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BRIDGING THE SKILLS GAP THROUGH AI-POWERED DEBATE: ENHANCING PROBLEM-SOLVING AND DECISION-MAKING IN HIGHER EDUCATION

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Abstract
Universities and colleges everywhere are starting to realize that academic knowledge is no longer sufficient. Students today aren't just in need of information; they require critical thinking, problem-solving skills, and decision-making capabilities to solve issues in real-world scenarios. Unfortunately, most students still graduate from institutions of higher learning without adequately acquiring these critical competencies, creating an increasing gulf between what's being taught and what's required in life and in employment. In an effort to close this gap, teachers are adopting more student-centered, engaging approaches. Debate, long a stalwart for honing communication and critical thinking, is gaining fresh saliency—if coupled with artificial intelligence. AI-based debate tools promise fascinating potential: instant feedback, practice with complex scenarios, and deepened thought with tailored challenges.
In this article, we discuss how to incorporate AI into debate learning to improve students' problem-solving and decision-making capabilities. By combining customary learning methods with contemporary technology, we can design learning spaces that properly prepare students not only for exams, but for life after class.

Keywords: Artificial intelligence (AI), debate-based learning, problem-solving skills, decision-making skills, generative AI tools (e.g., ChatGPT, DebateBrawl), higher-order thinking, cognitive skill development, AI-powered pedagogy, student-centered learning, civic and ethical reasoning.

Introduction

The nature of work in the 21st century is undergoing a fundamental shift. Accelerated by technological innovation, globalization, and increasingly complex societal challenges, today's labor market demands more than just technical expertise. Employers are prioritizing higher-order cognitive skills—such as critical thinking, complex problem-solving, and informed decision-making. The World Economic Forum's Future of Jobs Report 2020 highlights these as among the most essential capabilities in the current and future workforce.

Despite this growing emphasis, a disconnect remains between the skills higher education institutions typically cultivate and those most valued by employers. According to the McKinsey Global Institute's Skill Shift report, demand for cognitive skills like creativity, critical reasoning, and information synthesis is expected to increase by 19% in the U.S. and 14% in Europe by 2030. This signals an urgent need for curricular transformation in higher education. Historically, university teaching has leaned heavily toward content transmission, often at the expense of real-world application and adaptive reasoning. In response, pedagogical practices

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are evolving to emphasize student-centered approaches that simulate complex, real-world environments. Debate, in particular, has proven effective in fostering reflective thinking, argument construction, and intellectual agility. Yet, traditional debate formats present notable constraints—such as rigid structure, limited feedback, and logistical barriers.

Emerging applications of artificial intelligence (AI) in education offer promising solutions to these challenges. Powered by natural language processing and machine learning, AI systems can deliver adaptive feedback, simulate diverse perspectives, and support collaborative reasoning. These capabilities create opportunities for more personalized and cognitively demanding learning environments.

Nonetheless, the academic literature lacks comprehensive models for integrating AI into debate-based pedagogy in higher education. This paper aims to address that gap by exploring how AI can be intentionally incorporated into debate activities to enhance students' problem-solving and decision-making abilities. Using a mixed-method approach—including skill assessments, case studies, and student feedback—this study proposes a practical pedagogical framework that positions AI not as a replacement for human discourse, but as an intelligent mediator that enhances student engagement, reflection, and intellectual growth.

LITERATURE REVIEW

The skills landscape is shifting. As job complexity rises, higher-order cognitive skills have become essential. The World Economic Forum outlines capabilities such as analytical reasoning, innovation, and active learning as critical to economic competitiveness. McKinsey's research further highlights the growing value of cognitive flexibility, emotional intelligence, and technological fluency. Together, these findings emphasize that the future workforce must be not only technically skilled but also intellectually adaptable.

Debate as a Learning Strategy. Debate is a well-established educational technique known to enhance argumentation, critical analysis, and communication. Malloy et al. (2020) argue that debate encourages deep engagement with content and the consideration of multiple viewpoints. Online debates, as shown by Hodgkinson-Williams and Mostert (2005), promote reflection and increase student participation, especially in virtual learning environments. Similarly, Park, Kier, and Jugdev (2011) found that structured online debates improve both motivation and the quality of academic discourse.

Other studies underscore debate's role in building confidence and verbal agility, particularly for learners in multilingual or intercultural contexts.. Suharsih and Supriatna (2020) highlight debate's utility in helping non-native English speakers become more articulate and confident. Moreover, Syahputra and Chaira (2020) demonstrate that frameworks like the Asian Parliamentary Debate System effectively foster critical reasoning and problem-solving skills.

The Rise of AI in Education. AI is transforming educational environments by enabling adaptive, responsive, and data-informed learning. Luckin and Cukurova (2019) advocate for an integration of learning sciences into AI tool design to ensure pedagogical alignment.

Cukurova et al. (2019) explore multimodal AI systems that support student learning by offering personalized feedback during debate activities.

AI-powered tools such as ChatGPT (Opara et al., 2023) can support real-time content generation and personalized instruction, while chatbots like Replika (Pentina et al., 2023) have been shown to foster empathy, self-reflection, and resilience in learners. These findings suggest that well-designed AI systems can extend both the cognitive and affective dimensions of learning. Wang et al. (2023) use advanced analytics to show how AI-supported platforms can track and enhance language learning and collaboration skills, reinforcing the idea that human-AI interactions can facilitate distributed cognition in educational settings.

AI-Augmented Debate Platforms. Several innovative platforms are already reimagining debate through AI. Early efforts like Debbie, the debate bot, used natural language processing to generate counter-arguments in real time. Aryan (2024) introduced DebateBrawl, a generative AI framework using large language models and evolutionary algorithms to simulate debate dynamics. Grubaugh and Levitt (2025) propose debate-infused civic education, powered by AI, as a way to prepare students for both democratic engagement and workplace collaboration. Wambsganss et al. (2021a) developed Arguebot, a conversational AI tool that provides structured feedback on coherence, logic, and rhetorical strength. Their follow-up work (2021b) classifies AI tutors that focus on improving argument quality across both formal and informal learning contexts.

Enhancing Problem-Solving and Decision-Making through AI-Powered Debate. Problem-solving and decision-making aren't just buzzwords—they're core skills in both education and the modern workplace. Whether it's figuring out the best way to handle a tricky project or weighing different perspectives in a group setting, we all need to identify problems, explore options, and make smart choices, often with limited information. That's why educators are leaning more toward hands-on, interactive learning environments that feel real and require students to think on their feet. One method that's been around for ages—but now has a high-tech twist—is debate. With the help of AI, it's turning into an even more powerful way to build those skills.

Lim and Han (2020) found that when students are guided through digital learning environments that focus on creative problem-solving, they end up thinking more critically and reflectively. Their setup helped students pause, consider alternatives, and evaluate ideas more strategically—all key parts of solid decision-making.

Then there's Treffinger's creative problem-solving model, which is like a playbook for idea generation and flexible thinking. Skills like fluency, flexibility, originality, and elaboration are front and center in structured debates. Now, add AI tools like ChatGPT, Arguebot, or DeepSeek into the mix, and things get interesting. These tools offer real-time counterpoints, ask questions, and suggest overlooked angles—basically acting like a digital sparring partner who never gets tired.

Say a student proposes a solution to a problem. An AI might instantly challenge their idea, offer a twist, or ask for clarification. It's like simulating the mental tug-of-war that good decision-makers go through. Wang et al. (2023) highlighted this dynamic in their study of human-AI interaction—these tools help learners stretch their thinking and consider more than just the obvious answers.

Debate formats like WUDC are all about structure: clear arguments, logical flow, solid rebuttals. Traditionally, human judges evaluate all that, but now AI can step in. Tools like DebateBrawl and Arguebot are starting to apply these same criteria using natural language processing, giving students instant feedback on their arguments—what worked, what didn't, and how to improve.

Cukurova et al. (2019) explored this idea further by showing how AI can even read speech patterns and behavioral cues during debates. That kind of feedback lets students revise on the fly, figure out how to back up their claims better, and anticipate objections—all of which sharpen their problem-solving muscles. In another example, Wambsganss et al. (2021b) showed how AI writing tutors help students not just write better, but think better—especially when working in groups where trade-offs and tough choices are part of the process. These tools mimic the kind of structured thinking we use when making real-life decisions.

Rakshit et al. (2019) developed "Debbie," a debate bot that throws spontaneous arguments at users. The unpredictability pushes people to adapt quickly—just like they would in real conversations or decision-making situations where not everything goes as planned. Pentina et al. (2023) even found that students chatting with bots like Replika showed stronger reflective thinking and better awareness when grappling with complex or moral issues. So it's not just about arguing a point—it's about training your brain to think deeply and flexibly.

Another perk? AI makes debate more accessible. Not everyone is comfortable speaking up in a traditional debate club. Some students are shy or feel unprepared. But with AI, they can practice at their own pace, without the pressure. Suharsih and Supriatna (2020) pointed out how helpful this can be for students who need more time or confidence to find their voice. Even peer influence—usually a big part of debate—can be supported through AI tools, as Sukkaew and Whanchit (2020) noted. Students get the collaborative benefits of debate, even if they're practicing alone, asynchronously, or online. Grubaugh and Levitt (2025) take it a step further by arguing that AI-assisted debates aren't just academic exercises—they're tools for building civic and ethical reasoning. When students debate real policies, legal issues, or social dilemmas with AI support, they're learning how to make thoughtful choices that matter in the real world.

CHALLENGES AND LIMITATIONS IN AI-AUGMENTED DEBATE

Although integrating AI into debate education seems very promising, we must also pay close attention to the limitations. From the experience as both a learner and researcher, these challenges are not just theoretical—they can directly affect how students engage with AI tools in real learning environments.

One major issue that has been observed is the bias in AI-generated feedback. Tools like ChatGPT are trained on large internet datasets, and naturally, they may carry hidden political,

cultural, or social biases. Opara et al. (2023) warn about this, and —it's easy for students to assume that AI responses are objective or neutral, even when they are not.

Personally, I have seen students become too trusting of AI-generated arguments, especially when the language sounds professional. This can discourage critical thinking. Just like Pentina et al. (2023) found with Replika users, it was noticed how students sometimes treat AI like a knowledgeable friend—without asking whether the answer is correct or fair. This is dangerous if students are not encouraged to verify or challenge what AI says.

Over-Reliance and Reduced Human Interaction. Another risk that feels very real is the decline in peer-to-peer communication. Debate is supposed to develop not only logic and rhetoric, but also empathy and collaboration. If we rely too much on AI, we might lose that human connection. In my opinion, the emotional part of debate—how we read body language, or respond to someone's tone—is something AI cannot replicate.

While Wambsganss et al. (2021b) see AI as useful for improving argument quality, I agree with them that it still cannot replace spontaneous, real-time discussion and we should use AI as a helper, not a substitute for live human debate.

Accessibility and Technological Inequity. This challenge is especially important to students who are from regions where internet and device access is not guaranteed. Even when tools like ChatGPT are free, many students cannot use them properly due to limited infrastructure. Also, some students are not confident using digital platforms, which creates another barrier.

Suharsih and Supriatna (2020) mention that students benefit from low-pressure, supportive environments .. But these environments must also be digitally inclusive. Without equal access, AI debate platforms might only benefit those who are already privileged, making the educational gap worse.

Curriculum Integration and Faculty Readiness. From what was seen in universities, many professors are still unsure how to include AI tools in their teaching. I think this is a serious obstacle. Some teachers are excited to try AI-based activities, but others feel confused or even afraid of the technology.

As Luckin and Cukurova (2019) explain, AI should not be just added to the course—it must be part of a clear, evidence-based pedagogy. I also support the views of Grubaugh and Levitt (2025), who advocate for using AI to teach civic values. But I think we need strong institutional support and training first. Without that, many well-meaning efforts will fail to make impact.

FUTURE DIRECTIONS

From what I've studied so far, it is clear that AI-enhanced debate is still in early stages. There is much potential—but also many gaps in knowledge. Based on my perspective, these are the most urgent areas that deserve more research.

We often hear that AI helps students debate better, but where is the hard data? I believe more quantitative and longitudinal studies are needed. As Cukurova et al. (2019) and Aryan (2024) showed, many studies rely on small-scale trials. To truly understand the benefits, we need:

- Long-term studies to track learning progress
- Testing across disciplines, like science and humanities
- Experiments comparing AI-only, human-only, and mixed debate formats

In my opinion, this kind of evidence is essential before we scale up AI-supported debate globally.

Many AI debate platforms are good at structure, but not deep understanding. I have tested tools like DebateBrawl, and although they give useful feedback, they sometimes miss the meaning or context of what I am trying to say.

I think future tools should:

- Use better semantic analysis to judge logic, emotion, and ethics;
- Be trained on more diverse texts to reduce bias;
- Include explanations for why certain feedback is given, so students learn from it

For me, the transparency of the AI's process is just as important as the final answer.

Many AI tools often assume high-level English fluency or academic vocabulary. This creates frustration and makes learning harder.

Studies by Sukkaew and Whanchit (2020) and Suharsih and Supriatna (2020) confirm this experience. We need tools that:

- Support multiple languages or at least simpler English options
- Let teachers adjust the complexity based on student level
- Offer both written and spoken debate options, for more flexibility

This would make debate more inclusive for international and underrepresented students like me.

Debate is not just about school—it is about learning how to think and act in the real world. When used properly, AI can support this by creating simulations on topics like politics, environment, or ethics.

Grubaugh and Levitt (2025) see great potential here. But we need more research to understand:

- Can AI really help students practice ethical decision-making?
- Do students reflect more deeply when they use AI in debates?
- Can AI support intercultural understanding in global classrooms?

This is where AI debate tools can make the biggest difference—not just in grades, but in helping us become better global citizens.

CONCLUSION

AI-powered debate is not just a new tool—it is a new way of thinking about education. In a world full of complex problems, we need students who can reason, argue, and decide with clarity. Debate already helps with this, and AI can make it even more powerful—if we use it the right way.

This paper explored the opportunities and problems in combining AI with debate. We believe AI can personalize learning, boost confidence, and provide fast feedback. But it also brings risks: bias, inequality, lack of research, and confusion about how to teach with it.

The solution is not to reject AI, but to be careful and thoughtful. We must build systems that include all learners, respect cultural diversity, and work alongside teachers—not replace them. If we succeed, we can prepare students not just for exams, but for real-life thinking, ethical leadership, and meaningful participation in society.

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