations. This model emphasizes the core competencies for collaborative practice required for successful teaming and collaboration with members of other health sector disciplines represented by four domains: (a) values and ethics; (b) roles and responsibilities for collaborative practice; (c) interprofessional communication; and (d) teamwork and team-based care (Interprofessional Education Collaborative, 2023).

Competencies for AI Use and Collaboration

Against the backdrop of this essential collaborative training requirement for health professions students, there is the emerging reality that artificial intelligence systems and services will continue to proliferate within healthcare settings and the work taking place across the health sector (Alowais et al., 2023; Ray, 2023; Sallam, 2023). The rapid growth and dissemination of AI tools and enhancements to existing educational systems has led to a response within academia to craft competency models for students to help provide training needed for future roles inside and outside the health sector. The new models bring focus to domains such as: (a) basic knowledge of AI, (b) social and ethical implications of AI, (c) AI-enhanced clinical encounters, (d) evidence-based evaluation of AI-based tools, (e) workflow analysis for AI-based tools, and (f) practice-based learning and improvement regarding AI-based tools (Russell et al., 2023).

It is thought that genAI tools may have a specific role in facilitating teamwork, collaboration, and formative assessment (Masters et al., 2025). For example, AI tools may enable students to create and critique each other's work with AI-enhanced guidance, fostering deeper understanding and critical thinking. Russell (2023) underscores the intersection of clinical competencies, AI competencies and collaborative competencies, highlighting AI's potential influence on various clinician roles and responsibilities, the nature of the clinical encounter, and the "impact on team dynamics and workflow" (pp. 350–352). These competencies received

strong support during a recent convening of healthcare and AI experts by the National Academies (Forstag & Cuff, 2023). A recent study of interprofessional student teams and their acceptance of generative AI agents as a part of their team process (Wiss et al., 2025) point to areas of concern for students including ethics and clarity of roles and responsibilities, with direct implications for teaming and collaboration. In summary, there is a dearth of scholarly work at this time providing an exploration between the intersection of collaborative competencies outlined in models such as IPEC (2023) and the workforce and AI competencies put forward by Russell et al. (2023).

Groupthink in Academic Settings

The phenomenon of groupthink has been studied extensively in organizational settings (Hällgren, 2010; Mullen et al., 1994), yet its presence in the academic realm has lacked the same attention from researchers. Packer's study of undergraduate teams and groupthink (2009) indicates that the strength of a student's identity as a part of the community is predictive of their willingness to challenge ideas within their group. Kaba et al.'s (2016) work regarding interprofessional education and groupthink note a direct relationship between factors such as trust, team focus, and team unity, as potentially resulting in unintended levels of conformity, reticence to challenge commonly held positions with divergent thinking, and ultimately leading to the phenomenon of groupthink. Høidal (2023) suggests that coaching on design thinking can improve student team process in this regard, focusing the collaboration on the essential needs and goals of the project, taking emphasis away from interpersonal and affective dimensions of team interaction and conflict when it may arise.

Role of Psychological Safety and Controversy in Team Learning

Closely tied to the challenges related to groupthink are underlying issues of psychological safety, controversy in group process, and its impacts on team learning. A study of short-term teaming assignments with nursing students found that there were improved attitudes towards teaming activities after a two-hour collaborative activity, yet when that teaming assignment was extended across multiple days, no further significant improvement in attitudes was found (Brown & Benson, 2020). These findings align with previous research on the IPE model utilized in this particular study regarding positive student attitudes post-activity (Showstark et al., 2023).

While reported improvements in attitudes from short-term engagement in IPE experiences are often viewed as an instructional success, studies of team performance also indicate that the desire to maintain surface-level positive group dynamics may block difficult conversations (Edmondson, 1999, 2023). Along these same lines, Sanner and Bunderson's (2015) study of team learning found positive correlations between: willingness to engage in challenging discussions, admitting errors, and seeking help, leading to a reduction in team member anxiety and an increase in consideration of dissenting opinions. The question for instructors designing collaborative experiential learning activities then becomes: *How do we make space for dissenting views and controversy to enhance student team processes?*

Methods

Purpose

This study assessed the perceptions of graduate level health professions learners after their participation in a collaborative case study IPE activity that integrated a GenAI agent known as CALIE (the Collaborative Agent for Learning and Interprofessional Exploration) into student discussion groups. More specifically, the authors wished to know how students within varying graduate training and backgrounds would perceive the AI agent in their collaborative discussion groups, not knowing that the AI was intentionally placed as a disruptor of potential groupthink and its underlying causes. Further, we wished to understand the influence that the faculty facilitator tasked with leading the collaborative discussion within each small group might have on students' perceptions of the genAI agent, including any potential bias, positive or negative, towards the genAI agent. To gain a more robust understanding of these areas of interest a mixed methods approach was adopted for the study, which was conducted under Yale IRB #2000024050.

Participants

One hundred and sixty-five learners participated in this virtual case study activity. Of that number, 158 participants opted into the study, which was administered using an online survey after the experiential interprofessional education activity described below. Students were divided evenly across twelve small groups, each led by a faculty facilitator from one of the participating academic programs. The CALIE agent's output was used in every group and students were evenly distributed across groups based on their academic program. Students were informed that the activity was part of a research study twice—during the case study activity itself and once again with the waiver of consent presented prior to their participation in the online survey. These volunteer participants were current students in one of seven different graduate programs preparing students for a role in clinical health, allied health professions, or public health. These degree programs included: Master of Public Health (MPH); Family Nurse Practitioner (FNP); Acute Care Nurse Practitioner - Adult Gerontology Acute Care Nurse Practitioner (AGACNP); Doctor of Physical Therapy (DPT); Doctor of Pharmacy (PharmD); Doctor of Dentistry (DDS); and Physician Associate (PA). Participant demographics are presented in Table 2. To simplify data analysis, all nursing degrees previously reported were collapsed into a single “nursing” degree category.

Learning Design and Research Context

This activity used the previously mentioned Virtual Interprofessional Education (VIPE) pedagogical method (Showstark et al., 2023), an efficacious model used for virtual interprofessional education learning activities that demonstrate IPEC competency (2023) attainment in domains such as collaboration, communication, and ethics. The VIPE method aligns well with and uses many recommendations from a recent meta-analysis of best IPE experience design practices (Oudbier et al., 2024). Findings from this analysis suggest that features such as development of knowledge about professional roles and responsibilities, utilization of active learning and student-centered activities including problem based learning,

integration of technological support, reflection, and pre-briefing and debriefing activities can lead to successful learning outcomes.

Students were provided with asynchronous preparatory case materials to review in advance of a synchronous 180-minute problem based learning (PBL) session focused on a specific patient and her family within a fictional community's response to the opioid crisis. Preparatory materials included: a text-based medical case involving an individual who had recently suffered an overdose; a companion video to the case involving the mother of the patient and a physician associate (PA) discussing the patient's history and next steps in her treatment and recovery; a community snapshot document containing details on the local population, its health, related social determinants of health; and a companion video to the community snapshot featuring a planning call between the county's Public Health Director and the Chief Medical Officer of that county's primary addiction and rehabilitation facility. Along with these for required components, optional materials were also provided so that students could familiarize themselves with the roles and responsibilities of the other health professions students they would be collaborating with during this activity.

The 165 student participants joined a synchronous meeting platform for the PBL session, and after introductory remarks from the faculty, moved to small groups of 15 students facilitated by a faculty member from one of the academic programs involved. All faculty facilitators from varying professions were provided with a Facilitator's Guide that contained a set of approximately 50 open-ended questions to help guide their group's discussion, as is standard using the previously described VIPE model for virtual interprofessional education. During the opening portion of the small group session, faculty facilitators use the same script to announce the addition of the genAI agent CALIE, stating:

Welcome to our small group discussion session. As noted in the main session, we will engage in an interprofessional exploration of this case study together, driven by all of you and your developing professional expertise. This case activity is also an opportunity for us to explore the value AI may or may not bring to interprofessional teams and their collaboration. At three points over the next hour, I will "voice" for a generative artificial intelligence named CALIE (which stands for Collaborative Agent for Live Interprofessional Exploration). CALIE has reviewed the case materials just as you have and was posed the same questions we are considering in this session. We will integrate CALIE's output into our group discussion.

Constructing CALIE—Technical Overview

The Collaborative Agent for Live Interprofessional Exploration (CALIE) was developed by the faculty leading this activity using ChatGPT 4.0. A new session was created in ChatGPT, with introductory prompting that outlined the following parameters: (a) In this session we would be creating and then interacting with a new AI agent named CALIE; (b) CALIE was being created to ingest a set of robust case study materials in order to respond to complex open-ended questions; (c) CALIE was asked to respond to all questions as if it were a health services delivery expert, with knowledge of the opioid crisis; (d) CALIE was informed that its responses would be shared with students training for health professions roles, as a part of a class discussion activity, and to shape its responses accordingly. After this initial prompting, the previously

described case study materials were uploaded into the ChatGPT session. The rudimentary CALIE agent was then considered ready for prompting using the same PBL questions located in the faculty facilitator guide.

The faculty designers of this activity found CALIE’s initial responses to sample PBL questions to be factually accurate yet lacking the same levels of sophistication and creativity that would be expected of the graduate students who would be participating in the activity. It was through this initial faculty exploration of CALIE’s abilities that the instructional strategy of prompting for potentially controversial responses arose. To help standardize the student experience across multiple small group sessions, and ensure that all students received the same output from CALIE when responding to the PBL questions from the facilitator guide, CALIE was prompted with questions prior to this activity. This allowed the faculty to select the most instructionally appropriate and valuable responses. Those responses were then inserted into the Faculty Facilitator Guide for each facilitator to read aloud as the “voice” of CALIE during the VIPE session.

Use of CALIE in the VIPE Session

During each small group session, faculty facilitators led their students through a discussion of no more than 10–15 of the larger set of 50 questions located in the facilitator guide. At natural breaks in the discussion identified by the facilitator, a new question would be introduced, and when that facilitator deemed appropriate, voice aloud the previously generated output as CALIE. Students then had an opportunity to respond to CALIE’s response, evaluate it as needed, and build it into their larger discussion of the question being considered. After the 60-minute small group session, all students and facilitators were brought back to the main virtual meeting room to debrief their experiences in their small groups, share their findings related to the case study, the questions provided, and conclude with an open-ended discussion regarding their experiences interacting with the output from CALIE.

Table 1

PBL Questions and CALIE Responses

| PBL Question | CALIE Response—GenAI Agent |
|---|---|
| Are there gaps at the community health services level that you would recommend local leaders consider? Think about the call you watched and also the “Community Health Snapshot” pre-reading. | Local leaders should consider outsourcing certain health services to private companies. While controversial due to potential profit motives, this could bring efficiency and innovation lacking in public systems. It might bridge gaps highlighted in the “Community Health Snapshot” by leveraging specialized expertise and resources, albeit at the risk of privatizing essential services. |

Who are the other stakeholders relating to this issue, in this community, and what do you imagine their roles would be?

Other stakeholders could also include local law enforcement agencies. They might serve a dual role: enforcing drug laws while also assisting in harm reduction efforts, such as providing safe spaces for drug use and facilitating access to treatment instead of punitive measures. This could involve training officers in overdose response and diversion programs, challenging traditional approaches to drug enforcement.

What are the resources (community or otherwise) that the: Patient would benefit from? Family would benefit from?

The patient could benefit from controversial resources such as safe injection sites, where they can use drugs under supervision, and harm reduction programs providing clean needles and overdose prevention kits. The family might benefit from controversial interventions like tough love strategies, where they cut off support until the individual seeks treatment, and involuntary commitment laws allowing them to force the patient into rehab against their will.

Quantitative Data Analysis Procedures

Responses were analyzed using a combination of repeated measures ANOVA, multivariate ANOVA, and correlation analysis. Repeated measures ANOVA was used to compare responses to the questions related to perceptions of AI. Multivariate ANOVA was used to examine AI perceptions by whether or not the facilitator influenced participants perceptions of AI. Finally, a correlation analysis was used to examine the relationship between perceptions of AI.

Qualitative Data Analysis Procedures

The single source of qualitative data collected was derived from a survey instrument that captured participant comments. In total, 158 sets of participant comments were analyzed. These comments were analyzed using categorical coding (Maxwell, 2005). This less structured approach to analysis was chosen to foreground internal validity and contextual understanding (Miles & Huberman, 1994), allowing the researchers to bound results based on the socio-contextual factors emerging from this specific IPE event. To this end, comments were coded using an open coding approach to assign meaningful categories to grouping of participant comments (Charmaz, 2006). These comments were coded in related groupings before a categorical cluster was assigned to identify similar patterns in the data (Saldaña, 2016). Beyond this systematic review of comments, the researchers benefited from their experience with similar IPE events to understand the setting, context, and participant experience and identify emergent patterns (Janesick, 2011). From these clusters coalesced patterns that linked to the study design

and purpose noted above (Richards & Morse, 2013). The results of this analysis are detailed in the qualitative results section below.

Results

Quantitative Results

Quantitative analysis began with an analysis of participant perceptions of AI as useful, helpful, and as part of their team. A repeated measures ANOVA revealed that levels of agreement differed between all three items, $F(2, 156) = 26.01, p < .001$. Participants showed the greatest agreement with believing AI can be a useful tool ($M = 3.49$), followed by finding the AI's feedback to be helpful ($M = 3.21$), and finally perceiving AI as part of the team ($M = 2.88$). Pairwise comparisons between each item revealed all three to be significantly different from each other (all $ps < .001$).

We then examined whether specific facilitators had an impact on participant perceptions of AI. A multivariate ANOVA revealed that participants who reported that the facilitator influenced how they responded to and integrated the AI into their group's work indicated more positive sentiments toward AI on all three questions. In the context of leader influence, we then examined perceptions of *input from AI as if it were part of the team*. Participants reported greater agreement when they reported that the facilitator influenced the group response ($M = 3.08$) than when they said there was no facilitator influence ($M = 2.64$), $F(1, 156) = 5.96, p = .02$. Participants also reported greater agreement with the statement that *AI can be a useful tool in health sector work* when they also reported facilitator influence ($M = 3.67$) than when they reported no facilitator influence ($M = 3.26$), $F(1, 156) = 5.70, p = .02$. Finally, for the statement regarding *usefulness of AIs feedback in supporting the group's work*, when participants reported facilitator influence there was greater agreement ($M = 3.44$) than when they reported there was no facilitator influence ($M = 2.93$), $F(1, 156) = 10.26, p = .002$.

While there were clear differences on these three items regarding perceptions of AI, it was also found that they were all positively correlated with each other (all $ps < .001$; correlation coefficients are displayed in Table 4). This suggests that positive perceptions of AI in one dimension will result in a greater likelihood of finding AI valuable in other dimensions as well.

Table 2

Participant Demographics

| | | N |
|--------|-------------------------|-----|
| Age | 18–24 | 30 |
| | 25–34 | 99 |
| | 35–44 | 18 |
| | 45–54 | 8 |
| | 55 or older | 3 |
| Gender | Female | 119 |
| | Male | 35 |
| | Non-binary/third gender | 1 |
| | Other | 2 |

| | | |
|----------------------|---------------------|----|
| | Not disclosed | 1 |
| Professional Program | Public Health | 65 |
| | Nursing | 36 |
| | Pharmacy | 28 |
| | Dental | 16 |
| | Physician Assistant | 8 |
| | Physical Therapy | 1 |
| | Not disclosed | 4 |

Table 3

Overall Item Means, and Means by Response to Facilitator Influence

| | Overall | Facilitator Influence— Yes | Facilitator Influence— No |
|--|---------|-------------------------------|------------------------------|
| I perceived the input from artificial intelligence as if it were part of the interprofessional team. | 2.88 | 3.08 | 2.64 |
| Going into this activity, I believed that AI can be a useful tool to support health sector work and collaboration. | 3.49 | 3.67 | 3.26 |
| Artificial intelligence's feedback was helpful in supporting my group's work on the case. | 3.21 | 3.44 | 2.93 |

Table 4

Inter-item Correlations

| | I perceived the input from artificial intelligence as if it were part of the interprofessional team. | Going into this activity, I believed that AI can be a useful tool to support health sector work and collaboration. |
|--|--|--|
| Going into this activity, I believed that AI can be a useful tool to support health sector work and collaboration. | .56 | - |
| Artificial intelligence's feedback was helpful in supporting my group's work on the case. | .51 | .58 |

Note. $p < .001$

Qualitative Results

Participants expressed perspectives on the AI team member in three affective categories: (a) the AI's qualities as a teammate, (b) the AI's enhancements to the group, and (c) the challenges presented by AI's inclusion in the group. Within each category, participants' perspectives coalesced into three more broadly shared perspectives regarding characteristics of the AI and its function within the group dynamic. Table 4 below presents these results accompanied by relevant participant quotes drawn from the survey data.

Table 5

Categories of Shared Participant Perspectives

| Affective Category | Shared Perspectives | Participant Quotes |
|--------------------|---|--|
| AI as a teammate | | “While the input from AI clearly showed a wealth of knowledge on the topic, its response lacked consideration of what other team members had already said because it wasn't directly part of the discussion and had essentially come up with their answers in a vacuum (ie CALIE wasn't listening to other's responses and responding accordingly, as the rest of us were).” |
| | genAI outputs are not aligned with typical human interaction or human connection. | “I am not sure how AI would work in relation to interprofessional teamwork and collaboration. I believe with AI there could be potential for error or miscommunication.” |
| | | “I don't feel I would trust the responses from AI based on answers it gave our group today.” |
| | | “The AI wasn't actively participating in the discussion (ie we weren't continuing to type in questions to the AI bot), I didn't necessarily perceive it to be a member of the team.” |
| | | “There is no discourse [from the AI].” |
| | | “There is no human connection to AI so it is more challenging to get a humane response that consists of empathy.” |
| | | “It was a little out of the blue and didn't fit in context.” |
| | | “We did not ask the AI what it thought of the group's ideas.” |

| | | |
|---------------------------|--|--|
| AI as a teammate | The genAI's contribution s perceived as a part of the team process. | <p>“It was another team member giving their opinion and expertise.”</p> <p>“I viewed it as a resource.”</p> <p>“AI can contribute the same as data from a team member.”</p> <p>“I did see AI as part of the team, but it is also a mental block that it is AI and not a human being responding to the questions.”</p> <p>“I treated it like another group member.”</p> <p>“It was interesting to see the perspective that the AI had...I obviously knew it was AI, but it still informed conversation.”</p> |
| AI as a teammate | genAI's inability to draw from lived experience limited its team contribution s. | <p>“I think team members not only bring knowledge but professional and personal experience which makes their input invaluable.”</p> <p>“There is no human aspect that makes an interprofessional team work well.”</p> <p>“AI does not have its own ideas, it would be the same as a team member searching through the literature for ideas and bringing them to the table. I think it is more useful in keeping people building on ideas.”</p> <p>“It's difficult for the AI to see human error or add the unexpected nature of human actions. We, as healthcare providers, have human and patient interaction experience which is valuable in our discussion of the opioid crisis and possible solutions to our current problem.”</p> |
| Group Enhancement from AI | genAI responses prompted group ideation. | <p>“The responses from AI definitely made our group think more about our answers.”</p> <p>“It helped to stimulate diverse conversations.”</p> <p>“AI's feedback allowed different perspectives and thinking to emerge and challenge the current ideas that we have in place.”</p> <p>“I think AI's response to the questions help elicit critical thinking from our group.”</p> |

| | | |
|---------------------------|---|--|
| | | <p>“CALI provided quite an outside-the-box suggestion that no one suggested within our group.”</p> <p>“It provided another viewpoint to discuss.”</p> <p>“The AI responses more-so helped to serve as discussion prompts for the group...it more served as a resource for discussion prompts for our group.”</p> <p>“I think that it can help provide an alternative thought process that may not be contributed by other members.”</p> |
| | | <p>“The generative AI prompts gave us different discussion topics. I think this is useful to change the dynamics and give other people a chance to speak.”</p> |
| Group Enhancement from AI | AI agent’s prompting helped to initiate group discussion | <p>“It allowed and facilitated a good flow within our discussion.”</p> <p>“I think it helped initiate some conversations between group members from different disciplines.”</p> <p>“AI was helpful in that it helped create conversation. However, it was not helpful in providing concrete direction.”</p> |
| | | <p>“I think it was beneficial in creating group discussion.”</p> |
| | | <p>“We disagreed as a group with most of the AI responses and that consensus was helpful in solidifying our own responses and thoughts.”</p> <p>“We didn’t really agree with any of her answers. I guess it opened the conversation as to why we disagreed.”</p> |
| Group Enhancement from AI | AI agent’s contrarian viewpoints provided discussion material for the group | <p>“AI generated some great ideas but also some that were unpopular with the group. However, this presentation of ideas, however unpopular, is an important aspect of effective problem-solving and definitely added value to the conversation.”</p> <p>“We didn’t necessarily agree with its ideas, but at least it got us thinking.”</p> <p>“While we didn’t really agree what the AI feedback said, it allowed us to talk through the points that were said. We were able to talk about how we agree/disagree about what the AI said in our own disciplines, so it allows us to think more critically.”</p> |

| | | |
|---------------------------|--|--|
| Challenges with the AI | AI's lack of humanity was apparent. | <p data-bbox="594 197 1425 268">“I think it lacks the component of human emotion and experiences.”</p> <p data-bbox="594 306 1425 447">“I think the challenges are that AI lacks the human empathy and human emotion when responding to questions. this could also be seen as a good thing because sometimes we need to take emotion out of the answers to our questions.”</p> <p data-bbox="594 485 1425 520">“AI took a lot of empathy away from responses.”</p> <p data-bbox="594 558 1425 667">“It’s easy for AI technology to make sweeping generalizations, but does not have the ability to understand patient care with human emotions (like care, empathy, understanding).”</p> <p data-bbox="594 705 1425 741">“The answers lacked a human aspect.”</p> <p data-bbox="594 779 1425 888">“Sometimes AI does not show the empathetic side of a situation and lists only the facts and figures which may be an issue within the healthcare field.”</p> <p data-bbox="594 926 1425 997">“I felt that AI lacks empathy and it felt very capitalistic in its response.”</p> <p data-bbox="594 1035 1425 1106">“AI wasn’t able to grasp the human factor into their answers and that is one of the reasons why it is not accurate.”</p> <p data-bbox="594 1144 1425 1215">“The AI answers through finding pure data without the humanistic nature of policies, actions, or locations.”</p> <p data-bbox="594 1253 1425 1285">“AI offered objectified insight. Lacked humanism.”</p> |
|---------------------------|--|--|

| | | |
|------------------------|--|---|
| | | <p>“It was like hearing from a politician. Thanks for sharing, but I’m over here in the real world.”</p> <p>“It seems the AI gave responses applicable to ‘in an ideal world,’ and missed some of the nuances of real-life issues/barriers/challenges to caring for people with addiction issues.”</p> <p>“AI cannot represent every unique/specific situation. Each state, each setting, and each individual may have a different situation. It only provides suggestions from a general perspective.”</p> |
| Challenges with the AI | AI’s lack of lived experience was most apparent when situational context was needed. | <p>“AI answers are sometimes not applicable to real life situation...AI generates response from a larger scale rather than concentric around a specific or small pool.”</p> <p>“Not able to bring in personal experiences.”</p> <p>“AI is unable to see patients as individuals. The comments were too broad and not relevant.”</p> <p>“Some of the issues were that the AI didn’t incorporate a lot of the nuances of the questions of considering the holistic situation.”</p> <p>“The answers sometimes did not put into consideration of the dynamics of certain areas or populations.”</p> <p>“I didn’t perceive the AI response as a human response because it hasn’t had the same experiences as we have.”</p> <p>“AI was very ‘1-dimensional.’ It was not capable of providing or using the specific contexts of the case.”</p> |
| Challenges with the AI | Biases perpetuated from, with, and about AI clouded participant perceptions. | <p>“I have realized that one of the challenges with using AI is that I can be biased when interpreting the answers. It’s important to understand that AI doesn’t have emotions and doesn’t answer questions based on personal beliefs or opinions. Instead, its responses are based on the data that has been fed into it.”</p> <p>“It will only worsen and perpetuate racist biases in medicine and has no place in healthcare.”</p> <p>“I think the AI made some excellent points. While AI can help generate ideas, those ideas can sometimes be unreasonable or biased. One must research to understand the cause and effect</p> |

of various health issues. AI can be used to create a study guide or a daily plan to maintain good health.”

“Knowing it’s a machine creates bias.”

“I think AI is not always accurate.”

“There seems to always be a slight bias based on how AI has been designed to lean one way or another. I believe that is the greatest drawback and it was evident that there were some areas that this bot didn’t venture into.”

“I am biased against it—my husband works in data and he and I talk a little too regularly about AI hallucinating things and the inaccuracy.”

“AI has some bias, so some of the answers weren’t the best way to navigate a situation.”

“Maybe it’s AI bias on my part. Knowing that AI is a computer and not a human, I have a difficult time acknowledging the AI’s input as credible or accurate.”

AI as a Teammate

Participants’ perceptions of the AI’s capacity and function as a teammate were centered around human-related factors. In some cases, the AI was perceived as a member of the interprofessional team, and learners “treated it like any other group member” and “viewed it as a resource.” However, the AI was not seen as a substitute for peer learners in dialogue, as several participants noted that AI’s responses were not connected to the typical flow of human conversation. One participant described how AI responses were disconnected from the group’s discussion, “its response lacked consideration of what other team members had already said because it wasn’t directly part of the discussion and had essentially come up with their answers in a vacuum.” Other participants agreed, suggesting “It was a little out of the blue and didn’t fit in the context” and “It was not interactive.” Thus, the AI agent functioned as a resource or initiator of discussion, rather than an active participant in the ongoing development of interactive team processes. Participants also highlighted that it was evident that the AI was not drawing upon lived or professional experience, which influenced its capacity to contribute to team processes. One participant wrote, “I think team members not only bring knowledge but professional and personal experience which makes their input invaluable.” While the artificiality of AI was apparent to participants in its capacity and function as a teammate, participants did emphasize several enhancements that the AI provided to the group discussion.

Group Enhancements from AI

The AI provided several dialogical enhancements for small groups. The AI’s prompts and responses elicited group ideation. Participants noted that the AI responses helped to “elicit

critical thinking from our group” and “helped to stimulate diverse conversation.” One participant noted that this catalyzing effect worked across disciplines: “It helped initiate some conversations between group members from different disciplines.” While the responses were not perceived as natural or human, the resulting group discussion appeared to develop naturally. According to one participant, the AI “facilitated a good flow within our discussion.” The most striking and controversial AI responses appeared to cause the greatest effect in this regard. Participants suggested that the group coalesced its thinking in opposition to the AI in these cases, with one noting how “we disagreed as a group with most of the AI responses and that consensus helped solidify our responses and thoughts.” Another participant agreed that “we didn’t agree with any of her answers. I guess it opened the conversation as to why we disagreed.”

Challenges with AI

Several challenges were foregrounded by participants in terms of working with the AI. The primary challenges described by participants were the AI’s lack of lived experience and subject matter expertise, factors that presented mixed effects. The AI’s inability to account for context or draw from its own professional experience was apparent in how the AI “doesn’t take into consideration the entire picture,” with “answers [that] lacked a human aspect,” including the AI’s inability “to see patients as individuals.” Some participants expressed frustration in working with the AI or giving its responses legitimate consideration. One participant wrote, “It was like hearing from a politician. Thanks for sharing, but I’m over here in the real world.” Other participants expressed concrete issues with the AI’s responses rooted in their discipline: “It seems the AI gave responses applicable to ‘in an ideal world,’ and missed some of the nuances of real-life issues/barriers/challenges to caring for people with addiction issues.”

Related to these challenges were biases from and about the AI agent. Several participants expressed their bias towards the AI that influenced their perceptions, stating, “knowing it’s a machine creates bias,” “I am biased against it,” and “I have realized that one of the challenges with using AI is that I can be biased when interpreting the answers.” Similarly, participants were struck by the biases embedded in the AI’s responses. One learner noted, “ideas can sometimes be unreasonable or biased,” and another suggested, “AI has some bias, so some of the answers weren’t the best way to navigate a situation.” Ultimately, several participants framed their experience with the genAI agent in terms of perceived biases and the human or profession-specific quality of the AI’s responses.

Discussion

This experimental integration of the genAI agent CALIE into a team-based PBL setting yielded a number of notable findings relating to student team formation, processes, and performance. More specifically, our findings address the following areas: (a) student perceptions of the genAI agent; (b) its integration into the student team process; (c) its influence on team discussion and outcomes; (d) the influence each team’s faculty facilitator on the acceptance of the genAI agent; and (e) the essential question of whether introducing controversial viewpoints by a genAI agent can help steer groups away from groupthink.

A benefit identified through this research was the confirmation that inclusion of genAI agents within student teams has the potential to strengthen instructional outcomes related to PBL. These benefits were seen both in terms of team process and the substance of the discussion. Learners reported that the genAI agent stimulated critical thinking in groups, introduced outside viewpoints not present in the ongoing discussion, and provided a launching point for students to analyze its responses using their own disciplinary knowledge and training. Students commented on the quality of the AI's contributions from their discipline-informed perspectives, drawing from their professional training to support or refute aspects of the AI responses. This represented a new way for learners to demonstrate their awareness of professional roles and responsibilities in their interprofessional small groups, thus capturing an essential IPEC (Interprofessional Education Collaborative, 2023) competency outcome.

Disagreement with the genAI agent also appeared to influence teamwork dynamics positively. Learners actively engaged with the agent's responses regardless of perceived quality or relevance of its content. Contrary and adversarial views of the agent, either through baseline mistrust or the nature of its responses, offered students a socially permissible opportunity to speak up against it. Even when the agent replied outside the flow of group conversation, the genAI agent's disconnected responses did not negatively influence its ability to spark further discussion within the team. At times, learners situated the agent in counterpoint to the group's emerging cohesion due to the nature of the agent's responses or their baseline mistrust of AI. In turn, such situations stimulated critical thought and conversation flowing from the resulting group reflection and value ascribed to the agent's responses. This dynamic effectively counteracted passivity or inactivity that can occur in groups of unfamiliar interprofessional learners and practitioners (Dobbeck, 2024; Freeth et al., 2008; Reeves, 2005).

Results regarding bias were complex and messy with regard to participants' perceptions of AI in general and the genAI agent's perceived bias. A subset noted personal negative bias towards AI in their survey responses, and some of the most in-depth responses to the survey prompts were related to that bias. It was also unclear whether participants labeled controversial genAI agent responses as "biased" because they disagreed with the response content. Ultimately, the function of bias from, with, and about AI in an interprofessional learning environment remains a compelling area for future research.

An additional notable finding requiring further exploration is the role that leaders have in shaping team members' perceptions towards genAI agents in their team's process. There was a significant relationship found between a student's belief that their facilitator influenced their perception of CALIE and their perceptions of its helpfulness in the team's work on the case and perceptions of CALIE's role as team member. The research team did not capture information on whether that leader influence was perceived as a positive or negative, nor learner specific commentary on what types of leader behaviors can promote or negatively impact team member perceptions of genAI agents. This finding has direct implications for both academic and workforce settings and is identified here as another area of interest for continued study.

In terms of the potential for groupthink's emergence in small teams during this learning activity, indicators of this phenomenon were not observed in the quantitative or qualitative results. Behaviors known to be impeded by groupthink in academic settings, such as student's

willingness to critically test, analyze, and evaluate ideas (Fong, 2010) were present and in many cases a vibrant part of the reported activity in small teams. Along these same lines, underlying behaviors leading to groupthink including limitations on sharing contrarian opinions (Robinson & Held, 2024) and a tendency to minimize conflict were not observed in student responses. In fact, open discussion of challenging topics appeared to occur robustly in small teams, with focus on issues of trust, bias, and ethics regarding AI's role in both the group's discussion and the larger context of the professional roles these students were training for.

Limitations

The most notable limitation of this research was the use of the CALIE agent itself. Several students noted the lack of interaction with CALIE given that the genAI output was pre-generated and read aloud in the session. While this allowed for more instructor and researcher control over the genAI output in the sessions, these participants rightly note that CALIE was not involved in the ongoing team discussion and processes beyond those brief interjections of potentially controversial concepts. Future iterations of this work should consider a more unstructured utilization of genAI agents like CALIE to study their influence on team processes and phenomena such as groupthink. Variations of this use may include individual student usage, shared team usage, and facilitator or other individuals acting as a mediator between the genAI agent(s) and the student teammates. Additionally, while it was generally understood from the qualitative results that behaviors indicating groupthink did not occur during the 60-minutes spent in teams, this time period itself may have been too brief to account for the initial novelty of the genAI agent to become a part of expected team processes. To address this gap, longitudinal studies of student teams interacting with genAI agents are required to understand their effects on team process and performance over time. Additionally, all health profession student learners are not represented in this study, future studies may want to include other health profession learners such as social workers and addiction sciences. Finally, given that this was some learners' first encounter with a genAI agent in the context of their academic and professional development, the novelty effect may have either amplified or otherwise influenced their experience and engagement in this team based activity.

Further Research

In addition to the areas for further research noted in the discussion, the researchers identified several additional areas for further study regarding genAI agents and their integration into group learning environments. Although participants noted the agent's influence on group dynamics, it was not clear whether the agent's inclusion influenced the group's team development. It is possible that the catalyzing effect the AI agent had on group interactivity allowed for more rapid team development and is noted as an area for further study.

Similarly, participants did not suggest feeling more psychologically safe as they disagreed with ideas put forward by the genAI agent as opposed to the potential conflict that may arise in disagreeing with peers; however, the level of engagement suggested this may be the case. It was also unclear how interacting with a genAI agent influenced learners' understanding of their roles and responsibilities in the group. Exploration of these factors could inform the work of educators and researchers focused on problem based learning and team performance in both

educational and professional settings and expand the growing body of knowledge regarding integration of AI tools to support team collaboration.

Along these same lines, this particular application of genAI's ability to encourage newly formed student groups to challenge ideas and assumptions, both internal and external to the group, stimulating the co-creation of knowledge and steering that group away from a potential state of groupthink, in many ways meets the definition of "humanizing action" (p. 13) as defined in the "Framework for Ethical AI Use that Promotes Humanizing Action" (Swindell et al., 2024). We encourage further research in the area of educational application designs that can support these types of ethical and human-centered interactions.

Conclusion

This research highlights the introduction of a genAI agent into a collaborative problem-based learning setting focused on interprofessional collaboration for health sector professions. The introduction of the genAI agent was observed to positively influence group dynamics of newly formed student groups and limited their potential for groupthink. Our findings suggest that intentionally prompted genAI agents can catalyze engaged discussion by introducing novel and potentially controversial perspectives for students to react to, ultimately steering groups away from behaviors and team processes that may potentially lead to groupthink.

The use of genAI agents in this fashion is a strategic choice for educators and learning designers concerned with both student group process and products they produce. Educators who have perceived challenges with their own team based course activities relating to a lack of student engagement, a tendency to work from a narrow set of perspectives, or symptoms of groupthink may benefit from introducing genAI agents, using an approach similar to the one described here.

This research contributes to the existing literature on genAI in education through its focus on the integration of genAI agents into the processes of newly formed student teams. Our findings suggest that genAI agents can create and then inject new and potentially controversial viewpoints into student discussion groups, thus stimulating student engagement, potentially challenging individual viewpoints, and expanding the lens through which students are engaging in collaboration. While generalizable to many problem based learning settings, these findings are of particular note for interdisciplinary, transdisciplinary, and interprofessional settings where collaboration and team problem-solving between various professional perspectives are required.

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Appendix A

VIPE AI Survey

Q1 What group number were you a part of?

Q2 What is your age?

Under 18 (1)

18–24 (2)

25–34 (3)

35–44 (4)

45–54 (5)

55–64 (6)

65–74 (7)

75–84 (8)

85 or older (9)

Q3 What is your gender?

Male (1)

Female (2)

Non-binary / third gender (3)

Prefer not to say (4)

Other (5) _____

Q4 What is your highest level of education?

Less than high school (1)

High school graduate (2)

Some college (3)

2 year degree (4)

4 year degree (5)

Master's degree (6)

Doctorate (7)

Please include any degrees in progress. (8)

Q5 What professional degree are you representing during today's IPE?

Q6 Artificial intelligence's feedback was helpful in supporting my group's work on the case.

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q7 In a few sentences, please explain how.

Q8 I perceived the input from artificial intelligence as if it were part of the interprofessional team.

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q9 Please explain your response.

Q10 What challenges or gaps did you perceive in working with or incorporating the feedback from artificial intelligence?

Q11 Going into this activity, I believed that AI can be a useful tool to support health sector work and collaboration.

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q12 My small group facilitator influenced how our group responded to and integrated AI into our work.

Yes (1)

No (2)