Perceptions of Collaboration between Virtual and Human Teachers in Online Education

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Abstract

This study delves into the perceptions of teachers regarding the collaboration between virtual and human teachers in online education. It is situated within the broader context of artificial intelligence (AI) in education, with a particular focus on Generative Artificial Intelligence (Gen AI) and its potential to transform online learning. This study aims to explore the possibilities of Virtual Humans (VH) as humanized Gen AI entities. More specifically, in this presentation, we study the perceptions of online teachers of d-teach online school regarding VH. This study employs a survey that combines the Agent Persona Instrument (API-R) and the Technology Acceptance Model (TAM) to measure the participants' perceptions with respect to using a VH as a digital co-teacher. The primary research objective is thus to understand how these stakeholders perceive VH roles and effectiveness in supporting the learning process. Follow up interviews are planned to deepen our insights on how real teachers think about virtual humans as a teacher. Although specific results are pending at this stage, the study promises to provide valuable insights into teachers' perspectives. Beyond the confines of the school, this research has the potential to benefit global education and training by enhancing the quality, efficiency, accessibility, and inclusivity of online education.

Keywords

Human Non-Human interaction, AI in Education, Professional development, Gen AI, Virtual Human, Digital Human, Digital Person, AI-teacher, teachers, perceptions, online education

Introduction

From AI to Human Tutor

Artificial Intelligence (AI) encompasses machines that replicate certain facets of human intelligence, such as perception, learning, logical reasoning, problem-solving, language comprehension, and creative tasks (COMEST, 2019; Haenlein & Kaplan, 2019). Generative Artificial Intelligence (Gen AI) represents a cutting-edge development in AI and can generate new text, audio, images, video, or code based on pre-trained content, which holds significant promise for educational applications (UNESCO, 2022).

Within the realm of education, AI has transcended its role as a mere tool and has emerged as a distinct research domain, so called AIED (Artificial Intelligence in Education) and Networked Learning (NLEC, 2021; Baker, 2021; Veletsianos & Russell, 2014; AI in Education EDEH Squad, 2023). By delving into the possibilities of learning for, about, and with AI, this study seeks to harness the potential of AI in education. Furthermore, it establishes a crucial link between Gen AI and the concept of Virtual Humans (VH), exploring how human teachers can collaborate with these humanized Gen AI digital entities to shape the future of education.

Virtual Humans

VH go beyond chat-based interactions, presenting a captivating and promising innovation. VH combine AI with visual and oral capabilities, delivering lifelike interactions that mimic human presence, so called Humanized AI. Within the context of contemporary technology and AI advancements, a VH represents an advanced and dynamic digital entity that closely simulates human characteristics, behaviors, and interactions. While the terminology may vary, the concept of a VH has gained significant recognition. To distinguish it from a mere photorealistic 3D model, a VH encompasses a broader dimension, incorporating attributes such as occupation, personality, and narrative (Lamarche-Toloza, 2020). This multidimensional aspect makes a VH more analogous to an actual human, transcending static representations. VH leverage artificial intelligence techniques, including artificial neural networks, to engage in social interactions informed by user data, encompassing emotional facial expressions, language, and physiological parameters (Loveys et al., 2022). They are versatile and accessible through various digital platforms, and even augmented or virtual reality environments. In essence, VH are poised to redefine human-computer interactions, offering scalable, engaging, and emotionally expressive communication experiences (Seymour et al., 2020).

The main goal of this research is to explore whether VH can be used to transform online educational practices. In a first step, we want to know if they could serve as co-teachers in an online environment. In other words, we want to study what teachers' perceptions are regarding VH as co-teachers.

Human Non-Human Interaction

Molenaar (2022) introduces the augmentation perspective and the concept of hybrid intelligence as frameworks for understanding AI in education. It emphasizes that AI and human cognition are closely interconnected in the context of learning. It suggests that it is challenging to separate AI in Education (AIED) from human cognition, and advocates for viewing, developing, and researching educational systems as hybrid human-AI systems. This highlights the distinctive nature of education as an area where collaboration between humans and AI is crucial, emphasizing the combined strengths of both. Networked learning, distinguished as a field of research and practice, insists on paying attention to three sets of phenomena and their intertwinement in practice: human/inter-personal relationships, technology, and collaborative engagement in valued activity (NLEC, 2021). This perspective calls for a holistic understanding of education, acknowledging the hybridity of human-non-human networks that shape modern learning environments (de Laat & Dohn, 2019; NLEC, 2021).

Research Gap

A critical research gap identified in the literature pertains to the potential of advanced technologies, notably AI and natural language processing, to enhance communication with agents and develop human-like attributes, such as emotions (Guzman, 2020). Future Human-Machine Communication (HMC) research should prioritize investigating relational dynamics, human-machine relationships, and the evolving understanding of machines as communicators (Guzman & Lewis, 2020). Additionally, exploring how individuals engage with and communicate through technology, focusing on communication between students and technology, the role of Personal Assistants (PAs) (Kim & Baylor, 2016), and examining relational functionalities represents crucial areas for research (Johnson & Lester, 2018).

Moreover, deploying VH offers a promising avenue to partially address Bloom's Sigma 2 problem, which recognizes that one-to-one tutoring yields superior learning outcomes but poses scalability challenges (Bloom, 1984). Gen AI tutors may have the potential to mitigate this issue effectively (Cantor, 2023). VH provide instant feedback, foster human connection in online education, and hold immense promise. Emphasizing conversational AI and natural interactions, VH present unique solutions for personalized online learning (Soul Machines, 2018).

However, it's crucial to maintain a critical perspective when considering the integration of VH into education. While they offer significant advantages, such as instant feedback and personalized interactions, it's essential to acknowledge their limitations. VH are, by nature, artificial entities, and there will be instances where they cannot fully replicate the nuanced interactions and emotional understanding that human educators provide. Moreover, questions surrounding data privacy, ethical use, and potential biases in AI-driven education must be rigorously addressed to ensure responsible implementation (European Commission, 2022; Miao, 2021).

Another hurdle to overcome is humans' perception towards virtual co-teachers. If human teachers want to collaborate with VH in online education, it is important to know how teachers, students and parents perceive the VH. Perception refers to interpreting and understanding the presence and role of VH in the online learning environment. It includes their beliefs, attitudes, and feelings towards VH as educational tools, their credibility, effectiveness, and potential impact on the learning experience. The perception of VH can influence their acceptance, engagement, and willingness to embrace these virtual entities in the online education process (Schroeder et al., 2018).

The research goal of the present study is to investigate the perception of VH, aiming to explore how online teachers perceive the role and effectiveness of VH in supporting the learning process. The specific research question centres on understanding how online teachers perceive VH in their role within the learning process.

Methodology

Participants for this study will be recruited from the 55 freelance online teachers of d-teach online school.
For the construction of the survey we combined the API-R (Schroeder et al., 2018) and TAM (Davis, 1989) instruments. The variable 'perception' is included in the Agent Persona Instrument (Ryu & Baylor, 2005) to measure perceptions of a VH. Specifically, the API has four subscales that measure perceptions of how humanlike, credible, and engaging the VH is, and how well it facilitates learning. Accordingly, Schroeder et al. (2018)

conducted a revision of the API, resulting in the creation of the API-R instrument. As Chiou et al. (2020) suggested that to gain insights into the perceptions that affect learning with VH, researchers should explore factors beyond those covered by the API-R, we integrated the Technology Acceptance Model (TAM), in our survey to measure, perceived usefulness and perceived ease of use (Davis, 1989).

For this survey, we will use the VH technology developed by Soul Machines to offer participants an immersive first-hand experience of the capabilities of VH. In addition to the survey, interviews will be conducted to gather further insights and complement the quantitative data analysis. Throughout this study, all survey and interview data will be pseudonymized, ensuring anonymity and data security at every stage.

Results and discussion

Data collection is planned and results regarding teachers' perspectives will be presented at the conference. In addition, we will also present some examples of VH teachers and we will delve into the implications that these findings have for both the research field and practical applications.

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