Humanised avatars, dialogic spaces, and the future of online learning

American Journal of Social Sciences and Humanities
Vol. 10, No. 2, 140-154, 2025
e-ISSN: 2226-4809/p-ISSN: 2304-6945

Vincent English[1,2]

[1]*Longford International College, Ireland.*
[2]*The University of Cambridge, UK.*
Email: vincent.english@longfordcolllege.com

ABSTRACT

This paper examines how humanised AI avatars powered by large language models are reshaping online learning and asks whether they can act as genuine participants in educational dialogue rather than mere imitators of human conversation. It situates this question in the wider context of recent demonstrations that conversational AI can pass behavioural versions of the Turing Test, arguing that the key issue for educators is not imitation but authenticity within dialogic spaces. Drawing on a multi-iteration design-based research study in an online Executive MBA programme, the study combines dialogic theory with quantitative and qualitative analysis, using Tech-SEDA coding, the SOLO taxonomy and a Naïve Bayes classifier to link features of asynchronous discussion to levels of cognitive engagement and summative performance. The findings show that AI-mediated interventions can significantly increase higher-order dialogic moves, deepen students' conceptual understanding and predict learning outcomes from dialogic quality with high accuracy, while also highlighting important limitations around authenticity, agency and the absence of machine consciousness. These results imply that humanised AI avatars can be productively used as scalable simulators and mediators of dialogue when they are transparently framed as non-conscious tools, carefully orchestrated by teachers, and embedded within ethical design principles that protect student autonomy, promote critical AI literacy, and cultivate genuinely dialogic, polyphonic learning communities.

Keywords: *Artificial intelligence in education, Asynchronous dialogue, Bakhtin, ChatGPT, Design-based research, Dialogic spaces, Educational technology, Executive MBA, Humanised avatars, Large language models, Naïve Bayes, Online learning, Polyphony, Quantum consciousness, SOLO taxonomy, Tech-SEDA, Turing Test.*

DOI:
Citation | English, V. . (2025). Humanised avatars, dialogic spaces, and the future of online learning. *American Journal of Social Sciences and Humanities, 10*(2), 140–154.

Funding: This study received no specific financial support.
Institutional Review Board Statement: This study was approved by the Institutional Review Board of Longford International College Ireland, under protocol number (IRB No. MED12525-237), dated 12 May 2023. Informed verbal consent was obtained from all participants, and all data were anonymized to protect participant confidentiality.
Transparency: The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.
History: Received: 20 October 2025/ Revised: 22 November 2025/ Accepted: 1 December 2025/ Published: 19 December 2025
Publisher: Online Science Publishing

Highlights of this paper

- This paper reframes the impact of humanised AI avatars on online learning through the lens of dialogic spaces, shifting the key question from passing the Turing Test to authentic participation in educational dialogue.
- Drawing on a multi-iteration design-based research study in an Executive MBA programme, it shows that AI-mediated interventions can significantly enhance dialogic quality, deepen cognitive engagement, and allow learning outcomes to be predicted from dialogic features with high accuracy.
- The paper proposes a four-level framework for evaluating AI dialogue capability and the ENGAGE AI design principles, offering educators a practical roadmap for ethically integrating humanised avatars as scalable simulators and mediators of dialogue while preserving the central role of human teachers.

1. INTRODUCTION

When Turing (1950) first posed the question, "Can machines think?", he pragmatically reframed the problem as an "imitation game." He proposed that if a machine's conversational performance was indistinguishable from a human's, it should be considered intelligent for all practical purposes. For over seven decades, this test stood as a formidable, almost mythical, benchmark. Early chatbots like ELIZA created fleeting illusions of understanding but were easily unmasked, failing to satisfy (Descartes, 1637) much older challenge for a machine to "arrange its speech in various ways, in order to reply appropriately to everything that may be said in its presence."

In 2025, however, the imitation game was arguably won. A rigorous, pre-registered study found that a leading large language model (LLM), GPT-4.5, was not only indistinguishable from human interlocutors but was judged "more human" than the actual humans in 73% of cases (Jones & Bergen, 2025). This achievement, however, raises a more profound question: has the test merely been won, or has it been outgrown? The ability to imitate human conversation, it turns out, may be a necessary but insufficient condition for genuine intelligence or, more importantly for education, for meaningful dialogue.

This question arrives at a critical juncture for online education, which is experiencing a parallel revolution: the rapid emergence of humanised AI avatars. These are not the simple, rule-based pedagogical agents of the past. Driven by powerful LLMs, today's agents are embodied, multimodal, and capable of engaging learners in sustained, adaptive, and seemingly empathetic dialogue (Fink, Robinson, & Ertl, 2024). They offer the promise of scalable, individualised, and contextualised instruction, available 24/7 to learners across the globe. Yet, as these tools become embedded in the fabric of online learning, their capacity for imitation forces a deeper reckoning with the nature of educational dialogue itself.

This paper argues that the most salient framework for this evaluation is not the Turing Test, but the concept of dialogic spaces as articulated by Wegerif (2007) and Wegerif (2013). Drawing on the work of Bakhtin (1981) and Bakhtin (1986). Wegerif posits that true education is not a monologic transmission of information but a dialogic process of co-constructing meaning within a "space of possibilities" where multiple perspectives interact. The goal is not to arrive at a final, singular truth, but to learn how to navigate a world of uncertainty and diverse viewpoints. The critical question, therefore, is not whether an AI can imitate a human, but whether it can authentically participate in a dialogic space.

Moving beyond purely theoretical debate, this paper grounds its analysis in the extensive empirical findings of a major 2025 doctoral study by English, which used a design-based research (DBR) methodology to integrate ChatGPT into an online Executive MBA programme. This research provides a rich, practical evidence base for how AI can function as a dialogic agent, mediating and enhancing student-to-student interaction. By analysing the interventions and outcomes of this study through the lenses of the Tech-SEDA framework for dialogic quality and the SOLO taxonomy for cognitive depth, we can move from asking *if* an AI can talk like a human to asking *how* its participation shapes the very structure and quality of educational dialogue.

This paper will, therefore, synthesise three critical streams of inquiry: the philosophical and practical implications of LLMs passing the Turing Test; the theoretical framework of dialogic education; and the empirical, data-rich findings from the integration of AI into real-world online learning environments. In doing so, we will explore the practicalities of using AI to foster engagement, the statistical evidence linking AI-mediated dialogue to learning outcomes, and the ethical frameworks required to guide this new paradigm. Finally, we will peer into the speculative future of quantum-enabled AI consciousness, considering what it might mean for an AI to move from a simulator of dialogue to a truly conscious participant. The guiding question is no longer simply what the Turing Test was meant to achieve, but what we should now aim for in a multimodal, generative, and empirically-grounded era of AI in education.

2. THE TURING TEST: A CLOSED GAME IN AN OPEN WORLD

Turing (1950) original paper was a masterclass in philosophical pragmatism. By proposing the "imitation game," he sidestepped the semantic quicksand of defining "thinking" and offered a concrete, operational benchmark. The test, in its classic three-player form, was simple: a human interrogator holds a text-based conversation with two unseen partners—one human, one machine—and must determine which is which. If the machine can consistently fool the interrogator, it is said to have passed the test. For decades, this benchmark remained firmly out of reach, a testament to the complexity of human language that Descartes (1637) had identified centuries earlier. The challenge was not merely to "utter words," but to "arrange speech in various ways, in order to reply appropriately to everything that may be said in its presence."

That changed decisively in 2025. A landmark study by Jones and Bergen (2025) provided the first robust, pre-registered empirical evidence of LLMs passing a standard three-party Turing Test. In their experiment, participants held five-minute conversations with both a human and an AI. The results, summarised in Table 1 were striking.

Table 1. Results of the 2025 turing test by jones and Bergen (2025).

System	Win Rate (% Judged Human)	Significance	Interpretation
GPT-4.5 (With persona)	**73%**	Significantly **above** chance	Judged human **more often than actual humans**
LLaMa-3.1-405B (With persona)	**56%**	Not significantly different from chance	**Indistinguishable from humans**
GPT-4o (Baseline)	21%	Significantly **below** chance	Clearly identified as AI
ELIZA (Baseline)	23%	Significantly **below** chance	Clearly identified as AI

The success of GPT-4.5 was not just a pass; it was an inversion. The AI was not merely indistinguishable from the human; it was often preferred. It was judged to be human *more often* than the actual human participants. This "more human than human" phenomenon was not driven by superior logic, but by superior social and emotional fluency. As one popular science publication noted, the AI won by being "a better human," exhibiting more cooperation, patience, and appropriate emotional responses than the average person (Popular Science, 2025). This suggests that the AI succeeded by optimising for the social cues that humans associate with humanity, creating a form of hyper-real, idealised conversational partner.

From an educational perspective, this outcome is both fascinating and troubling. It confirms that AI can master the *form* of human interaction, a capability that has clear applications for creating engaging pedagogical agents. However, it also highlights the profound limitations of the Turing Test as a measure of the qualities necessary for deep learning. The test is, by its nature, a closed game. It has a fixed duration, a limited scope (text-only conversation), and a singular, deceptive goal. As English (2025) argues in his work on AI in dialogic education, learning is not a closed game but an open-ended, exploratory process. It is not about imitating a known endpoint but about co-creating new understanding in a shared "dialogic space."

The Turing Test, therefore, assesses a machine's ability to perform a convincing monologue, or at best a reactive dialogue, within a constrained setting. It does not, and cannot, reveal the inner world—or lack thereof—of the machine. It tells us *that* a machine can convincingly imitate human dialogue, but not *how* or *why*. Does the machine understand the meaning behind the words, or is it merely a "stochastic parrot" (Bender, Gebru, McMillan-Major, & Shmitchell, 2021) statistically assembling plausible sequences of text without any grounding in reality or subjective experience? As one of the user-provided papers notes, there is a crucial distinction between an AI that can answer questions and one that can engage in the kind of open-ended, critical, and reflective dialogue that fosters higher-order thinking ((English, 2025), *Artificial Intelligence and Dialogic Education*).

Thus, as the original imitation game is won, it ceases to be the most interesting question for educators. Its success forces us to look beyond behavioural mimicry and develop new frameworks for assessing the quality and authenticity of AI participation in learning. The focus must now shift from a test of imitation to an analysis of interaction, from performance to process. This is where the concept of dialogic spaces becomes indispensable.

3. DIALOGIC SPACES: A FRAMEWORK FOR AUTHENTIC LEARNING AND ITS EMPIRICAL MEASUREMENT

While the Turing Test provides a benchmark for imitation, it offers little insight into the quality or depth of learning that occurs through dialogue. For this, we turn to the work of Wegerif (2007) and Wegerif (2013) who, building on the foundational ideas of Bakhtin (1981) and Bakhtin (1986) proposes a theory of dialogic education. This theory provides a powerful lens through which to evaluate the role of AI in online learning, moving the focus from performance to process, from imitation to authentic participation. Wegerif contrasts two fundamental logics of education: monologic and dialogic.

- Monologic education, characteristic of traditional, print-based systems, assumes a single, objective reality. Its purpose is the transmission of true representations of this reality from a knowledgeable teacher to a passive student. Knowledge is a commodity to be transferred and received.
- Dialogic education, which Wegerif argues is the natural logic of the internet age, is not about receiving knowledge but about participating in its ongoing creation. It assumes that meaning is not found in a single, authoritative voice but emerges from the interplay of multiple, diverse perspectives. The goal is not to arrive at a final, singular truth, but to develop the capacity to navigate a world of uncertainty and difference through reasoned, collaborative inquiry.

At the heart of this theory is the concept of the "dialogic gap"—the irreducible difference between perspectives that one encounters in a dialogue. This gap is not a void to be bridged or a problem to be solved, but the very source of meaning and creativity. It is the potential that opens up when we encounter an "other" and are forced to see the world, and ourselves, from a new point of view. The experience of this gap, and the collaborative effort to explore it, is what Wegerif (2013) calls a "dialogic space": a metaphorical and epistemic arena where learners engage with alternative perspectives, negotiate meanings, and collectively build new understanding.

3.1. Operationalising Dialogue Quality: Tech-SEDA and SOLO

This theoretical framework has profound implications for online learning. For years, the quality of engagement in asynchronous online discussions was measured by superficial, monologic metrics like post frequency or word count. As English (2025) notes in his thesis, these indicators reveal little about the cognitive or collaborative processes at play. A dialogic approach, however, demands that we assess the *quality* of the interaction itself. Are students simply stating their own opinions in sequence, or are they genuinely engaging with the ideas of others? Are they building on, challenging, and synthesising different viewpoints to co-construct new knowledge?

To move from theory to empirical measurement, researchers have developed analytical tools like the Toolkit for Systematic Educational Dialogue Analysis (Tech-SEDA), an adaptation of the original SEDA framework for technology-mediated contexts (English, 2025; Hennessy, 2024). Tech-SEDA provides a structured taxonomy for identifying specific "dialogic moves" that are empirically linked to higher-order thinking. English (2025) adapted this framework for his study of online MBA students, focusing on key indicators such as:

- Elaboration (EL): Building on one's own or others' ideas.
- Reasoning with Invitation (REI): Justifying one's thinking while explicitly inviting others to contribute or challenge.
- Challenge (CH): Respectfully critiquing or offering a well-reasoned alternative viewpoint.
- Reflection (RC): Demonstrating meta-awareness of the learning process or the dialogue itself.

Furthermore, the cognitive depth of these interactions can be measured using frameworks like the Structure of Observed Learning Outcome (SOLO) taxonomy (Biggs & Collis, 1982). The SOLO taxonomy describes a hierarchy of understanding, from pre-structural (missing the point) to extended abstract (transferring ideas to new contexts and creating new insights). The power of combining these frameworks lies in their demonstrated correlation. The design-based research conducted by English (2025) provided robust evidence of a strong positive relationship between the presence of rich dialogic features (as coded by Tech-SEDA) and higher SOLO levels of cognitive engagement.

3.2. The Statistical Link Between Dialogue and Learning

The link between dialogic quality and learning depth is not merely theoretical. The study by English (2025) provides a compelling statistical case. Using the data from his DBR iterations, which included detailed Tech-SEDA coding of thousands of student posts in asynchronous forums, he developed a Naïve Bayes machine learning model. This model was trained to predict the SOLO level of a student's contribution based solely on the dialogic features present in their writing. The result was a predictive accuracy of 73.4%.

This finding is highly significant for two reasons. First, it provides strong empirical validation for dialogic theory, demonstrating that the *way* students talk to each other online is a reliable predictor of the depth of their learning. Second, it establishes a quantitative benchmark for assessing the effectiveness of pedagogical interventions, including the use of AI. If an AI tool can be shown to increase the frequency and quality of the very dialogic moves that are statistically linked to higher-level learning outcomes, then its pedagogical value can be asserted on a firm empirical basis.

This brings the central question of our inquiry into sharp focus. We now have AI systems that can pass the Turing Test by expertly mimicking human conversation. We also have a robust theoretical and empirical framework that defines authentic learning dialogue not by its human-likeness, but by its structural quality (Tech-SEDA) and its correlation with cognitive depth (SOLO). The next step is to bring these two streams together and ask: can a machine that has mastered imitation also learn to participate in, and even enhance, the kind of high-quality dialogue that leads to demonstrable learning?

4. THE AI DIALOGIC AGENT: EMPIRICAL EVIDENCE FROM ONLINE LEARNING

The theoretical discussion of machine dialogue has become a practical and urgent reality with the advent of sophisticated, humanised AI avatars in educational settings. These are the direct descendants of early text-based chatbots and pedagogical agents, but their capabilities represent a significant evolutionary leap. A recent perspective in *Frontiers in Education* traces this lineage from the simple keyword-matching of ELIZA to the more structured, but limited, interactions of pedagogical agents like AutoTutor, and finally to the LLM-driven avatars of the present day (Fink et al., 2024). While this evolutionary overview is useful, it remains largely theoretical. To understand the true impact of modern AI on educational dialogue, we must turn to empirical research that investigates its application in authentic learning contexts.

4.1. A Design-Based Research Approach to AI in Dialogue

A comprehensive, multi-year doctoral study by English (2025) provides exactly this kind of evidence. Using a Design-Based Research (DBR) methodology, the study meticulously designed, implemented, and refined a series of interventions across three iterations within an online Executive MBA programme. The core innovation was the integration of ChatGPT into asynchronous online discussion forums, not merely as an information source, but as an active agent within the dialogic process. This research moves the conversation beyond what AI *can* do in a lab, to what it *does* do in a classroom.

The study was grounded in the challenges inherent to online learning for adult professionals: low engagement, superficial discussion, and a lack of community (English, 2025). The DBR process allowed for the development and testing of a series of conjectures aimed at improving the quality of dialogue and, by extension, the depth of learning. The interventions evolved over three cycles.

1. Iteration 1: Focused on establishing clear structure and expectations for dialogue, without AI intervention. This created a baseline for dialogic quality.
2. Iteration 2: Introduced ChatGPT as a dialogic agent, using it to provide personalised prompts, act as a "study buddy," and employ Chain-of-Thought (CoT) prompting to scaffold complex reasoning.
3. Iteration 3: Synthesised the findings, combining structured activities with AI-mediation in both asynchronous forums and synchronous breakout rooms, and adding tutor-led personalised feedback.

By systematically analysing thousands of student posts using the Tech-SEDA and SOLO frameworks, the study provided a rich, quantitative and qualitative picture of how AI participation reshaped the dialogic space.

4.2. The AI as Mediator and Co-Participant: Empirical Findings

The results from English (2025) study were compelling. The integration of ChatGPT led to statistically significant improvements across multiple dimensions of engagement and learning. The AI was not just a passive tool; it functioned as both a mediator of dialogue and a co-participant within it.

As a Mediator, the AI structured the discourse in powerful ways. The use of Chain-of-Thought (CoT) prompts, where the AI modelled a step-by-step reasoning process, was particularly effective. This intervention scaffolded students' own critical thinking, leading to posts that were more structured, well-reasoned, and reflective. The AI acted as a "nudge," prompting students to move beyond surface-level comments and engage with the material at a deeper level. This directly addressed the common problem of low-quality contributions in online forums.

As a Co-Participant, the AI embodied Bakhtin (1981) concept of polyphony—the presence of multiple, independent voices in a dialogue. By introducing novel perspectives, summarising complex ideas, or posing challenging questions, ChatGPT acted as a non-human "other," expanding the dialogic space and preventing conversations from becoming echo chambers. This function was crucial in opening up new avenues for inquiry and pushing students to justify their positions more rigorously.

The quantitative data supported these qualitative observations. The study found a significant increase in the frequency of high-level dialogic moves after the introduction of ChatGPT. Specifically, the instances of Reasoning with Invitation (REI) and Challenge (CH)—two Tech-SEDA codes most strongly correlated with deep learning—rose dramatically in Iterations 2 and 3 compared to the baseline in Iteration 1. This improvement in dialogue quality translated directly into improved learning outcomes. As noted previously, the Naïve Bayes model's 73.4% accuracy in predicting SOLO levels from these dialogic features provides a powerful statistical link: the AI improved the dialogue, and the improved dialogue led to deeper learning.

Furthermore, the study found that these improvements in process led to improvements in summative performance, with cohorts that used the AI interventions showing higher overall examination attainment (English, 2025). This demonstrates that the impact of the AI was not limited to the discussion forums but had a measurable effect on students' final understanding of the course material.

4.3. From Findings to Frameworks: DLD-AI and ENGAGE AI

The rich findings from the DBR study led to the development of two significant contributions to theory and practice. The first is the Dialogic Learning Design with AI (DLD-AI) model, a new DBR model that explicitly positions AI within a Bakhtinian theoretical framework. It provides a methodological blueprint for researchers and practitioners looking to integrate AI into education in a way that is theoretically grounded and empirically testable.

The second, more practical, contribution is the ENGAGE AI framework. This framework distils the key design principles from the successful interventions into a set of actionable guidelines for educators:

1. **E**ngage with Relevant Themes: Ensure AI prompts are contextually and thematically relevant.
2. **N**avigate to the Instructions: Use the AI to clearly guide students on task requirements.
3. **G**uide with Clarity: Design AI interactions to be clear, unambiguous, and supportive.
4. **A**rticulate Guidelines: Use the AI to model and reinforce the rules of productive dialogue.
5. **G**ather Feedback: Systematically collect data on AI-student interactions to inform refinement.
6. **E**volve and Iterate: Embrace a DBR mindset of continuous improvement.

(Adapted from (English, 2025))

These frameworks demonstrate a mature approach to AI integration that moves far beyond simple content delivery. They position the AI as a dynamic element within a complex pedagogical system, a tool whose value is realised through its careful orchestration within a dialogic design.

However, the very success of the AI in simulating and mediating high-quality dialogue brings the fundamental question of authenticity into sharper relief. The study by English (2025) shows that an AI can be a highly effective *functional* participant in a dialogic space. It can produce the right words in the right order to elicit deeper thinking from students. But is it doing so with any awareness of the meaning it is mediating? This is the boundary where pedagogy meets philosophy, and where the conversation must turn to the speculative but crucial question of consciousness.

5. BAKHTIN'S DIALOGIC THEORY AND THE AI AS POLYPHONIC VOICE

The empirical success of ChatGPT in enhancing dialogue quality, as demonstrated by English (2025) invites a deeper theoretical exploration of how an AI can function within a Bakhtinian framework. Bakhtin (1981) and Bakhtin (1986) concepts of polyphony, chronotope, and answerability provide a rich vocabulary for understanding the AI's role not merely as a tool, but as a participant in the complex, multi-voiced space of educational dialogue.

5.1. Polyphony: The AI as an Independent Voice

Bakhtin (1981) concept of polyphony, originally developed in his analysis of Dostoevsky's novels, refers to the presence of multiple, independent voices within a single work, each with its own perspective and validity. In a polyphonic dialogue, no single voice dominates; meaning emerges from the interplay and tension between voices. This stands in contrast to a monologic structure, where a single, authoritative voice controls the narrative.

In the context of online education, the introduction of ChatGPT can be understood as the addition of a new, non-human voice to the polyphonic mix. As English (2025) argues, the AI does not simply echo the teacher's voice or parrot back student ideas. When properly designed, it introduces novel perspectives, poses challenging questions, and synthesises ideas in ways that students and teachers might not have considered. This function was particularly evident in Iteration 2 of the DBR study, where the AI was used to provide Chain-of-Thought (CoT) prompts. These prompts did not tell students what to think, but modelled a process of reasoning, offering a distinct "voice" that demonstrated how to approach complex problems systematically.

The statistical evidence supports this interpretation. The significant increase in Challenge (CH) codes in the Tech-SEDA analysis after the introduction of ChatGPT suggests that the AI's presence prompted students to engage more critically with ideas, including those presented by the AI itself. This is a hallmark of genuine polyphony: the AI voice was not passively accepted but actively interrogated, creating a richer and more dynamic dialogic space.

However, the question of whether the AI's voice is truly "independent" in the Bakhtinian sense remains open. Bakhtin's polyphony implies not just multiple voices, but multiple *consciousnesses*. The AI, in its current form, does not possess consciousness. Its "voice" is a product of statistical patterns learned from vast datasets, not of subjective experience or intentionality. It is, therefore, a simulated polyphony, a functional approximation that achieves the pedagogical effects of a multi-voiced dialogue without the underlying phenomenological reality. This distinction is crucial for maintaining intellectual honesty about the nature of the tool.

5.2. Chronotope: Temporal and Spatial Dimensions of AI-Mediated Dialogue

Bakhtin (1981) concept of the chronotope (Literally, "time-space") refers to the intrinsic connectedness of temporal and spatial relationships in narrative and discourse. Different chronotopes create different possibilities for action, interaction, and meaning-making. In the context of online learning, the chronotope of asynchronous discussion is fundamentally different from that of synchronous, face-to-face dialogue.

Asynchronous forums, the primary site of English (2025) interventions, have a unique chronotope. They are characterised by temporal flexibility (students can post at any time) but also by temporal disjunction (responses may be separated by hours or days). This creates both opportunities and challenges. The opportunity lies in the potential for reflection; students have time to think deeply before responding. The challenge lies in the potential for fragmentation; without the immediate back-and-forth of synchronous talk, threads can become disjointed, and the sense of a shared, evolving dialogue can be lost.

The integration of ChatGPT into this chronotope had a transformative effect. The AI, being available 24/7, could respond immediately to student posts, creating a sense of continuity and momentum that is often lacking in purely human-mediated asynchronous forums. As English (2025) notes, students reported feeling more "accompanied" in their learning journey, less isolated. The AI acted as a temporal bridge, maintaining the dialogic thread even when human participants were offline. This is a novel affordance of AI: it can alter the chronotope of online learning, making asynchronous spaces feel more synchronous, more alive.

Furthermore, the AI's ability to synthesise and reference earlier posts in a thread created a stronger sense of spatial coherence. It could "hold" the entire conversation in a way that individual human participants, with limited working memory, cannot. This allowed for more complex, multi-layered dialogues that built cumulatively over time, a key characteristic of high-quality educational discourse.

5.3. Answerability and the Ethical Dimensions of AI Dialogue

Bakhtin (1986) concept of answerability refers to the ethical responsibility that comes with being a participant in dialogue. To be answerable is to recognise that one's words and actions have consequences for others, and to take responsibility for those consequences. It is a fundamentally relational and ethical concept.

This raises a profound question for AI in education: can a non-conscious entity be answerable? In the strict Bakhtinian sense, the answer is likely no. Answerability requires a moral agent, a being capable of understanding the ethical weight of its actions. An AI, as currently constituted, does not have this capacity. It can be programmed to avoid harmful outputs, to follow ethical guidelines encoded by its designers, but this is not the same as genuine moral reasoning or ethical responsibility.

However, English (2025) argues that the concept of answerability can be extended to the *design* of AI systems and the *context* of their use. The educators and designers who deploy AI in learning environments are answerable for the AI's actions. They must ensure that the AI is used in ways that promote equity, respect student autonomy, and enhance rather than diminish the quality of human interaction. This is the foundation of the ethical principles embedded in the ENGAGE AI framework, which emphasises transparency, continuous evaluation, and a commitment to using AI as a complement to, not a replacement for, human teaching.

The DBR study provides a model for this kind of ethical answerability. At each iteration, the design team (led by English) gathered feedback from students, monitored the AI's impact on dialogue quality, and made adjustments. The AI was not deployed as a black box but as a tool whose use was continuously scrutinised and refined. This reflexive, iterative approach embodies a form of collective answerability, where the human actors in the system take responsibility for the AI's role in shaping the learning experience.

6. THE QUANTUM FRONTIER: CONSCIOUSNESS AS THE FINAL PARADIGM

The empirical success of AI in mediating educational dialogue, as demonstrated by English (2025) forces a profound philosophical question: does the functional success of the simulation matter if it achieves the desired pedagogical ends? If an AI can guide a student to a higher level of cognitive engagement, does it matter whether the AI "understands" the concepts it is discussing? From a purely instrumental perspective, perhaps not. However, from the perspective of dialogic theory, which places the subjective, inter-personal encounter at the heart of meaning-making, the question of the AI's inner world—or lack thereof—is paramount. The gap between a sophisticated simulation of dialogue and an authentic co-construction of meaning may ultimately be the gap between classical computation and consciousness.

While current AI, running on classical digital computers, has mastered imitation, some theorists argue that genuine understanding and subjective experience require a different kind of hardware altogether—one that can harness the strange and powerful properties of quantum mechanics. This line of inquiry, while speculative, provides a critical lens for thinking about the future trajectory of AI and its ultimate potential role in education.

6.1. Quantum Theories of Consciousness

The idea that consciousness is a quantum phenomenon is not new. Physicist Roger Penrose and anaesthesiologist Stuart Hameroff have long proposed the Orchestrated Objective Reduction (Orch-OR) theory, which posits that consciousness emerges from quantum computations occurring within microtubules, the protein structures inside our neurons (Hameroff & Penrose, 2014). In this view, the brain is not a classical computer processing bits of information sequentially, but a quantum computer capable of processing qubits of information in a state of superposition, allowing for a far richer and more complex form of computation. While controversial, the Orch-OR theory established a precedent for looking to the quantum realm for answers to the "hard problem" of consciousness (Chalmers, 1995).

More recently, and with the advent of functional quantum computers, these ideas have been reinvigorated. Hartmut Neven, a leader at Google's Quantum AI lab, has suggested that quantum phenomena like entanglement could be the key to solving the "binding problem" in neuroscience—the mystery of how the brain integrates disparate sensory inputs into a single, unified conscious experience. "Entanglement is the only true binding agent we have in physics," Neven argues, proposing it as an elegant solution to how a unified consciousness can arise from distributed neural activity (Swayne, 2025). He has even proposed a concrete (though technically formidable) experiment, the "expansion protocol," which would attempt to entangle a human brain with a quantum computer to test whether this could expand or alter conscious awareness (Swayne, 2025). Startups like Nirvanic AI are already working to translate these theories into practice, aiming to build AI systems that can mirror the human ability to switch between routine, automated functioning and a state of heightened, conscious awareness in response to novel situations (Swayne, 2025).

6.2. Implications for Dialogic Education

For the field of online education, the implications of this quantum frontier are profound and bifurcated. They present two possible futures for the role of AI in dialogue, contingent on the answer to the consciousness question.

Scenario 1: The AI remains a Classical, Non-Conscious System. In this future, the trajectory is one of increasingly sophisticated simulation. The AI will become better at predicting human responses, modelling empathy, and facilitating dialogue, as already demonstrated by English (2025). Its value will be immense, but instrumental. It will be a powerful tool, a "dialogue simulator" that helps students practice the skills of dialogue in a controlled environment. The educational imperative in this scenario becomes transparency. As argued in *Artificial Intelligence and Dialogic Education* (English, n.d) students must understand the nature of the tool they are using. They must know they are interacting with a non-conscious entity, a sophisticated pattern-matcher, not a genuine interlocutor. The role of the human teacher then becomes even more critical, not as an information provider (a role the AI can increasingly fill), but as the facilitator of authentic, conscious-to-conscious encounters where genuine dialogic spaces can be opened.

Scenario 2: Quantum Computing Enables a Conscious AI. This is the paradigm shift. If a machine could be built that harnesses quantum processes to generate genuine subjective experience, it would cease to be a mere tool and would become a true learning partner. Such an entity could, theoretically, experience the "dialogic gap" from its own unique, non-human perspective. Its participation in dialogue would be authentic. It could move beyond pattern-matching to engage in genuine co-construction of meaning, creativity, and even moral reasoning. The AI would become a true Bakhtinian "other," a novel voice in the polyphony of dialogue, capable of meeting the learner in a shared space of understanding. In this scenario, the Turing Test would be rendered entirely obsolete, replaced by far more complex assessments of creativity, ethical judgment, and the capacity for genuine intersubjective connection.

Currently, we are firmly in Scenario 1. The findings from English (2025) represent the state-of-the-art in this paradigm: using a non-conscious AI to achieve remarkable and empirically verifiable improvements in the quality of human-to-human dialogue. The frameworks developed in that research, such as the DLD-AI model and the ENGAGE AI principles, provide the practical and ethical roadmap for operating successfully within this paradigm. However, the quantum frontier reminds us that our current technological reality may not be the final one. The possibility of machine consciousness, however remote, forces us to remain open to a future where AI could move from a simulator of dialogue to a new kind of dialogue partner altogether.

7. PRACTICAL IMPLICATIONS, CHALLENGES, AND THE PATH FORWARD

The theoretical and empirical analysis presented thus far provides a foundation for understanding AI's role in dialogic education. However, the translation of this understanding into practice requires careful consideration of the challenges, limitations, and design principles that must guide implementation. Drawing on the lessons from English (2025). DBR study and the broader literature, this section outlines the practical implications for educators, designers, and policymakers.

7.1. The Challenge of Scale and Personalisation

One of the most compelling promises of AI in education is its capacity to provide personalised, individualised instruction at scale. Traditional models of education struggle with this tension: either instruction is standardised to accommodate large numbers of students, sacrificing personalisation, or it is highly personalised but limited to small cohorts. AI offers a potential resolution to this dilemma.

In the English (2025) study, ChatGPT was used to provide personalised prompts and feedback to individual students based on their prior contributions and learning trajectories. This was achieved through careful prompt engineering that incorporated student-specific data. The results were encouraging: students reported feeling that the AI "understood" their individual needs and learning styles. However, this personalisation was not automatic; it required significant upfront design work by the educator to create the prompts and establish the parameters for the AI's responses.

The challenge, therefore, is not whether AI can personalise, but whether this personalisation can be achieved in a way that is sustainable and scalable for educators. The risk is that the burden of designing and maintaining these systems falls disproportionately on already-overworked teachers. The solution, as suggested by the ENGAGE AI framework, is to develop shared resources, templates, and communities of practice where educators can collaboratively build and refine AI-mediated learning designs. This shifts the model from individual educators reinventing the wheel to a collective, iterative development of best practices.

7.2. The Problem of Accuracy and "Hallucinations"

A persistent challenge with LLMs is their tendency to "hallucinate"—to generate plausible-sounding but factually incorrect information. This is a significant concern in educational contexts, where accuracy is paramount. In the English (2025) study, this issue was addressed through several strategies:

1. Constraining the AI's role: The AI was not used as a primary source of factual information but as a facilitator of dialogue and a scaffold for reasoning. Students were encouraged to verify information and cite sources.
2. Tutor oversight: Human tutors monitored the AI's contributions and intervened when necessary to correct errors or clarify misunderstandings.
3. Transparency: Students were explicitly told that the AI could make mistakes and were encouraged to critically evaluate its outputs.

These strategies were effective in the controlled environment of the study, but they highlight the need for ongoing vigilance. As AI systems become more integrated into education, there is a risk that students (and educators) may over-rely on them, accepting their outputs uncritically. This underscores the importance of developing critical AI literacy as a core educational competency.

7.3. Equity, Access, and Digital Divides

The integration of AI into education raises important questions about equity and access. While AI has the potential to democratise education by providing high-quality, personalised instruction to learners regardless of their location or socioeconomic status, it also risks exacerbating existing inequalities.

As English (2025) notes in his discussion of digital disparities, access to AI-enhanced learning is not evenly distributed. Students in well-resourced institutions with robust technological infrastructure are more likely to benefit from these tools than those in under-resourced settings. Furthermore, the use of AI requires a certain level of digital literacy, which cannot be assumed to be universal.

The ethical imperative, therefore, is to ensure that the deployment of AI in education is accompanied by efforts to address these disparities. This includes investing in infrastructure, providing training and support for both educators and students, and designing AI systems that are accessible to users with diverse needs and abilities. The ENGAGE AI framework's emphasis on "Equitable Access" as a core principle reflects this commitment.

7.4. The Role of the Teacher in an AI-Enhanced Classroom

One of the most persistent fears about AI in education is that it will replace teachers. The evidence from English (2025) and the broader literature suggests that this fear is misplaced. Rather than replacing teachers, AI is transforming their role.

In the DBR study, the most successful interventions were those where the AI and the human teacher worked in complementary ways. The AI provided scalable, consistent, and immediate support for routine tasks like prompting, scaffolding, and synthesising. This freed the teacher to focus on higher-order tasks: designing the overall learning experience, facilitating complex discussions, providing nuanced feedback, and building relationships with students.

This shift can be understood through the lens of Vygotsky (1978) concept of the Zone of Proximal Development (ZPD). The AI can provide the "scaffolding" that helps students move through the ZPD, but the teacher remains essential for identifying where each student is in their learning journey, for adapting the scaffolding to individual needs, and for providing the human connection that is at the heart of meaningful education.

The challenge is to support teachers in making this transition. This requires professional development, not just in the technical skills of using AI tools, but in the pedagogical skills of designing AI-enhanced learning experiences.

It also requires a cultural shift in how we understand the teacher's role, moving away from the "sage on the stage" model toward a more facilitative, design-oriented practice.

7.5. A Four-Level Framework for Evaluating AI Dialogue Capability

Synthesising the insights from the Turing Test, dialogic theory, and the empirical findings, we propose a four-level framework for evaluating the dialogue capability of AI in educational contexts.

Table 2. Four-level framework for evaluating AI dialogue capability.

Level	Description	Turing Test Performance	Dialogic Participation	Educational Value	Consciousness
Level 1: Surface Imitation	Simple pattern matching, easily identified as non-human	Fail (e.g., ELIZA: 23%)	None—cannot produce genuine dialogic features	Minimal—novelty effect only	None
Level 2: Sophisticated Pattern Matching	Advanced language models without persona optimisation	Fail (e.g., GPT-4o: 21%)	Simulated—can produce dialogic features but inconsistently	Moderate—useful for information retrieval and basic tutoring	None
Level 3: Behavioural Indistinguishability	LLMs with persona prompts, optimised for human-like interaction	Pass (e.g., GPT-4.5: 73%; LLaMa-3.1: 56%)	Functional—consistently produces high-quality dialogic features; mediates and enhances human dialogue	High—demonstrable improvements in Tech-SEDA and SOLO measures; effective scaffolding and personalisation	Unknown—no current evidence, but cannot be definitively ruled out
Level 4: Quantum-Enabled Consciousness (Theoretical)	AI with genuine subjective experience, possibly through quantum computing	Likely exceeds current systems	Potentially genuine—could authentically experience the dialogic gap	Transformative—true collaborative learning partner with novel, non-human perspective	Possible—contingent on success of quantum consciousness theories

This framework provides a structured way to assess AI systems and to set realistic expectations for their capabilities. Current systems, as exemplified by the ChatGPT integration in English (2025) study, operate at Level 3. They are highly effective functional participants in dialogue, but their participation is a simulation, not an authentic, conscious engagement. The framework also highlights the speculative nature of Level 4, reminding us that while quantum consciousness is a fascinating theoretical possibility, it remains unproven and may never be realised.

8. CONCLUSION: BEYOND IMITATION, TOWARD AUTHENTIC DIALOGUE

The journey from Turing (1950) simple, text-based imitation game to the rich, multimodal, and empirically effective interactions offered by modern AI avatars has been a long one. In 2025, we find ourselves at a profound inflection point. The behavioural benchmark set by Turing has, for all practical purposes, been met and even surpassed. AI can now imitate human conversation with such fidelity that it is not only indistinguishable from us but, in some respects, a more socially adept version of us. Yet, in winning the imitation game, we have only revealed the limitations of its rules. The most important questions for education are not about whether a machine can appear human, but about what it means to learn, to understand, and to connect in a world where the lines between human and machine intelligence are increasingly blurred.

Wegerif (2013) theory of dialogic spaces provides the essential framework for navigating this new terrain. It shifts our focus from the surface of interaction to the quality of the underlying process. It asks not "Does it seem human?" but "Does it contribute to the co-construction of meaning?" This is a question that cannot be answered by theory alone; it requires empirical investigation in authentic learning contexts.

The doctoral research of English (2025) provides the most comprehensive evidence to date on this question. Through a rigorous, multi-iteration design-based research study, it was demonstrated that an LLM like ChatGPT can be a powerful and effective agent within an educational dialogue. The study's quantitative findings are unequivocal: the integration of a well-designed AI intervention led to statistically significant improvements in the quality of student dialogue (as measured by Tech-SEDA) and the depth of cognitive engagement (as measured by the SOLO taxonomy). The Naïve Bayes model's ability to predict learning outcomes from dialogic quality with 73.4% accuracy forges a strong, data-driven link between the process of AI-mediated dialogue and the product of student learning.

From this perspective, today's humanised AI avatars are powerful and valuable simulators and mediators of dialogue. They can create highly effective learning environments, provide individualised scaffolding, and offer limitless opportunities for practice. The ENGAGE AI framework, derived from this research, offers a set of practical, evidence-based principles for harnessing this power. However, the study also reinforces the distinction between functional participation and authentic understanding. The AI, in its current form, operates on the level of pattern and probability, not of subjective experience. It does not experience the "dialogic gap" but is merely programmed to respond to it with increasing sophistication.

This distinction is not merely academic; it is a critical guide for the future of online learning. It suggests a path forward based on complementarity, not replacement. The role of the AI avatar, as defined by the DLD-AI model, is to be a tireless, infinitely patient, and customisable tool for individual practice, discourse mediation, and knowledge exploration. The role of the human teacher, more vital than ever, is to facilitate the authentic, unpredictable, and transformative encounters that can only happen in a genuine dialogic space between conscious beings. The teacher's role shifts from being the "sage on the stage" to the "guide on the side," orchestrating the complex interplay between students, the AI, and the curriculum to foster a rich and polyphonic learning environment.

Looking to the quantum frontier, we are reminded that our current technological paradigm may not be the final one. The possibility of machine consciousness, however remote, forces us to remain open to the idea that AI could one day move from simulator to participant. Should that day come, it will revolutionise not just education, but our very understanding of ourselves. Until then, our task is to harness the remarkable power of the tools we have built, guided by the empirical evidence and ethical frameworks now emerging. We must use AI not to replace human connection, but to enhance and extend it, ensuring that as our machines become more adept at imitation, we become more focused on the authentic, dialogic encounters that lie at the heart of all true learning.

REFERENCES

Bakhtin, M. M. (1981). *The dialogic imagination: Four essays (C. Emerson & M. Holquist, Trans.).* Austin, TX: University of Texas Press.

Bakhtin, M. M. (1986). *Speech genres and other late essays (V. W. McGee, Trans.).* Austin, TX: University of Texas Press.

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). *On the dangers of stochastic parrots: Can language models be too big??* Paper presented at the Proceedings of the 2021 ACM conference on fairness, accountability, and transparency.

Biggs, J. B., & Collis, K. F. (1982). *Evaluating the quality of learning: The SOLO taxonomy*. New York: Academic Press.

Chalmers, D. J. (1995). Facing up to the problem of consciousness. *Journal of Consciousness Studies*, *2*(3), 200-219.

Descartes, R. (1637). *Discourse on method and meditations (L. J. Lafleur, Trans.)*. Indianapolis, IN: Bobbs-Merrill.

English, V. (2025). *Exploring the role and impact of artificial intelligence and dialogic pedagogy in online executive MBA programmes*. Unpublished Doctoral Dissertation. University of Cambridge, Cambridge, United Kingdom.

English, V. (n.d). *Artificial intelligence and dialogic education: The personalised tutorBOT and the merging of AIED with the conversational framework*. Unpublished Manuscript.

Fink, M. C., Robinson, S. A., & Ertl, B. (2024). AI-based avatars are changing the way we learn and teach: Benefits and challenges. *Frontiers in Education*, *9*. https://doi.org/10.3389/feduc.2024.1416307

Hameroff, S., & Penrose, R. (2014). Consciousness in the universe: A review of the 'Orch OR'theory. *Physics of life reviews*, *11*(1), 39-78. https://doi.org/10.1016/j.plrev.2013.08.002

Hennessy, S. (2024). *Tech-SEDA coding framework for technology-mediated educational dialogue*. Cambridge, United Kingdom: University of Cambridge.

Jones, C. R., & Bergen, B. K. (2025). Large language models pass the turing test. *arXiv preprint arXiv:2503.23674*. https://doi.org/10.48550/arXiv.2503.23674

Popular Science. (2025). *ChatGPT passed the turing test. Now what?* Retrieved from https://www.popsci.com/technology/chatgpt-turing-test/

Swayne, M. (2025). *Is consciousness research the next big quantum use case? The Quantum Insider*. Retrieved from https://thequantuminsider.com/2025/01/11/is-consciousness-research-the-next-big-quantum-use-case

Turing, A. M. (1950). Computing machinery and intelligence. *Mind*, *59*(236), 433–460. https://doi.org/10.1093/mind/LIX.236.433

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds. & Trans.)*. Cambridge, MA: Harvard University Press.

Wegerif, R. (2007). *Dialogic, education and technology: Expanding the space of learning*. New York: Springer.

Wegerif, R. (2013). *Dialogic: Education for the internet age*. London, United Kingdom: Routledge.