



## **I'm a chatbot, ask me anything: using ChatGPT to improve learning experiences**

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### ***Presentation abstract***

Artificial Intelligence (AI) offers substantial opportunities and challenges in higher education. Given the evolving technological landscape, educators must ensure that students acquire a skill set encompassing both AI and traditional academic skills to enable them to succeed in their studies and future careers. We tested two groups of students, who each watched a recorded lecture on an unfamiliar topic. The first group used ChatGPT to ask questions and clarify content during the lecture, while the second group used Google search for the same purpose. We assessed the impact of these tools on the students' cognitive load (germane and extraneous) and measured active learning through the number of questions students asked. We also used a post-test quiz, covering the breadth of Bloom's Taxonomy, to evaluate the efficacy of each method. We expected that students using ChatGPT would experience lower extraneous cognitive load, higher germane cognitive load, and would learn content more effectively. Qualitative results demonstrated a notable preference for chatbots over search engines, due to the ease of locating specific information and obtaining insightful responses. Our findings suggest the potential of AI as a transformative tool in education, helping to enhance and deepen learning, while ensuring students retain ownership of their critical and creative processes. Leveraging the potential of AI and large language models may also serve a broader purpose: by personalising learning experiences to match individual students' language

skills, experience levels, and needs, AI may bridge the gap between the tailored support students want and the practical constraints that educators face.

**Keywords:** GenAI; cognitive load; skill building; artificial intelligence; AI.

## ***Community response***

With much of the emerging work surrounding AI focusing on its potential detriment to student learning, this paper demonstrated how AI can in fact be a supporting factor in the learning experience. It also showed how the increasing sophistication of AI is changing how learners learn. This was positive approach and perspective on AI was noted by the community: 'The idea of using GenAI to support this seems a really interesting one, especially if it can help learners to become more independent and active in their learning'.

Another attendee picked out a particular theory discussed in the paper, which sparked an interest in wider influence this could have in LD beyond the individual topic of this paper.

Amongst many interesting elements in this talk, I was particularly interested to see a reference to Sweller's Cognitive Load Theory – this is something I've recently encountered and find very interesting, and I haven't previously noticed it in LD or educational development studies. Although it may not align well with more critical pedagogy-orientated perspectives on knowledge construction (as it might be taken to imply ... dare I say it ... that there is some useful knowledge to be learned or even transmitted 'out there', external to the learners themselves), it's worth exploring its potential in LD. Learning to write is a really complex and challenging process, so considering the 'load' on students' working memory for new ideas or concepts seems really important.

## ***Editorial comment***

The topic of artificial intelligence has been much discussed in recent *Journal of Learning Development in Higher Education* publications, which may further build on the discussions and ideas introduced in this paper. For example, in his paper from 2024, Michal Bobula

reviews the challenges, opportunities, and implications of generative artificial intelligence. Likewise, Zhou and Schofield's 2024 opinion piece takes a similarly positive perspective on the impact AI could potentially have on student learning.

### ***Next steps and additional questions***

To further the discussions and findings of this paper, it would be interesting to:

- Explore the potential impact or influence that Sweller's Cognitive Load Theory may have in Learning Development and/or Educational Development studies.

### ***Authors' reflection***

The authors of this piece are psychologists, primarily employed on 'Teaching and Scholarship' contracts, meaning that we focus on pedagogy within our discipline but our knowledge and practices are grounded in psychological principles and theory. Our background shapes and informs our pedagogical research. Since the explosion of GenAI into our collective consciousness less than two years ago, we have been bombarded by opinions. GenAI has been alternately positioned to surpass human ability while simultaneously destroying it, or simply as a superficial mirror of human abilities. It was therefore important to us to devise methods to test the potential cognitive benefits of GenAI with scientific rigour.

Humans have adapted to technological advances before; there was a time when writing was denounced as a dangerous innovation, detrimental to the memories of those who adopted it. This might actually be true: how many of us could now recite Homer in its entirety in the Greek tradition, now that we have the means to read it? The long-term impact of GenAI on cognitive abilities remains to be seen, yet its impact on teaching and assessment has undoubtedly been huge and it continues to present significant challenges to educators. Our challenge is to determine the ways in which the tool can be used to enhance learning, and our call-to-action is for educators to shift the focus from ideological narratives to evidence-based interventions to improve higher education for learners. We were encouraged by the discussions with colleagues during and after the presentation as it

felt like we, as a community, were embracing this journey with the right amount of scepticism and open-mindedness.

Our experiment is one of the first to begin this journey. We focused on cognitive load theory, positing that a primary benefit of ChatGPT is its ability to parse complex concepts into simplified language, tailored to the needs of the learner. We prioritised using a somewhat naturalistic setting; a short, recorded lecture was presented, and we asked students to learn the material well enough to perform well on a test at the end, using ChatGPT or Google to deepen their understanding. Though we didn't observe many advantages to the subjective measure of cognitive load from ChatGPT use, our ability to see how students had interacted with the tool was illuminating and revealed shortcomings in their ability to ask questions in an appropriate way to get the best from large language models. We predict this finding will elicit the not-unfamiliar refrain: students need to be taught how to learn. Then GenAI might become useful as a conceptual tool that helps learners explore complex ideas to facilitate deeper learning of concepts through constructionist principles of learning (Papert, 1980; Vasconcelos and dos Santos, 2023).

A surprising and interesting finding was that a large proportion of the students assigned to the Google group refused to use Google to clarify their understanding of the material, an observation that was far less frequent in the ChatGPT group. We believe this is an important observation, given that active learning (which we defined as 'asking more questions or performing more searches'; a loose definition, perhaps!) using ChatGPT led to higher quiz scores, whereas this relationship didn't exist in the Google group. If students are more willing to use ChatGPT than other ways of accessing material, then a primary goal moving forwards must be a) to teach students how to get more out of GenAI tools to support their learning, and b) to quantify the effect of the ease of information access on their learning. It may be that the ease of access helped in our task because the quiz was administered directly after watching the lecture; however, to facilitate longer-term, broader learning, the comparative 'struggle' to access information from search engines and databases may boost learning by forcing students to interact with more material – by having to parse the information themselves and decide what is or isn't relevant. This is a key avenue for further research, as well as determining the other ways in which GenAI may support learners on their educational journeys, and we would welcome comments, collaborations, and suggestions from other institutions on the challenges they are facing

with assessments to think about how we can design them so that GenAI can be used as a 'supportive partner' to their studies, rather than a replacement.

## **Acknowledgements**

Thank you to all the contributors who shared their reflections and enriched our insight into this conference presentation and its impact on the audience.

The authors and contributors did not use generative AI technologies in the creation of this manuscript.

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Pauldy Otermans is a Reader (Education) in Psychology at Brunel and a female tech leader in the UK. She is the Director of the Education Hub and Employability Lead for the Faculty. Dr Otermans's research focuses on using AI in education and authentic assessments. She believes that upskilling students and staff with AI literacy is crucial for graduate and professional development in Industrial Revolution 4.0.

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journal published by the Association for Learning Development in Higher Education  
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