



AI supported Text Production in the University

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Abstract Since the release of OpenAI’s chatbot ChatGPT, tools based on artificial intelligence have also reached the wider public. This chapter discusses the opportunities and challenges for their use at the university level.*

Keywords Artificial Intelligence, Text Production, University Education

1. AI and the Disruption of the Academic World

The public has previously only associated *artificial intelligence* (AI), connected with natural language, with service chatbots that provide information on request, such as the opening hours of a library or the general terms and conditions of a telephone company. These were previously recognizable by their limited “knowledge,” understood as information processing skills tailored to a specific area of application (Adiwardana & Luong 2020). This limited perspective changed abruptly in November 2022 when the US company OpenAI released ChatGPT, an AI-based tool for conversations. The application enables one to conduct human-like dialogs with an algorithm-based system in a chat window using *prompts* in natural language, such as asking questions, have facts explained, or perform more complex actions. As the system’s output appears plausible and coherent, many users do not realise that they are not based on indisputable data, but are merely statistical calculations. The chats with the free version of ChatGPT¹ based on the GPT-3 language model and the improved version GPT-3.5 were in many ways indistinguishable from interaction with a human.

* This chapter, including quotations in foreign languages, was translated from German by Brandon Watson.

1 On 14 March 2023, the successor model, GPT-4, was released as a paid version and expanded to include multimodal capabilities and access to data from the internet. Since November 2023, it has

The Turing test – developed to distinguish machine thinking from human thinking – seemed to have been passed (Borchers 2022).

In 2019, Springer Nature published the first specialist publication on lithium-ion battery research generated entirely by AI under the pseudonym *Beta Writer* (2019). The research summarized and referenced all articles on the topic of lithium batteries, which provided an outlook on how the literature review step could be automated in scientific work in the future (Wilder et al. 2022, 217f.). In education, the hype surrounding ChatGPT triggered dystopian panic, utopian-naïve glorification, and heated debates on written examination forms such as term papers and theses: How can a text document a person's cognitive process and level of knowledge when the work could have possibly been generated by a machine? While there were skeptical voices saying that the door was open to attempts at cheating, which could now increase dramatically, others, including the author's marketing departments, emphasized the advantages of using AI in education, which should spark nothing less than an educational revolution: every person, regardless of their learning level, their abilities, their socio-economic conditions, etc., would now have an individual learning companion at their disposal to support the learning process in all phases and thus make a significant contribution to the acquisition of skills. The controversial discussion about the opportunities and risks of using AI-supported applications in an academic context therefore picked up speed immediately with the publication of ChatGPT and will continue to occupy and challenge the education sector. In essence, the controversial discourses that have arisen in the educational context are leading to the inevitable future task of fundamentally rethinking teaching, learning, and examination cultures (Weßels et al. 2022).

Disruptive effects are occurring on the academic writing process, ultimately on language and its use, as well as on the linguistic acquisition and transfer of knowledge. Further developments and their evaluation are difficult to predict and will be decided less by the technology of the AI systems themselves and more when used, how, and for what purpose they will be used (Limburg et al. 2023).

To outline and categorize the current state of the discussion, this chapter first explains how *Large Language Models* (LLMs) work, on which current tools like ChatGPT from *OpenAI*² or the open source project *Open Assistant*³ are based. Generated outputs from these systems can thus be systematically analyzed along with the associated opportunities and risks, and future developments and their significance for the education sector can be assessed. Subsequently, the chapter presents examples of possible application scenarios in teaching and research and examines previous activities at universities to provide orientation for teachers and students. Challenges like data protection, copyright, and bias are also considered.

been possible to utilize specialized plugins for specific tasks or to create customized GPTs with one's own data. Since mid-May 2024, GPT-4o (omni) has been accessible at no cost to all users.

2 See <https://chat.openai.com> (Accessed: 18 June 2024).

3 See <https://open-assistant.io/de> (Accessed: 18 June 2024).

2. How AI Text Generators Work

The term *artificial intelligence* is a generic term for various systems with algorithms designed to perform human tasks independently. According to the current draft status of the EU AI Act (Art. 3), the draft law that provides for the regulation of AI systems within the European Union, AI systems are defined as

software that is developed with one or more of the techniques and approaches listed in Annex I [these are machine learning, logic and knowledge-based concepts, and statistical approaches] and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with software developed using one or more of the techniques and concepts listed in Annex (European Commission 2021, 46).

One area of particular importance for the performance of current systems is *Machine Learning* (ML), in which the system learns independently: patterns and regularities (a model) are extracted from training data (examples) based on a given algorithm to derive predictions (i.e., to apply the model to unknown examples). ML is generally used when the task to be performed is too complicated to be mapped in clear rules (Döbel et al. 2018, 8). Exemplary and typical areas of application for ML are image recognition or text generation. Determining the concept of “dog,” for example, so precisely that it recognizes all dogs in images and does not identify any objects other than dogs is only possible with very detailed descriptions that cover all individual cases. In contrast, it is much more efficient to have an algorithm analyze a large data set of dog images. The algorithm can then develop a model of the concept of a “dog,” which can then be used to determine further images with the distinction between dogs and non-dogs. The same applies to language, the essence of which cannot be reduced to syntactic rules.

In ML, a distinction is made between three different methods or learning styles: (a) *supervised*, (b) *unsupervised*, and (c) *reinforcement learning*. In *supervised learning* (a), the training data must first be provided with labels from humans in a complex process, an annotation with the assignment of an associated category for the desired output. For example, different animal photos are assigned the labels dog, cat, or mouse – which must already be known as a result of this learning style. The machine then essentially creates its model using the relationship between label, image, and text. Since the predictions of the model can be compared with the known correct results, the learning process can be “monitored” (Müller & Guido 2017, 2). In *unsupervised learning* (b), there is no need to prepare the data and the algorithm independently searches for patterns in the input data set. Unsupervised learning is used when no clear target values are specified (Patel 2019, 7–8), e.g., for anomaly detection when analyzing financial transactions to identify fraud attempts, or for recommendation

systems that generate suggestions for music, films, or purchases based on the user's preferences, but also for text analysis, such as identifying certain topics or trends in a collection. In the learning style of *reinforcement learning* (c), the AI is programmed to develop a strategy to increase the rewards it receives because of its interaction with an environment. If a strategy is rewarded, the probability of reusing it increases; if the strategy is not rewarded or negatively sanctioned, the probability decreases. It is essentially a trial and error process (Sutton et al. 2018). Reinforcement learning is used, for example, to learn games such as Go or chess, where victories are used as positive reinforcers and defeats as negative ones in model development. However, the evaluation possibilities of output, e.g., in ChatGPT, also flow into the improvement of the models in the same way.

Machine learning is the fundamental basis for the development of *Large Language Models*, AI models based on *Natural Language Processing* (NLP). NLP trains these models to analyze text data and make useful predictions for the next section. Large language models calculate correlations based on their training data and the most likely text output for the respective user input. This process often results in plausible texts that are cohesive on the linguistic text surface, but which – due to the limited *common ground* and world knowledge – can create an “illusion of coherence” (Lotze 2016), which is why they have been given the name “stochastic parrots” (Bender et al. 2021).

However, the probabilities for the output are not calculated at word level, but at token level, as it allows matching grammatical endings or punctuation marks to be predicted. Tokens are meaning bearing units that are produced through the process of tokenization (Michelbacher 2013, 8). In GPT-3.5, tokens comprise an average of four letters, which, according to OpenAI, corresponds to around $\frac{3}{4}$ of an English word (OpenAI 2023).

As an example for GPT-3, Fig. 1 shows that the token with the highest probability is not always selected. The reason is the *temperature* parameter, which is a setting variable determining the creativity or randomness of the model. The lower the temperature is set, the higher the probability of selecting the most likely token. A temperature set to the lowest value 0 would therefore always respond to a given input with the same, most probable, output. When asked for a suggestion for a name of a discipline that deals with the impact of AI on theology, GPT-4 suggests “Theological AI Studies” at a low temperature, but “Divine Datology” at a high temperature.

The examples from OpenAI's GPT family (the acronym GPT stands for *Generative Pretrained Transformer*) and LaMDA (*Language Model for Dialogue Applications*) use a transformer architecture, a special form of neural network developed by Google in 2017, to generate the probabilities (Vaswani et al. 2017; Collins & Ghahramani 2021). This architecture enables a faster and more precise analysis of the input by directing the probabilities for the tokens to be generated to certain semantic spaces by entering the prompt – the text-based input into an AI system – as well as the preceding conversation in the case of dialog models (so-called *attention mechanism*). For example,

KI-Technologien beeinflussen die Art und Weise, wie Menschen Informationen erhalten und nutzen.

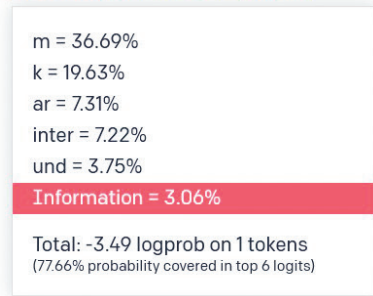


Fig. 1 Probability distribution for the token in the OpenAI Playground. The generated text presented in this figure translates as: “AI technologies are influencing the way people receive and use information.”

if the word “tower” is used in an input, then it is decisive for the calculation of the probability for the output whether the input or the preceding discussion refers to chess, castles, or medieval crimes: attention is directed to the respective semantic space in which the most probable output is searched. The field of application of this architecture – developed for the improvement of machine translations, whose shortcoming was the lack of consideration of the context often leading to translations that distorted the meaning – has been considerably expanded and now ensures the higher quality and more accurate output of current systems (Linde 2023).

Even though OpenAI’s GPT language models bear the underlying properties of a modern LLM in their name (*Generative Pretrained Transformer*), other current models are also based on this foundation. *Generative* means that something new is being created. *Pretrained* refers to the training procedure of the LLM, i. e., the underlying machine learning process. The training data for the LLMs comprises a total of around one trillion words (Saboo & Kublik 2023) and, in the case of GPT-3.5, is based on five data sets (Common Crawl, WebText2, Books1, Books2 and Wikipedia) (Brown et al. 2020). LaMDA, on the other hand, is based on English-language dialogs (Collins & Ghahramani 2021), thus giving rise to a central and discussed problem for text-generating AIs, as the training data always contains inherent values and views of the training material. The more frequently material on a topic or concept appears in the training data, the more likely it is that this will be reproduced in the output, which leads Draelos (2023) to conclude: “Large language models (LLMs) like ChatGPT are racist, sexist, homophobic, and in general packed full of all of the worst of society’s biases, because they are trained on biased data.” The fact that this reality is not so noticeable in the everyday use of ChatGPT is because it is not the raw output of the LLM that is presented, but the output filtered by a *Moderation API* that filters out unwanted output (Markov et al. 2022). However, this detour is susceptible to *prompt injections*, which attempt to persuade systems to make statements that the system

should not actually publish (Liu et al. 2023). Draelos therefore is advocating for a focus on the development of LLMs that have a weaker bias. Examples of models that attempt to take this approach include the Claude language model from the US company Anthropic, which purports to have based its model training on the values enshrined in the US Constitution, and the Luminous model created by the Heidelberg start-up Aleph Alpha.

3. Using AI Text Generators at Universities

3.1 Effects

ChatGPT becoming freely accessible sparked different reactions in the field of education – in addition to bans in the USA and a few months later in Italy. There were opposing and swift efforts to create guidelines to give teachers orientation for the constructive use of AI in the context of teaching and examinations. In the meantime, a broad consensus emerged that a blanket ban on AI tools in educational institutions and science is not expedient; rather, that strategies should be pursued to integrate the applications into everyday teaching and research (Buck & Limburg 2023). Examination practices should also be adapted to the technological transformation process. The focus should be less on information retrieval and more on skills and personality development (Budde et al. 2023).

The onset of AI-generated information concerns not only the most traditional form of academic knowledge assurance and skill assessment, namely, the (written) text, and thus these technological developments are at the core of the fundamental academic conception. The focus in the creation and assessment of written work needs to change, since soon – or already at the time of publication of this book – quality texts can be created by generative AI systems. While term papers and theses were previously a medium in which students documented their knowledge acquisition and showed that they could work academically, the aim of these assessments may be more of a means of reflecting on a student's own learning process (Weßels 2022; Weßels et al. 2022; Klein 2023). However, the development of writing skills is a prerequisite for the competent use of text generation tools (Klein 2023). To this end, writing should be more strongly “integrated into subject teaching and used as a thinking tool,” students should be more involved in providing mutual feedback and both should be supported by writing tutors. Student conferences are also a proven means of promoting exchange between students (Klein 2023).

Mollick & Mollick (2022, 9) see “new possibilities for interaction” in this sense of a constructive use of AI systems in the writing process and illustrate these constructive uses with three concrete tasks in which generative text tools can help to develop skills in the acquisition of knowledge: a) knowledge transfer by asking the language assis-

tant for an explanation of new concepts to be learned and then checking the output for correctness; b) checking the knowledge gain and stimulating critical thinking by the teacher giving a prompt to generate an essay. The learners should then improve the result by interacting with the application. Documenting the process enables the teacher to understand the student's thought processes and decisions. The third use c) is to encourage the critical evaluation of information and the questioning of one's own assumptions.

Weßels (2022) sees generative AI as having the potential of a “personal learning companion” and predicts that examination discussions, the process of text creation in relation to the final product and, if necessary, the inclusion of tools in the writing process will become more important in assessment. This process entails a change in the role of teachers to designers of the learning space. Digital skills will become increasingly important for students (Friedrich & Tobor 2023). Regarding the concrete writing process, Meyer & Weßels (2023) have published initial results from an AI writing workshop, showing how students see the challenges of these applications and would not adopt the unknown text outputs in a term paper (ibid., 244). At the same time, generative text generators were a helpful tool for overcoming writer's block. Students at the *Hochschule der Medien* see potential both in improving performance, especially by saving time, and in personal development, as they learn how to “use technology” and see this as “preparation for their career and future” (Bihlmeier et al. 2023, slides 4–6).

While many application scenarios are being discussed in academic discourse and tested in small pilot studies, and many experts are calling for their integration into academic teaching, current practice looks different. Empirical surveys from May and June 2023 show most of the students surveyed have never used AI for examination purposes (Humboldt-Universität zu Berlin 2023, 3). The terms most frequently mentioned by the students surveyed in connection with AI in higher education include deception, cheating, uncertainty, plagiarism, and deceit (ibid., 6). Clearly, there is a need for clear rules and instructions as well as training on effective handling to maximize the potential a large portion of respondents see despite many negative associations (ibid., 4–6). Similarly, the need for guidance is also evident on the part of teachers, combined with the desire for guidelines and further training on the use of AI in education (Philologenverband NRW 2023; Surovell 2023).

Initial guidance has been developed since the summer 2022 at the Kiel University of Applied Sciences and the RheinMain University of Applied Sciences in the form of declarations of independence (Limburg et al. 2022, 103; RheinMain University of Applied Sciences 2023). They offer the option of explicitly allowing or excluding the use of text-generating AI tools, either with or without labeling. The adaptation is necessary because the term plagiarism does not apply, even if incorrectly used in connection with AI text tools. Nevertheless, instances of plagiarism are unlikely to be a significant issue in the future, given that LLM-generated texts are inherently distinctive and cannot be readily replicated. AI-generated texts do not constitute plagiarism

but are rather classified as ghostwriting. Limburg et al. (2022, 101) see the need for a “revision of the concept of plagiarism.”

In order to address the uncertainty regarding the origin of a given text, namely whether it was written by a human or a machine, programs have been developed to distinguish between the two based on linguistic features such as stylistic breaks or “AI-typical” expressions. The leading providers of plagiarism detection software are also working on incorporating a function for recognizing AI-generated texts into their programs (Hipold & Weber 2023). However, OpenAI took its own AI text identifier offline in July 2023 because the recognition rate was too low (Sokolov 2023). Weber-Wulff et al. (2023) concluded the same in their study, in which they tested several programs to determine whether texts can be correctly assigned by machines and humans. The results showed that there was a very high number of false positives and false negatives (ibid., 30). Incorrectness was not due to the lack of quality of the detectors, but rather due to the mathematical elements. Reliable identification would therefore not be possible (Wilkins 2023).

In March 2023, a legal statement commissioned by the Ministry of Culture and Science of the State of North Rhine Westphalia provided clarity on legal issues for the first time – taking a major step towards orientation. It is imperative that AI-generated texts be labeled in a manner that is transparent to third parties, delineating which portions were created through the use of AI tools and to what extent. In formulating labeling strategies, it is essential to consider the relevant legislative framework and the license and terms of use associated with the software in question. In specific instances, labeling can be governed by declarations of independence and, in the context of examination regulations, by the aforementioned legislative and licensing considerations. The adoption of AI-generated text does not inherently contravene the tenets of sound scientific practice as long as the main creative input is furnished by the human operator of the tool. Generative AI can therefore only be an aid (Hoeren 2023, 23). The University of Hohenheim, on the other hand, derived from its statutes on good scientific practice, asserts that the use of ChatGPT is dishonest (Vogelgesang 2023, 8), despite not being explicitly formulated.

Plagiarism can be defined as the appropriation of another person’s thoughts or ideas, whether intentionally or unintentionally, without proper attribution. In the context of ghostwriting, it refers to the practice of a person other than the stated author writing the text. Different rules apply to AI-generated texts. According to the German Copyright and Related Rights Act (UrhG), AI is not considered an author. Leading scientific publishers have therefore banned AIs as co-authors (Nature 2023; Science 2023). However, if AI-generated text elements are used in the context of a university assignment, these should be identified. The *Modern Language Association* (MLA) and the *American Psychological Association* (APA), which also publish two of the citation styles that are particularly widespread in the humanities (McAdoo 2023; MLA Style Center 2023), suggest how this identification can be carried out. However, the traditional concept of authorship will have to be altered, given that work with AI

text generators will increase, making it increasingly difficult to clearly mark in the texts which parts of the text originate from humans and which from the machine (Kullmann 2023).

The first handouts on the use of AI text generators were published in the first half of 2023 for and by educational institutions in German-speaking countries (Mohr 2023). The general thrust is in line with the legal opinion. A ban on generative AI tools and AI in general in education is not considered sensible; rather, the aim is to integrate them sensibly into teaching and research. The University of Applied Sciences Teachers' Association also calls for the possibility of using AI tools in teaching and refers to the freedom of teaching when structuring their use (Hochschullehrerbund 2023). However, the members are calling for access to such tools for everyone, as they see it as part of the educational mission of universities to prepare students for the world of work. However, doing so requires a basic understanding on the part of both teachers and students. The first tutorials to convey these understandings and present practical application scenarios have already been produced (e.g. KI-Campus 2023).

3.2 Examples of Application

Almost every task and every step of the academic writing process, from topic identification to feedback, can now be completed using AI tools, even with very high quality (Limburg et al. 2023, 4; Gröpler 2023, 367). However, critically reviewing the results is critical. Some examples of these uses can now be examined. The selected tools were chosen as representatives for a range of applications with the same or similar functions to reflect the diversity.

To begin, the chapter shows how an AI text tool can be used for research. For this purpose, ChatGPT (GPT-3.5) was asked to output five important German-language publications on the topic of AI and theology. The following three books and their descriptions were among the results:

- “Gott im Netz: Ein Tagungsband zu Theologie und künstlicher Intelligenz” by Andreas Mertin (Ed.) (Publication year: 2019).
- “Digitale Auferstehung: Von der Zukunft des menschlichen Geistes” by Thomas Metzinger and Svenja Flaßpöhler (2018). This book sheds light on the philosophical and theological aspects of AI and its potential impact on human consciousness and spirituality.
- “Gott 4.0: Warum die Zukunft der Religion in der KI liegt” by Thomas D. Williams (2017). In the work, Williams explores the potential role of AI in religious contexts and how it might affect the future of religion.

These three entries stem from two different queries in the same tool. The different formatting already shows that the outputs differ each time. The results also had no

overlaps. At first glance, they look reputable, as the author, title and year of publication are all present. If the existence of these publications or the correctness of the information is not checked, then problems arise. For example, there is a monograph with the title “Gott im Netz,” but with a different subtitle. The author and year of publication do not match the chatbot’s edition.

However, there is an author named Andreas Mertin, who also publishes in the field of religion. The author of the second book also exists, but a book by this name cannot be found. The third book also has no real equivalent, even though there is an author of this name and a monograph “Gott Version 4.0.” Although the results may initially prove that the tools are useless for in-depth research, they can be used to practice critical handling of sources or to become aware of previously unknown authors. The output could also provide ideas for further search terms. However, conventional information infrastructures should always be used for trustworthy sources. Nevertheless, in this domain, a considerable number of AI-supported alternatives and research instruments have emerged, facilitating scientific data discovery through semantic searches.⁴ This example illustrates the misleading characteristic of LLMs to conjure up fake results and give the appearance of high plausibility through the coherent formalities, which makes the critical handling of AI text generators imperative.

The following example shows the interaction with a PDF using PDFGear⁵ (Fig. 2), which can be downloaded for free. The integrated PDFGear Copilot extends the usual functions of a PDF viewing and editing program with a chat assistant based on GPT-3.5 and allows interaction with the text. To quickly find out which positions are represented in the articles, one prompt could be: “Is digitalization viewed critically in connection with theological issues?”

The tool provides a concise answer, the length and structure of which depends on the parameters of the input. One can also output a list of the main statements of the entire book or just a single chapter, structured by indentions. Here, the output must be critically checked and can then be used in teaching. For example, one task could be to have a student summarize a text and then have a summary created automatically and compare the two to see whether similar core theses have been worked out. For students, teachers, and researchers, a PDF evaluation tool can also help speed up the initial review of electronic literature or to open challenging passages. This function is also integrated into many *AI research assistants* like *Jenni.ai*. As with paraphrasing tools such as *Quillbot*, there is a risk of plagiarism concealment with this application if texts are reformulated by the AI and therefore not recognizable as such. However, a discussion or reflection on the texts can prevent this.

4 Cf. a structured and regularly updated selection at <https://www.vkkiwa.de/ki-ressourcen> (Accessed: 18 June 2024).

5 PDFGear is representative of other tools that have similar functions, such as ChatGPT Pro with plug-in, BingChat, or ChatPDF.

Gotlind Ulshöfer
Peter G. Kirchschräger
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Digitalisierung aus
theologischer und
ethischer Perspektive
Konzeptionen – Anfragen – Impulse

PDFgear Copilot - Chatten Sie mit PDF

Wird Digitalisierung im Zusammenhang mit theologischen Fragestellungen kritisch gesehen?

Das Buch "Digitalisierung aus theologischer und ethischer Perspektive" beinhaltet verschiedene Standpunkte zum Thema Digitalisierung und Theologie. Einige Beiträge diskutieren kritische Aspekte wie die Auswirkungen von Social Media auf die zwischenmenschliche Kommunikation, die Herausforderungen, die durch Künstliche Intelligenz und die digitale Speicherung von Erinnerungen entstehen, sowie die Wirtschaftsethik und die Gefahren von Cyberkriminalität. Andere Beiträge befassen sich mit positiven Aspekten der Digitalisierung, wie z.B. dem Potenzial für die Vernetzung von Menschen in religiösen Kontexten. Insgesamt kann man sagen, dass es in dem Buch keine eindimensionale oder einheitliche Stellungnahme zur Digitalisierung gibt, sondern dass verschiedene Perspektiven diskutiert werden.

Seitennummer: 1 4 9 3 5 6
Chatverlauf löschen Exportieren
Schreiben Sie hier, um zu chatten...
Schicken

Fig. 2 Chatting with a PDF document*

* For a translation of the chat history shown in Fig. 2 see here:

Prompt: Is digitalization viewed critically in connection with theological issues?

AI-generated answer: The book "Digitalisierung aus theologischer und ethischer Perspektive" ["Digitalization from a theological and ethical perspective"] contains various viewpoints on the topic of digitalization and theology. Some contributions discuss critical aspects such as the impact of social media on interpersonal communication, the challenges posed by artificial intelligence and the digital storage of memories, as well as business ethics and the dangers of cybercrime. Other contributions deal with positive aspects of digitalization, such as the potential for connecting people in religious contexts. Overall, it can be said that there is no one-dimensional or uniform position on digitalization in the book, but that different perspectives are discussed.

Einige Fragestellungen, die zu dem Thema Generative KI und theologische Forschung zusammenhängen könnten sind:

- Wie kann man den Begriff "Generative KI" im Kontext der theologischen Wissenschaft verstehen?
- Welche Möglichkeiten bietet das Verwenden von Generativer KI für die Erforschung des menschlichen Geistes?
- Inwiefern kann die Generative KI dazu beitragen, unser Wissen über Gott zu erweitern oder zu vertiefen?
- Gibt es ethische Bedenken bezüglich der Anwendung von Generativer KI auf dem Gebiet der Theologie?
- Wie können wir sicherstellen, dass die durch Generativer KI erzeugten Ergebnisse mit den Prinzipien und Lehren der Theologie übereinstimmen?

Es ist wichtig zu beachten, dass diese Fragestellungen lediglich als Vorschlag dienen und nicht zwangsläufig alle relevanten Aspekte abdecken. Es ist empfehlenswert, eine breite Palette an Fragen zu erstellen, um ein möglichst detailliertes Verständnis des Themas zu gewinnen.

Fig. 3 Personal screenshot of the chat response from *Open Assistant**

* For a translation of Fig. 3 see here:

Some questions that could be related to the topic of generative AI and theological research are:

- How can we understand the term "generative AI" in the context of theological science?
- What possibilities does the use of Generative AI offer for the exploration of the human mind?
- To what extent can generative AI contribute to expanding or deepening our knowledge of God?
- Are there ethical concerns regarding the application of generative AI in the field of theology?
- How can we ensure that the results generated by Generative AI are in line with the principles and teachings of theology?

It is important to note that these questions are merely suggestions and do not necessarily cover all relevant aspects. It is advisable to create a broad range of questions in order to gain as detailed an understanding of the topic as possible.

As mentioned, text generators can help a writer brainstorm when one finds it difficult to start writing or find a topic. On request, *Open Assistant* creates a selection of possible research questions on the topic of "generative AI in theological research" (Fig. 3).

In the end, one should not simply rely on the result. The results are not always solid output. If the same prompt is entered repeatedly, the answers are very different and do not always correspond to the instructions, which are short and consist of three questions. One can create a research plan based on one of the provided questions or one's own question, even one adapted from actual circumstances.

At a basic level, AI chatbots are also suitable for scrutinizing one's own drafts. One example of this editorial oversight can be seen in the comments that the Claude-2 model produced in response to the request to provide feedback on the section on "How AI text generators work" from this chapter (Fig. 4).⁶

6 Since May 2024, the Claude-3 model family has been regularly available in Europe in three variants: Haiku, Sonnet, and Opus. Additionally, since June 2024, the Claude 3.5 Sonnet model and the

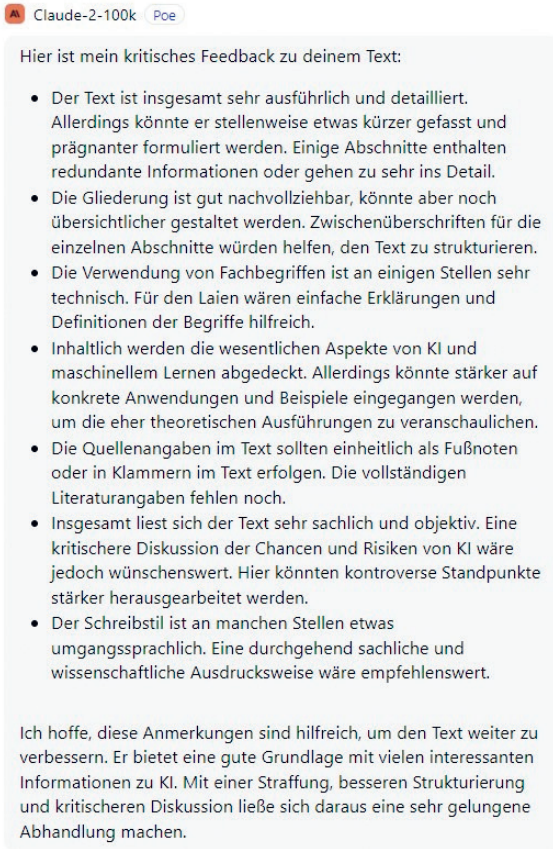


Fig. 4 Text criticism with the help of an AI-supported chat tool*

* For a translation of Fig. 4 see here:

Here is my critical feedback on your text:

- Overall, the text is very extensive and detailed. However, it could be shortened in places and formulated more concisely. Some sections contain redundant information or go into too much detail.
- The structure is easy to follow, but could be made even clearer. Subheadings for the individual sections would help to structure the text.
- The use of specialist terms is very technical in some places. Simple explanations and definitions of the terms would be helpful for the layperson.
- In terms of content, the main aspects of AI and machine learning are covered. However, more attention could be paid to concrete applications and examples to illustrate the more theoretical explanations.
- The references in the text should be uniformly given as footnotes or in brackets in the text. The complete references are still missing.
- Overall, the text reads very soberly and objectively. However, a more critical discussion of the opportunities and risks of AI would be desirable. Controversial viewpoints could be highlighted more strongly here.
- The writing style is somewhat colloquial in some places. A more factual and scientific style would be advisable.

I hope the comments are helpful in further improving the text. It provides a good basis with a lot of interesting information on AI. With streamlining, better structuring and more critical discussion, it could be turned into a very successful treatise.

The feedback relates to both content and form, although the comments related to content remain superficial. Nevertheless, AI offers suggestions for further work on the text. One must ensure that the prompt clearly informs the model of the desire for “critical feedback” or that weak points or contradictions should be indicated to obtain the most concrete results. As explained, precise prompts determine where attention should be focused when generating the output and are therefore the central key to useful output. There are now several prompt guides for use in an academic context (e.g., Lenk-Ostendorf 2023). For a final linguistic correction of texts and presentations, specialized applications such as *DeepLWrite*⁷ or one of the chat tools based on an LLM can be used.

4. Challenges for Universities, Research and Teaching

The use of generative AI tools is presents opportunities as well as risks. These tools have the potential for the (partial) automation of standard tasks at universities, in teaching and research, such as the preparation of research funding applications or literature reviews, so that more time and focus can be placed on creative work.

However, there are still many challenges. In addition to bias, which, as described above, cannot be completely ruled out by the training data, can be minimized by the most careful curation possible, as with open-source programs (e.g., *Open Assistant* or open source models available on the US developer platform). There are pressing legal issues in the areas of copyright, personal rights, and data protection. The most known and powerful applications on the market not only require the input of personal data, at least an e-mail address, but also use the prompts to train the language model. One can now, at least in the free version of ChatGPT in the free version, exclude this requirement in the settings. Initial approaches to create a protected space for students are already in place. For example, German companies that use the interfaces to the proprietary American language models provide their own user interfaces, which blurs the use of one’s personal data. At *Fobizz*, a teacher can set up a classroom in which learners can test out AI tools (Fobizz 2023). With HAWKI, from the University of Applied Sciences and Arts Hildesheim/Holzminden/Göttingen, university members can log in with their university accounts and securely access the interface to OpenAI (HAWK 2023).

Currently, LLMs remain the most reliable, yet are critical for use in sensitive areas due to a lack of transparency regarding training data, poor working conditions

Claude Artifacts feature have been available. The latter can be used to create and execute interactive diagrams or HTML websites, for example, without programming knowledge.

7 See <https://www.deepl.com/de/write> (Accessed: 18 June 2024).

for the model's human trainers, and data protection. The possibility of this type of use is due to the large investments from large corporations.

A European solution is also being sought with *OpenGPT-X* (Luber 2023), *Aleph Alpha*, and *OpenAssistant*, among others, to remain competitive and not become further dependent on the US and Chinese AI models currently dominating the market. *OpenAssistant* is a project that aims to counterbalance the big players. Founded in Switzerland, both source code and training data are available on *Github* (Köpf et al. 2023). With LEAM (*Large European AI Models*), a project was launched under the umbrella of the *Bundesverband der Unternehmen der Künstlichen Intelligenz in Deutschland* e.V. (KI Bundesverband) to promote the development and expansion of models that consider “European values and [...] standards and regulations” in cooperation with European providers of LLM and representatives from business and science (Bienert et al. 2023, 4:12).

The transformation processes triggered by technological developments in the field of AI will continue to have a considerable influence on the practices of the university system in the future, in teaching, learning and research with the central element of text production, to an extent that cannot even be guessed at yet, and may force us to question our fundamental self-image, at least in some aspects: What does authorship mean? What does good scientific practice mean in the context of the use of AI? What is science and what role do humans play in it? After the initial shocking disruption, science is answering the first sub-questions, gradually providing orientation in the chaos. Many of these questions are likely to become the subject of ongoing controversial discourse. However, the task of research and science is not only to find answers, but above all to ask the right questions. Now, the argument comes full circle, as no one can predict further developments, even in the short term, as the last few months have shown. Between the opportunities and risks roughly outlined as examples, there is a wide range of possibilities for the future of academic study: What is now possible with technology? What do we want to use, how, and for what purpose? What kind of future do we aspire to live, teach, learn, and research in? This range of possibilities now needs to be scientifically explored and positions negotiated in a wider discourse within society.

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Figure Credits

Fig. 1: Personal screenshot from <https://platform.openai.com/playground?mode=complete> (Accessed: 18. June 2024).

Fig. 2: Personal screenshot of the chat with the e-book PDFgear.

Fig. 3: Personal screenshot of the chat response from Open Assistant.

Fig. 4: Personal screenshot of the chat response from Claude, provided by poe.com.