

# **Exploring the Acceptance of AI Video Technology in Distance Learning Environments**

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*Abstract: This study investigates whether AI-generated instructor-cloned avatars can replicate the social presence of human instructors in online education. Grounded in social presence theory, uncanny valley theory, and technology acceptance theory, we conducted a qualitative case study involving college students enrolled in an online course. Participants experienced two online learning modules: one taught by a human instructor and another presented by an AI avatar closely mimicking the instructor's appearance and voice. Semi-structured interviews revealed that students reported higher engagement with the human instructor, attributing this to authentic interactions and personal connections. Interactions with the AI avatar often felt detached, and some students experienced discomfort due to its near-human appearance. Although there was a moderate acceptance of this technology for its advantages in scalability and accessibility, the findings underscore the current limitations of AI video technology in replicating subtle human behaviors essential for effective learning. The findings also highlight the need for guidelines to ensure the responsible use of AI video technology in educational settings.*

## Background

The swift advancement of digital technology has transformed the way we learn and teach, particularly in accessibility and engagement through online learning environments (Didmanidze et al., 2023; Hao, 2024; Djibrán et al., 2024). Generative artificial intelligence (GenAI) has brought forth impactful tools that seek to improve instructional delivery and expand access to quality online education, aligning with broader trends in educational technology such as intelligent tutoring and personalized learning (Chen et al., 2020; Yu & Guo, 2023). A notable innovation is the AI-generated human-cloned avatar, a GenAI-driven entity made to closely replicate human instructors in both appearance and behavior (Liu et al., 2024; Chang et al., 2023; Huang et al., 2024). By offering a semblance of a human presence, these technologies can be utilized to tackle the frequent deficiencies found in online courses.

However, the incorporation of AI-generated avatars in online courses prompts significant questions regarding their potential to create genuine relationships with learners, which are vital for effective learning. Real social interactions foster trust, increase engagement, and improve motivation, making educational experiences more social and impactful (Cents-Boonstra et al., 2020; Ennis, C., & McCauley, 2010; Martin & Bolliger, 2018), yet achieving authenticity remains a challenge. This case study aims to evaluate whether AI-generated instructor-cloned avatars can effectively mirror the social presence of human instructors and similarly engage students. Our investigation is guided by the following research questions:

1. How does the social presence of an AI-generated instructor-cloned avatar compare to that of a human instructor?
2. How do learners perceive the AI-generated instructor-cloned as authentic, and how does this perception affect engagement?
3. How does the AI-generated instructor-cloned evoke discomfort and affect engagement?
4. How do learners accept AI-generated instructor-cloned avatars, and what challenges do they perceive in adopting this technology as an effective instructional tool?

## Theoretical Framework

Our study is grounded in several critical theoretical perspectives: (a) social presence theory (Short et al., 1976), (b) uncanny valley theory (Mori et al., 2010), and (c) technology acceptance theory (Davis et al., 1989). Social presence theory posits that the degree of perceived social presence in a communication medium can enhance the quality of interactions and, consequently, learning engagement. In online learning environments, a strong sense of social presence can overcome the challenges posed by physical distance.

Conversely, the uncanny valley theory suggests that as artificial representations of humans become more lifelike, they can evoke feelings of eeriness or discomfort if they are not perfect replicas. This phenomenon could potentially hinder engagement if learners find the AI-generated avatars unsettling. Lastly, GenAI technology integration enables the creation of realistic avatars, offers new possibilities for enhanced learner acceptance, and presents challenges in replicating the subtleties and nuances of human interaction.

## Method

### Participants

Our study centered on college students in a structured online course. We explored their experiences with two distinct learning modules: one taught by a real human instructor and another presented by an AI-generated avatar designed to closely mimic the instructor's appearance, behavior, and voice.

### Design

We investigated learners' perceptions and experiences of the two instructional video representations through a qualitative case study approach. By engaging them in these learning settings, we aimed to explore the subtle nuances of their interactions and perceptions.

### Procedure

After completing each module, we conducted semi-structured interviews with the participants to reflect on their experiences. They shared insights about their levels of engagement, how authentic they felt the instructors were, any discomfort they experienced during the modules, and their acceptance of the technology.

### Data Analysis

We analyzed the preliminary data from five participants using thematic analysis. This involved coding the data to identify key themes and patterns related to engagement, authenticity, discomfort, and technology acceptance.

## Results

The data analysis revealed that learners generally reported higher engagement levels with the human instructor, attributing this to more social connections. They described the human instructor as more responsive and relatable, enhancing their overall learning experience.

In contrast, interactions with the AI-generated instructor often felt detached. Some participants mentioned feeling uncomfortable with the GenAI avatar's nearly human appearance and behavior. Despite this discomfort, there was a moderate acceptance of the GenAI video technology, with some participants recognizing the potential benefits of AI-generated avatars for increasing accessibility and scalability in online education.

## Discussion and Implications

Our preliminary findings support the social presence theory, emphasizing the importance of authentic interactions in enhancing learner engagement. The preference for the human instructor highlights the value learners place on authentic connections and nuanced communication. The AI-cloned avatar's inability to fully replicate subtle human behaviors and emotional cues limited its effectiveness in creating a solid social presence. The discomfort some learners felt suggests that the near-human appearance of the AI-cloned avatar can be unsettling, potentially disrupting their overall learning experience. However, the moderate acceptance of the GenAI video technology indicates an openness to its future improvement and integration into other educational settings.

Our findings underscore that integrating AI-generated instructor-cloned avatars into educational settings introduces several considerations that should be addressed to ensure responsible use and enhance authenticity. Ethical design practices should consider user comfort and acceptance by providing clear disclosures on AI-generated instructional materials. Learners have the right to know when interacting with an AI-generated instructor. Misuse can lead to a breakdown in academic integrity and negatively affect the learning experience. Institutions should establish ethical guidelines and faculty training to ensure compliance with privacy policies and regulations to protect sensitive information from unauthorized access or misuse. While AI-cloned avatars benefit from scalability and accessibility, they should not replace human instructors. Maintaining opportunities for direct human interaction is crucial for addressing critical questions, providing human-touched feedback, and supporting learners' social and emotional needs in the learning process.

## Limitations

One study includes preliminary results, so the generalizability of the findings could be restricted to other settings. Moreover, relying on self-reported data from interviews might introduce biases. The technological constraints of the AI-generated avatar during the study also affected participants' experiences, which may not represent future advancements in GenAI video technology.

## Future Directions

Future research could expand the case study to include a more diverse range of participants across different educational contexts to enhance the applicability of the findings. Furthermore, continued assessment, development, and refinement of AI-generated avatars could improve their effectiveness as instructional tools.

## Conclusion

This study examined the experiences of college students interacting with both a human instructor and an AI-generated instructor-cloned avatar in an online learning setting. The results highlight the crucial role of genuine human interactions in fostering learner engagement. Although AI-generated avatars present potential advantages for educational scalability and accessibility, they currently do not match the authentic presence of human instructors. Addressing both the technological limitations and the ethical considerations associated with GenAI video technology is vital for its effective and responsive use in online education. As technology evolves and ethical practices are refined, AI-generated avatars may offer more engaging and authentic learning experiences.

## References

- Cents-Boonstra, M., Lichtwarck-Aschoff, A., Denessen, E., Aelterman, N., & Haerens, L. (2020). Fostering student engagement with motivating teaching: An observation study of teacher and student behaviours. *Research Papers in Education*, 36, 754-779. <https://doi.org/10.1080/02671522.2020.1767184>
- Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. *IEEE Access*, 8, 75264-75278. <https://doi.org/10.1109/ACCESS.2020.2988510>
- Chang, C., Liu, Z., Lyu, X., & Qi, X. (2024). What matters in detecting AI-generated videos like Sora?. *arXiv preprint arXiv:2406.19568*. <https://doi.org/10.48550/arXiv.2406.19568>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). Technology acceptance model. *J Manag Sci*, 35(8), 982-1003. <https://dspace.mit.edu/bitstream/handle/1721.1/15192/14927137MIT.pdf?sequence=2>
- Didmanidze, I., Tavdgiridze, L., Zaslavskiy, V., Khasaia, I., Dobordginidze, D., & Olga, Y. (2023). The Impact of digital technologies in education. *International Conference on Dependable Systems, Services and Technologies*, 1-7. <https://doi.org/10.1109/DESSERT61349.2023.10416515>
- Djibrin, A., Subiyanto, P., Wakhudin, W., & Rahayu, N. (2024). Transforming education in the digital age: How technology affects teaching and learning methods. *Journal of Pedagogi*. <https://doi.org/10.62872/ksq9jc13>
- Ennis, C. D., & McCauley, M. T. (2002). Creating urban classroom communities worthy of trust. *Journal of Curriculum Studies*, 34(2), 149–172. <https://doi.org/10.1080/00220270110096370>
- Hao, Z. (2024). Digital Technology in Education: Navigating the Challenges and Opportunities for the 21st Century Learner. *Transactions on Comparative Education*. <https://doi.org/10.23977/trance.2024.060319>
- Huang, Y., Lv, S., Tseng, K. K., Tseng, P. J., Xie, X., & Lin, R. F. Y. (2023). Recent advances in artificial intelligence for video production system. *Enterprise Information Systems*, 17(11), 2246188. <https://doi.org/10.1080/17517575.2023.2246188>
- Liu, X., Xiang, X., Li, Z., Wang, Y., Li, Z., Liu, Z., ... & Zhang, J. (2024). A survey of AI-generated video evaluation. *arXiv preprint arXiv:2410.19884*. <https://doi.org/10.48550/arXiv.2410.19884>
- Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, 22(1), 205-222. <https://doi.org/10.24059/OLJ.V22I1.1092>
- Mori, M., MacDorman, K. F., & Kageki, N. (2012). The uncanny valley [from the field]. *IEEE Robotics & Automation Magazine*, 19(2), 98-100. <https://doi.org/10.1109/MRA.2012.2192811>

Short, J., Williams, E. and Christie, B. (1976). *The Social Psychology of Telecommunications*. John Wiley and Sons Ltd., Hoboken. <https://doi.org/10.2307/2065899>

Yu, H. & Guo, Y. (2023). Generative artificial intelligence empowers educational reform: current status, issues, and prospects. *Frontier Education*. 8:1183162. <https://doi.org/10.3389/feduc.2023.1183162>