Beyond Algorithmic Solutions: The Significance of Academic Debate for Learning Assessment and Skill Cultivation in the AI World

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Abstract

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As a result of the proliferation and constant advancement of artificial intelligence (AI) applications that are becoming increasingly adept at completing student work, many educators are looking for alternative models of educational assessment. This need for new forms of assessment and instruction is coupled with the need to increase student engagement in the classroom and provide opportunities for students to develop skills for a technologically augmented world, including learning to use the same AI technologies that create assessment challenges. Schools are simultaneously facing challenges related to increasing teacher burnout from constant educational changes starting with COVID-19, the fall in teacher retention stemming from burnout, and failures to upskill remaining teachers to teach appropriately in the AI world, who are additionally expected to understand new changes and rapidly adapt.

In this paper, we explore the role of academic debate as a performative assessment method where students' understanding of the subject matter can be demonstrated in real-time, allowing teachers and students to learn and utilize new tools to augment their abilities in an AI World. By approaching K-12 education through a method of debate-centered instruction (DCI), the application of competitive academic debate in the classroom, students can have a chance to develop crucial 21st-century durable skills and engage in human-to-human interaction in a world that is becoming increasingly dominated by technology. As an instructional and assessment method, academic debate has proven itself relevant in all eras, from the agriculture era to the present, and, we argue, is especially relevant in the AI World.

Teachers who learn instructional methods rooted in facilitating classroom debates will also develop skills to help manage not only the classroom of the present but also the classroom of the future: one where a human teacher facilitates and supports student learning utilizing developing technologies, including AI tools.

When utilized properly, the integration of AI and debate into the classroom provides us with a practical opportunity to support the integrity of assessment, facilitate individualized instruction, engage students, provide students with a stake in their learning outcomes, provide essential human-to-human interaction, and push education forward, all while providing an easily accessible starting point for teachers and administrators who are just coming to understand the impact AI is having on our world.

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Introduction

The release of OpenAI's chatbot, ChatGPT, in November 2022 has triggered profound educational changes. Since AI can produce high-quality written output and its ability to do so will continue to proliferate, bots such as ChatGPT conflict with most assessments that are based on single output assessments such as papers and essays (Herman, 2023), and efforts to contain such use with plagiarism detectors are a colossal failure that discriminates against minority students (Bauschard, 2023a; OpenAI, 2023).

In addition to colliding with the integrity of common assessments, AIs call into question the desirability of continuing to prioritize content knowledge, as AIs will be able to perform a lot of the 'knowledge work' students are currently trained to do. This triggers a dual existential crisis in education as educators struggle with what to teach and how to assess that content knowledge. As a result of the shift towards AI, and even before, schools have come under much pressure to provide opportunities for students to develop more skills frequently referred to as "soft" or "durable" skills. Providing class time to help students develop the skills is often seen as competing with the time needed to learn the content that is assessed on standardized exams that schools need to hit specific benchmarks on.

But it doesn't stop here for schools. The content being covertly produced by bots such as ChatGPT often includes factual hallucinations (made-up facts), and students and teachers who use these tools but do not understand how they work often end up basing learning and instruction on false information. This is magnified because schools still need to prioritize training for teachers and students. Many pretend AI isn't here and cannot do most of what we ask students to do.
Moreover, it is more than just a lack of training. We are facing a teacher shortage that is compounded with teacher burnout. The burnout was magnified by teaching during the pandemic, which just ended for many in November 2022, and teachers do not want another "what's next?" We have disengaged students, and their disengagement is magnified by the technologies that have created the exigence for this paper.

The approach of many educators has effectively been to ignore this technology because they do not know what to do about it. Max Tegmark, a physicist at MIT and a leader in AI, often references the movie about climate change, "Don't Look Up," to argue that we are doing the same thing with AI at our peril (Tegmark, 2023).

In this paper, we argue that introducing competitive academic debate into more schools and more thoroughly, as well as introducing it into our classrooms through debate-centered instruction (DCI), presents an opportunity to increase student engagement, strengthen content learning, provide a solution to the "cheating" and "hallucination" problems, and enable schools to take a

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practical step toward introducing changes in instruction and technology in a way that is both practical for most teachers and lays the foundation for developing classrooms of the future.

Challenges Facing Schools

This first section will review the significant challenges facing schools today.

The Rate of Technological Change

Many of us have experienced the rapid growth of generative AI technology and associated applications over the last nine months. We have seen advances from ChatGPT3.5 to ChatGPT4 and the development of many new language and image models with growing capabilities. Advances in these technologies not only allow training on more recent data, but they also enable greater personalization of text, greater factual accuracy, and better writing, and exhibit a whole host of capabilities that were not even intended. These are referred to as emergent properties. Emergent properties include everything from code completion to language conversation to (arguably) reasoning. The simple reality is that as computer scientists add more data and computational power to large language models, new abilities emerge that were not predicted (Bowman, 2023).

So, not only will this technology continue to advance rapidly, but it will advance *unpredictably*. Schools need to prepare for a world where technology advances in a completely unknown way. Any adjustments to instruction and assessment need to assume that.

Lack of AI Knowledge

Although the technology continues to advance rapidly, most teachers need more than basic knowledge of these applications. Approximately one-third of teachers have never signed on to ChatGPT, let alone any other large language model. Only 20% have received any professional development or learning related to the technology. As a result, they need to learn what it can or cannot do and the strengths and weaknesses of different applications. This makes it impossible to support productive student use in the classroom.

One significant problem with the models is that they cannot be relied on for facts, as the next-word prediction technology the models are based on can put words together that may represent strong ideas but not facts. As a result, there are often factual errors in student papers because teachers cannot train students to use the technology properly.

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Undetected Writing

Last spring, many teachers became able to detect AI writing with the "naked eye" simply by recognizing the basic patterns in ChatGPT, and most students were using ChatGPT3, often copying and pasting the "robo text," and even then, "As a large language model…." This basically gave them away. If it did not, teachers could use one of the many AI writing detectors, which appeared to identify patterns in written output, to estimate the likelihood that AI wrote the piece.

The problem is that the output is no longer visible to the "naked eye." AI writing tools can be trained to produce output in individual student's voices, and students have learned to perturb the output enough to alter the patterns that make it possible for the detectors to work.

Moreover, even unperturbed, the detectors produced many false positives and false negatives. The false positives were often triggered by English Language Learners and those with lower writing skills, whose predictable writing was picked up by the detectors (Liang et al., 2023). As a result, OpenAI pulled its writing detector (OpenAI, 2023), and some major universities, including Vanderbilt University, disabled their writing detectors (Vanderbilt, 2023).

The owners of such detectors recognize these limitations, and in trying to save their businesses, they suggest that teachers use this as one indicator of cheating and use that percentage score to have a conversation with students about potential AI writing. These conversations will be interesting given that one-third of teachers have never used an AI writing tool, and 80% know little about how they work.

Teaching Content

As with the development of the internet, aggressive developments in AI have led many to question the continued emphasis on teaching students content. While some advocate the "throwing the baby out with the bathwater" approach, we still need to teach students content because the licensing boards require it and because students need to learn content to apply it critically in testing evidence and ideas. Understanding history and literature binds us; if you do not want to teach your students history, the Russians will. Students need to learn chemistry and biology to make informed decisions about environmental and health risks and understand developments in new synthetic technologies. Understanding mathematics is critical to understanding our new computationally mediated worlds. We could go on, but the critical point here is that students still need to learn content in school, and we need a better way to teach it.

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Declining Student Engagement and Scores

We must find a better way to teach content because student scores continue declining. It is not likely that content score declines reflect greater skills development. Declining student scores represent both content learned, and skill development, and both are declining.

This is likely related to declining student engagement. Educators expected students to engage at the same level they did pre-COVID-19 when they returned to school, but they did not (and even pre-COVID-19 engagement levels were low). Many learning theorists argue that engagement is not enough for learning but is a precondition.

Need to Teach Skills

Although it is too early to resolve what AI means for the content vs. skills debate referenced above, we know that students will continue to need to learn foundational knowledge, develop greater expertise in particular areas, and develop the *skills* needed to succeed.

Since at least the beginning of the "information age," when people could easily access the information they needed to know when they needed it, academics, commentators, and leading global institutions have emphasized the value of developing durable skills.

The US Army first wrote about the importance of developing soft skills in 1971 (US Army, 1971), and the US Department of Labor made its case in 1991 (Department of Labor, 1991). The National Education Association (2008) also pleaded its case. Industry made many efforts to sound the horn that they need workers with these skills (Webber & Cutter, 2019; Schislyaeva & Saychenk, 2022; Hutson et al., 2022; Li, 2022), but educational assessments have not shifted to focus on these skills, and now industry struggles to find workers, even college graduates, with these skills (Society for Human Resources Management, 2019).

What are these skills? Skills commonly listed include:

- Problem-solving
- Critical thinking
- Decision-making
- Creative thinking
- Communication
- Persuasion
- Interpersonal relationships
- Self-awareness
- Empathy

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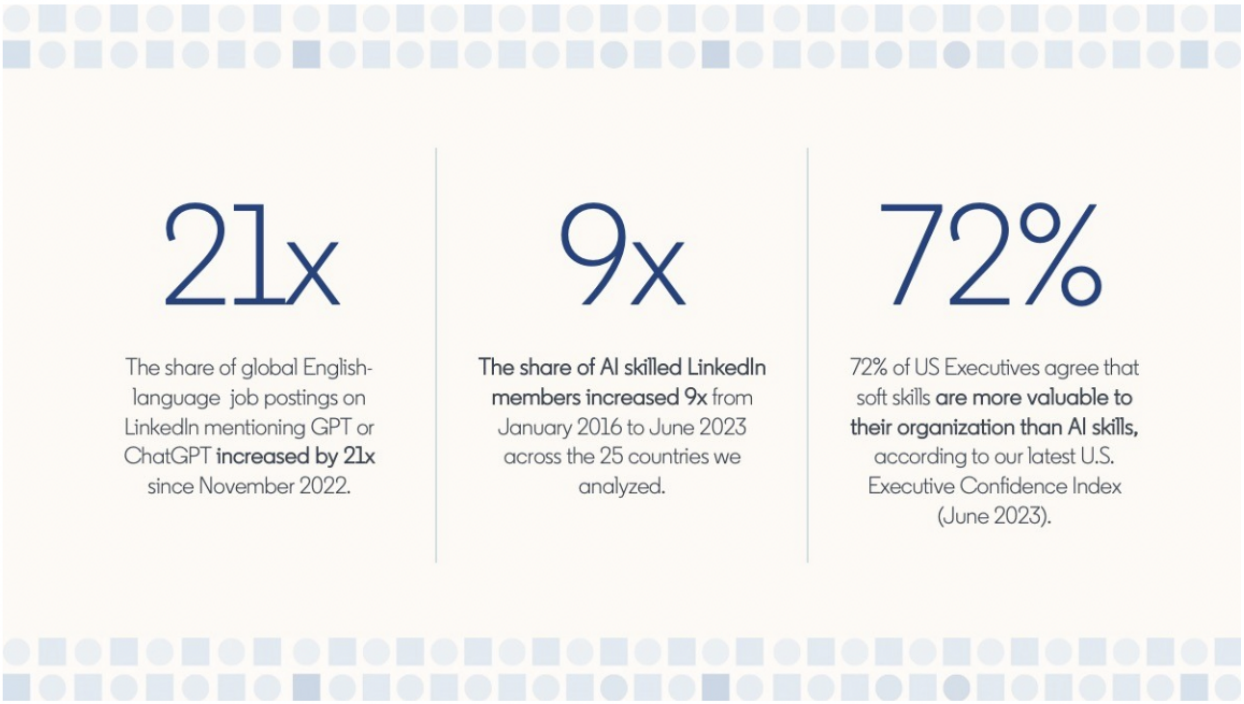
- Coping with stress
- Resilience
- Coping with emotions
- Adaptability
- Leadership

Some of the support for the call to develop these skills is driven by institutions that support economic growth and development (World Economic Forum, 2023; World Health Organization, 2020), the specific needs of industry (McKinsey, 2020), global improvements in health (Dileep, 2019), leading academics (Spencer, 2023; Hustan & Ceballos, 2023), and creators of one of the world's leading universities (Minerva Project, 2023).

LinkedIn CEO Ryan Roslansky (2023) states that these skills are in the highest demand by employers.

Figure 1

LinkedIn Skill Demand



This is even clearer in the World of AI (Gates, 2023). Amid likely AI disruptions in the job market, Maria Flynn (2023) added, "However, as new (AI) technology emerges to disrupt entire industries and professions, the skills most relevant across job types—durable skills—will become increasingly important."

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The development of these skills is not something that can be left to industry. Hutson and Ceballos (2023) argue that these "must be purposefully integrated into curriculum design now more than ever" (p. 26). Ed Elliott (2023), Head of the Perse School, states, "the curriculum of the future will still be knowledge-based, but the knowledge will be slimmed down." The skills emphasis should be broadened so that alongside the academic skills of essay writing, trigonometry, and dissection, there will be a greater focus on the WHO core life skills such as creativity, communication, and empathy. Herget (2023) reaches the same conclusion. Robert Litan (2020) explains that

> In a society where machines and software will be doing more and more "work," humans add value by working with artificial intelligence (AI) rather than being worried about being replaced by it. Meeting that challenge will require all workers to be creative, to think critically, and to communicate in ways that Alexa or Google Home cannot and never will be able to do. When students learn by applying their creativity to specific projects, using the tools of the internet and AI, they will not only appreciate learning but be better able to adapt to the needs of a constantly changing workplace (p. 6).

In the world of AI, many argue that these are our "uniquely human" skills (Price 2017), but machines may eventually develop these skills (Lecun, 2023). If they do, however, humans will still need them to interact both with machines and each other.

Teacher Shortages and Burnout

Even absent technological disruption of the classroom or changing educational expectations, teachers are experiencing burnout from the COVID-19 pandemic and overworking. A vicious cycle is created when teacher shortages are a typical result of burnout in school districts, which in turn disincentives more teachers from remaining in the classroom. A study by Kush et al. (2022) found that teacher anxiety rates increased during COVID-19, and teachers experienced more mental health challenges than essential healthcare workers during the pandemic.

In late 2022, there were more than 30,000 teacher vacancies across the U.S., a conservative estimate, and more than 45% of schools experienced at least one teaching vacancy (Nguyen, 2022). Amid these shortages and teacher burnout, it is essential to consider the use of generative AI bots within education as teaching "copilots," which can ease the burden on individual teachers using DCI while helping individualize student learning (Bauschard, 2023b).

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Growing Use and Risk of Algorithmic Control

Learning bots are making their way into the education system and will continue to grow. These bots can potentially lower educational costs, increase the speed of learning (Devi et al., 2022), and individualize instruction for individual students (Bauschard, 2023b). As they do, there is growing concern that these bots will undermine the development of durable skills, especially communication and empathy (Jaiswal et al., 2022; Singh, 2023; Yu et al., 2023). *Interpersonal interactions* are critical to developing social, emotional, and cognitive competencies (Muller et al., 2021), and these cannot be learned from books, and the rush to integrate the shiniest new piece of technology risks undermining these human-to-human interactions.

Argumentation and Debate

In the following sections of this paper, we explore the role of academic debate, both competitive academic debate and its application in the classroom, as a chance for students to develop crucial 21st-century durable skills that are in demand by employers as a performative assessment method where students' understanding of the subject matter can be demonstrated in real-time, as a way for both teachers and students to learn to utilize these new tools to augment their abilities in an AI World in a way they feel comfortable with, and as a way to facilitate engaged human-to-human interaction in a world that is becoming increasingly dominated by technology, all while providing an easily accessible starting point for teachers and administrators who are just coming to understand the impact AI is having on our world. Teachers can start by integrating academic debate into their classrooms and then slowly integrate AI tools as their knowledge of the tools grows.

Societal Need for Debate

Society is facing many challenges. There is intense political polarization in the United States (Murray & Marquez, 2023) and worldwide (Turner-Zwinkles et al., 2023). Globalization is declining, with many countries turning inward (Presad, 2023). AI will introduce significant new challenges related to the distribution of resources across society as it introduces the most rapid technological change in history; this is true both within and across countries (Suleyman, 2023). These issues are already producing significant debates that are becoming politicized and are challenging to resolve. The more politicized the issues, the harder they are to resolve and the more likely they will lead to conflict. Not since the Civil War has the United States faced such a high risk of internal conflict (Simon & Stevenson, 2023), and not since World War II has the world faced such a high risk of multiple conflicts conflict (Atlantic Council, 2023). In a world with growing access to destructive technologies, including synthetic biological weapons technology that could soon be at the handles of the individual (Suleyman, 2023), the risks are

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existential (United Nations, 2023). If we do not find a way to resolve our conflicts and manage change peacefully, we may not survive as a species.

Academic debate provides one such model for resolving these existential conflicts. Students who experience this academic debate when they are young have a chance to become ingrained in a process supporting dispute resolution that they can carry into their future lives. Since many debaters become domestic and global leaders, debate can help reduce the risk of global conflicts and help lead the development of society by advocating and considering policy-relevant knowledge (Hopp, 1999).

One way debate resolves conflict is by focusing on the issue first. When focusing on the issues first, debaters do not worry about alienating friends, family, and teachers with particular political beliefs as soon as they speak. They are simply there to debate, learn, and win. To win, students simply jump right into the arguments and the literature on the topic. They always engage the other side's argument. They will lose if they leave the debate simply out of disgust over their opponents' arguments. In debate, students start with the *arguments* and are immediately exposed to counterarguments, unlike television news and social media, which tend to reinforce echo chambers and the repetition of their pre-established beliefs.

We do not want an echo chamber. Debaters may even change their minds. For example, students who enter their debates over AI with a presumption for widespread use of AI in society may change their minds. Why? Because exposing the other side of the argument to debaters makes people humble (Resnick, 2019), they will see the weaknesses in their arguments even if they still believe them.

Debate requires students to thoroughly and critically examine issues from all sides before reaching a judgment (Mitchell & Suzuki, 2004; Suzuki & Matsumoto, 2002). Moreover, since debate is an iterative process where students will engage in multiple debates on the same topic, they always have the opportunity to revise their judgment. The idea of beliefs being contingent and subject to interactive revision is critical to effective political engagement and leadership (Tully, 2002).

In debate, one must listen carefully to the other side's argument to respond appropriately. Many coaches teach debaters to "steelman" arguments: To imagine and defeat the best possible version of their opponent's argument (Friedersdorf, 2017). In a debate, "steel-manning" ensures the refutation is thorough, but the life-long lesson is that one should always give someone you disagree with's argument the strongest possible consideration. This indirectly forces a person to listen carefully to ideas they disagree with and fosters intellectual pluralism (Zwarensteyn, 2012).

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Furthermore, debaters learn about what constitutes proper evidence and a well-reasoned argument. Debaters learn that quality evidence comes from reputable sources and is corroborated by similar evidence. When critically examining evidence, they see weaknesses in their opponent's position and their own (Keller, 2001). A willingness to put ideas out to be tested is critical to avoid polarization (Talisse, 2005; Talisse, 2007). Requiring ideas to be substantiated with evidence improves the quality of deliberation (Lundberg, 2010) while avoiding the "subjectivism of perspectivism" (Da Villa, 1992). The difference between deliberating and deliberating well is using evidence and reason (Misak, 2008).

Often, debaters need to make their opponents' arguments themselves when arguing the resolution's flip side. This forces debaters to fully understand the arguments from multiple perspectives (Leek, 2016) and opens the individual to change his or her mind. Such "perspective-shifting" enables us to learn the most from others (Bohlin, 2009). Moreover, at the end of the debate, they may often even more firmly believe in their argument, but debate also helps them defend their beliefs better (Iverson, 2009; Zhou, 2021). Society needs people who are open to change and individuals who are prepared to defend their beliefs with well-reasoned arguments and capable of addressing counterarguments thoroughly and thoughtfully.

There are also many elements of a structured process (Dascal & Knoll, 2011) that help to facilitate an environment that reduces conflict. Debates have a structure where everyone is given the same amount of time to speak. The process includes structured introductory speeches, rebuttals, questioning periods, and final summary speeches. Students do not need to shout over each other to be heard or maximize political fundraising. Judges are trained to be as neutral as possible and focus on giving students feedback on their *arguments*. Students are also defined as a specific topic, and the debates are limited to a discussion of that topic and *related issues* to keep the debates focused and on track (Steinberg & Freely, 2008).

The topics students are given to debate (e.g., carbon taxes, hypersonic weapons, universal basic income) are complicated and challenging to resolve. Experience with debating such topics prepares students to immerse themselves in the complicated topics in society (Leek, 2016).

Academic tournament debating allows students to develop an appropriate, research-based understanding of essential issues of the day, form opinions on those issues, and articulate them in front of judges who will provide all of their arguments a fair hearing. There is no better model for discussion of current controversies in society, and there is no better time to join a debate team.

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What is an Argument, and What is Debate?

Argumentation is the process of constructing, presenting, and defending a position or point of view. It is a critical component of many aspects of life, from academic discussions to legal proceedings to casual conversations. It is about putting forth a viewpoint and marshaling evidence to convince others while responding to any counterarguments that might be presented, and, of course, it also involves making counterarguments.

An argument is typically composed of at least three main parts. The *claim* is the main point or position that is being put forward. It is the central assertion that the rest of the argument supports. The *evidence (grounds)*: These are the facts, data, or sources that support the claim. It is the "proof" that validates or strengthens the claim. The *warrant* is the logic or reasoning that connects the evidence to the claim. It explains why the evidence supports the claim (Rybacki & Rybacki, 1996).

Individuals attacking the argument look for weaknesses in all of these parts of the argument and present their counterarguments. Developing critical argumentative reasoning skills has already made its way into education (*The Official SAT Study Guide 2020,* 2019).

What is Structured Academic Debate?

Structured academic debate is a collegiate and high school activity *where students argue with each other* over a pre-assigned topic in a structured format to strengthen their argumentation *skills* and build *content* knowledge of their debate topics.

In most debates, students begin with constructive speeches that are entirely written out in advance. Think of these first speeches as argumentative essays; students create them independently or in collaboration with other students and coaches (and sometimes use speeches others, including coaches, have written). Depending on how often the debate topic changes, students not only write and rewrite the speeches before the first competition on a given topic but throughout the entire time they debate that topic (at least a month in most instances), frequently including adjustments and revisions during any competition (tournament) they attend.

The second stage of each debate involves rebuttals, where students must respond to the details of the arguments made by the other side. Students rebut using pre-preparation (what is my opponent likely to say and how will I respond?) and thinking of responses 'on the fly,' both by drawing on their own knowledge base and looking for weaknesses in the opponent's arguments. Participants typically distill the discussions to the most crucial points in their concluding speeches, frequently choosing to discard their less convincing arguments voluntarily. For example, in advocating for a carbon tax, they may argue that it would both arrest climate change

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and reduce oil dependence. However, by the end of the debate, they may choose to carry through with the climate change argument because of their opponents' attacks on the oil dependence argument. Debaters do not need to win every argument; they only need to prove that their side is correct overall, in this case, that the benefits of the carbon tax outweigh the harms.

They also strive to craft compelling narratives that validate the overall value of their position. For instance, in a discussion about a proposed carbon tax, supporters might assert that the impact of climate change is harmful to the world's impoverished population and that the consequences of not addressing climate change would be worse than any economic slowdown brought on by the tax. In this way, advocates can coopt their opponents' argument about how a carbon tax might hurt the economy and even try to win the debate in the end by "turning" their opponent's economic argument.

Throughout the entire debate process, which includes preparation, active participation, and subsequent iterations, participants are perpetually engaged in crafting, examining, advocating, reorganizing, reconstructing, and refining their arguments. This process is *iterative* and involves collaboration with various others, some of whom may possess more knowledge or even superior intellectual capabilities. This collaborative endeavor among bright minds not only results in substantial academic benefits but also enables students to *accomplish more than what they could achieve individuall*y (Anderson & Mezuk, 2015; Ko & Mezuk, 2021; Mezuk, 2009; Mezuk et al., 2011; Schueler & Larned, 2023; Shackleford, 2019).

This process plays out *in competitive debate over an entire academic year,* and most students debate for *multiple years.* A similar debate process in the classroom can play out throughout a semester-long project or on any particular day when the argumentation process is used to explore an issue. Through participating in debate, students develop essential, durable skills.

Debate's Durable Skills

Debate Promotes Durable Skills

> "Many of the skills associated with debate emerge after some preparation. Others come only through actual debating. Confidence in ideas, effective research, preparation, and communication skills are all concepts that build upon one another and create a foundation that will serve students for the rest of their lives. When you involve students in a debate, it does much more than get them excited about the subject matter of the class; it also provides them with the tools they need to succeed in many different areas." (Snider & Schnurer, 2002)

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As an extra/co-curricular activity, debate provides a unique opportunity for students to develop a host of overlapping and mutually reinforcing durable skills. In preparation for a debate, students research and learn about new topics, consider competing viewpoints, and develop argumentative positions while also anticipating and preparing answers to what they think their opponents might argue. Then, in the debate, students must clearly present their positions as they engage with and adapt to their opponents and audience. Developing critical thinking, communication, leadership, and emotional intelligence through their participation in debate sets a foundation for students that they can transfer to their own lives.

Critical Thinking

In the contemporary landscape characterized by a deluge of information, the cultivation of critical thinking emerges as an imperative endeavor for individuals seeking to navigate the complexities of the world effectively. The alignment between critical thinking and the skills that make debating possible and meaningful is so strong that we often neglect to clarify the specifics. However, as we confront the next bold step for artificial intelligence at the same time that the walls of our communication enclaves are growing ever taller and more soundproof, it is the skill of critical thinking that makes human control of artificial intelligence possible and, in the end, may become the only meaningful distinction between human and artificial intelligence.

Noted Israeli Historian Yuval Noah Harari (2023) explains:

> The main job of the education system was just to provide people with the basics was the basic information about the world, and censorship worked by blocking information. Now, it's the other way around. We are flooded by enormous amounts of information that we cannot handle. The main job of the education system is not to provide information, we don't need more information, we need the ability to sift through the information to tell the difference between reliable and unreliable information. So this is what we need from education (Harari, 2023).

Critical thinking may be our best defense against extreme visions of humans controlled by artificial intelligence because uncritical acceptance of the conclusions that artificial intelligence offers lies at the root of most AI doom-and-gloom scenarios. Approaching everything students see or hear with a critical lens that demands evidence and tests it against other evidence is necessary; otherwise, humans abdicate the definition of what is known and what is true to whatever the machines say it is. Of course, this is arguably already a significant problem with the machines we already have. However, the advent of artificial intelligence is making uncritical acceptance less visible, and it may well be more challenging to maintain the discipline of critique/critical thinking with the advent of AI. Testing claims and evidence against other humans trying to prove the opposite results using the most rigorous tests gives us the best chance

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to avoid being deceived or even controlled by our machines. Testing evidence in a debate setting can be compelling as competitive impulses drive students to look ever closer for errors and inaccuracies. When a third-party observer/decider, whether a teacher or a peer, is asked to provide feedback and comparatively assess the strength of each side's presentation, the rigor of evidence testing grows stronger. When two interlocutors switch sides periodically, the result may be the most rigorous test of knowledge humans have devised. Suppose we are to stop short of unquestioned reliance on computers to tell us what is true and what is false. In that case, our concepts of content knowledge will have to include critical thinking as part of the knowledge development and acquisition processes we teach in schools.

Coverstone (2023) has argued,

> The differences between human critical thinking and the approximation of it that will increasingly be built into future artificial intelligence are likely to center on the importance of dialogue, discussion, deliberation, and decision-making in groups. Undoubtedly, individuals can think critically, which is how humans learn (Cantor & Osher, 2021). However, when individuals interact with others, we more clearly see the host of unspoken assumptions and biases they bring with them, even when it is challenging to see our own. Much is known about approaching critical thinking this way, and many pedagogical approaches are already known and being researched for their effectiveness (Manalo, 2020).
>
> When students can interact with and understand others' purposes and points of view, ask questions, discover information, explain concepts, identify assumptions, and work out implications (Paul & Elder, 2006), they are also prepared to learn new things that will confront them during their lives and explain and adapt to changes in technology and the economy in ways that will give them a measure of agency and control.

If this is to be the case, critical thinking deserves a comprehensive exploration. We need to identify and understand each essential component of the skills required for critical thinking, encompassing its definition, constituent elements, pedagogical strategies, and, notably, the transformative role of structured debates in enhancing this cognitive faculty.

Critical thinking, the intellectual cornerstone of astute decision-making and informed discourse, embodies an intricate interplay of skills and cognitive processes. Edward Glaser, whose 1941 work, *An Experiment in the Development of Critical Thinking,* represents the earliest efforts to define critical thinking for the purpose of developing assessments and instructional methods for improving it, authored a tripartite definition of the concept. Glasser (1941) held that critical thinking involves "(1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of

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logical inquiry and reasoning, and (3) some skill in applying those methods." Glaser's taxonomy of critical thinking further includes, "a persistent effort to examine any belief…in light of the evidence." Critical thinking furthermore:

> [R]equires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical relationships between propositions, to draw warranted conclusions and generalizations, to put to test the conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific things and qualities in everyday life (Glaser, 1941).

Glaser's exegesis on critical thinking contains one other pertinent observation that goes beyond the skills and knowledge required to think critically. Glaser also speaks to the *dispositions* of the critical thinker. He rates the *attitudes* of the critical thinker as "even more important for the everyday practice of democracy." The motivation to test knowledge and examine evidence must be attended to even before critical thinking skills can serve democracy.

This understanding is essential in the present since partisan communication enclaves operate first by disabling individual motivations to question arguments and evaluate evidence critically, substituting the ideological assumptions of the in-group for the critical evaluation of evidence across groups and within a democracy. Similarly, the advent of artificial intelligence can lead to laziness and relaxation of our critical capacities behind the assumption that machines can simply "know" more than we can as individuals. This observation suggests that instructional methods that teach the skills of critical inquiry and critical thinking but do not challenge assumptions of machine learning supremacy and/or ideologically imposed barriers to questioning will fall short of what is needed in our current context if critical thinking is to serve its purpose for future generations, beginning with today's K-12 students.

A detailed and helpful taxonomy of critical thinking, developed in the work of Paul and Elder (2006a, 2006b), describes critical thinking through eight distinct elements—unraveling the speaker's intent, discerning questions at issue, elucidating perspectives, analyzing information, scrutinizing interpretation and inference, grappling with underlying concepts, envisioning implications, and uncovering assumptions. The overlay of nine rigorous standards—ranging from clarity to fairness—provides a robust framework for assessing the quality of arguments, which, in turn, fosters the development of eight intellectual traits, reflecting qualities such as autonomy, empathy, and fair-mindedness. The Paul and Elder taxonomy of critical thinking provides a valuable roadmap for designing instruction in critical thought and is a worthy

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successor to the earliest work of Glasser. However, the critical disposition to *pursue* a critical investigation that Glaser identified requires at least equal attention to the knowledge and skills that practicing critical thinkers employ.

Figure 2

Taxonomy of Critical Thinking

Paul and Elder (2006) Taxonomy of Critical Thinking	
Critical thinking is composed of 8 elements: ● **What is the speaker's purpose?** ● **What questions are at issue** in the text? ● **What is the speaker's point of view**, frame of reference, or perspective? ● **What information/evidence is provided?** (data, facts, observations, experiences) ● **How do the suggested interpretation and inference from the facts work?** (reasoning, conclusions, solutions) ● **What accepted or contested "concepts"** (theories, definitions, axioms, laws, principles, models) are at work? ● **What implications and consequences are suggested?** ● **What assumptions are present?** (presupposition, taking for granted, bias)	Nine rigorous standards are applied to assess the quality of arguments (claims, evidence, and warrants): ● Clarity ● Accuracy ● Precision ● Relevance ● Depth ● Breadth ● Logic ● Significance ● Fairness Eight intellectual traits characterize effective critical thinkers: ● Intellectual Humility ● Intellectual Autonomy ● Intellectual Integrity ● Intellectual Empathy ● Intellectual Courage ● Intellectual Perseverance ● Confidence in Reason ● Fairmindedness

Falcione's widely used definition of critical thinking (1990, p. 3) defines it as "purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as an explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations on which that judgment is based." Critical thinking is widely believed to be important in the field of educational assessment and instruction. Furthermore, "the ideal critical

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thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results, which are as precise as the subject and the circumstances of inquiry permit" (Facione, 1990, p. 3).

While the value of critical thinking and available instructional approaches to teaching it are widespread, at least three barriers to students' mastery and general application persist. The first barrier lies in the human tendency to apply simplified and incomplete heuristics when making decisions. Without critical evaluation, interaction, and argument, individuals tend to confront overwhelming amounts of information by seeking simplified heuristics to make decisions at lower intellectual and investigatory costs (Burns et al., 2022). Therefore, critical thinking inserts a necessary nudge toward pro-social interaction as an antidote to ideological retreat (Van Peppen et al., 2021). Developing the attitude, dispositions, and skills to challenge and evaluate competing evidence may be the only available counter to surrendering to the simplicity of an ideological evaluation or outright deference to the machines as we allow ourselves to assume that their created knowledge is unquestionably superior to our human capacity for critical thought. Uncritical acceptance of conclusions without interactive evidence investigation leads to, explains, and maintains polarization. Applying critical reflection encourages and enables dialogue, deliberation, and community-centered problem-solving.

The second barrier lies in the present-day primacy of ideological heuristics created and maintained through the technologies that perpetuate ideologically organized communication enclaves into which we increasingly retreat and which serve to weaken our desire to understand or evaluate arguments from the ideological assumptions of the other. Intentional efforts to cultivate dialogue across ideologies, once considered a central purpose of education in a democracy, are now under attack in K-12 public education, even before we acknowledge the impact of independent, private, sectarian, and homeschooling enclaves on our opportunities to instruct in critical thinking processes.

A third significant barrier to instruction in critical thinking lies in the problem of transfer. Substantial research exists on teaching critical thinking skills (Abrami et al., 2008, 2014) and reducing biases in reasoning (e.g., Van Peppen et al., 2018, 2021a; Flores et al., 2012; Halpern, 1999; Heijltjes et al., 2014a, 2014b, 2015; Holmes et al., 2015; Janssen et al., 2019; Kuhn, 2005; Sternberg, 2001). Available research confirms that direct instruction in critical thinking and its approaches combined with practice can indeed improve critical thinking skills among students (Walker & Kettler, 2020; Bellon, 2000), but transferring the skills to unpracticed settings remains challenging (Van Peppen et al., 2018, 2021a; Heijltjes et al., 2014a, 2014b, 2015).

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Applying a pedagogy grounded in the essentials of argumentation and the structures and principles of debate carries the potential of developing critical thinking skills through practice in a context where the setting is constantly changing and evolving through the dialogic introduction of new information. When students engage in debates, they continuously apply an epistemic approach grounded in critical thinking to each new piece of information, regardless of context. By interacting with others whose epistemic grounding also calls for a dialogic critical approach, students develop the habits of mind and dispositions that make critical thinking applied in dialogue the way they will approach all new information they encounter. In this way, teaching argumentation skills has been shown to provide intense learning experiences across disciplines and in preparation for any number of career fields. Because argumentation is active and supportive of sense-making across contexts, it is a superior instructional vehicle compared to memorizing facts and concepts in isolation (Cavagnetto, 2010; Iordanou et al., 2019). The approach of "Arguing to Learn" (Andriessen et al., 2003; Bathgate et al., 2015) capitalizes on how argumentation forces students to develop a deeper critical awareness of their understandings. Centering instruction in argumentation for learning appears to tackle the transfer problem, with students being observed to develop critical thinking skills, writing skills, and even learning content knowledge across domains (Kuhn et al., 2016; Suephatthima & Faikhamta, 2018).

Research in many fields has shown how debate shapes and supports the development of critical thinking skills (Darby, 2007; Garret et al., 1996). The ability to comprehend and engage in argumentation is widely recognized as a fundamentally important skill, especially in our present age of information overload (Bathgate et al., 2015; Kuhn et al., 2016). Engaging in argumentation is an inherently social act requiring dialogue to develop understanding and collaborative efforts to develop meaning in context (Coffin et al., 2012). Because argumentation is fundamentally a process that occurs between people (Mercier et al., 2016; Scardamalia & Beriter, 2006), learning about argumentation requires practicing the back-and-forth dialogue inherent in the process (Mercier et al., 2016). Emphasizing social interaction and dialogue in classroom spaces increasingly colonized by artificial intelligence is a valuable antidote to abdicating our critical reasoning faculties to the assumed superiority of artificial intelligence. Designing our classrooms to utilize argumentation and structured debates may offer our best hope for maintaining human and social bases for knowledge, understanding, and community-building amid ever-accelerating information technologies.

Enhanced student ownership of their learning is supported by qualitative data showing that students perceive debate to improve their critical thinking skills, generate specific individual benefits and skills, improve their argument analysis skills, and cultivate skills relevant to their futures. Students identified skills learned by participation in debates, including the ability to "think on the spot, analyze arguments, see other perspectives, and construct counter-arguments" (Walker & Kettler, 2020). Spaska et al. (2021) found that instruction grounded in debates

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improved students' analytic and problem-solving skills and that students found the process engaging. Spaska et al. (2021) further noted that these findings "agree with Robb (2015), stating that the teaching strategies that form the basis for training in debating – modeling and guided practice, practice in collaborative independent learning, and scaffolded practice – transform the students from passive readers into a confident and ambitious personality who can comprehend, analyse information and make 'just right' decisions on what to read" (p. 886).

Debates are particularly effective for developing critical thinking skills precisely because they engage students, motivating them to participate, and because it is impossible to participate effectively without developing and using critical thinking skills (Iman, 2017). While flexibility exists within the precise structures used in debates, those that require students to "explore, explain, and defend a position" whether they choose a position themselves or are assigned a position by the teacher, even a position that they do not personally support which forces broader consideration and learning about perspectives they might simply dismiss in other learning situations. Because debating is interactive, students require careful listening and speaking skills, and can contribute to greater self-confidence and self-efficacy. Encouraging prediction of potential arguments ahead of time (itself a critical thinking skill) leads students to understand and consider a wide range of potentially opposing viewpoints. This level of prediction and preparation combines with an ongoing ability to process and analyze arguments and evidence in the moment during live debates. Finally, when topics are directly relevant to students' lives, debates can drive even deeper content-area learning and application of critical thinking skills (Carter, 2020).

Communication

Intuitively, student participation in debate will help them develop their communication skills. What is worth exploring is how those skills are developed in overlapping and mutually reinforcing ways with other durable skills. In preparation for a debate, students must research their position, develop clear arguments, and anticipate likely objections from their opponents that they must be ready to respond to. The student takes their written materials and adapts them for speaking by ensuring their delivery is understandable and appealing to their audience. The student must carefully listen to the questions asked in cross-examination and the arguments presented in their opponent's speech. They must share ideas and coordinate arguments when debating with a partner. Then, each student has to prepare and deliver a rebuttal speech that not only extends their previous arguments but also considers the arguments made by their partner and their opponents while adapting their arguments and delivery for their audience. Debate fosters critical thinking and analysis while employing a highly engaging format as students play devil's advocate and argue multiple positions (Medina, 2020), all of which prove to be essential conditions for the development of effective communication (Essential Debate Skills: What Every Debater Needs to Have in Their Toolbox, 2021).

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The experience of preparing for and participating in debates proves to be superior to other classroom experiences in terms of improved communication skills. In his article calling for integration debate across the curriculum, Bellon argues that developing communication skills is the first and most apparent benefit, as preparation and participation provide far greater exposure and experience than a single classroom experience could (2000). Extensive research has demonstrated that oral communication is one of the most evident values of debate, with several empirical studies finding that debate enhances a variety of communication skills, including analysis, delivery, and organization, and that in-class debate instruction and practice can significantly improve students' speaking (Semlak & Shields, 1977; Afri et al., 2021). Organizing and preparing arguments are transferable skills that apply to other forms of communication (Snider & Schnurer, 2002). Debate is not discipline-specific, as many have used debate as an instructional tool in other disciplines (Snider & Schnurer, 2002). As computer science instructor Stuetzle notes, "it has been long recognized that there exists a core 'transferable' discipline-independent" durable skills, including critical thinking and communication skills that are important to student outcomes in a variety of disciplines and writes about the use of public debate formats for the development of such skills in computer science curricula (2015). A meta-analysis of studies that looked at the use of debate in health professions education found that students found debate effective in helping them develop communication and critical thinking skills while learning new content in their discipline (Ang et al., 2019). There were similar results when debate was used in undergraduate science education, as students responded positively while developing their presentation, organization, and critical thinking skills while debating socio-scientific topics in class (Martini et al., 2021). A debate curriculum also proved effective in helping students develop their communication skills while learning English as a Foreign Language (EFL). An instructor analyzed the use of speaking and debate activities in the EFL classroom and found that students could develop communication skills while learning the language, including presentations and debates, noting that the skills transfer beyond the classroom (Rao, 2019). As debate scholars Snider and Schnurer note, "clarity of idea and speech are the hallmarks of a great debater [and you] can teach students the basics of these concepts even if you do not have a background in communication." (2002)

The interactive nature of in-class debate emphasizes the importance of effective listening skills, an essential skill that is often underdeveloped. Snider and Schnurer discuss the importance of listening in debate. Citing the work of Nichols and Stevens, who found that, on average, we listen at only a 25 percent level of efficiency, Snider and Schnurer note that if a debater were to miss 75 percent of their opponent's arguments, they would "be destroyed." Students are incentivized to actively listen during a debate for fear that they will miss their opponents' arguments. Developing critical and active listening is "widely recognized as an important attribute of the educated person" (Snider & Schnurer).

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Debate instruction and practice allow students to develop communication skills that build upon and depend upon the critical thinking and research skills they employ as they prepare. For the educator, this happens as students engage in a cooperative learning model that engages students and becomes primarily led by students.

Confidence

Durable skills are not simply taught; they are developed and built through experience and practice. Debate can be challenging and intimidating, and it might seem counterintuitive to suggest that debate can help build confidence in students, an essential, durable skill. However, it is through meeting the challenges presented in debate that students are given the opportunity to more fully explore how to build confidence in their arguments, presentations, and themselves. As communication and critical thinking are built through repeated use, students also build confidence in their ideas as they prepare for debates and test those ideas (Snider & Schnurer, 2002).

Fear of public speaking, also known as communication apprehension, is often referenced as one of the public's greatest fears, with some reports finding that 75% of adults suffer from it (31 Fear of Public Speaking Statistics (Prevalence), n.d.). Participation in debate has been found to reduce students' communication apprehension as, with practice, students feel more capable and build confidence (Collin C.Ceneciro et al., 2023).

Collaboration

Although seemingly rooted in opposition and conflict, competitive student debate is fundamentally a platform that hones collaborative skills. Most debate formats that require students to debate with partners necessitate teamwork, demanding participants to synchronize their efforts in research, strategy planning, and real-time adaptation to unforeseen challenges. As debaters prepare, they frequently split the research burden between themselves and coaches, later pooling their findings, embodying collaboration at its core. This creates positive interdependence, face-to-face interaction, interpersonal and small-group skills, individual accountability and personal responsibility, and frequent use of group processing (Johnson et al., 1991)

Strategic planning extends beyond crafting arguments; it encompasses decisions about presentation sequence, time division, and transition techniques. Integral to the process is the exchange of feedback and constructive criticism, fostering growth through mutual respect. Ehninger and Brockriede explain, "In this respect, debate may be compared with a group of mountain climbers concerned with their mutual safety" (1978, 15).

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This spirit of cooperation extends even in the heat of the debate, where team members may rely on non-verbal cues to coordinate responses to unexpected opposition points. Within debates, students need to develop "interactional skills" to "cooperatively communicate" (Hill & Leman, 1977) during times of disagreement, and the entire debate round can be considered a "cooperative dialogue" (Dee Fink, 1999).

Furthermore, the broader debate community encourages camaraderie and inter-team collaboration, with workshops and inter-school events as venues for shared learning (Rao, 2023). So, while debate stages might showcase contention, behind the scenes, it is a masterclass in collaboration.

Creative Thinking

Competitive student debate, while primarily associated with logic and rhetoric, is a powerful catalyst for creativity. The dynamic nature of debates demands that participants think beyond the conventional, crafting novel arguments or perspectives on given topics. Every debate round is essentially an open canvas where debaters paint their ideas, often under time constraints, pushing them to think on their feet. Debaters must anticipate various arguments and conceive imaginative rebuttals to counter opponents effectively.

Furthermore, the art of persuasion is not solely grounded in logic; it often requires creative storytelling and analogy to make points compelling and relatable to judges and audiences. Framing arguments, drawing connections between disparate pieces of information, and crafting a narrative that resonates with an observer requires a high degree of ingenuity. Additionally, debaters often encounter unexpected arguments or strategies from opponents, necessitating on-the-spot creative solutions. Outside the rounds, the preparation phase is also rife with opportunities for creativity, from brainstorming sessions to individual debater and team debate drills. This encourages creativity and supplements the core skills learned through debating. As Gray (2008) explains, if we understand debate as a game, valuing creative play for students,

> Attention is attuned to the activity itself, and there is reduced consciousness of self and time. The mind is wrapped up in the ideas, rules, and actions of the game . . . Play encourages conditions conducive to encouraging creativity and skill acquisition.

At its essence, competitive debate is as much a test of imagination and innovation as it is of logic and research skills. This form of creativity, encouraged by play, is especially inherent to speech and debate, an activity Bartanen and Littlefield (2015) define as "a form of self-chosen and self-directed play."

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Understanding, then, the iterative process of narrative crafting that goes into a debate strategy, combined with a creative approach to a debate round itself, individual student creativity and skill acquisition can bolster each other within DCI.

Additional Durable Skills

In the above sections, we have focused on the 4Cs – communication, critical thinking, collaboration, and creativity, but participation in debate also supports the development of many other durable skills.

Working as part of a team in the ways described above gives one experience navigating interpersonal relationships in a complex environment.

Debate promotes empathy by requiring participants to understand and often argue from multiple perspectives, even those they might not personally agree with. This exercise in taking on diverse viewpoints fosters an appreciation for the complexities of issues and the emotions and motivations of others (Roger & Stewart Lord, 2020). As debaters engage deeply with opposing arguments, they develop a heightened sensitivity to the experiences and feelings of people from different walks of life.

Moreover, defending or opposing particular standpoints fosters a deeper understanding of the moral implications of various decisions. As a result, students enhance their capacity for nuanced moral judgment, becoming more discerning and reflective about ethical complexities in the world around them (Carinanos et al., 2021).

Debaters face high-pressure situations where they must present arguments clearly and convincingly, often under tight time constraints. This requires them to manage their emotions, especially when confronted with unexpected challenges or passionate disagreements. Moreover, the competitive nature of debates and the desire to succeed can induce stress. To cope, debaters must cultivate resilience, develop strategies for staying calm under pressure, and learn to separate personal feelings from the arguments presented, ensuring objective and effective communication.

Being on the debate team significantly aids in the development of emotional intelligence. As debaters engage with diverse viewpoints, they cultivate empathy by understanding and internalizing perspectives other than their own (Light, 2019, p. 35). The high-pressure environment of debates necessitates effective regulation of one's emotions, honing the ability to recognize and manage feelings in oneself and team members. Interacting with teammates and opponents further refines interpersonal skills, fostering effective communication and a keen sensitivity to the emotional cues of others. In essence, the multifaceted experiences encountered

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in debate sharpen analytical and rhetorical abilities and profoundly deepen emotional awareness and understanding.

Being on the debate team inherently cultivates leadership skills, shaping individuals for future endeavors. The necessity of making informed decisions rapidly during debates sharpens critical thinking, while the demand for clear and persuasive articulation refines communication, a hallmark of effective leadership. Within the team, collaboration is paramount, leading to a natural emergence of leaders who facilitate strategy and cohesion. Debaters also learn the nuanced art of conflict resolution as they engage with opposing viewpoints alongside strategic planning that demands foresight and vision. Encountering challenges and setbacks fosters resilience, teaching them the perseverance essential for any leader. Furthermore, taking on specific roles or tasks instills a deep sense of responsibility, reinforcing the foundational qualities of leadership.

Overall, learning how to debate can be an effective way to develop durable skills that are highly sought after by employers. By engaging in debates, individuals can improve their critical thinking, communication, collaboration, creativity, and other durable skills that can be applied in various contexts and disciplines.

Developing Skills Through Human Interaction

Learning bots are making their way into the education system and will continue to grow. These bots can lower educational costs, increase the speed of learning (Devi et al., 2022), and individualize instruction for individual students. As they do, there is growing concern that these bots will undermine the development of durable skills, especially communication and empathy (Jaiswal et al., 2022; Singh, 2023; Yu et al., 2023). *Interpersonal interactions* are critical to developing social, emotional, and cognitive competencies (Muller et al., 2021), and these cannot be learned from books.

These skills have traditionally been learned through student-to-student and student-to-teacher interactions (Slater & Inagawa, 2019; Therisa et al., 2022), but with increased student and teacher interaction with bots, there is concern that these skills will decline. Technology-only approaches reduce soft skills when only technology is involved (Anderson, 2017), particularly communication and teamwork (Trajtenberg, 2018). Technology-only approaches result in reductions in soft skills when only technology is involved (Anderson, 2017), particularly communication and teamwork (Trajtenberg, 2018).

Che et al. (2023) underscore the significance of human interaction in the education system, arguing that education cannot be left to technology. Employers want individuals with technical and *soft skills* (Majid et al., 2019).

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Soft skills and technical skills must be intentionally designed into the system (Volger et al., 2018) and mapped into content (Kioupi & Vouvoulis, 2019) so that students acquire both technical and durable competencies (Bradberry & De Maio, 2019), including communication and teamwork (Trajtenberg, 2018).

Since in-class debates require student-to-student and student-to-teacher interaction both before and during the debates, it works to develop these skills in a human-to-human form. 21st-century skills require interactions with humans, not just machines. Debate can uniquely serve to develop these skills and prepare for future career readiness. As Timothy O'Donnell (2010) states, "participation in debate facilitates the professional careers of students… [and] participation was a positive influence in advancing their careers."

Debate As the Solution to "Cheating"

With the widespread proliferation of general tools such as ChatGPT, specialized writing assistants (getconch.ai), the general failure of AI writing detection tools (Bauschard, 2023a), and applications that help students pass off AI writing as their own (undetectable.ai), instructors need to develop instructional methods and assessments beyond the paper to measure student progress. Debate as a means of "performance-based" assessment, or iterative Project Based Learning (PBL), can play a critical role here (Litan, 2018).

To help understand this, let us unpack how any particular parts of the debate might be assessed. Each part of the debate should be assessed relative to the total human contribution.

First speech content (10%). Expectations for first speeches should be very high, yet they should represent a minimal part of the final grade. Why? Remember that these speeches are written out before the debate, and they can be written with significant assistance from both AIs and other students on the team, be it the competitive team or the class-based team. Not only *can* they be written with this assistance, but they *should*, as part of the skills being developed is learning to work with other students and AIs.

That said, even writing a speech with the collaboration of an AI requires skills in prompting, information validation (at least for now), proper organization, argument selection, and a demonstration of what is being taught/expected to be learned. Students cannot simply prompt an AI tool to "write me a speech" and end up with something usable. Fundamentally, a first speaker should "construct and deliver a compelling argument that is well-supported by both reasoning and evidence," which the teacher seeks in the assessment (Schueler, 2023).

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If you want to "push the limits," especially as your comfort level with debate grows, you might even want to make the non-performative assessment of the first speech a "group grade."

First speech presentation (25%). Without going into detail here, heavier weight is placed on the speech's performance/presentation (the "communication"), as these are human skills needed to help protect our humanity and develop essential job skills.

Rebuttals (40%). Presenting a strong rebuttal involves both pre-debate preparation to come up with responses your opponent is likely to make, but also *in-debate* thinking to adapt your general responses to the nuances of the argument made by the other team, to probe specific weaknesses in the other side's argument (their specific evidence and particular ideas), to choose which arguments you want to make if you have limited time, to organize your ideas, to adapt your ideas to non-verbal cues from the audience (especially the judge(s)) and to allocate time properly. Delivering a strong rebuttal requires *content mastery* and a strong demonstration of skill.

'Summary' speeches (50%). We put 'summary' in square quotes because different debate formats use different names for these latter speeches. Regardless of the exact name, the debater who delivered the first speech in the debate must respond to the rebuttal, select which arguments (s)he wishes to defend from the initial speech and use to argue the resolution is true, and compare, sustain the rebuttal against the opponent's first speech, and offer overall comparisons of the "truth" of the resolution. This requires both a demonstration of content knowledge and skill. This is often considered the most challenging speech in the debate because there is so much to accomplish in a short period of time.

'Final' focus speeches (35%). In this final speech, the person who presented the second speech focuses on the overall claim of the "truth" of the resolution, focusing on the main arguments of each side and making comparisons.

Questioning period (25%). During the questioning period, each side asks and answers questions *related to the specific content of the previous speech*. Students should use their collaborative efforts and AI assistance to help develop questions about arguments their opponents are likely to make. However, in the debate, they will have to select the best questions, articulate their arguments related to the questions, and ask and answer follow-up questions.

Suppose we imagine a 2:2 debate with two speakers. In that case, we get to 100%:

- First speaker (25% 1st speech, 50% summary speech, 25% questioning period)
- Second speaker (40% rebuttal, 35% final focus, 25% questioning)

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Teachers can adjust the weights based on what they want to emphasize. They may also want to incorporate scores for pre-debate work into the score for the debate itself.

As the earlier walkthrough of the basic structure of debate, as well as this more detailed discussion of how a classroom debate might work, debate functions well as a means of assessment that an undetected AI cannot replicate.

Content Assessment

Students must demonstrate content knowledge during questioning periods (and questions from the teacher could be added in), select arguments during the debate, and articulate arguments persuasively (it is hard to speak persuasively about things you need help to understand). During debate rounds, "debaters are often confronted with new advanced non-fiction texts that their opponents submit as evidence (Schueler & Larned, 2023). Students with strong content knowledge will also demonstrate an ability to hone in on weaknesses in their opponents' arguments, "explicitly contrasting the strengths of various pieces of text-based evidence" (IBID). The idea that one could debate well without demonstrating strong content knowledge is inconceivable.

Skill Development

In a recent report, Schueler and Larned (2023) unpack several ways participation in competitive debate promotes skill development.

First, in a debate, students are at the front of the room, taking ownership of their learning.

Second, "they must then read and refute those texts within a limited time and under pressure. Debaters can distinguish themselves, but they are trained to consider not only the content of the texts but also the relative credibility and objectivity of the sources."

Third, "given the regimented structure of a debate round, with timed speeches and a limited number of minutes of "prep time," students can use throughout the debate, debaters are incentivized to learn time management and the critical thinking skills needed to prioritize the arguments that will result in maximum impact within the limited time they are allotted."

Finally, "students must develop the ability to effectively listen to their opponents' arguments, to cross-examine (question) their opponents respectfully, and to work as a team toward a shared goal, making the theory of change consistent with a substantial research literature demonstrating the benefits of learning activities that incorporate cooperation with competition."

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Debate Promotes Student Engagement

Educators continue to struggle with how to boost student engagement, which is a precondition for learning in the classroom. Jal Mehta and Sarah Fine (2019) find that only 32% are engaged in today's classrooms.

Engagement on competitive debate teams is likely to be even higher. Schueler and Larned (2023) note, "[s]tudents have opportunities to be more actively engaged in the learning experience than in a typical classroom." Debate has been identified by scholars of "deeper learning" as a promising avenue for "developing student engagement with rigorous academic content."

Litan (2020) argues that "using the principles of debate more broadly in all classroom settings can be a powerful way of engaging students in the fun of learning, thereby encouraging them to stick with education" (p. 6). This is not surprising, as Project-Based Learning has been found to engage students, and debate can be seen as a form of extended PBL (Dintersmith, 2018; Litan, 2020).

Debate Supports Content Learning

"Tell me and I forget, teach me and I may remember, involve me and I learn."

Attributed to Benjamin Franklin

Education researchers have long recognized the limitations of learning a series of "facts" or the basic understandings that structure a discipline. While there are many benefits to developing content literacy and enough depth of knowledge in a specific field to enable critical assessment of evidence using that internalized content literacy, the speed of knowledge creation and accumulation today, especially in a world where artificial intelligence is combining and recombining knowledge without the limitations of disciplinary "traditions," renders efforts to "master" an entire discipline more than a lifelong endeavor. We must indeed dispense with the idea that a sole expert, researching and studying over a whole career, can offer the dispositive scope of any discipline's "content knowledge." Even the expert spends that career in dialogue and discussion with other experts, communicating and sharing with less knowledgeable peers, and testing new ideas in the crucible of argument. It is remarkably short-sighted to suggest that what students are expected to do in K-12 settings, from at least upper elementary school through high school and college, is to develop enough content mastery in all fields to be able to assess whether a computer's output is legitimate and aligned with what is known in a particular field or not. Content learning should be a lifelong endeavor, and we should spend far more time teaching

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students how to evaluate evidence and determine applicable content in collaboration with their peers.

Even beyond the problem of delivering and mastering content knowledge of this scope lies the problem of transfer. Researchers have studied transfer because the historical approach to education has focused on content mastery, assuming that if students are broadly educated about what is known, they can apply this knowledge in different contexts and settings. While not entirely untrue, transfer is also not natural, and our instructional practices have not always supported transfer well. Research has revealed that transfer is "affected by the degree to which people learn with understanding rather than merely memorize sets of facts or follow a fixed set of procedures" (Bransford et al., 2000). Transferring knowledge to new contexts also requires a great deal of "deliberate practice" to develop mastery in a particular field, enabling one to transfer the knowledge to novel settings. Specific and meaningful feedback must accompany deliberate practice, and students must develop and maintain a genuine motivation to learn. The context in which the original knowledge is learned, the degree to which abstract ideas can be represented in concrete examples, differences between the learning and transfer conditions, the degree of active involvement and productive struggle, and the application of reflection and metacognition all contribute to the challenges of relying on transfer, especially from a high school classroom where the content knowledge is learned in isolation with just enough practice time to remember the content in order to perform well on a test or college entrance exam (Bransford et al., 2000).

A critical barrier to relying on artificial intelligence to maintain and distribute all the content knowledge in any particular domain lies in the hallucination problem. At least for now, generative artificial intelligence sometimes produces statements of *fact* that are simply inaccurate, untrue, or made up to *sound* true in a given context. Some argue that hallucinations justify banning artificial intelligence in schools since the inaccuracies that appear true will enter and corrupt the disciplinary content knowledge that students need to learn. In such a setting, they argue, students need first to master the content so that they can use that knowledge to know whether the information they gather from AI tools is accurate and reliable. Unfortunately, however, prohibition fails to solve the hallucination problem that a pedagogy grounded in debating can actually reduce.

In a world where AI is "prohibited" or used in order to preserve the integrity of the content knowledge that students will learn, we know that students will still rely on artificial intelligence tools and continue to submit essays and other work, at least substantially produced by the large language models. It will fall exclusively to the teacher to check everything that is submitted. Overloaded teachers are in no position to conduct all of that research. Even teachers who know as much as possible about their discipline will not realistically be able to keep up with every new idea or advance as information rapidly accumulates. Beyond that, teachers will not intuitively

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know if a new idea, randomly generated by a large language model, is true or false. Even when teachers suspect inaccuracies, they still have to conduct their research simply to "catch" students cheating. This is an impossible expectation on teachers that, in practical terms, will often result in letting uncertainties go and errors in content knowledge proliferate.
A debating pedagogy, however, changes the incentive structure and motivates the students to demand content accuracy of their presentations (to avoid being called out or proven wrong and losing a debate). The students will also have incentives to check each other's content knowledge for errors since exposing them will help undermine their opponent's arguments, making it more likely that they will win the debate. Even without purely competitive "wins and losses," the performative assessment of a student's knowledge will suffer when their "facts" have been called out and corrected by a peer. This incentive structure makes the verification of content knowledge more manageable and enlists the students in their investigations. This critical posture toward content knowledge and willingness to investigate and understand more about what is known within a particular discipline may be the only manageable way to provide a meaningful check on hallucinations by AI.

Given the previous discussion, it is unsurprising that students are *more likely* to learn accurate and complete content in a debate-infused classroom than in a traditional classroom, at least if we want them to remember it after the test. Litan (2020) notes: "(S)tudents are much more likely to remember what they research and debate than when some or even much of the material is delivered to them by "the sage on the stage" in lecture format that they then regurgitate on an exam" (p. 8).

Why? Because through debate, students are more likely to *understand* the content, receive specific and meaningful feedback, have a greater desire to learn, be actively involved in their learning, and reflect on the material they are trying to master. Empirical research (Zhare & Othman, 2013; Fandos-Herrara, 2017; Boarman et al., 2018) also supports the conclusion that debates promote content learning.

Debate Promotes AI Skill Development

The world is currently experiencing the birth pangs of the world of generative AI, and there is likely to be substantial evolution in developing these technologies over time. The applications our students use at home and work when they graduate will differ substantially from what they use now.

Nonetheless, as noted in the first image in this paper, generative AI skills are in the second highest demand among all skills employers are looking for, and students must learn how to use these technologies well.

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Participating in competitive in-class debating will help students learn about the tools and their strengths and weaknesses.

Students can use AI tools to generate outlines for speeches, explain ideas (both to themselves and in the speeches), identify connections between ideas, produce argument lists they can research to validate and then choose from, help with the design of questions they can then modify and apply, provide options for persuasively expressing ideas, assist with gathering research citations (students need to be sure to use tools that are designed for this purpose as all are not). In this way, the tools function simply as output-driven assistants, and students should apply their thinking to make the best use of that output in their debates. Students who think through the potential applications and use them well will do best in their debates.

There are also AI applications such as Microsoft's Speech Coach and other individual apps that can help students improve their public speaking through practice and feedback. Suppose there is a presentation component of the speech (not always common in competitive speech and debate, but maybe it should be). In that case, many applications can also help build and improve presentations.

Students can also use AI to practice their arguments before debates start. For example, debateai.org allows students to engage in debates on particular topics with current and past historical figures. ChatGPT can be set to practice the questioning period with students and even provide feedback.

Figure 4

ChatGPT Questioning and Feedback

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S I'm a high school debater arguing that universal basic income will reduce poverty. Please ask me 5 questions that are aimed at undermining my argument. Please ask them one at a time and after I answer tell me what you think of my response before moving on to the next question

Of course! Let's begin.

Question 1: How would a Universal Basic Income be funded, and wouldn't the necessary increases in taxes or reallocation of funds from other welfare programs potentially harm the middle class or the overall economy?

Please provide your answer.

S It would be funded by taxes on companies developing artificial general intelligence. It wouldn't harm the middle class because these companies don't have middle class workers and they have enormous profits relative to expenses.

Feedback: That's an interesting approach, tying UBI funding to a specific industry, especially one with significant potential for growth and revenue. You highlight a source of funding that doesn't directly burden the middle class. However, opponents might argue about the long-term sustainability of this funding method or potential drawbacks of heavily taxing a specific industry. Additionally, as the artificial general intelligence industry evolves, the dynamics might change, affecting the revenue. It would be beneficial to have data or examples to back up the claim about the profitability of these companies and their lack of middle-class workers.

Question 2: Some argue that providing a UBI could lead to inflation, where the prices of goods and services increase because everyone has more money. How would you address concerns about inflation negating the benefits of UBI for those in poverty?

S Inflation doesn't matter

Feedback: That's a bold statement, and while it might be rooted in a deeper economic argument, it's essential to provide context and reasoning. Simply dismissing inflation might not convince opponents or judges in a debate setting. You might want to explain why you believe inflation won't be a significant concern with UBI, perhaps by citing historical examples, studies, or economic theories.

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These are just a few examples of how AI tools can enhance debate instruction, augmenting the preparation of its participants for an AI World. We will be developing these over time. For now, consider the critical importance of teacher training in this context.

Debate and AI in the Flipped Classroom

In 2006, two high school chemistry teachers first flipped their classrooms by recording lectures so students could have access at home, leaving class time for discussion and application (TeachThought, 2014). A flipped classroom is an instructional strategy and a type of blended learning that aims to increase student engagement and learning by having students complete readings or watch lectures at home and work on live problem-solving during class time. This pedagogical approach moves activities, including those that may have traditionally been considered homework. The principal goals of flipping are to make the classroom an active learning environment, to enable students to learn at their own pace, and to give the instructor more time to teach each student individually rather than the class as a whole. In a flipped classroom, students encounter information before class, freeing class time for activities that involve higher-order thinking (Flipped Classrooms). Instructors have used this model to provide students with instructional videos or to review before class (Gough et al., 2017) so that class time can be used for activities that involve higher-order thinking, such as problem-solving and group work (Lo & Hew, 2017), to provide individualized instruction to students during class time, and to create a more student-centered learning environment. Introducing AI tools for instruction presents a unique opportunity to flip the classroom, as high-quality instructional materials are now more readily accessible (Mollick, 2023). Exchanging in-class instruction with out-of-class student work allows instructors to employ an active learning pedagogy, including a debate-centered approach. While earlier iterations of the flipped classroom relied on readings and multimedia produced for broader audiences, such as an entire class, AI tools can provide individualized instruction for students outside of class, providing active engagement in the classroom (Mollick, 2023).

Teachers used the flipped classroom approach during the pandemic to adapt to remote learning and engage students in online classes (Heubeck, 2022). The flipped classroom approach allowed students to learn independently and provided teachers with more one-on-one time to help students and explain complex concepts. Teachers used recorded lectures and online presentations to provide instruction, which students could watch at home. This approach freed up class time for activities that involved higher-order thinking, such as problem-solving and collaborative work (Divjak et al., 2022). Teachers also used class time to answer students' questions about the video or online presentation.

According to a systematic literature review, the flipped classroom approach was effective for EFL courses during the pandemic (Linling & Abdullah, 2023). The study found that the flipped

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classroom approach had advantages such as increased student engagement, improved learning outcomes, and enhanced critical thinking skills. However, some challenges were also reported, such as the need for technical support and the difficulty of ensuring student participation. They used AI-based chatbots to provide students with 24/7 assistance and personalized support (Lo & Hew, 2023) and combined the flipped classroom model with AI technology to improve online learning (Lv, 2023).

AI in a flipped classroom can help teachers provide personalized instruction and support to students while promoting active learning and engagement in the classroom (Diwanji et al., 2018). AI can also help teachers monitor student progress and provide real-time feedback, improving learning outcomes. However, using AI tools to flip the classroom can be challenging. In addition to preparing materials for outside of class, instructors need support to develop active learning processes for in-class work, and numerous scenarios must be predicted and coordinated (Gonçalves et al., 2022). Using AI in a flipped classroom requires careful planning and implementation to ensure that it is effective and beneficial for students (Graves, 2019).

Debate in the Classroom: Modeling Competitive Debate

The above discussion largely focused on the skills developed by being on a competitive debate team. While in-class debating cannot capture all of the benefits discussed above due to the time limits (there is less time to debate in class than at a tournament, and developing these skills is strengthened by multiple iterations), it can capture many of them. Most importantly, it opens up debating opportunities *for all students*, not just those on the debate team. Of course, the more time allocated to in-class debates, the more benefits can be achieved.

Drawing on work done in Boston and Chicago, Robert Litan, a nonresident senior fellow at the Brookings Institution, argues for debate-centered instruction (DCI) in the classroom, writing that,

> [T]here is presumptive evidence that much more widespread adoption of DCI would equip many more workers than otherwise would be the case to have the communications, critical thinking, and research skills that employers say they want. It would make workers and our entire economy more productive, which would translate to higher and potentially more evenly distributed and higher wages (p. 12).

Building on the competitive academic debate models that generate the broadest learning of content and the deepest evaluation of argumentation, evidence, and knowledge, we can highlight what makes debates and debating such a powerful learning tool. We can identify the essential components of structured debates that carry the greatest value for developing both content area literacy and durable skills like problem-solving, critical thinking, communication, decision-making, creative thinking, interpersonal relationships, self-awareness, empathy, coping

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with stress, coping with emotions, adaptability, and leadership. The components reflect what is known from research on the brain and learning and, once identified, can be practiced, adapted, and applied at all levels of instruction.

Much experience already exists applying debate as an instructional approach across the curriculum, and those who have witnessed the power of the approach personally and in a competitive, extra-curricular setting have contributed to a wide variety of methods that researchers like Robert Litan have called debate-centered Instruction or DCI. Even before the advent of large language models and the latest excitement surrounding artificial intelligence, Litan (2020) argued that "much wider participation in debate and the introduction of DCI (debate-centered instruction) techniques belong on the education reform, workforce improvement, and civic health agenda, ideally at or near the top of the list" (p. 17).

In order to maximize classroom learning using a method like debate-centered instruction, structured opportunities for debating should include most, if not all, of the following structures:

- **Structured debatable questions:** A clear topic for which at least two sides can be identified and which content knowledge (facts) can be discovered and applied in argumentation for one side of the question provides the starting point. Developing questions that students can answer only when they have mastered the standards in the established curriculum takes a little practice, but it is easy once you start designing with the end in mind. What debates should a student participate in once they have mastered the standards? Start there.

- **Opposing sides and time to prepare:** Students should take opposing sides and develop the content knowledge to construct arguments favoring their side. Of course, they can develop the content knowledge in various ways, from direct instruction to asking chatGPT. The important things here are that 1) the content knowledge is learned in a meaningful context, and 2) the student will need to master the ideas in order to advance them in the debate AND test the ideas in order to prepare for challenges from the opposing side.

- **Structured dialogue rules:** The exchanges should be structured and fair to both sides. Each side should have uninterrupted time to present their arguments, time to answer questions about their arguments, time to listen actively to evaluate the other side's arguments and prepare ideas to challenge them, time to reflect, think, and prepare a response, time to rebut and refute the other side's arguments, time to answer questions about their own arguments, and time to continue the back and forth exchange, focusing increasingly on the points of principal disagreement or places where more research/content knowledge is needed.

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- **Evaluators to provide feedback:** A third party should provide feedback concerning the quality of each side's argument and evidence, identifying areas of uncertainty or weakness in each side's case, a research agenda (a list of what else needs to be known or understood to resolve the argument further), and a contingent assessment of which side debated better from the perspective of the third-party "judge" who can be the teacher, a peer, an outside expert, etc., depending on the lessons to be learned.

- **Switch sides and roles on the same topic periodically:** While it is essential to learn, develop deep and broad content knowledge, and develop strong skills of research and advocacy, the K-12 classroom does not call for developing one-sided or ideological perspectives that become lifelong, unquestioned beliefs. Switching sides makes hiding the ball or advancing arguments whose flaws may be unknown to others, tricks that are not useful. Instead, students can research and prepare for debates together, testing the very best arguments from each side. When both participants know as much as can be known about a topic, their argumentation not only enables a relative assessment of the strength of the argument on each side, it also leads toward the collaborative creation of new knowledge and ideas that traditional instructional methods seldom do. This new knowledge is transferred, and debate-centered instruction offers a uniquely effective tool for both developing content knowledge and transferring it to novel contexts and settings.

This list does not require extensive training. In fact, a teacher who understands the basics of how the AI large language models work, just like a teacher who understands how the basic search engines work, can prepare to facilitate this type of learning. It is also possible for pairs or even larger groups of students to work on learning this way simultaneously, meaning that this approach can also be more efficient than the traditional lecture. When the debates call for knowledge that can be delivered in a lecture, students who need to know in the context of debates they are preparing for will also become voracious consumers of the lecture.

Many instructional methods, such as project-based learning, recognize the power of intellectual exchange and argument. Professional development sessions are filled with ideas and admonitions for teachers to provide opportunities for students to choose what to learn and defend their choices and learning verbally at some point in the process. While these approaches are helpful and get at some of the ideas in this essay, the teacher's choices are too often limited, and the verbal defenses flow in one direction. Debate-centered instruction goes further by introducing challenging dialogue (argumentation), multiple learning modalities, and the side-switching motivation to listen and learn all sides of a question well, not just the one side to be defended.

Debate-centered instruction is not a unique technology that requires an elaborate setup or a year-long topic competition (both of which are useful). Instead, DCI begins with simple

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adaptations of existing protocols and instructional methods to include the key elements that make DCI effective. Developing topics or a question for a debate should start where students can participate after they have mastered the standards within the established curriculum. This approach also makes possible the backward design to scaffold the development of student debating skills. For example, long before students need to understand the idea of debate, an elementary school teacher could quickly transform a traditional turn-and-talk or pair-share protocol to include some of these debating structures. What if the turn and talk provided a specific time for each participant to talk, followed by questions from the other student, who then had a moment to prepare a challenge or response to the other student? The first student can then ask questions and respond, after which the students could discuss the arguments to determine which are more robust and what other information they would each need to strengthen their own arguments or resolve questions that emerge from their discussion. A third student who could listen and provide third-party feedback to these questions would provide another of the powerful inputs for debating. If that same teacher then asks the students to switch sides and/or roles, the learning processes that this simple turn-and-talk protocol offers start to grow significantly.

Teachers, of course, still need to teach content required by students to pass standardized tests in their respective content areas. Students cannot simply skip the history instruction they need to do well on standardized exams to engage in debates about the ramifications of artificial intelligence, for example, but they can use debate to facilitate learning that history content.

Imagine, for example, that a particular unit covered the impact of Enlightenment thinkers on the US Constitutional Convention. If you do not have any previous experience with debate, you may be wondering how to do that. So, let ChatGPT be your guide to get started.

Figure 3

ChatGPT History Debate Guide

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S

How might a teacher structure an in-class debate about the impact of Enligtement thinkers on the US constitutional. convention?

Structuring an in-class debate about the impact of Enlightenment thinkers on the U.S. Constitutional Convention can be both an engaging and informative experience for students. Here's a possible structure for the debate:

1. Topic Introduction:

Begin with a brief introduction to the Enlightenment and its prominent thinkers. Discuss the major ideas that emerged during this period, emphasizing individual rights, separation of powers, social contract theory, and the principles of liberty, equality, and democracy.

2. Debate Question:

"Did Enlightenment thinkers have a significant influence on the framers of the U.S. Constitution during the Constitutional Convention, and if so, in what ways?"

3. Team Formation:

Split the class into two or more teams:

- **Pro Team**: Argues that Enlightenment thinkers had a profound influence on the framers of the Constitution.
- **Con Team**: Argues that the influence of Enlightenment thinkers has been overstated, and other factors or ideas were more influential.

4. Research and Preparation:

- **Time for Research**: Give students time in class or as homework to research their stance. They should be encouraged to cite specific Enlightenment thinkers (e.g., John Locke, Montesquieu, Rousseau) and connect their ideas to specific sections or concepts within the U.S. Constitution.
- **Statement Preparation**: Each team prepares opening statements, counterarguments, and closing statements. Encourage students to anticipate the opposing team's arguments.

5. The Debate:

1. **Opening Statements**: Each team presents a 2-3 minute opening statement.
2. **Question & Answer**: The teacher poses questions, and each team gets a chance to answer. The opposing team can then offer a counterpoint. This can also be opened up to the class, where students not actively debating can pose questions.
3. **Cross-Examination**: Team members question the opposing team's arguments.
4. **Closing Statements**: Each team presents their final thoughts.

6. Reflection & Assessment:

- **Class Discussion**: After the debate, discuss as a class. What were the most compelling arguments on each side? What new perspectives did students consider?
- **Individual Reflection**: Ask students to write a brief reflection on what they learned and how their views might have changed or solidified.
- **Assessment**: If this is a graded activity, consider assessing not only the content of their arguments but also their teamwork, research skills, and presentation abilities.

7. Extension Activities:

- **Compare & Contrast Essay**: Have students write an essay comparing Enlightenment ideas with the actual content of the U.S. Constitution.
- **Role Play**: Let students play the roles of different Enlightenment thinkers and framers of the Constitution. How would they have discussed or debated these issues?
- **Contemporary Connections**: Discuss how Enlightenment ideas still impact U.S. governance and policies today.

This structure allows students to dive deep into the subject, understand both sides of the argument, and critically evaluate the impact of Enlightenment thinkers on one of the foundational moments in U.S. history.

Regenerate

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The essay probably needs to be revised because ChatGPT can write it with ease, but this broad overview of how it might operate will give you plenty of opportunities to think about how it might operate in a classroom.

You can quickly begin to think about how classroom debates can foster the development of enduring skills by reflecting on the suggestion above.

Critical thinking. Students must make the connection between the constitutional convention and ideas from the Enlightenment. Research and artificial intelligence (AI) tools can guide their thinking in this area, but they will be exposed to various ideas during the process. They will need to decide which of the many statements best supports the assertion that Enlightenment thinking significantly influenced the Constitutional Convention. They will also need to determine which thinkers and ideas to emphasize, which ideas they believe to be the most crucial, the most relatable to their audience, and the ones they can most convincingly explain and defend during the question and answer period.

Students must think about developing arguments for their in-class (IC) debates, especially since quality argument development involves iteration. They must consider weaknesses in their opponents' arguments before and during the debates. They need to question and respond to questions. All of these tasks are ones that an AI cannot perform for them.

Creativity. Thinking critically is essential to creativity in this context. In developing their ideas, students will be encouraged to look for creative and unique insights into their topics to develop unique argument ideas that may give them advantages in their debates. They may need to create a creative response if they are uncertain of an answer.

Communication. During the in-class debates, students must present their ideas in initial speeches, defend them orally in rebuttals and under the pressure of cross-examination, summarize critical information, and make essential comparisons. This must all be done in a way that is persuasive to their teachers and other judges (sometimes, in-class debates will also use fellow classmates as evaluators/judges).

Collaboration. The amount of collaboration that occurs will be impacted by the format the teacher chooses, and the guidance students are given to prepare for the debates. There will be minimal student collaboration if teachers organize simple 1:1 debates and instruct students to complete all preparation outside of class. If, however, teachers divide the class into two sides, they could all work together to prepare one side. Of course, having 12-15 students debate on each side (depending on the class side) may take much work to organize productively, so teachers could then create 6-7 teams of two on each side that would debate teams of two on the other side. This would help students focus and enable them to be a part of a wider group they

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would collaborate with for their preparation. For subsequent debates, the teacher would have the students switch both partners and sides to foster greater collaboration.

Research demonstrates the development of these skills through in-class debates. The use of debate in the classroom has also been found to reduce communication apprehension and build confidence in students (Howe & Cionea, 2021). This is even true for students learning English as a Foreign Language, facing apprehension through both language acquisition and public speaking, as debate practice in class has been found to improve fluency and confidence (Fauzan, 2016). Unfortunately, many college graduates report that they have a lack of confidence because of inadequate preparation, including limited opportunities to develop communication and critical thinking skills in their coursework. One survey found that only 30% of respondents felt they had obtained sufficient critical thinking skills in college (Head, 2016). Incorporating debate in more coursework can "help improve confidence as students learn to provide substantive impromptu responses to challenging questions." (Chikeleze et al., 2018)

Debate Coaching As Model for Future Classroom Instruction

There is considerable speculation that AI will shift the teacher's role as a distributor of knowledge to more of a facilitator of learning or a learning coach (Bauschard, 2023b). This will happen because teaching bots will excel at both mastering content and delivering instruction to students. We are not far from a world where we have universal teachers (and doctors and lawyers) who have mastered all of the knowledge on all school subjects and can effectively teach students, leaving the organization and facilitation to a human. While the AIs will likely exceed teachers' ability to teach content, we are far from a world in which AIs can manage a classroom or any future learning environment; human needs are simply too dynamic for AIs to manage those.

This approach essentially flips the role to that of a teacher as a coach. This is similar to how debate coaches, especially "head coaches" or "directors," have functioned for many years. In this model, the head coaches are responsible for setting the academic and competitive goals of the debate team, organizing preparation for competition, organizing the logistics of getting students to and from the competition, and providing overall assistance with direct instruction and preparation, including, when time permits, coaching individual students. The functions of a debate team thus break down into two key components. First is the role of the coach and assistant coaches in direct instruction, and second is the method of collaboration within the team, preparation group, or even summer camp.

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"Bot-as-Coach" Method for Instruction

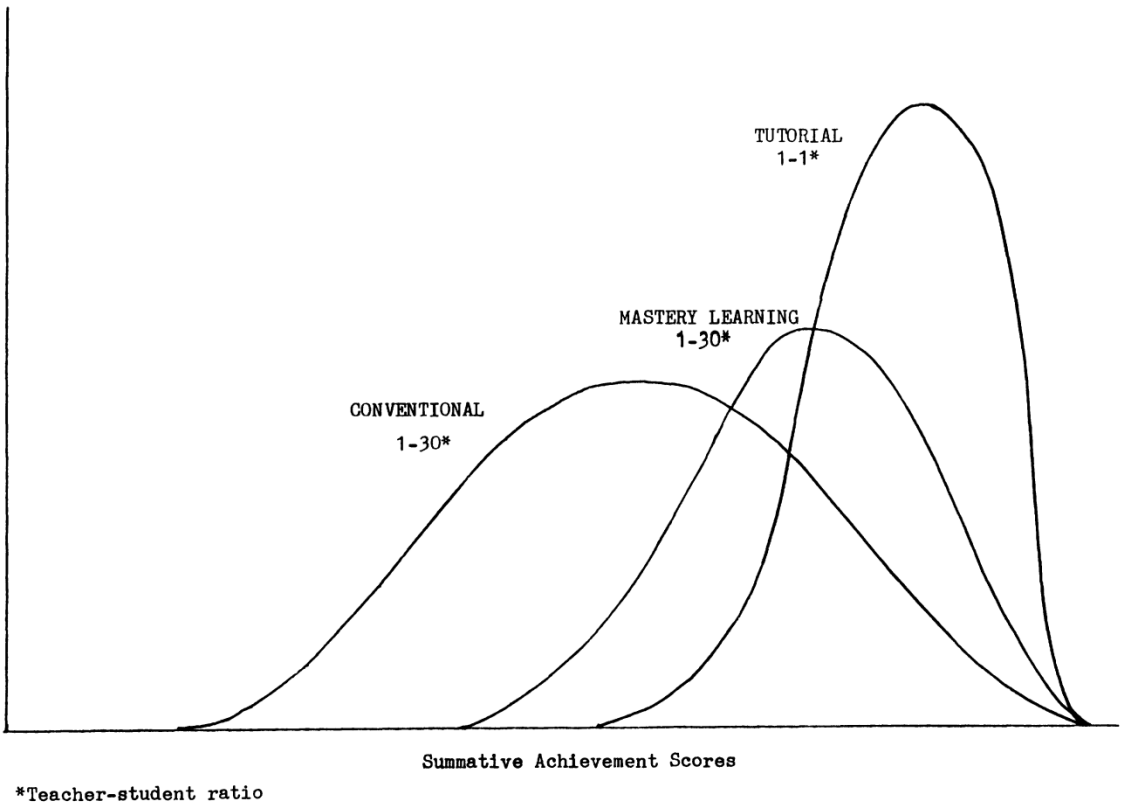
Within this team structure, there are assistant coaches. Sometimes, these assistant coaches are simply older, more experienced students who tutor the younger students. In other instances, they are often college or graduate students who support 1:1 instruction with individual students, often in an online environment or physically at a tournament. If the school does not provide these, many students often have their own "private coaches" who support them both online and often at tournaments. This intensive, 1:1 coaching, organized by sort of a master teacher, enables these students to excel; the students learn a lot and often perform the best at tournaments, both because of the individual attention the tutor can provide and because of the expertise the tutor often makes available. Often, these debate tutors know more than the head coach about particular types of arguments or debate strategies.

It is no surprise that such one-on-one tutoring works so well. Bloom (1984) reported the results of a study, which has been widely confirmed and cited, that students who receive individual tutoring (or even 1:2 or 1:3 tutoring) perform two standard deviations above the mean compared to students in both conventional classrooms and in Mastery-designed classrooms using formative assessment.

Figure 5

Achievement Distribution Curves (Bloom)

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This is no surprise given that individual tutors can pace instruction to a specific student's mastery of the material, correct for previous misunderstandings, adapt the instruction to the student's academic and life circumstances, and become invested in the success of individual students.

While this is the ideal educational model, and how the wealthy educated their children before the introduction of mass schooling (though the wealthy still supplement mass schooling with tutoring now), until now, it was limited by both cost and availability of tutors. However, the advent of AI and generative AI in particular, means that students can now (or at least in the near future) have access to high-quality tutoring and even teaching.

These teaching bots, commonly known as Intelligent Tutoring Systems (ITS) (Kearney, 2023), present several advantages to students, including 24/7 availability, the ability to adapt to each learner's interests (it can give student-specific examples of the same concept), it can teach in any language the student knows, it will demonstrate content knowledge that is at least a strong as any human teacher, generative engaging instructional materials in seconds, consistently demonstrate patience, and always understand the most recent content knowledge in the field (Bauschard, 2023b). Since social media and AI companies have mastered retaining students' attention, they will also excel in this area. Moreover, since it will likely know everything about the parents, it

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will be able to have smooth parent-teacher communications. In this way, the role of the teacher shifts to that of the head coach, the learning organizer, and the developer.

Moreover, competitive academic debate proves this model works quite well. The best debaters learn from the head coach directly and from many assistant coaches, including summer camp instructors. In many ways, assistant debate coaches are today's AIs, fully integrated into the learning process. Students who have the opportunity to debate in this type of environment typically excel beyond their peers. Why? Because they can fully take advantage of the *group's collective intelligence* – all of the student debaters and coaches – and propel themselves to be more than they otherwise would. As Mark Zuckerberg pointed out, Meta is more intelligent than any given individual and accomplishes more than any one individual could.

This learning environment, facilitated by a coach, also de-emphasizes the norm of individual/"sole" student work. Beyond working as a collective, successful debaters work with peers and their assistant coaches to develop their arguments. They co-develop arguments, think of questions, think of answers, talk about final speeches, practice with students, and even use each other's work. In many ways, assistant debate coaches have always been "*Copilots" who work hard with students to co-produce content.* This idea of "copiloting" student learning, though, is easily transferred over to AIs in a debate-specific context, as evidenced by use in summer programs in 2023 with softer GAI implementation, mainly used as a supplement to assistant coach instruction (RDI, 2023).

This integration is made easier, seeing the success of a tutor "copilot" in the past. Ullah et al. (2020) demonstrate general academic gains in peer tutoring for students and the tutee, extended across the curriculum as evidenced by Wright (2020) within mathematics instruction.

The "Lab" Model and Collaboration

As outlined earlier, many programs and camps aim to train high school debaters to be intense forensic competitors within a purely competitive view of speech and debate. Within speech and debate, instructional models are trained to be as productive and efficient as possible when preparing students for debate rounds or speech competitions. Beyond lectures and direct instruction from coaches and assistant coaches, debate can also provide a classroom structure that can more future-proof the collaborative skill development process, even absent the competitive end.

Summer debate camps utilize a collaboration model where students who would ordinarily compete against one another during the year come together to share research and ideas. This debate instruction uses "labs" similar to recitation sections after lectures, in which students

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collaborate, such as within summer programs or other preparation groups that usually compete against each other (RDI).

The debate camp specifically teaches students portable skills through student collaboration, and those skills are used primarily during competition between the students who initially had collaborated. In this way, the role of the debate camp already differs from that of a team at a more extensive program; the coaching and instruction are similar, but the collaboration model is different. Students learn from different coaches during the school year than the lab leaders they worked with during summer instruction. With the integration of GAI use at debate camps, encouragement of primarily student use supersedes the use by instructors, and the gap between camp instruction and school instruction closes (RDI, 2023; Bauschard & Rao, 2023).

This especially shows the value of collaboration, even within a system that encourages competition to the extreme. Because hyper-competition breeds fast innovation, just to keep up with the current model of competition, within the world of academic debate, students and instructors have been forced to integrate AI very fast into the model that they currently have (Rao, 2023).

Applying this to the classroom, students can be taught to use GAI tools so that the bot becomes a fellow collaborator rather than filling in just an instructing role. The collaborative nature of lab-like environments shifts to that primarily using GPT-like GAI tools and feedback/coaching tools such as Speaker Coach, which can then combine with that tutor role for individual students (Microsoft, n.d.).

In this model, collaboration in the classroom becomes one of student-student-bot-instructor, and during classroom assessments during debates, the competitive model of student vs. student can use the AI bot in preparation and in post-debate reflection, with the instructor serving as that third-party observer or judge discussed earlier. The teacher still plays a significant role, but the need for solely human-human collaboration decreases, allowing a more seamless transition into a collaborative classroom without any teaching assistants.

This approach can help both promote critical thinking and creativity associated with debate collaboration and make instruction accessible and individualized for all students in the classroom, assisting with struggles during various stages. The part that many debaters struggle with the most is writing the initial draft of the speech – creating a basic outline, a few sample paragraphs, and building some basic organization. It is not that they do not understand the concepts, but it is simply difficult to do with a topic one knows nothing about. Furthermore, when one is young (especially in middle school or 9th-10th grade), one does not even have the background knowledge to start. If students could generate their basic first speeches on a new topic with ChatGPT and then improve them with better sources of evidence, nuances of

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persuasive wordings, adaptations to feedback from peers and instructors (serving as those observers and judges), and changes based on current events, then they would undoubtedly end up with a better product than they otherwise would.

Although it is impossible to replicate all of the elements of a debate team for in-class debates, many elements are replicable. Earlier, we discussed how the class could be divided into two larger debate teams that will support the preparation of individual 2-3-person teams who individually debate. Though each classroom likely only has one adult teaching assistant or co-teacher, AI tools can be utilized to fill in for assistant coaches, help students develop initial arguments, support argument development, provide feedback on presentations, and even assist teachers with assessment.

This is precisely what our classrooms may look like in 5-10 years, and debate-centered instruction can help students manage that transition. There may be some resistance from some teachers, but as Robert Litan (2018) writes, "I suspect many teachers would enjoy this mentorship function as much as, if not more than, delivering lectures, especially if they get better educational results….DCI (Debate Centered Instruction) is a fundamental change in pedagogy. It puts much more of the onus on learning on individual students, with guidance and mentorship of the teacher, plus feedback and interactivity with peers."

Conclusion

Providing students with the opportunity to develop argumentation and debate skills enables them to develop durable skills for the AI-World, including communication, critical thinking, creativity, collaboration, leadership, adaptability, and emotional intelligence. These skills will serve them well not only in the present, where the highest demand among employers is for skills in these areas, but also as AI's ability to do more "knowledge work" explodes and the job market remains in flux.

Increasing the integration of debate into the classroom provides opportunities for students to develop these skills and provides teachers with a means of performative assessment that can be utilized to assess student knowledge in a world where traditional essays and papers can be easily completed by AIs undetected. Substantial research demonstrates that engaged learning methods such as speech and debate facilitate content learning.

Beyond serving as a means to develop these skills and to help retain essential content knowledge, competitive academic debate also serves as a model for a new world of education where students will learn to live, learn, and work with the assistance of AI tools. While many educators wonder how this will play out in the classroom, even in a pre-AI world, students in debate collaborated in an intellectual endeavor to co-develop and share knowledge to enable each of them to

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maximize their capacities. This involved shared work among students and coaches, including assistant coaches who functioned more like tutors and head coaches who functioned more like learning coaches who were ahead of their time. We now add AIs to the mix in the modern world, enabling education and its participants to be stronger than ever.

Although much of the model we discussed focuses on a competitive speech and debate format, it is possible to adapt this model to the classroom, as has been demonstrated in many instances. We have also outlined potential approaches to using debate in college, high school, middle school, and elementary school classrooms.

We have spent our entire lives in debate and education, and we have seen first-hand how the model offers a strong opportunity for training students to develop essential durable skills and facilitate content mastery. Debate-centered instruction can now also help students and teachers learn to use new AI tools in education properly. Given the critical role debate can play in preparing students to thrive in the AI world, we strongly urge schools to support both competitive and in-classroom debate. The future of students' preparedness for the AI world should not rest on bake sales and GoFundMes.

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Stefan Bauschard is the co-editor of "*Chat(GPT): Navigating the Impact of Generative AI Technologies on Educational Theory and Practic*e." He has been actively involved in issues related to generative artificial intelligence and hosted one of the first webinars on AI and education. He has spoken about AI at conferences in the US (AIxEducation; NDCA) and in the UK (Cottesmore (2 conferences)) about understanding AI, trends in AI development, and impending educational disruptions. Wrote with AI in 6 minutes. He has co-taught an online course for educational leaders and is working on AI training programs for the Orange County Department of Education and the Santa Ana Unified School District. He has been active in speech and debate for 37 years. He has established debate programs in more than seven countries and has built a large online instruction platform with more than 40 teachers that provides debate instruction for hundreds of students worldwide. He also manages an instructional services website that supports more than 15,000 students and teachers. He co-founded the Harvard Debate Council Summer Workshops, the Georgetown PF workshop, the Georgetown PF tournament, the Georgetown International PF and Vancouver tournaments, and the Silver Division of the Tournament of Champions (TOC). He also created the Middle School TOC, the

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Dr. Alan Coverstone is an educator, leader, and consultant who has worked for over 30 years to advance educational equity and catalyze change in K12 and higher education through professional roles in educator preparation, charter school innovation, grantmaking, and school improvement. Alan partners with educational communities to drive practical and meaningful outcomes with students of color and those experiencing poverty. Alan seeds intentional, transformational change efforts by building trusting relationships and placing those most connected to the outcomes at the center of decision-making. Prior to launching Covariant Education, where he is now Principal Consultant, Alan served as a Senior Program Officer at the Bill & Melinda Gates Foundation, in multiple faculty and program leadership roles in the College of Education at Belmont University, as an innovation leader for Metropolitan Nashville Public Schools, and as a school board member.

Dr. Anand Rao is a Professor of Communication and Department Chair at the University of Mary Washington. He started integrating AI applications into his courses in the spring and is currently teaching a Digital Studies course on Generative AI. He is a co-editor and contributor to the March 2023 book "Chat(GPT): Navigating the Impact of Generative AI Technologies on Educational Theory and Practice," and is a frequently invited speaker on the impact of generative AI on education. He has given more than fifty scholarly presentations and has run workshops around the world for faculty on the teaching of communication across the curriculum and for middle and high school students on argumentation and debate. He was the founding director of Harvard Debate Council's Summer Workshop on Public Speaking and Argumentation and co-founder of the Millennial Speech & Debate Institute's Summer Debate Workshop.

Sebastian Rao is a senior at the Commonwealth Governor's School, a STEM magnet program in Virginia. Sebastian has studied the use of AI by students and high school debaters. Most recently, he presented at the AIxEducation Conference in August, worked as an AI instructor for the Richmond Debate Institute in the summer of 2023, instructed in a DebateUS AI webinar series in the spring, and contributed to the March 2023 book "Chat(GPT): Navigating the Impact of Generative AI Technologies on Educational Theory and Practice." He is co-founder of his school's chapter of the International Youth Neuroscience Association, serves as the President of various student activity chapters, and is a nationally ranked high school debater.

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