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TLIC PAPER

AI-Driven Avatars for Smarter Decisions: Reducing Bias and Strengthening Critical Thinking

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ABSTRACT

As digital education evolves, AI-driven avatars become pivotal tools for enhancing decision-making skills. This paper presents an innovative approach leveraging intelligent conversational agents to cultivate critical thinking and mitigate cognitive biases. Through dynamic, scenario-based interactions, these avatars challenge assumptions, provide real-time feedback, and foster a deeper understanding of complex issues. The proposed framework integrates advanced generative AI models to reduce inherent biases, guiding learners through structured debiasing techniques such as the D.E.B.I.A.S. mnemonic. This scalable solution enhances decision-making quality across diverse sectors, including healthcare, recruitment, and corporate training. Beyond individual learning, this technology offers a foundation for equitable, data-driven decision-making within organizations. By positioning AI-driven avatars as key enablers of unbiased reasoning, this paper highlights their transformative potential in fostering more ethical and informed decision-making in professional and educational settings.

KEYWORDS

AI conversational avatars, unbiased decision-making, critical and multidimensional thinking, people and organizational development

1 AI-DRIVEN AVATARS: CATALYSTS FOR CRITICAL THINKING AND BIAS AWARENESS

In the rapidly evolving landscape of generative AI, fostering critical thinking and unbiased decision-making is essential for professional training and education. e-REAL Labs [1] introduces an innovative approach that leverages AI-driven avatars as interactive learning companions, immersing users in realistic, high-stakes scenarios. These intelligent agents are designed to confront cognitive biases, providing an adaptive environment where learners can refine their decision-making strategies through guided, data-driven interactions (see Figure 1).

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Powered by advanced algorithms, these avatars simulate natural human interactions, creating a dynamic learning space for complex problem-solving. While eliminating bias entirely is unattainable, these AI-driven systems actively minimize inherent biases, equipping learners with the tools to recognize and mitigate their own cognitive tendencies. Our conversational avatars challenge assumptions and encourage structured reasoning, fostering an environment that prioritizes critical thinking (see Figure 2). By immersing users in real-world dilemmas and decision-making processes, the avatars offer immediate feedback and expose learners to diverse perspectives, essential for cultivating a well-rounded, analytical mindset. Additionally, they guide users through thought experiments that prompt deeper reflection, urging them to evaluate multiple angles of a given situation (see Figure 3).

Fig. 1. Representative conversational avatars boosted by artificial intelligence, designed and developed by the e-REAL Labs

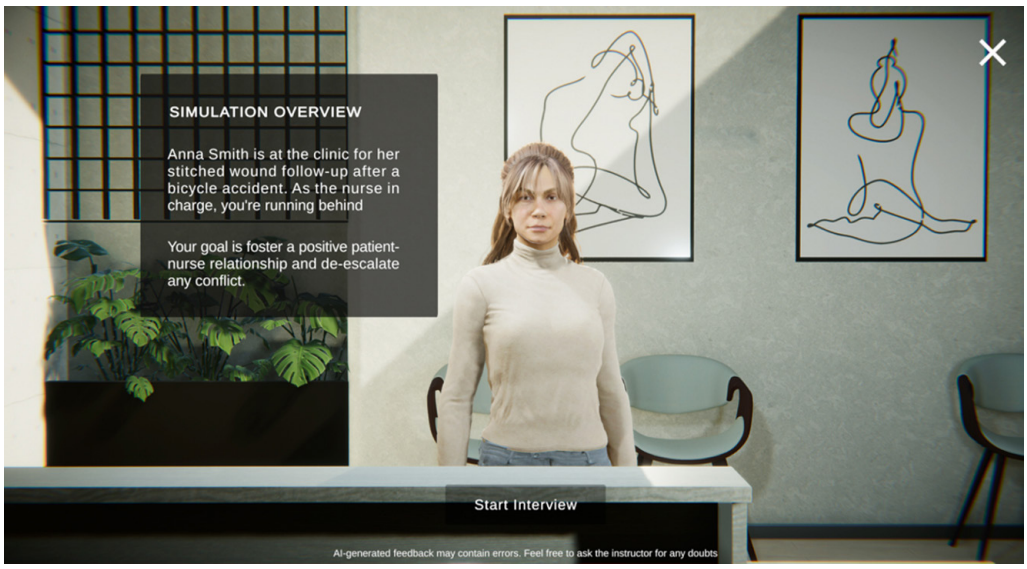

Fig. 2. Representative simulation scenario implemented by e-REAL Labs

Fig. 3. A trainee interacting with the conversational avatar to gain insight into his communicative and relational dynamics, as well as into the decisions taken during the simulation

These AI-driven avatars demonstrate exceptional value in sectors where decision-making quality directly impacts recruitment, customer service, and healthcare. The avatars facilitate deeper insights through repeated, scenario-based learning sessions in critical areas like diagnostic reasoning and treatment planning. Participants gain the ability to recognize and address their biases, sharpen their judgment, and enhance their overall decision-making skills. Acting as both mentors and reflective tools, the avatars provide a neutral platform for users to reassess their thought processes and adopt more balanced strategies. Beyond individual learning, these avatars lay the groundwork for building more objective and consistent decision-making frameworks within organizations. By adopting this technology, e-REAL Labs is leading the way in equipping professionals to effectively navigate complex challenges while upholding fairness and integrity in their choices, setting new standards in bias mitigation and critical-thinking education.

2 ADVANCING DECISION-MAKING AND CRITICAL THINKING WITH AI-DRIVEN AVATARS

In an era of information overload, developing unbiased decision-making and critical thinking skills is more essential than ever. These cognitive abilities enable individuals to navigate complex situations, make well-informed choices, and apply logical reasoning while avoiding misconceptions and biases. Unbiased decision-making extends beyond personal bias awareness, requiring a thorough evaluation of the multiple factors influencing judgment. These competencies are crucial across various domains, from personal decision-making to high-stakes choices in business, technology, and policy.

However, teaching these skills poses significant challenges in educational and professional training settings. Traditional pedagogical methods often fall short in replicating the complexity and unpredictability of real-world decision-making, limiting their effectiveness in fostering critical thinking. Additionally, educators must create learning environments that minimize biases—both their own and those embedded within educational systems. Learners must not only acquire knowledge but also develop the ability to critically assess and apply that knowledge, a skill that is difficult to measure and traditionally challenging to teach. Professionals, in particular, benefit from enhancing their reflective thinking abilities, allowing them to critically

analyze their own decisions and actions. Research highlights the importance of critical self-reflection in professional settings [2], [3], [4], [5], [6], [7], [8], [9], [10].

Generative AI-powered conversational avatars represent a transformative solution to these challenges. These intelligent agents create dynamic, interactive learning environments by simulating realistic conversations and decision-making scenarios. Acting as virtual mentors, they engage learners in dialogue, challenge their reasoning, and present complex situations that require critical analysis and unbiased decision-making (see Figures 4 and 5).

By offering immediate feedback and systematically analyzing users' decision-making processes, these AI-driven avatars have the potential to become indispensable tools for cultivating critical thinking and improving judgment in both educational and professional contexts.

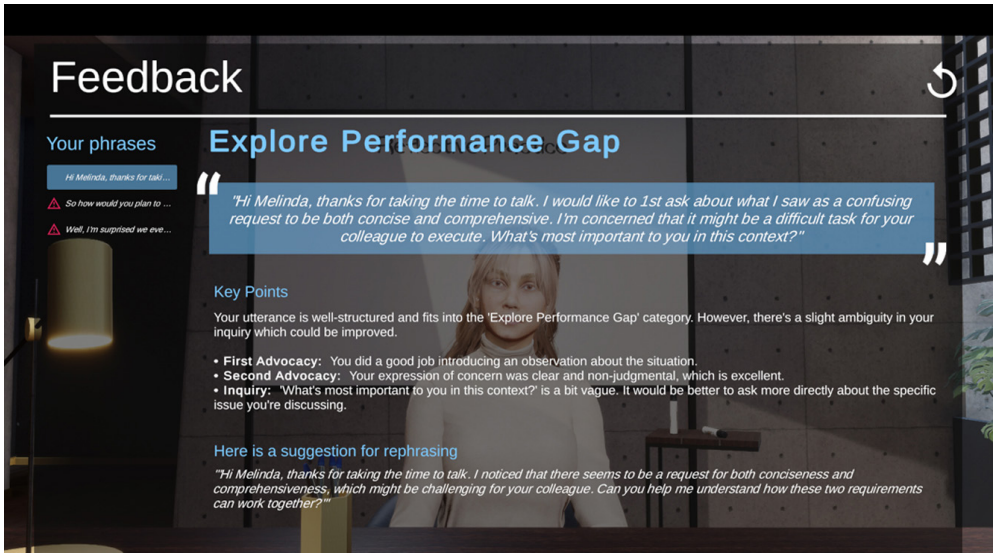

Fig. 4. Screenshots illustrate the AI system's immediate feedback during a training session on ethical decision-making in recruitment

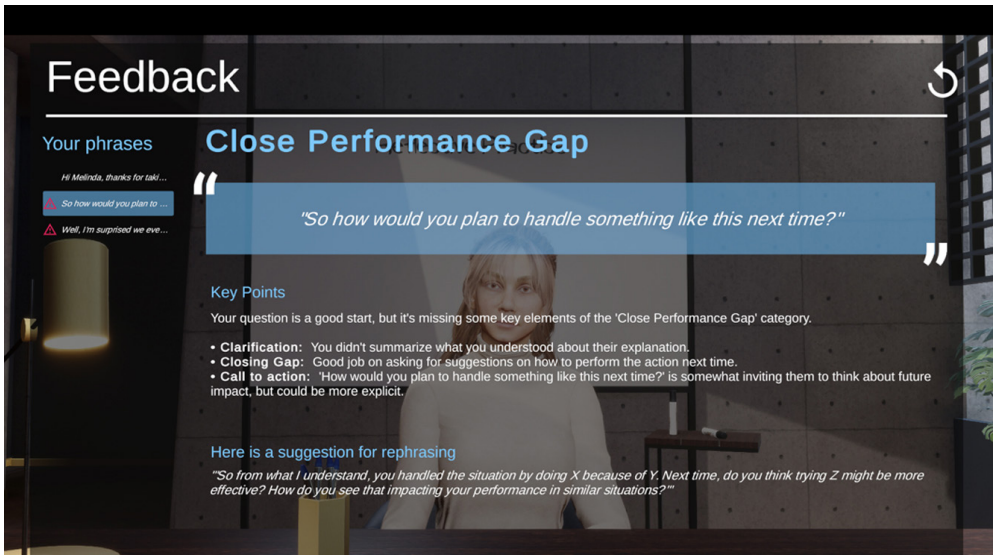

Fig. 5. Screenshots illustrate the AI system's immediate feedback during a customer service conflict resolution scenario. These examples highlight how the avatars facilitate real-time learning and adaptation by providing context-specific suggestions and critiques

As they are devoid of human biases, AI-enhanced conversational avatars can create a neutral zone where learners can safely test hypotheses, argue positions, and refine their thinking strategies, thus serving as a sophisticated technological scaffold for developing the critical cognitive skills that are so necessary in our complex world. An educational route crafted by the instructional design team headed by Barbara Bertagni, following the guidance offered by Martin Eppler and associates [11] revolves around a mnemonic: D.E.B.I.A.S. (Don't Easily Believe in Automated Suggestions). This philosophy centers on a critical inquiry: What constitutes the essence of debiasing? It embodies a prudent skepticism towards our immediate reactions, intuitions, and presumptions, as well as against precipitate advice from others, including AI systems (see Figure 6). In this context, debiasing signifies a methodical effort to lessen the influence of biases (departures from rational judgment) on individuals, teams, and organizations. It aids in recognizing or preventing frequent cognitive shortcuts, inequitable preferences, skewed analyses, and poor decision-making.

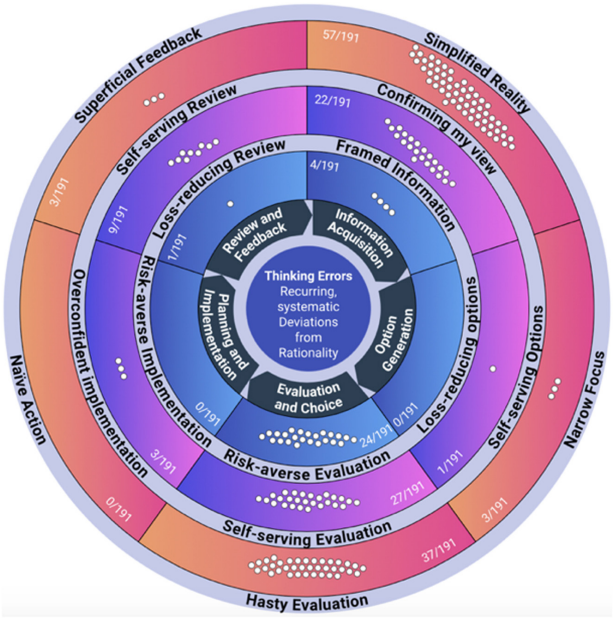

Fig. 6. A map of the most frequent and impactful biases, part of the D.E.B.I.A.S. program designed by Martin Eppler and colleagues from the University of St. Gallen, Switzerland, and the Nuremberg Institute for Market Decisions, Germany

The D.E.B.I.A.S. mnemonic is a strategic approach to mitigate cognitive biases systematically. AI conversational avatars, designed to embody this mnemonic, can play a critical role in each step of the process:

D – Don't rush: Avatars encourage learners to take a moment before reacting, promoting thoughtful reflection instead of impulsive decisions. They can create scenarios that reward evaluating information before forming judgments.

E – Examine evidence: These digital entities can present a range of data and ask probing questions that compel learners to scrutinize the evidence thoroughly, ensuring decisions are well-informed and evidence-based.

B – Block noise: By offering focused dialogues, avatars can assist in filtering out irrelevant information or "noise" that may cloud judgment, teaching learners to concentrate on critical factors affecting decisions.

I – Interpret information objectively: Avatars can be programmed to challenge subjective interpretations and push for objective analysis, providing alternative viewpoints and counterarguments to foster balanced understanding.

A – Assess alternatives: Through interactive exercises, avatars can guide users to consider multiple solutions or paths, illustrating the value of not settling for the first option that comes to mind.

S – Stay updated: Avatars can introduce the latest information and updates relevant to the decision-making context, encouraging continuous learning and the re-evaluation of previous conclusions in light of new evidence.

By integrating these principles, AI conversational avatars serve as virtual mentors, guiding individuals through a structured debiasing process. They are not only conversational partners but also educators and facilitators of a robust critical-thinking environment. These avatars can simulate complex decision-making environments, provide a safe space for learners to practice these steps, and embed the D.E.B.I.A.S. approach into the very fabric of their learning journey. This prepares learners not only to engage with the content at hand but also equips them with a disciplined approach to thinking that they can apply to various situations, making it a versatile and valuable skill set in any context.

3 AI-POWERED AVATARS FOR EXPANDING COGNITIVE AGILITY IN INDIVIDUALS AND ORGANIZATIONS

The rise of AI-driven conversational avatars marks a significant transformation in cognitive skills development and refinement. These intelligent systems go beyond conventional learning tools by offering users an immersive environment that mirrors the complexities of real-world interactions. Through diverse and dynamic simulations, they expose learners to a spectrum of perspectives, compelling them to confront biases and refine their reasoning processes [12], [13], [14].

Designed with rich contextual detail, these AI avatars place users in decision-making scenarios that require analytical thinking, adaptability, and problem-solving under uncertainty. Learners engage with challenges involving incomplete data, opposing viewpoints, or long-term consequences, promoting advanced cognitive flexibility. This form of interactive learning is instrumental in fostering higher-order thinking skills such as analysis, synthesis, and evaluation—key components of critical thinking.

One of the defining strengths of these AI-driven avatars lies in their adaptability. They dynamically adjust to users' responses, progressively increasing complexity to match the learner's capabilities. This real-time adaptation aligns with the "zone of proximal development," ensuring that users are consistently challenged but not overwhelmed. This targeted challenge keeps learners engaged while driving the most effective skill acquisition and refinement.

Additionally, AI avatars provide a risk-free space for experimentation, failure, and reflection. By offering real-time, constructive feedback, they guide learners through the consequences of their cognitive biases, reinforcing lessons that would be difficult to grasp in traditional learning settings. Rather than simply reading about biases, learners experience their effects firsthand, allowing them to recognize, analyze, and ultimately correct flawed reasoning patterns.

Another powerful feature of these avatars is their ability to personalize learning experiences. By tracking individual decision-making patterns, they can identify specific cognitive tendencies—such as confirmation bias or loss aversion—and offer tailored exercises to address these blind spots. This personalized approach enhances self-awareness, encouraging users to challenge ingrained biases and refine their decision-making frameworks.

In essence, AI-powered avatars serve as both cognitive mirrors and mentors, shedding light on implicit thought patterns and fostering continuous intellectual growth. They transcend the traditional role of educational tools, acting as catalysts for reshaping the way individuals process information, evaluate evidence, and make informed choices.

Beyond individual learning, the influence of AI avatars extends into the corporate and institutional landscape. Organizational decision-making is inherently complex, often shaped by an interplay of individual biases and group dynamics. AI avatars offer an innovative solution by acting as impartial facilitators in decision-making processes, fostering more objective and equitable outcomes.

Within organizations, these avatars can simulate intricate decision-making scenarios that reflect the nuanced challenges of leadership, strategy, and policy implementation. By questioning assumptions, introducing alternative viewpoints, and minimizing hierarchical influence, they create an environment that encourages critical dialogue and mitigates the risk of groupthink. This shift is essential for fostering a decision-making culture that values objectivity, diversity, and long-term impact.

Moreover, AI avatars can be customized to align with an organization's core values and strategic objectives, ensuring that every decision reflects ethical principles and broader institutional goals. By integrating these avatars into key decision-making processes, organizations can benefit from data-driven insights that mitigate cognitive overload, leading to more well-reasoned and bias-free conclusions.

From a training and development perspective, AI avatars serve as powerful tools for cultivating a workforce that is self-reflective, analytical, and open to diverse perspectives. Employees engaging with these avatars can develop strategies to recognize and counteract biases, fostering a culture of fairness, inclusivity, and adaptive thinking. As a result, teams equipped with enhanced decision-making capabilities are more likely to generate innovative solutions, anticipate potential challenges, and implement strategies that are considerate of all stakeholders.

By leveraging AI-driven avatars, both individuals and organizations can refine their decision-making frameworks, enhance cognitive resilience, and foster a culture of strategic, evidence-based thinking. These digital agents are not just transforming learning—they are reshaping how we perceive, process, and act upon complex information in an increasingly dynamic world.

4 FUTURE DIRECTIONS AND INTEGRATION OF AI CONVERSATIONAL AVATARS IN GLOBAL EDUCATIONAL SYSTEMS

As AI technology continues to evolve, the potential for AI conversational avatars to transform educational systems worldwide is immense. The versatility of these avatars, combined with their ability to simulate real-world scenarios and offer personalized feedback, positions them as critical tools for developing cognitive skills. Implementing AI avatars within formal education systems presents opportunities for revolutionizing both the delivery of content and the methods of skill acquisition. Traditionally, critical thinking and unbiased decision-making are skills that have been challenging to teach in standard classroom settings. However, through AI-driven avatars, educational institutions can now offer students interactive, real-time learning experiences that foster these essential skills.

AI avatars can be tailored to each student's needs and learning pace. By adapting to individual learning styles, these avatars ensure that students remain engaged

and are challenged at their appropriate level. This personalized learning approach promotes deeper understanding and addresses diverse learning gaps across different demographic groups.

Introducing AI avatars into curricula focused on critical thinking, ethics, and decision-making offers a more immersive and practical learning experience. For example, students studying history or political science could interact with AI avatars that simulate historical figures or complex diplomatic scenarios, forcing students to assess decision-making processes and consider multiple viewpoints critically.

In the fields of science, technology, engineering, and mathematics (STEM), AI avatars could be utilized to simulate complex problem-solving environments. Students could engage in experiments or engineering challenges in a virtual space, receiving immediate feedback from avatars on the effectiveness and bias within their approach. This can strengthen their problem-solving skills and foster innovation.

Beyond formal education, AI avatars have a significant role to play in professional development and lifelong learning. The workforce of the future will require continual skill upgrades, especially in fields like healthcare, finance, and technology, where decision-making and critical thinking are paramount. AI conversational avatars can be integrated into continuing development programs, allowing professionals to regularly engage in bias-reduction exercises and simulations of real-world dilemmas that they may encounter in their work. For instance, in the healthcare industry, doctors and nurses can use avatars to practice decision-making under pressure, explore diagnostic reasoning, and challenge their own cognitive biases in patient care.

In corporate environments, AI avatars can revolutionize leadership training and development programs. By simulating high-stakes decision-making situations, avatars allow professionals to explore complex business problems in a controlled environment, offering real-time feedback on their decisions, communication strategies, and management styles. This prepares leaders to make more informed, balanced, and bias-free decisions in their organizations. As AI avatars gain traction in educational and professional settings, there is a need to address how these technologies can be integrated on a global scale, considering cultural, linguistic, and regional differences.

For AI avatars to be effective in different parts of the world, they must be designed to respect and reflect cultural contexts. The avatars should be equipped with the ability to adapt to different cultural norms and values, ensuring that their feedback and interaction style are appropriate and relevant. This might involve creating localized versions of avatars that speak regional languages and understand cultural nuances in decision-making. AI avatars could facilitate cross-border educational programs by acting as intermediaries for international collaborations. For example, students in different countries could work together on shared projects, with AI avatars moderating discussions, offering unbiased viewpoints, and challenging assumptions. This encourages global learning, fosters cross-cultural understanding, and promotes unbiased critical thinking on a broader scale.

As these avatars become more prevalent, governments and educational institutions must develop policies to ensure ethical usage, data privacy, and equal access. The integration of AI avatars should not exacerbate existing educational inequalities but instead serve as tools for leveling the playing field. Ensuring that schools in under-resourced regions have access to these technologies will be crucial in bridging the global digital divide.

One of the key strengths of AI avatars lies in their ability to promote collaborative learning by facilitating group decision-making exercises. As education becomes

more globalized and collaborative in nature, avatars can act as mediators, offering objective insights and guiding teams of learners through complex problem-solving processes. Avatars can simulate organizational settings where multiple stakeholders with diverse perspectives must work together. For example, in a business course, students could engage with avatars in a scenario where they must make corporate decisions while balancing stakeholder interests, ethical concerns, and financial constraints. The avatar's role in this scenario would be to present different perspectives and help the group mitigate biases that arise during discussions. AI avatars can also promote equity in group settings by ensuring that all voices are heard. In traditional group dynamics, certain individuals may dominate discussions, while others are marginalized. Avatars can monitor these dynamics, prompting quieter members to contribute while gently reminding dominant members to allow space for others. This helps create a more balanced and inclusive learning environment.

The future of education and professional training is poised for a transformation through the use of AI conversational avatars. These tools offer a unique blend of real-time feedback, critical thinking challenges, and unbiased decision-making exercises that can significantly enhance learning outcomes in both formal and informal settings. As we move toward a world where cognitive skills are at the heart of professional success, the role of AI avatars in shaping these skills will become indispensable. For AI avatars to reach their full potential, further research, global collaboration, and ethical considerations must be prioritized. By doing so, we can ensure that these innovative technologies not only advance individual learning but also contribute to the creation of more equitable, inclusive, and globally connected educational systems.

In conclusion, AI conversational avatars hold immense promise for shaping the future of organizational decision-making. They stand as harbingers of a new era where technology and human intelligence collaborate to create decision-making frameworks that are not only intelligent and efficient but also fair and just. This collaboration could be the key to achieving unbiased and equitable decisions that propel organizations toward sustainable success, guided by principles of fairness and integrity that are deeply embedded in their decision-making processes.

Further research is needed to explore the potential of these conversational – and artificially intelligent – digital humans. At e-REAL Labs, we're committed to this research because we envisage generative artificial intelligence as an interesting driver for education and training. A representative conversational digital human to interact with is available by scanning the QR code below (see Figure 7) and then scheduling a meeting online:

Fig. 7. By scanning the QR code, an avatar will appear and after a short self-introduction will provide an online calendar allowing you to book a meeting to directly talk and test a digital human

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