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Synthetic Educators: Analyzing AI-Driven Avatars in Digital Learning Environments

Patrick Struger, Benedikt Brünner, Martin Ebner

2025-06-23

27th International Conference on Human-Computer Interaction, Gothenburg, Sweden

Email flaait.llt@tugraz.at

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Slides available at https://doi.org/10.3217/bngt5-p2053

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Martin Ebner
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Outline

Background

- AI tools like HeyGen and ElevenLabs enable creation of AI-generated educational content
- Rise of generative AI reshapes instructional video production (Schön et al., 2025)
- Emotional engagement is key in digital learning (Struger et al., 2024)

Research Questions

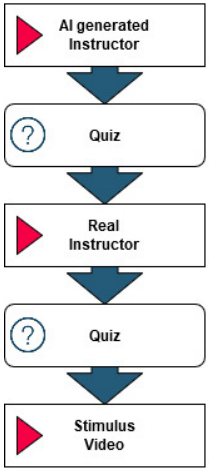
- **RQ1**: Does the use of AI avatars in learning videos affect their emotions and perceived quality from the learners' perspective?
- **RQ2**: Can the recognition software *FaceReader Online* reliably track emotional states during interactions with learning videos?
- **RQ3**: How do learners perceive the potential and limitations of AI avatars in educational videos?

Outline

Study Design

- Micro Learning Courses
  1. AI avatar
  2. Real teacher
- Same video content, different presenters

Micro Learning Course



Learning video with AI generated instructor alternating course topic and gender of the presenter

2 single-choice questions regarding the former presented course topic

Learning video with human instructor alternating course topic and gender of the presenter

2 single-choice questions regarding the former presented course topic

Stimulus video revealing study subject matching the resolution of the first video with the AI generated instructor

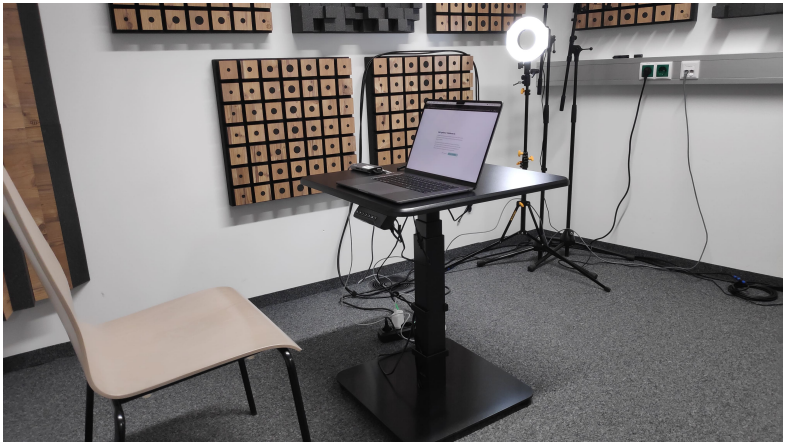
Study Design

- n = 55 participants (students, adult learners)
- 3 videos and 2 quizzes
- Emotion tracking: *FaceReader Online*
- Structured interview

Experimental Setup

- Randomized presenter order
- Neutral conditions (light, soundproof)
- Final “stimulus” video to trigger emotion peaks

Experimental Setup

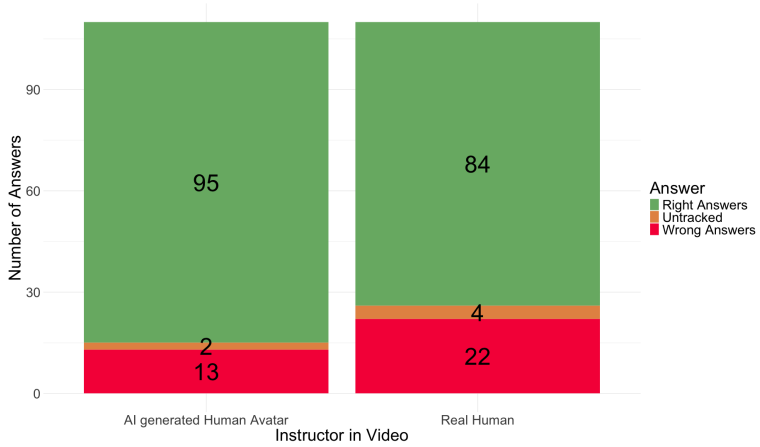


Outline

Quiz Performance

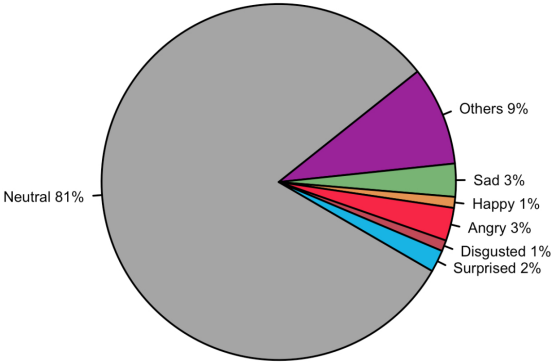
- AI avatars: 86% correct
- Real teachers: 76% correct
- Slightly better recall with first video and AI avatar instructors

Quiz Performance

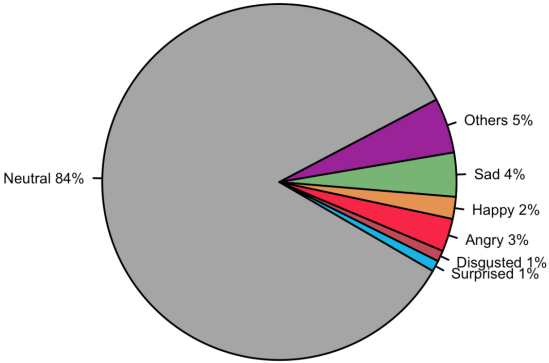


Emotional Reactions

Participants Emotions for Real Human

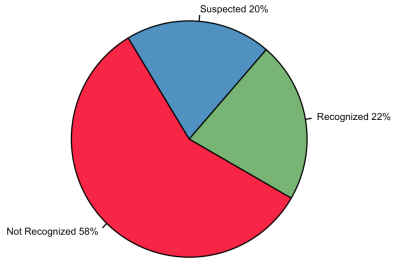


Participants Emotions for AI generated Human Avatar



Perceived Authenticity

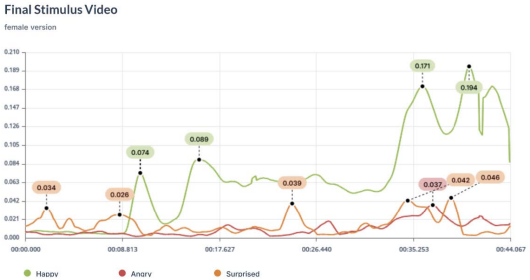
- 58% did not recognize avatars as synthetic
- Majority rated AI videos as clear and understandable



FaceReader Stimulus Video (Lehr- und Lerntechnologien, TU Graz, 2024)

FaceReader Stimulus Video (Lehr- und Lerntechnologien, TU Graz, 2024)

- Peaks in “happy” at reveal moments
- FaceReader Online reliably captured emotional shifts



Outline

Interpretation

- AI avatars: effective + efficient content delivery
- Slight emotional distance still noted
- Need for enhanced gestures, tone modulation

Learner Perspectives

- **Pros:** Accessibility, translation, production efficiency
- **Cons:** Less emotional authenticity, repetitive gestures
- AI avatars seen as promising but **not yet fully empathetic or adaptive**

Outline

Implications

- AI avatars can be effective educators
- Adoption requires attention to pedagogical, ethical, and technical factors
- Emotional design and personalization should guide avatar development

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Acknowledgements

This research was done as part of the
"FutureDEAL - Future of Digital Education and Learning"
initiative within the doctoral program
"Bildungsinnovation braucht Bildungsforschung",
which is supported and partially funded by the
Austrian Federal Ministry of Education and
Austrian Federal Ministry of Women, Science, and Research.

FutureDEAL
Digital Education And Learning

Pädagogische Hochschule Steiermark

TU Graz

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