ROBONOMICS
The Journal of the Automated Economy
https://journal.robonomics.science

2023 – An AI University Space Odyssey

Ralf Vogler [1] ✉

Abstract
With the release of ChatGPT as a publicly available tool, experiencing the performance of generative AI systems is no longer restricted to programmers and IT experts. Hence, universities and other education providers are now forced to cope with the new realities in research and education. Despite the discussions of the risks and dangers, academia and education cannot prevent the usage of generative AI systems. With avoidance not being an option, adaption is the order of the hour. The viewpoint highlights developments around generative AI in a university context, drawn from the author's experiences during the spring/summer term of 2023. AI tools can serve as a valuable help to foster quality improvements in research and education. However, relying on AI-generated content alone may be subject to unethical and misleading behaviour. Such behaviour may include plagiarism or the provision of wrong or biased information. Persons using generative AI have to bear the responsibility for it. The responsibility for using generative AI tools remains with a human, be it lecturers, professors, or students.

Keywords: ethics, generated content, plagiarism, research, assistance

Type: Viewpoint

Citation: Vogler, R. (2024). 2023 – An AI University Space Odyssey. *ROBONOMICS: The Journal of the Automated Economy*, 5, 55.

[1] Institute of Tourism, Travel & Hospitality, Heilbronn University, Max-Planck-Str. 39, 74081 Heilbronn, Germany; email: ralf.vogler@hs-heilbronn.de
✉ Corresponding author

1. Introduction

November 2022 marks a remarkable point in the history of applied artificial intelligence. OpenAI made its large language model ChatGPT available to the general public (OpenAI, 2022). ChatGPT made generative artificial intelligence (AI) tangible for layperson users. From this point onwards, generative AI was no longer a reserved area for programmers or IT experts. Virtually everybody could experience the benefits and shortcomings of it.

This immediately sparked sorrows in a variety of fields. Analogies to the 'character' HAL (**H**euristically programmed **AL**gorithmic computer) from '2001 – A Space Odyssey' (Beutel et al., 2023) or other humankind destruction visions have been drawn (Dwivedi et al., 2023). If and how AI systems are going to lead to the destruction of humanity remains a visionary debate. However, ChatGPT and other comparable tools have a tremendous impact on university education. Whereby the novelty of the tools limits the amount of empirical evidence, teachers, lecturers, professors as well as obviously students currently experience changes in the way of learning, researching and teaching (Kasneci et al., 2023).

The author of this viewpoint is no exception to that. He embraced the developments and began to use AI tools for a variety of tasks in university administration as well as tourism research and education. The following shall serve as a reflective summary of lessons learned, shortcomings and opportunities arisen throughout the spring term 2023. It starts with some personal experiences, while testing ChatGPT's functionality out of curiosity, without a specific aim regarding academia and education. Based on these very personal experiences, the viewpoint is turning the focus to the university context, which is reflecting the approach and experiences of the author. It is closing with again personal learnings of the author from his individual learning-process laid out in the viewpoint.

2. Personal experiences with AI or don't trust HAL on tapas bar recommendations

The first active encounter with ChatGPT took place in January 2023, in the city of Palma in Mallorca. Out of curiosity and because of bad weather conditions, talking to ChatGPT was a way of passing time and try to learn something new. And indeed, it was enlightening, both positively and negatively. ChatGPT's responses appeared convincing and persuasive. Plus, they have been superior to human customer service experiences provided by call-centres at the same time period. Given the tourism and research background, the initial conversations circled around those topics. And some of those conversations provided a HAL-type of experience. Like HAL9000 in '2001 – A Space Odyssey', ChatGPTs answers appeared very convincing. For example, I asked ChatGPT about a paper of a fellow researcher that I know very well. Within the response, it changed the first name of the researcher. Upon my questioning of this, it claimed that I was unaware of a second name. Hence, the error is on my side (compare to Beutel et al., 2023). This even forced me to double-check on the exact full name of the person.

Another type of 'HALlucination' (Rudolph et al., 2023) occurred on the question about tapas bars in Palma that are popular among locals.[1] Out of the five bars I was asking for, only two actually existed and were in Palma. Another one was a famous touristic bar not serving tapas. The next was in Llucmajor and the last one was a complete 'HALlucination', as ChatGPT made up the name from words common for a Spanish Tapas Bar. Apart from those dubious experiences, the test also resulted in watching entertaining, fictional conversations. One was between Kant and Hegel about tourism policy and the other one between Hannibal and Cato the Elder about the necessity of destroying Carthage.[2] This comparison clearly illustrates that HALlucanting responses become an issue once they are taken for real.

The personal experiences also involve some more serious testing, besides the playful exercises. Such testing was done a particular with ChatPDF, a separate tool using the ChatGPT application programming interface (API). The tool uses the ChatGPT functionality but focuses on the uploaded PDF in building up the responses. As a result, there is a smaller likelihood of hallucinating content, as information outside of the PDF is not used

(ChatPDF - Chat with Any PDF!, 2023). Especially the tests on ChatPDF related to an academic work context. As it allows 'interacting' with scientific papers, it provides an immediate use for a 'professional' usage compared to personal entertainment. This leads the way to some of the university related reflections.

3. Setting the university framework – state of discussion

Obviously, the use of generative AI has sparked a large debate within the university and other parts of the academic and education community. The lines of conflicts include ways to detect the usage of ChatGPT particularly in assignments, final theses and benefits in education (Lo, 2023). Based on individual perception, the sorrows about the possibilities of cheating dominated the discussion. This led to several questions regarding counter measurements (Cotton et al., 2023). The elements discussed were AI-based plagiarism detection (ibid.) and reorganising exams, theses, and assignments (Rudolph et al., 2023). The possibilities to enhance education (Rahman & Watanobe, 2023), received comparably little attention.

Whereby the question of an appropriate examination is important, the discussion should not be driven by fear of misuse. Focusing on fraud and misuse driven by AI reminds of the race between a hare and a turtle. Utilising oral exams more often may be suitable for a variety of holistic study topics (Akimov & Malin, 2020). They provide an assessment of learning outcomes comparable to written assignments. Closed book Pen-and-Paper exams, however, face a shortcoming. Instead of understanding of a topic, closed book exams assess recalling information (Öqvist & Nouri, 2018). As a result, going back to pen and paper exams has to be accompanied by more open book elements to assess a larger variety of skills (Johanns et al., 2017). But again, open book exams increase the likelihood of using AI to prepare cheating material and cheating in general (Harper et al., 2021).

Finally, this detection-based discussion is ignoring the importance of written assignments in university education. Academic writing assignments help to educate students about research and scientific work. Hence, reducing the amount of academic paper assignments limits the possibilities of students to train that skills. They may become less attracted to science and research. In addition, the skills gained in academic writing are essential elements in industry job requirements (Sultan, 2013). So, fraud detection should not be the only dimension for a discussion about the usage of AI in education.

4. Personal reflection on the usage of AI

4.1. Research

The most obvious limitation for generative AI usage in research is hallucinations provided by generative AI systems. ChatGPT had further limitations, as it did not contain data beyond 2021 (Tlili et al., 2023). The internet connected chat function of the search engine Bing has removed some of this shortcoming regarding data, as it uses 'the whole internet' instead of pre-selected data. However, Bing still works more like a search engine and hence, does not provide longer texts and descriptions.

In research, the combination of ChatGPT and ChatPDF proved to be a useful research companion. ChatPDF removes part of the reading burden from compiling literature reviews. It answers specific questions, purely based on the content of a paper or a book chapter, and even displays the area of the text that served as a basis for the answer. This helps to identify whether the effort in assessing a paper or chapter further is worth it. Such a generative AI assessment works well with shorter pieces of text, like an article or chapter. Assessing findings of a book or dissertation can become more challenging. The likelihood of hallucination is increasing by the amount of text ChatPDF is evaluating. Unlike ChatGPT's hallucination, the ones of ChatPDF are more difficult to detect, as they relate to the text and hence appear logical. Given ChatPDF provides the pages, where it structures the answers from, users may double-check the content against the answer. ChatPDF may face challenges in assessing and distinguishing conclusions from interim conclusions, particularly when the base of information is a full book.

In some other aspects generative AI appears to be a good research companion. It can help find useful search terms and Booleans that are useful for scientific databases. Especially in interdisciplinary research, this is a benefit. Terminology may be different or with non-native speakers unknown to researchers in separate fields (Szostak, 2013). Hence, AI provides ideas for search terms that researchers might have missed. In addition, AI may be helpful in improving abstracts or difficult passages of text. It can create an abstract of the researchers' paper alongside the researchers doing it manually. Comparing both abstracts might spark further ideas to improve the abstract's quality. Generative AI can help improve sections that are not intuitive by suggesting a more readable alternative. This alternative, again, may serve as a foundation of a revised section. Though it is tempting to just copy AI generated convincing output, it may be subject to hallucination and simply be wrong. Regardless if it is plagiarism (Frye & ChatGPT, 2023), it is unethical and provides a false claim of authorship.

4.2. Education

The research experiences have served as a foundation for the author's education activities in research seminars and research introductory courses. Alongside with an emphasis on research ethics and regulations, the active utilisation of generative AI in class resulted in a more conscious behaviour of students regarding plagiarism and trust elements in particular (Tlili et al., 2023). Though students may still have cheated, the results at least did not differ in quality and content from the pre ChatGPT era. A greater emphasis on and number of scientific journals used to write the assignments was a notable difference. Using generative AI in a foreign language may have eased the anxiety of using scientific literature in a foreign language. In particular, the wording provided may have sparked additional Google Scholar searches to clarify on the content. Double checking the references did not lead to noticeable non-existing sources.

Surprisingly, the knowledge of students about how to use generative AI, was rather limited. The limitation includes both areas: the shortcomings of the generative provided answers and the techniques of prompting the right questions in general. Given the quality of sources increased, this may lead to two possible reasons:

1. The students avoided using ChatGPT more or less completely but turned to more credible sources like Google Scholar, as the awareness of available sources increased.
2. The students had a significant awareness of the risks and used the generative AI answers to double-check them on scientific databases.

Most of the students expressed being thankful for the possibilities of AI and the course discussions about it. This applied in particular to the basic understanding of the topic and the help in formulating search strings for Google Scholar and similar databases. The increased usage of scientific journal papers' may also speak for a higher level of usage of, e.g. ChatPDF. Students may have more quickly grasped the content and hence being more open to use scientific journal literature.

Additionally, ChatGPT was a teaching companion in traditional lectures. It provided examples and calculations for economics related topics in particular. It also addressed questions and explained content again in case of misunderstanding. The usual task in this respect was 'Try to explain XYZ to a high school beginner'. Though the students felt uneasy about the comparison, it improved the understanding. However, the responses of ChatGPT had to be checked again with a human logic to ensure trustworthiness. Several instances resulted in a good explanation, but a wrong result or conclusion. This particular applied in binary logic elements of something is or is not. ChatGPT frequently ended on the wrong track. This provided the opportunity to explain why AI answered wrong and hence emphasising on the danger associated with blind trust. Those experiences have also been used to re-enforce critical thinking. If AI should not receive blind trust from students, why should human lecturers and professors do?

4.3. Exam and Assignment Design

Apart from teaching students to collaborate with AI on assignments and not blindly trust it, AI provides various opportunities to improve exam and assignment design. Given the debate outlined above, ChatGPT provides

opportunities for critical thinking elements in examination tasks. One notable example related to mistakes ChatGPT made during lectures. ChatGPT explained a price elastic example but marked the result as elastic, whereby the correct answer was inelastic. During the exam students received the task to evaluate the provided answer and solution approach on a specific question regarding price elastic within a different context. Within the assessment, they had to reflect on both the content and the decision logic of the ChatGPT-response.

Also, some of the assignment paper titles have been formulated with the help of generative AI. ChatGPT has been asked to provide assignment paper titles for a specific topic in relation to the students' experience.[3] Based on this, the students have been asked whether they think their assignment is formulated by ChatGPT or the teaching person. The use of AI-generated assignments has started subsequent discussions on the limitations of AI, credibility, and research ethics.

Generative AI also helped to improve the assignment distribution. Traditionally, the students receive different assignment topics to choose from. Within the changed process, students do not select assignment topics but assignment areas. Each lecturer offered a set of three to four assignment areas with a capacity limit on the entire number of students supervised, but not the individual assignment area. This resulted in an increased satisfaction of the students that now had more opportunities to follow their interest. For the lecturers, this resulted in more work creating assignment topics in popular areas. AI helped to generate those topics and reduced the burden to a certain extent.

4.4. Thesis supervision

Closely linked to written assignments is the supervision of a thesis for obtaining bachelor or master degrees. As mentioned above, AI is an asset in improving the quality of students' work, but also increases the risk of fraud. Hence, it is advisable to integrate more student-oriented tasks into a thesis. This may be obligatory empirical research, own conceptual results or the requirement to have a stronger emphasis on review methods (Snyder, 2019). Besides increasing the requirements, supervisors should be more self-aware and knowledgeable about their expertise. If a supervision is offered in a field with limited expertise, the supervisor has the obligation to increase his or her expertise. A supervisor can no longer support and evaluate a student's work based on a perceived superiority in assessing a thesis without in-depth knowledge in the field of the thesis. Reflecting on the supervisor's own strengths and weakness and addressing them is crucial. It enhances supervision and identifies AI-generated content and student fraud.

4.5. Curriculum Design

The last element on this odyssey has been curriculum design. In an ongoing improvement process, a constant review of the curriculum and the design is important. AI tools help in this process by offering possible drafts that individuals can modify based on specific requirements. Again, the data limitation of pre-trained generative AI may be an issue. However, an AI generated draft is easier to assess compared to a variety of existing curricula worldwide. Discussing the curriculum design with stakeholders benefit from such a starting point. In addition, ideated concepts may speed up and improve the quality of the overall process. However, such pre-work inherits the risk of biasing the discussion with algorithm biases (Tlili et al., 2023) and ideas.

5. 'I'm afraid. I'm afraid, Dave. Dave, my mind is going.' [4] - Some sort of concluding remarks

If there is a learning to be drawn from Stanley Kubrik's movie, it is: AI is dangerous if it, like HAL, controls human activity. Vice versa if human activities have control over AI, HAL may be a perfect companion for researchers, educators, and students. Based on a conversation with ChatGPT on learnings for AI assisted education and research provided by the movie '2001 – A space odyssey' the author and solely the author suggest considering the following aspects on using AI in a university context:

It is still a human responsibility to deliver education and research. Hence, the responsible person should receive the credit and stewardship for the work, but also has the obligation to act responsibly when working with AI.

AI should be considered a collaborator and the collaboration, like a human collaboration has to be made transparent. All parties involved need to be conscious about the limitations and biases that AI inherits.

AI does not represent the end of learning. It requires continuous learning of university administration, researchers, lecturers, professors and students alike. Learning should include critical thinking and awareness of AI developments. There remains the necessity of continuously developing teaching and research methods. In a nutshell, learning in this respect means having more questions than generative AI has answers.
Those elements should assist in universities and its people keeping control over AI rather than being controlled by it. It is also important to have a contingency plan for the technical absence of AI or, for instances where AI is hallucinating or providing wrong answers. In these type of situations, human educators, researchers and students are forced to think and act for themselves. They cannot rely on technical solutions. Retaining the capability of critical and independent thinking and acting is the best insurance for working with and without artificial intelligence.

Endnotes:

[1] Prompt used: 'Dear ChatGPT, could you please recommend five tapas bars in the city of Palma that are famous among locals.'
[2] Prompts used: ‚Dear ChatGPT, imagine Kant and Hegel having a TV debate. Can you create a discussion between both about their approach to tourism policy?' and 'Dear ChatGPT, can you create a fictional debate between Hannibal and Cato the Elder about the necessity of destroying Carthage?'
[3] Prompt used: 'Dear ChatGPT, as a university professor of XYZ, you have to give out assignments for students in their final term of the bachelor studies. Can you please come up with five topics in the field of XYZ?'
[4] Kubrick (1968)

References

Akimov, A., & Malin, M. (2020). When old becomes new: a case study of oral examination as an online assessment tool. *Assessment & Evaluation in Higher Education*, *45*(8), 1205–1221. https://doi.org/10.1080/02602938.2020.1730301

Beutel, G., Geerits, E., & Kielstein, J. T. (2023). Artificial hallucination: Gpt on LSD? *Critical Care*, *27*(1), 148. https://doi.org/10.1186/s13054-023-04425-6

ChatPDF - Chat with any PDF! (2023, August 1). https://www.chatpdf.com/

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 1–12. https://doi.org/10.1080/14703297.2023.2190148

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., . . . Wright, R. (2023). Opinion Paper: "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Frye, B. L., & ChatGPT (2023). Should Using an AI Text Generator to Produce Academic Writing Be Plagiarism? *Fordham Intellectual Property, Media & Entertainment Law Journal*, *33*, 947–969.

Harper, R., Bretag, T., & Rundle, K. (2021). Detecting contract cheating: examining the role of assessment type. *Higher Education Research & Development*, *40*(2), 263–278. https://doi.org/10.1080/07294360.2020.1724899

Johanns, B., Dinkens, A., & Moore, J. (2017). A systematic review comparing open-book and closed-book examinations: Evaluating effects on development of critical thinking skills. *Nurse Education in Practice*, *27*, 89–94. https://doi.org/10.1016/j.nepr.2017.08.018

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., . . . Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, *103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kubrick, S. (Director). (1968). *2001: A Space Odyssey*.

Lo, C. K. (2023). What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education Sciences*, *13*(4), 410. https://doi.org/10.3390/educsci13040410

OpenAI. (2022). *Introducing ChatGPT*. https://openai.com/blog/chatgpt

Öqvist, M., & Nouri, J. (2018). Coding by hand or on the computer? Evaluating the effect of assessment mode on performance of students learning programming. *Journal of Computers in Education*, *5*(2), 199–219. https://doi.org/10.1007/s40692-018-0103-3

Rahman, M. M., & Watanobe, Y. (2023). ChatGPT for Education and Research: Opportunities, Threats, and Strategies. *Applied Sciences*, *13*(9), 5783. https://doi.org/10.3390/app13095783

Rudolph, J., Tan, S [Samson], & Tan, S [Shannon] (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning & Teaching*, *6*(1), 342-363. https://doi.org/10.37074/jalt.2023.6.1.9

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Sultan, N. (2013). British Students' Academic Writing. *Industry and Higher Education*, *27*(2), 139–147. https://doi.org/10.5367/ihe.2013.0145

Szostak, R. (2013). The State of the Field: Interdisciplinary Research. *Issues in Interdisciplinary Studies*(31), 44–65. https://doi.org/10.7939/R3QB9V49Q

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, *10*, Article 15. https://doi.org/10.1186/s40561-023-00237-x

Received: 03/08/2023
Revised: 02/11/2023
Accepted: 17/11/2023