

Lernen mit Avataren

Riskante Spielerei oder individuelle Lernbegleitung?



Download:

<https://rwth-aachen.sciebo.de/s/gGTxbBJfrtGiT9e>

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Unsere Agenda für die nächsten 15 Minuten

Kurze Einführung: Wofür und was sind KI-Avatare?

Fragestellungen: Kritische Reflexion des Einsatzes.

Empirie: Wirkungen und Seiteneffekte von KI-Avataren.

Arbeitsphase 1: **Meinungsbild**

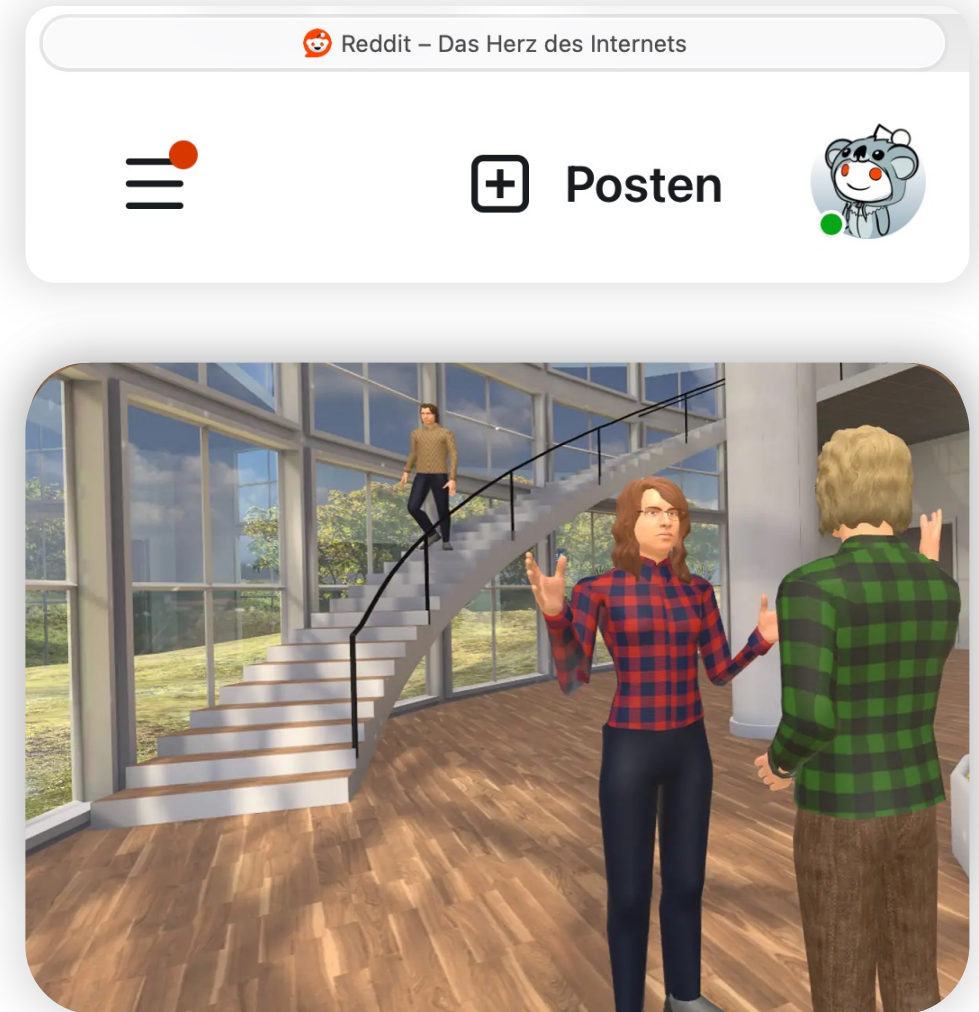


- 4'** Wie ist Eure Idealvorstellung eines für die Lehre geeigneten Avatars (Optik, Verhalten, Sprache etc.)?
- 1'** Was würdet Ihr unbedingt vermeiden?

Etablierte Definition „Avatar“

„Als Avatar wird die Visualisierung und Charakterisierung von Personen in virtuellen Szenarien [...] bezeichnet, die sich Nutzer anlegen müssen, um dort interagieren zu können.“

<https://e-teaching.org/materialien/glossar/avatar>



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<https://e-teaching.org/materialien/glossar/avatar>



Arbeitsdefinition

„Als Avatar wird die Visualisierung und Charakterisierung von Personen oder Künstlicher Intelligenz in digitalen Umgebungen bezeichnet, um dort zu interagieren.“

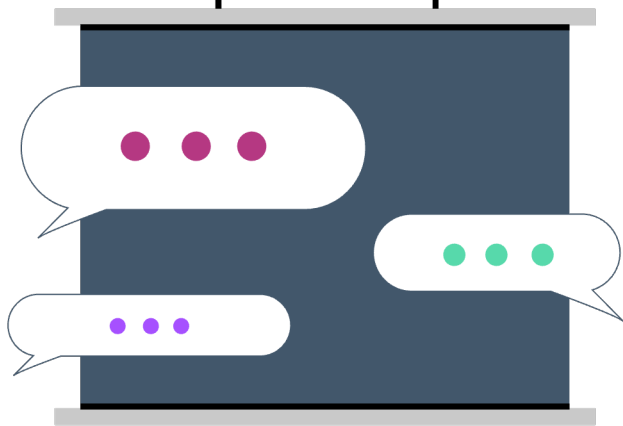
Repräsentand
Mensch **KI**

Dynamik
Statisch **Bewegt**

Anthropomorphie
Fiktion **Realperson**

Authentizität
Niedrig **Hoch**

Entwicklung



heygen.com



colossyan.com



synthesia.io



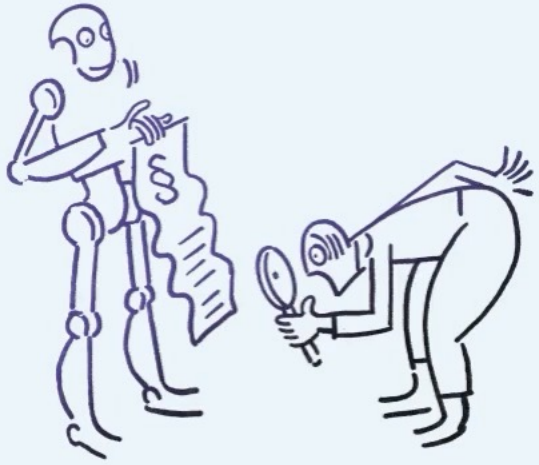
ltx.io



wan.video



genmo.ai



Ethische Aspekte



Einsatzzwecke für KI-Avatare

- Ermöglichung und Professionalisierung
- Ressourceneinsparung
- Vollwertige Übersetzung
- Zielgruppenspezifität (z.B. Ethnizität, Gender)
- Inklusion und Barrierefreiheit (z.B. Leichte Sprache)



Kritische Themenbereiche

Transparenz: Was muss ausgewiesen werden?

Recht: Was darf ein Avatar?

Empirie: Wie wirken Avatare in der Lehre?

Transparenz

Was muss ausgewiesen werden?



Kapitel IV, Artikel 50

Transparenzpflichten für Anbieter und Betreiber bestimmter KI-Systeme

(2) Anbieter von KI-Systemen, einschließlich KI-Systemen mit allgemeinem Verwendungszweck, die synthetische Audio-, Bild-, Video- oder Textinhalte erzeugen, stellen sicher, dass die Ausgaben des KI-Systems in einem maschinenlesbaren Format gekennzeichnet und als künstlich erzeugt oder manipuliert erkennbar sind.



Source: https://eur-lex.europa.eu/legal-content/DE/TXT/?uri=OJ:L_202401689

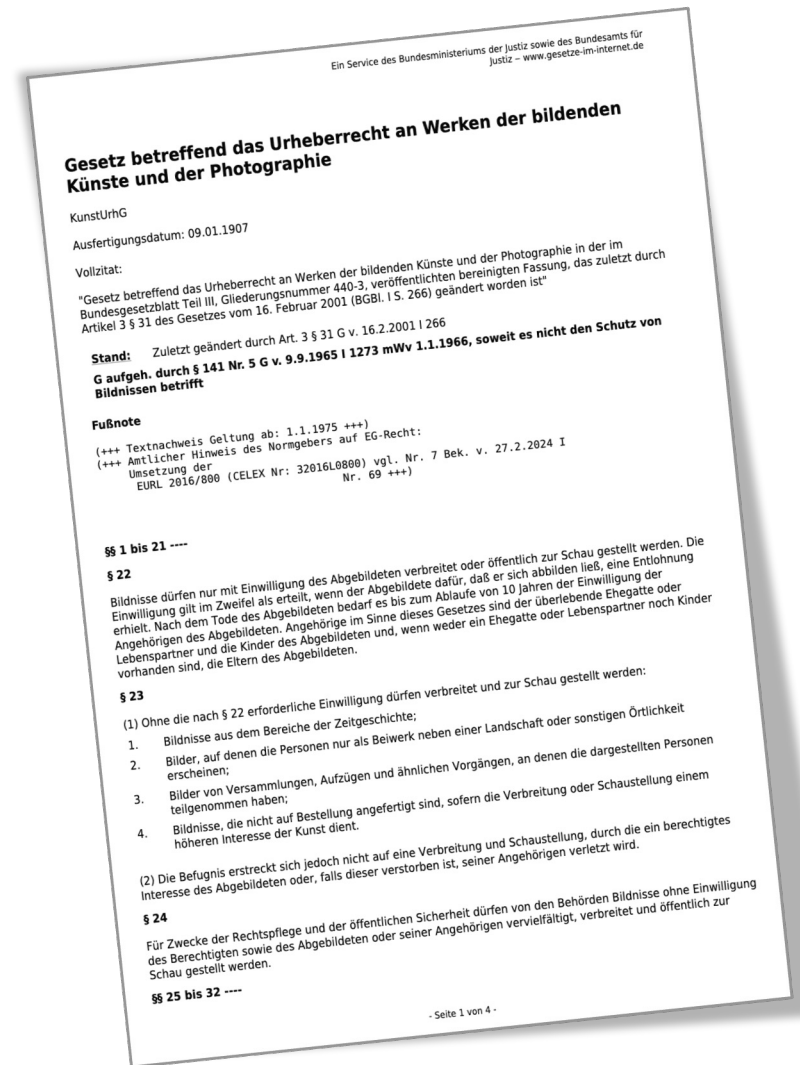
Recht

Was darf ein Avatar?



§ 22 KUG

Bildnisse dürfen nur mit Einwilligung des Abgebildeten verbreitet oder öffentlich zur Schau gestellt werden. Die Einwilligung gilt im Zweifel als erteilt, wenn der Abgebildete dafür, daß er sich abbilden ließ, eine Entlohnung erhielt. Nach dem Tode des Abgebildeten bedarf es bis zum Ablaufe von 10 Jahren der Einwilligung der Angehörigen des Abgebildeten.



Source: <https://www.gesetze-im-internet.de/kunsturhg/KunstUrhG.pdf>

§ 51a UrhG

Karikatur, Parodie und Pastiche

Zulässig ist die Vervielfältigung, die Verbreitung und die öffentliche Wiedergabe eines veröffentlichten Werkes zum Zweck der Karikatur, der Parodie und des Pastiches. Die Befugnis nach Satz 1 umfasst die Nutzung einer Abbildung oder sonstigen Vervielfältigung des genutzten Werkes, auch wenn diese selbst durch ein Urheberrecht oder ein verwandtes Schutzrecht geschützt ist.

Bruce Willis' Synchronsprecher siegt vorm LG Berlin II

KI-Nachahmung verletzt das Recht an der eigenen Stimme

29.08.2025



"Yippie-Ya-Yay, Schweinebackel!": Unter anderem als Synchronstimme von Bruce Willis erreichte Manfred Lehmann große Bekanntheit. Foto: picture-alliance / Sven Simon | SVEN SIMON

Ein Youtuber hat mittels KI die bekannte Stimme des Synchronsprechers Manfred Lehmann nachgeahmt und für seine Videos genutzt – ohne dessen Einwilligung. Dafür muss er Lehmann nun ein fiktives Honorar zahlen, entschied das LG Berlin II.

§ 51a UrhG

Karikatur, Parodie und Pastiche

Zulässig ist die Vervielfältigung, die Verbreitung und die öffentliche Wiedergabe eines veröffentlichten Werkes zum Zweck der Karikatur, der Parodie und des Pastiches. Die Befugnis nach Satz 1 umfasst die Nutzung einer Abbildung oder sonstigen Vervielfältigung des genutzten Werkes, auch wenn diese selbst durch ein Urheberrecht oder ein verwandtes Schutzrecht geschützt ist.

Art. 1 Abs. 1 GG

Art. 2 Abs 1 GG

§ 823 Abs. 1 u. 2 BGB

Recht am eigenen Wort

Es bezieht sich auf die von einer Person gesprochenen, geschriebenen oder auf sonstige Weise geäußerten Worte und umfasst die Befugnis, selbst zu entscheiden, ob der Inhalt einem oder mehreren Dritten oder der Öffentlichkeit zugänglich sein soll..



Empirie

Wie wirken Avatare in der Lehre?



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EnglishProducts

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MENU

Search > Results for digital avatar (All Fields) AND learning (All Fields) AND 2022-2026...

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digital avatar (All Fields) and learning (All Fields) and 2022-2026 (Year Published)

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Quick add keywords:

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+ avatars

+ metaverse

+ virtual avatars

+ avatar

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140

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Show Final Publication Year

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1 of 9

1 Effectiveness of Digital Avatars in Student Engagement and Learning

Hoang, C; Miles, JD and Vu, KPL

Conference on Human Interface and the Management of Information Thematic Area (HIMI) Held as Part of the 26th International Conference on Human-Computer Interaction (HCIII)

2024 | HUMAN INTERFACE AND THE MANAGEMENT OF INFORMATION, PT III, HIMI 2024 14691, pp.44-58

With the recent COVID-19 pandemic, students have reported that online classes not only lack effective teaching practices, but there is also an absence of the collaborative learning aspect that provides students with the ability to have quality interactions with one another and stay engaged (Dumford& Miller, 2018). The purpose of the ... Show more

Full Text at Publisher

1 Citation

32 References

Related records

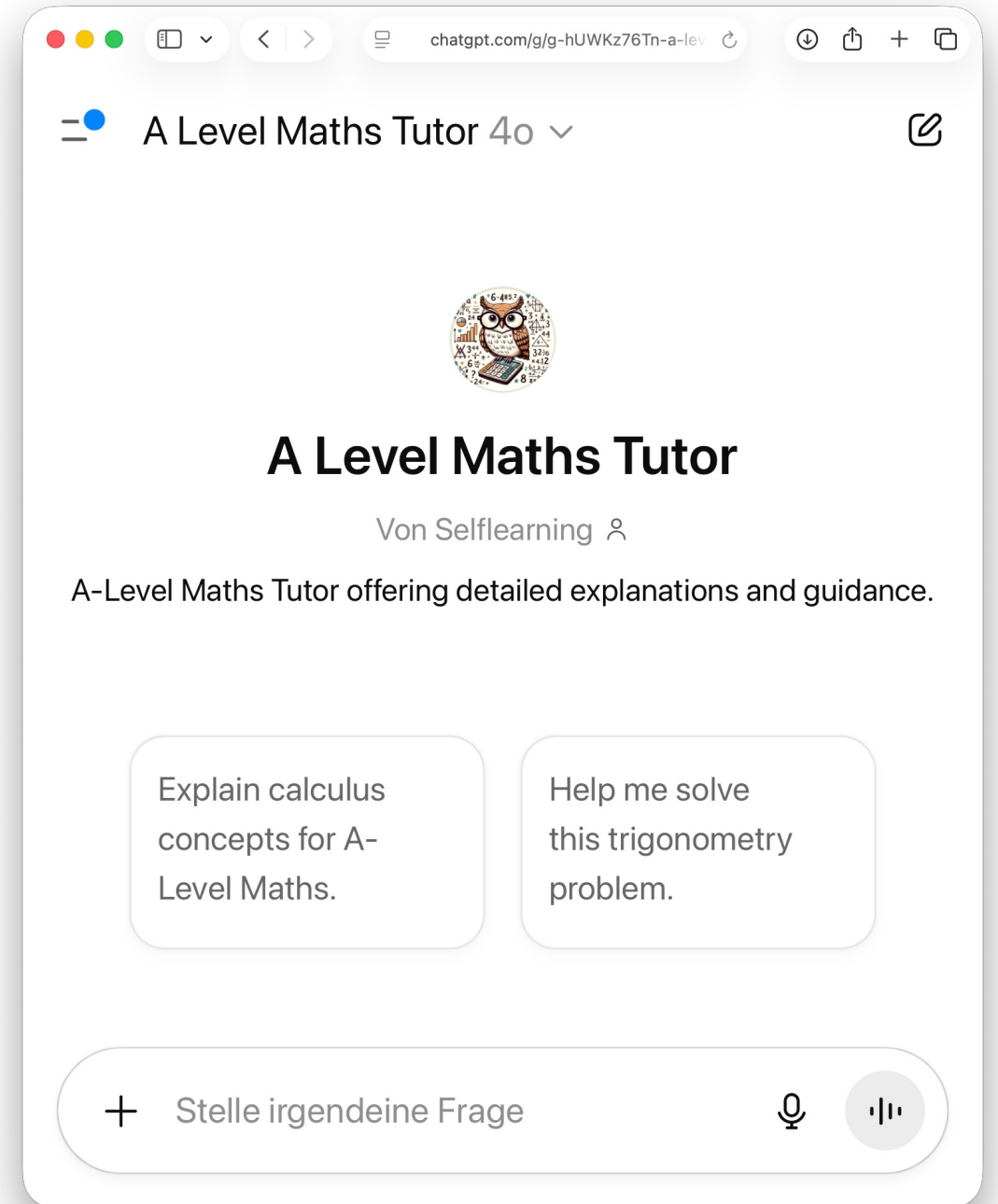
2 Exploring costume avatar interaction in digital dance experiences

Konsequenzen aus der Arbeitsdefinition

Wir betrachten die volle Bandbreite von Avataren gemäß unserer Definition.



Empirische Evidenz zu Tutoring- und Coaching-Bots



Lernwirksamkeit

Studierende erreichen während der Arbeit mit Chatbots **höhere Kompetenzebenen** (+1 Ebene nach Bloom).

Insbesondere **entdecken und korrigieren** Studierende durch die Arbeit mit Tutoring Bots eigene Fehlannahmen.



REVIEW

<https://doi.org/10.1057/s41099-025-04787-y>

OPEN

Check for updates

The effect of ChatGPT on students' learning performance, learning perception, and higher-order thinking: insights from a meta-analysis

Jin Wang¹ & Wenxiang Fan^{1,2}

As a new type of artificial intelligence, ChatGPT is becoming widely used in ever, academic consensus regarding its efficacy remains elusive. This study aimed to explore the effectiveness of ChatGPT in improving students' learning performance, perception, and higher-order thinking through a meta-analysis of 51 research studies published between November 2022 and February 2025. The results indicate that ChatGPT had a positive impact on improving learning performance ($g = 0.867$) and a moderate impact on enhancing learning perception ($g = 0.456$) and fostering higher-order thinking ($g = 0.457$). The impact of ChatGPT on learning performance was moderated by course ($Q_b = 64.249, P < 0.001$), learning model ($Q_b = 76.220, P < 0.001$), and ($Q_b = 55.998, P < 0.001$), its effect on learning perception was moderated by moderated by type of course ($Q_b = 7.811, P < 0.05$) and the role played by ChatGPT in developing students' higher-order thinking. This study suggests that: (1) appropriate learning scaffolds and in different types of courses should be encouraged to support diverse learning needs; ChatGPT should be actively integrated into different learning modes to enhance student learning, especially in problem-based learning; (4) continuous use of ChatGPT ensured to support student learning; with a recommendation for stable effects; (5) ChatGPT should be used as a learning tool to support student learning.

Article

Generative AI as a Coach to Help Students Enhance Proficiency in Question Formulation

Paul Kim¹, Wilson Wang¹, and Curtis J. Bonk²

Journal of Educational Computing Research
2025, Vol. 63(3) 565–586
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Shih, J.L. et al. (Eds.) (2023). Proceedings of the 31st International Conference on Computers in Education. Asia-Pacific Society for Computers in Education

Large Language Models (GPT) for automating feedback on programming assignments

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^aInstitute of Information Technology, Warsaw University of Life Sciences, Poland

^bPenn Center for Learning Analytics, University of Pennsylvania, USA

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Abstract: Addressing the challenge of generating personalized feedback for programming assignments is demanding due to several factors, like the complexity of code syntax or different ways to correctly solve a task. In this experimental study, we automated the process of feedback generation by employing OpenAI's GPT-3.5 model to generate personalized hints for students solving programming assignments on an automated assessment platform. Students rated the usefulness of GPT-generated automated assessment hints for students solving programming assignments on an automated assessment platform. The experimental group (with GPT hints enabled) relied less on the hints positively. The experimental group performed better in terms of percentage of successful submissions across consecutive attempts for tasks, where GPT hints were enabled. For tasks where the GPT feedback was made unavailable, the experimental group needed significantly less time to solve assignments. Furthermore, when GPT hints were unavailable, students in the experimental condition were initially less likely to solve the assignment correctly. This suggests potential over-reliance on GPT-generated feedback. However, students in the experimental condition were able to correct reasonably rapidly, reaching the same percentage correct after seven submission attempts. The availability of GPT hints did not significantly impact students' affective state.

Keywords: Programming, automated assessment tools, automated feedback, LLM, GPT

1. Introduction

Large Language Models (LLMs) are deep neural network models able to effectively process and analyze complex linguistic structures (Carlini et al., 2021). LLMs have garnered significant attention in the field of natural language processing (NLP) because of the ability to generate human-like text. This technology in educational settings

The generative AI Web application, Ask.SMILE, designed to evaluate questions asked, 2559 educators generated 25,973 question-free-month period, with an average of over 10 questions per educator. A significant improvement in question quality from initial questions. Specifically, participants progressed from Level 1 questions (creative and evaluative), based on Bloom's Taxonomy. Questions that began with lower-quality questions showed varied progression to analyze the data, a Linear Mixed Model (LMM) was used to analyze the data, revealing a statistically significant improvement in random effects, revealing a statistically significant improvement in time ($p < .01$). ANOVA results further confirmed the significance of quality, and a Least Squares Means (LSMEANS) analysis indicated a significant improvement in later-stage questions. Additionally, survey responses appreciated the ongoing development of AI-driven educational technology. Several implications and future research directions are explored, to expand the platform's features beyond question evaluation.

learning, Bloom's taxonomy, ask.SMILE, question formulation, AI pedagogy, AI integration, AI in education innovation

USA
SA

University, 3432 S. Ashwood Drive, Bloomington, IN 47401, USA.

Lernwirksamkeit

Studierende erreichen während der Arbeit mit Chatbots **höhere Kompetenzebenen** (+1 Ebene nach Bloom).

Insbesondere **entdecken und korrigieren** Studierende durch die Arbeit mit Tutoring Bots eigene Fehlannahmen.

Dies gilt über verschiedene **Fachdisziplinen** hinweg.

The screenshot shows a web browser window with the URL www.ombplus.de/ombplus/link/Integ. The page header includes the OMB logo (Online Mathematik Brückenkurs Plus) and the DPG logo. The navigation bar shows links for 'Kurs', 'Forum', and 'Benutzerkonto', along with the user 'Angemeldet als: Sirblackadder' and a 'Abmelden' button.

The main content area displays a math problem (a) and its solution. Problem (a) asks to integrate the derivative $f'(x)$ from $a = 1$ to $b = 8$, given $f(x) = 2x^2 - 2x - 8$. The solution shows the integral $\int_1^8 f'(x) dx$ and a button for the solution. Problem (b) asks for the correct statements regarding the functions $F(x)$ and $G(x)$.

A chat window is open, showing a conversation between 'Malte' and 'AI Tutor'. Malte asks for clarification on the integration process, and the AI Tutor explains the correct approach, suggesting that the user should not integrate the derivative but rather use the function $f(x)$ directly.

The chat window also shows a 'Feedback' button and a 'Chat neu starten' button.

Lernwirksamkeit

In kontrollierten Studien zeigen Studierende mit Tutoring Chatbots erheblich **bessere Leistungen** in semesterbegleitenden Assessments und Abschlussprüfungen.

Aber: Das gilt nur unter streng kontrollierten Bedingungen – nämlich wenn die Nutzung “vollwertiger” KI-Tools verunmöglicht wird.

GPT-4 as a Homework Tutor can Improve Student Engagement and Learning Outcomes

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Abstract
This work contributes to the scarce empirical literature on LLM-based interactive homework in real-world educational settings and offers a practical, scalable solution for improving homework in schools. Homework is an important part of education in schools across the world, but in order to maximize benefit, it needs to be accompanied with feedback and followup questions. We developed a prompting strategy that enables GPT-4 to conduct interactive homework sessions for high-school students learning English as a second language. Our strategy requires minimal efforts in preparation, one of the key challenges of alternatives like tutors or ITSs. We carried out a Randomized Controlled Trial in four high-school classes, replacing traditional homework with GPT-4 homework sessions for the treatment group. We observed significant improvements in learning outcomes, specifically gain in grammar, and student engagement. In addition, we reported high levels of satisfaction with the system and continued using it after the end of the RCT.

CCS Concepts
• Human-centered computing → Empirical studies in computing
Applied computing → Computer-assisted instruction
putting methodologies → Natural language processing

Keywords
Homework, Tutoring, Language Education, Randomized Controlled Trial, GPT-4

ACM Reference Format:
Alessandro Vanzo, Sankalan Pal Chowdhury, and Mrinmaya Sachan. 2025. GPT-4 as a Homework Tutor can Improve Student Engagement and Learning Outcomes. In *Arxiv Preprint*. ACM, New York, NY, USA, 11:1–11:15.

students in their homework using a simple prompting strategy and an interface we developed.
In the seminal paper on the 2 Sigma problem, Bloom [4] noted that compared to conventional learning, which consists of lectures followed by evaluation tests, students who received feedback on said tests and were given corrective instruction thereafter performed one standard deviation (σ) higher in terms of learning gains. The same paper notes a 0.8 σ improvement for graded homework, suggesting that the benefit comes from one-on-one interaction rather than no substitute for

OPEN ACCESS

Phys. Educ. 60 (2025) 025022 (9pp)

‘ChatGPT did my homework’: lessons learnt from embedding a chatbot in undergraduate coursework

Lucy Elson¹, Lauren Gaughan¹, Benjamin Hopton¹, Stephen Lloyd-Brown¹, Christopher Briggs, Moustafa Gharamti¹ and Philip Moriarty²

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PAPER
iopscience.org/ped



THE STUDYCHAT DATASET: STUDENT DIALOGUES WITH CHATGPT IN AN ARTIFICIAL INTELLIGENCE COURSE

A PREPRINT

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ABSTRACT
The widespread availability of large language models (LLMs), such as ChatGPT, has significantly impacted education, raising both opportunities and challenges. Students can frequently interact with LLM-powered, interactive learning tools, but their usage patterns need to be analyzed to ensure ethical usage of these tools. To better understand how students interact with LLMs in an academic setting, we introduce **StudyChat**, a publicly available dataset capturing real-world student interactions with an LLM-powered tutoring chatbot in a semester-long, university-level artificial intelligence (AI) course. We deploy a web application that replicates ChatGPT’s core functionalities and use it to log student interactions with the LLM while working on programming assignments. We collect 1,197 conversations, which we annotate using a dialogue act labeling schema inspired by behavioral trends, and analyze how specific usage patterns relate to course outcomes. **StudyChat** provides a rich resource for the learning sciences and AI in education communities, enabling further research into the evolving role of LLMs in education.

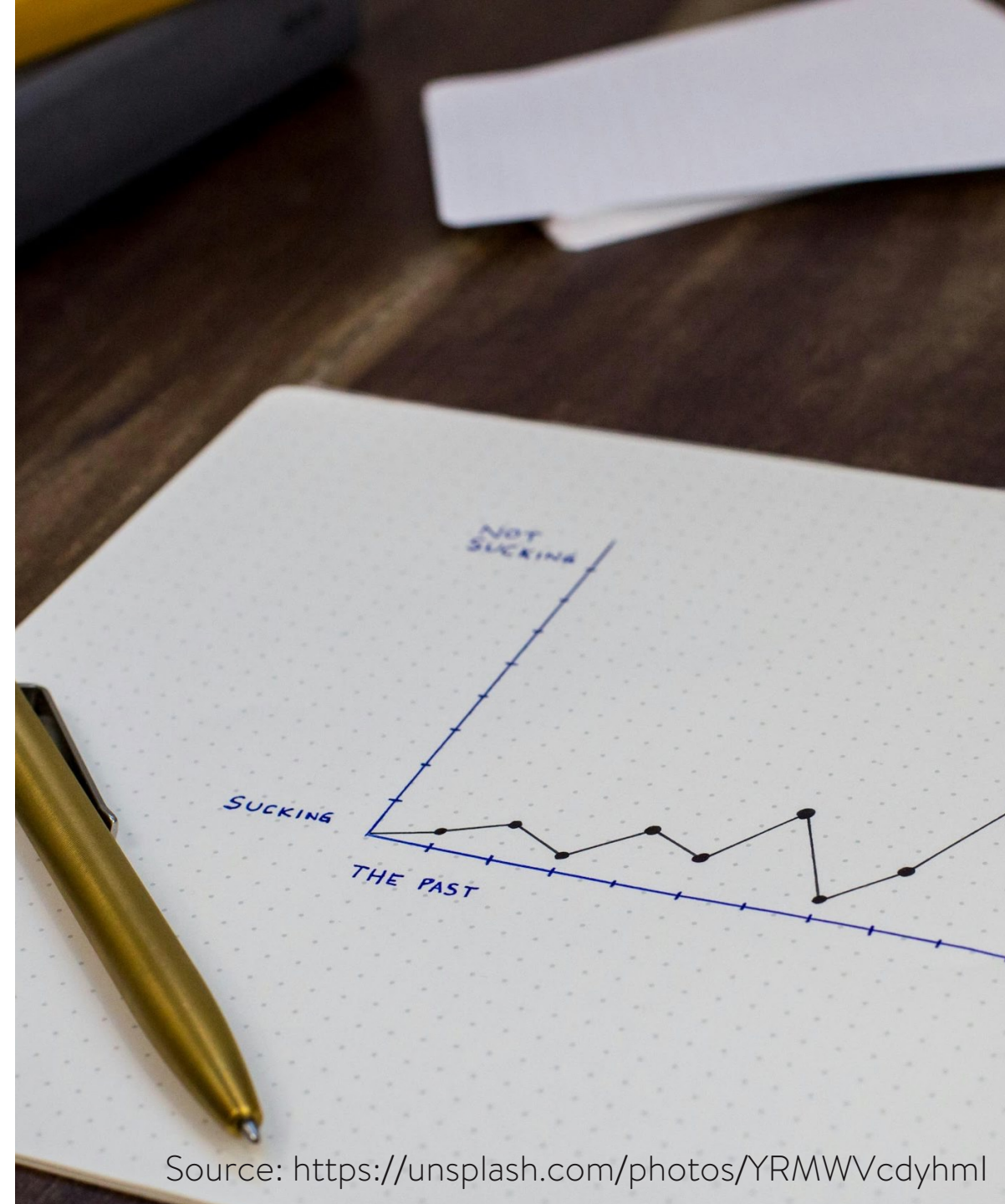
Keywords Conversational Datasets · CS Education · Dialogue Analysis · Large Language Models · Natural Language Processing

1 Introduction

Advances in large language models (LLMs) have had major ramifications on almost all levels of education. Many models to create new course content [MacNeil et al., 2022], assignments [MacNeil et al., 2023], and interactive learning experiences [Lin et al., 2023, Tancig et al., 2024]. These interactive technologies enable rich engagement with course material by allowing students to engage in on-demand conversations with an interactive tutor, and receive personalized feedback on their work. However, while the potential use cases for LLMs in education are vast, many educators are understandably concerned about student misuse of LLM chatbot tools, such as ChatGPT [Lau and Guo, 2023]. While a motivated learner can use these tools in a learning positive way, an unmotivated student could use them to complete their assignments on their behalf, circumventing the learning objectives of the assignment, or to cheat on a test. This dis-

age model (LLM) based on a e, has a remarkable, and rather enging physics problems. One atGPT’s capabilities in this re on the questions that make up /arxiv.org/abs/2303.01067]. dvances in LLM technologies ent, we asked a class of use ChatGPT to solve ne eigenfunctions of the illator—a staple of discuss the significant

Empirische Evidenz zu Videoavataren



Source: <https://unsplash.com/photos/YRMWVcdyhml>

- Studien aus der Zeit vor 2022 berichten teilweise **keine Unterschiede oder sogar Wirksamkeitsnachteile** von künstlichen Avataren gegenüber menschlichen **Vortragenden**.
- Hier wirken aber eine Reihe von Störvariablen (z.B. Vertrauenswürdigkeit, Aktivierung, Motivation).

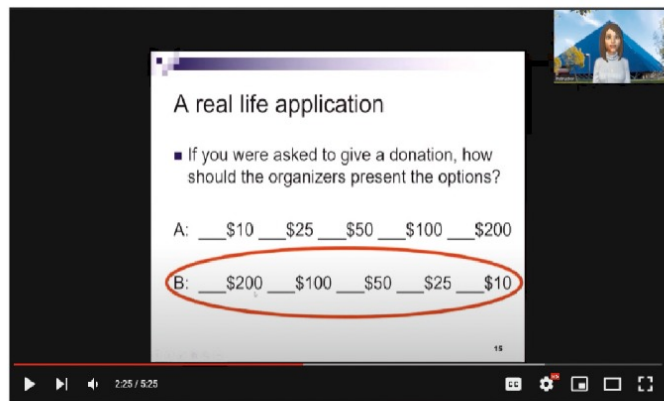


Fig. 1. Educator Type: Digital Human Avatar (Condition 1)



Effects of Artificial Intelligence-Powered Virtual Agents on Learning Outcomes in Computer-Based Simulations: A Meta-Analysis

Chih-Pu Dai¹ · Fengfeng Ke² · Yanjun Pan³ · Jewoong Moon⁴ · Zhichun Liu⁵

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Abstract

Computer-based simulations for learning offer affordances for advanced capabilities and expansive possibilities for knowledge construction and skills application. Virtual agents, when powered by artificial intelligence (AI), can be used to scaffold personalized and adaptive learning processes. However, a synthesis or a systematic evaluation of the learning effectiveness of AI-powered virtual agents in computer-based simulations for learning is still lacking. Therefore, this meta-analysis is aimed at evaluating the effects of AI-powered virtual agents in computer-based simulations for learning. The analysis of 49 effect sizes derived from 22 empirical studies suggested a medium positive overall effect, $\bar{g} = 0.43$, $SE = 0.08$, 95% C.I. [0.27, 0.59], favoring the use of AI-powered virtual agents over the non-AI-powered virtual agent condition in computer-based simulations for learning. Further, moderator analyses revealed that intervention length, AI technologies, and the representation of AI-powered virtual agents significantly explain the heterogeneity of the overall effects. Conversely, other moderators, including education level, domain, the role of AI-powered virtual agents, the modality of AI-powered virtual agents, and learning environment, appeared to be universally effective among the studies of AI-powered virtual agents in computer-based simulations for learning. Overall, this meta-analysis provides systematic and existing evidence supporting the adoption of AI-powered virtual agents in computer-based simulations for learning. The findings also inform about evidence-based design decisions on the moderators analyzed.

Keywords Artificial intelligence · Computer-based simulation · Machine learning · Pedagogical agents · Simulation-based learning · Virtual agents

Avatare im KI-Zeitalter

- Studierende erzielen **Lerngewinne** durch die Arbeit mit Avatar-Videos.
- Dies zeigt sich auch späteren **Prüfungsleistungen**.
- Dies gilt selbst dann, wenn „**Sekundäreffekte**“ eher zugunsten des Real-Videos ausfallen.





Fehlerquellen für RAG

1. Die Eingangsdaten für die Vektordatenbank sind fehlerhaft
2. Der Chunking-Prozess
3. Der Chatbot macht Fehler beim Einbau der Informationen



- Signifikante und identische **Verbesserung** zwischen Prä- und Post-Prüfung für Avatar- und Realvideo → gleiche **Lernwirksamkeit**.
- Keine bis schwache Unterschiede im Selbstbericht der Lernerfahrung



Experimental



Control

Generative AI for Learning: Investigating the Potential of Learning Videos with Synthetic Virtual Instructors

Daniel Leiker^{1,3} , Ashley Ricker Gyllen^{2,3} , Ismail Eldesouky³ , and Mutlu Cukurova¹ 

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² Metropolitan State University, Denver, CO 80204, USA

³ EIT InnoEnergy, Eindhoven, Netherlands

Abstract. Recent advances in generative artificial intelligence (AI) have captured worldwide attention. Tools such as Dalle-2 and ChatGPT demonstrate that tasks previously thought to be beyond the capabilities of AI may now augment the productivity of creative media in various new ways. To date, there is limited research investigating the real-world educational value of AI-generated media. To address this gap, we examined the impact of using generative AI to create learning videos with synthetic virtual instructors. We took a mixed-method approach, randomly assigning adult learners ($n = 83$) into one of two micro-learning conditions, collecting pre- and post-learning assessments, and surveying participants on their learning experience. The control condition included a traditionally produced instructor video, while the experimental condition included an AI-generated learning video with a synthetic virtual instructor. Learners in both conditions demonstrated significant improvement from pre- to post-learning ($p < .001$), with no significant differences in gains between the two conditions ($p = .80$), and no qualitative differences in the perceived learning experience. These findings suggest that AI-generated learning videos have the potential to be a viable substitute for videos produced via traditional methods in online educational settings, making high quality educational content more accessible across the globe.

Keywords: AI-Generated Learning Content · Generative AI · AI in Education

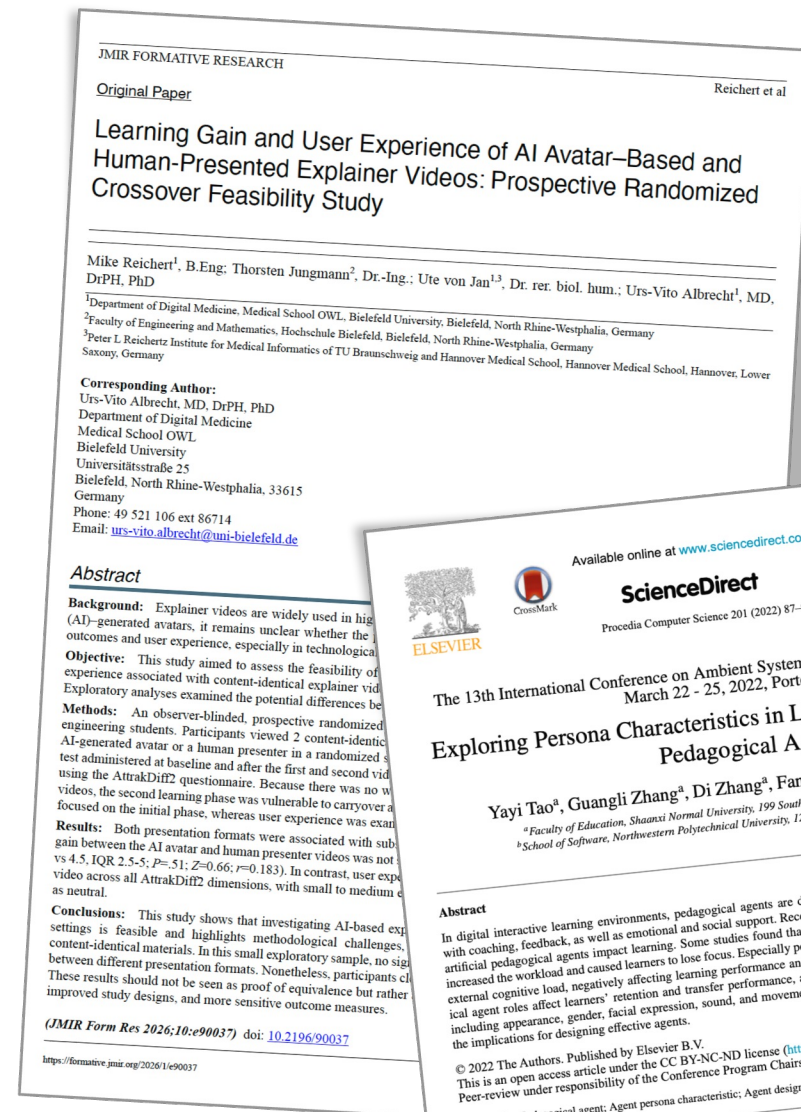
1 Introduction

Despite the growing body of evidence demonstrating the positive impacts of using AI to support learning, engagement, and metacognitive development [1–3], the use of generative AI in learning contexts remains largely unexamined. Recent advancements in generative AI tools have enabled the synthesis of realistic digital content, including photorealistic images, voice cloning, and face animation [4–6]. These tools are being leveraged across several industries including entertainment, customer services and marketing

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N. Wang et al. (Eds.): AIED 2023, CCIS 1831, pp. 523–529, 2023.
https://doi.org/10.1007/978-3-031-36336-8_81

Arten von Avataren

- Unterschiede zwischen Realpersonen und menschenähnlichen KI-Avataren sind **klein bis nicht vorhanden**.
- Bei der Verwendung nicht-menschlicher oder comichafter Avatare sind Resultate **uneinheitlich**.



Uncanny Valley?

- Je **lebensechter** ein Avatar ist, desto höher ist seine „akademische Vertrauenswürdigkeit“, auch wenn ein Uncanny Valley Effekt verbleibt.
- Studien mit **Live-Avataren** demonstrieren Lernwirksamkeit auch in Konversations-Settings.



Keine bis schwache Unterschiede bei weiteren **Sekundäreffekten** wie:

- Lernmotivation
- Immersion
- Präferenz für Real-Video
- Cognitive Load

Selbst wenn Sekundäreffekte zugunsten des Realvideos ausfallen, hat dies keine bis kaum Auswirkungen auf die **Lernwirksamkeit**.



Arbeitsphase 2: **Avatare in der Hochschule**



- 10'** Stellt Euch Avatar-basierte Projekte aus Eurem Arbeitskontext vor?
- 20'** Diskutiert für diese Projekte folgende Aspekte:
 - a) Warum** wurde die Umsetzung als Avatar gewählt?
 - b) Wurden die Ziele erreicht?**
 - c) Was waren die wichtigsten Erfahrungen, was die größten Herausforderungen?**