Academic Writing with GenAI: Professional Development Needs in Higher Education

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Abstract

Academic writing has always posed a challenge to university students, regardless of the language they are writing in (first, second or foreign language) or the amount of digital support they have access to – for example, online dictionaries, thesauruses, or new generative artificial intelligence (GenAI) software such as ChatGPT. With the rise of GenAI as a legitimate digital tool in higher education, it is crucial to identify the professional development needs of teaching faculty in order to ensure quality teaching. Based on factors such as digital literacy, or access to digital tools, these needs might differ in various geographical regions. Within the context of the European Framework for the Digital Competence of Educators (DigCompEdu), this paper aims to provide a differentiated, international student perspective on the use of GenAI in the academic writing process, identifying professional development needs for faculty. We developed an online questionnaire that was filled out by 192 university students from 15 different countries. In addition to their academic and linguistic backgrounds, the respondents answered questions about their own experiences and competences with the use of GenAI within academic research. Results highlight clear discrepancies between geographic regions, for example, in their self-ranked digital proficiency or in what GenAI tools they use. This, along with further results from the analysis, provides the basis to identify some professional development needs.

Introduction

The digital transformation, in particular within the higher education context, has led to an increased use of generative artificial intelligence (GenAI) in various teaching and learning contexts. These digital advances represent a significant development in the way teaching content is conceptualized and delivered on one hand and absorbed by students on the other. One consequence of this is that academic practices are being redefined to some extent, particularly in the area of academic writing (Limburg et al., 2023; Dong, 2023). Thus, the introduction of GenAI in academic writing might offer an opportunity to improve the quality of student writing, for example, by supporting student learning through the implementation of various GenAI tools in the classroom or in the writing process (cf. Limburg et al.'s 2023 study conducted with university lecturers across Germany). On the other hand, GenAI tools might negatively impact students' critical thinking skills, active knowledge generation, or the purpose and effects of the writing process itself. In line with these concerns, the use of GenAI poses

challenges for universities, such as the need to rethink examination formats and to train teaching staff to deal effectively with the new technologies. In light of these developments, the study presented in this article aims, among other things, to reflect on some indications of the different dimensions of the use of GenAI in academic writing and to define the associated professional development needs for teachers.

Based on an international survey with 192 participants from 15 different countries, this paper examines how students use GenAI tools in their academic work. The study highlights not only the benefits and challenges associated with the use of these technologies, but also the regional differences in digital literacy and the accessibility/choice of GenAI tools. At the same time, the results of the analysis highlight the challenge that incorporating GenAI in academic work should not only take into account the technical aspects. Instead, there seems to be the need to reflect on analytical abilities that can be improved or supported through GenAI. In order to systematically integrate GenAI as supportive tools for academic writing, advanced digital literacy in teaching faculty is crucial. Based on the survey results, this paper thus outlines and discusses the development of digital competences in relation to the integration of GenAI.

The article is structured as follows. First, we touch on the concepts of academic work and writing and place them in the context of GenAI applications. The European Framework for the Digital Competence of Educators (DigCompEdu; Redecker, 2017) will then be presented and discussed within the context of GenAI and academic writing. In the next section, the study is introduced, followed by the results of the study on the use of GenAI in academic work and writing by students, providing initial indications of how teachers' digital competences should be enhanced. Finally, a series of considerations for university (writing) instructors will be presented, preparing them for the challenges and opportunities that GenAI offers as future perspectives.

Academic Writing and GenAI: Educators' Digital Literacy and Competence

Throughout this paper, academic writing refers to any writing done within the academic context. Furthermore, within the context of our study, we understand academic writing as a progression of numerous elements of literacy tasks (Irvin, 2010, p. 8) and we often refer to them using the generic term 'academic research' because said research, or literacy, skills usually provide the basis for any academic text written, for example, as part of a literature review or even the development of study instruments or data analyses.

Treating academic writing as a process involving pre-writing, during writing, and post-writing skills, poses certain requirements on teaching practices on one hand, and evaluation and expectations on the other; as noted by Fageeh (2014): "Contemporary writing theory and instructional practices advocate a process teaching approach that involves the generation of ideas, multiple drafting and revising" (p. 1). This perspective highlights the complexity of writing. However, it is important to acknowledge the dichotomy between process and product in writing theory. Generalizing the role of GenAI in contemporary writing without addressing these distinctions may oversimplify the complexities involved. Thus, when making any recommendations, it is crucial to consider these distinctions to ensure that lecturers understand the intricate nature of academic writing, particularly for those who may not specialize in writing instruction. This is also important when it comes to evaluating written assignments: usually, it is the final product that is assessed rather than the process.

Designing writing assignments and assignment sequences seem to play a crucial role in students' development of academic writing. In order to support students in their development of academic writing skills, individual assignments reflecting the specific steps of the writing process are necessary. For example, in order to expect students to submit a research paper at the end of the semester, various low-stakes and high-stakes writing assignments throughout the semester should lead up to and prepare for that final assignment (cf. Slot, 2015). Teachers, therefore, need to be trained in clearly designing, structuring and communicating writing assignments, and thoroughly to consider their sequencing. This will help students to understand what is expected of them, help guide them in their writing tasks, and, ideally, reflect course

progression (Gottschalk & Hjortshoj, 2004, pp. 29–46). With this in mind, it is crucial to consider which additional competences would enable teaching faculty to effectively teach the use of GenAI to their students.

(Teaching) Academic Writing and GenAI

Discussions around the status, abilities, challenges, and limitations of GenAI within tertiary education have dominated the academic and non-academic discourse for quite some time, but they have peaked in the last two years, particularly since ChatGPT became available in November 2022. It is well known that GenAI tools may facilitate or improve any of the steps involved in the academic writing process, for example, searching for literature, literature management, identifying or narrowing of topics, or summarizing, translating and writing texts. However, Limburg et al. (2023) also highlight potential changes in academic writing caused by GenAI and note further that overall student learning might be affected as writing also functions as a means for learning (see, for example, Hand & Prain, 2012, p. 1383, for the critical role writing can play in the learning process). Limburg et al. posit 10 theses pertaining to the development of academic writing within the context of GenAI. Amongst others, they include the idea that texts will be evaluated based on new criteria and that the process of knowledge-generating writing is changing.

Circling back to the two main concerns mentioned above, let us discuss them against the backdrop of the emergence of GenAI within academic writing. Academic writing should be taught, at least to a certain extent, by any college instructor from any discipline, as part of any class that requires any form of writing assignment, especially if that assignment is evaluated. Within the context of GenAI, it seems even more necessary to highlight the importance of teaching writing as part of a content course in one's discipline: Dong (2023) discusses GenAI-powered instruction, GenAI-powered tools with automated feedback, and GenAI-powered assessment in the EFL classroom, and demonstrates that students who were only working with GenAI "showed a significant improvement in writing scores from the pre-test to the post-test, while the [students who were taught traditionally and without any GenAI tools] showed no significant improvement [in their writing scores]" (Dong, 2023, p. 56). Thus, it seems crucial that faculty in content courses not only include academic writing in their teachings, but expand it to include the use of GenAI. This requires that faculty first expand their own digital competences to include GenAI.

The European Framework for the Digital Competence of Educators

The European Framework for the Digital Competence of Educators (DigCompEdu; Redecker, 2017) discusses the requirements for digitally proficient educators in Europe. Its goals are manifold and include serving as a guideline for policymakers and providing a common baseline when discussing digital competences across institutions both nationally and internationally. It provides six areas of digital competence, all spanning across three dimensions (educators' professional competences, educators' pedagogic competences, and learners' competences), as shown in figure 1 below. Note that this framework focuses on general digital competences; it does not include (academic) writing as a specific learner competence nor does it discuss GenAI in the context of (academic) writing.

As depicted by the framework, some areas and their specific competences inform others. For example, reflective practice is a competence in the area of professional engagement within the professional competence dimension, and it directly informs teaching competence, which is part of the teaching and learning area, nested within the educators' pedagogic competences dimension. Furthermore, collaborative learning is considered a competence in the teaching and learning area and informs the communication competence in the area facilitating learners' digital competence, which is part of the learners' competences dimension.

Within the scope of this paper, we cannot discuss the framework and all implied correlations and effects between the individual skills in detail. However, we want to point out that it provides specific activities and a progression table to help educators strengthen the individual
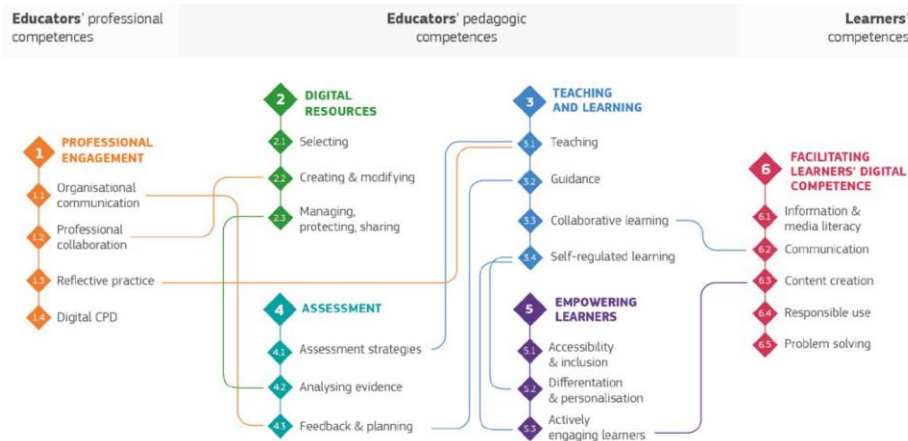
Figure 1. DigCompEdu competences and their connections (from Redecker, 2017, p. 16)

competences depicted in figure 1. For example, educators should use digital sources and resources for their own continuous professional development (cf. Redecker, 2017, p. 40). Various digital activities not only help to update and develop one's discipline-specific skills, but also improves one's ability to use certain tools and resources. Furthermore, educators can implement a number of digital technologies in their lessons, in their interactions with students, or in learning activities (cf. Redecker, 2017, pp. 52–57). However, the activities and descriptors are rather broad as they need to cover a wide range of educators. Therefore, we will discuss certain activities within the context of teaching academic writing and GenAI and against the backdrop of the study results in the discussion section below.

Professional Development for Educators

As highlighted by DigCompEdu and the adaptation of numerous faculty development programs to include GenAI to some extent, the crucial role of continuous training to enhance teaching and learning in educational institutions has been identified (cf. Kamel 2016). It also known that teachers' digital abilities impact students' skills (cf. López-Nuñez et al., 2024). However, how such development is offered, what is expected from university employees, or whether or not there are policies that enforce the use of GenAI in teaching on one hand and faculty training on the other remain issues that cannot be addressed through a global consensus. Too many institutional, policy-related factors and diverse work cultures influence the way universities may require or ask their faculty to adapt and develop methods to cater towards student learning.

In light of these complexities, some recent discussions have highlighted teachers' attitudes towards GenAI in higher education (Rahiman & Kodikal, 2023; Nassoura, 2022) and what that means for professional development overall. One of Rahiman and Kodikal's main findings notes that faculty members' awareness about and willingness to learn about new technologies and how to apply them has a significant influence on the application of GenAI in their teaching in research (2023, p. 15) and they suggest that institutional policymakers prioritize training and professional development for educators. However, studies on attitudes and readiness for professional development in university staff have also shown that those with lower sensitivity towards a topic may be less aware of their need for improvement and, therefore, less likely to pursue training opportunities (Studer et al., 2023, p. 14).

Given these considerations, it is essential that universities recognize that enhancing faculty's proficiency with (teaching with) GenAI is not their individual responsibility. Instead, it requires a collaborative effort between universities and faculty members. Institutions must provide training and resources (such as the DigCompEdu), while educators should actively engage in their professional development.

Seeking Answers

Having touched on (teaching) academic writing, GenAI, and DigCompEdu, this study sought to identify professional development needs for teaching faculty. Specifically, we will discuss

the insights gathered from 192 students, and provide some first considerations for tertiary (writing) teachers' professional competence and pedagogic competence developments.

The Study

The comprehensive study, of which we introduce and analyze only selected data in this paper, set out to learn about students' use of GenAI in academic research as well as in academic writing in both their native and non-native languages. Part of the questionnaire sought to understand how competent students feel in their use and application of GenAI, what challenges they encounter, how GenAI supports their writing process, and how they improve their digital literacy skills. Thus, these data identify specific student needs and behaviors which, in turn, provide the basis for faculty development needs in this area.

Methods

The online questionnaire was designed (Riemer, 2016; Atteslander, 2010) and conducted through Unipark, an online survey software designed specifically for universities and other research institutions. The questionnaire underwent a pre-test using think-aloud protocols (Ericsson & Simon, 1984), and findings were implemented into the final revised questionnaire. In order to maximize the range of information, quantitative and qualitative data were collected through open, semi-open, and closed questions that were presented in three thematically distinct sections. The first section consisted of eight questions pertaining to the participant's personal and educational backgrounds. These include, among others, questions about the respondents' study program, countries of origin, and language skills; however, metadata pertaining to age and sex were not collected. The two questions in the second section aimed at finding out whether participants conducted academic work in German and what challenges they associated with academic work in general. Eleven questions in the last section of the survey focus on GenAI in academia. In addition to information regarding individual use of digital tools, participants were asked, among other things, what challenges they encounter in this context, and whether and how such challenges are addressed in their study programs. The survey was completely anonymous as no identifying data was collected, and there was no time limit to answer the survey. We distributed the questionnaire through a weblink and collected data between November 15, 2023, and January 7, 2024. The data obtained were evaluated quantitatively with Unipark using EFS Reporting+, with Microsoft Excel as well as the statistical software JASP to determine statistical significance (chi-squared test), while the open questions were interpreted by application of the qualitative content analysis approach according to Kuckartz & Rädtker (2022).

Participants

The survey was completed by 192 students who were currently enrolled at a university in Germany (N=111) or abroad (N=81), while three respondents did not provide any information about the country in which they study. If you compare German-speaking countries with countries with a different L1, 135 students from DACH countries (that is, Germany, Austria, and Switzerland) took part in the survey and 57 from countries where German is not an official language. The latter group comprised 27 participants from European universities, 6 participants from North and South America, and 24 participants from Asia. Accordingly, some regions of the world are underrepresented in the survey or not represented at all, which will be taken into account in the analysis and discussion parts below. The majority of participants are enrolled in Germanic Studies programs, such as German linguistics or German as a second/foreign language; however, six participants did not share their study programs, and 11 participants are enrolled in engineering programs taught in German. With the study focus of academic writing and research in German (whether L1 or L2), their participation was welcomed.

Limitations

The study was subject to various limitations. Firstly, the participants represent a non-probabilistic sample. Therefore, it is unknown to what extent the sample size is distorted. Secondly, the survey was conducted in German. The participants self-reported their knowledge of German in accordance with the Common European Framework of Reference for Languages

(CEFR); however, the self-assessments were not verified. Thirdly, the factor of social desirability must be taken into account. While the participants read that the data were collected anonymously, it cannot be guaranteed that answers were given truthfully. Furthermore, the questionnaire does not inquire about the universities' digitalization or GenAI strategies. Hence, institutional regulations might impact a participant's answer, behavior or attitude towards this subject. Finally, as mentioned above, some world regions are not represented or are underrepresented in this survey.

Results

The scope of this paper does not allow for a thorough presentation of all data collected. Therefore, we limit this section to the results most crucial to making recommendations for tertiary (writing) teachers' professional competence and pedagogic competence developments.

With respect to challenges encountered in academic research in general (see fig. 2), some of the most common aspects pertain to the academic writing process, namely, literature research and management (N=78), formulating research questions (N=74), time management (N=66), and data analysis (N=60). This question was answered by 169 participants. Only four respondents added their own challenges, namely, *developing a research question, time management, proofreading,* and *persuasive argumentation.*

**Which of the following aspects do you consider challenging?**
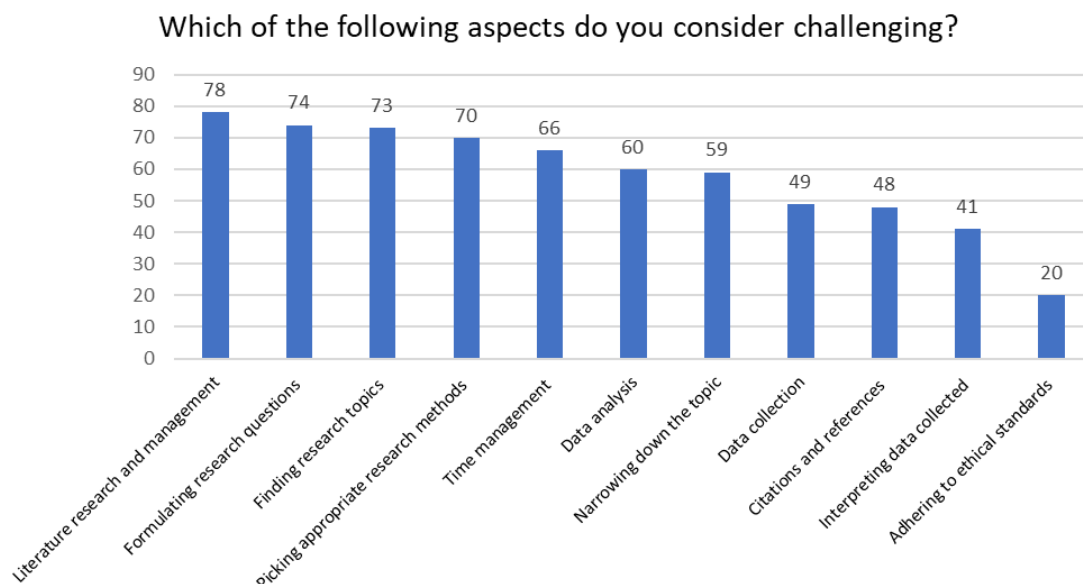
Figure 2. Aspects of research that participants consider challenging, raw numbers

Furthermore, participants were asked to indicate how digitally proficient they rate themselves. Almost 20% rate their digital competence to be 'very good' and approximately 65% indicated to possess a 'good' level of digital proficiency. About 13% indicated 'fairly low' or 'low' (2% did not answer this question). There is an observable difference in answers depending on the geographical region: 72% of the participants studying in Germany rated their digital skills to be 'good' and 17% rated themselves to be 'very good'. Among the DACH respondents, only 9% felt they possess 'fairly low' or 'low' digital skills, as opposed to over 22% of all non-DACH participants. Despite these discrepancies, there is no statistical significance between the variables *country* and *self-rated digital proficiency* ($p=0.17$).

In another question, participants were asked to indicate what support they find most helpful in using digital tools. This question was answered by 192 participants. Overall, 33% find so-called *explainer videos* the most helpful, followed by *self-learning* (31%). Only 21% indicated that support from other students or people (except faculty) was helpful, while 11% find support from faculty helpful. However, while help through *explainer videos* also outranks the other options in

non-DACH countries (35%), help from a teacher and *self-learning* were both seen as equally helpful (23% each). DACH countries behave differently here: *self-learning* is seen as the most helpful (35%), followed by help through *explainer videos* (33%) and then help from other students or other people (24%). Help from a teacher is seen as only little helpful by students from DACH countries (only 7%).

Participants were also asked to share what they use GenAI tools for. Not necessarily in line with the challenges listed above, some of the most common goals for using GenAI tools are linguistic in nature, that is, they pertain to actual language use and writing: *linguistic improvement, summarizing, saving time, translation and multilingualism, paraphrasing, overcoming writer's block,* or *drafting* (see fig. 3 below).
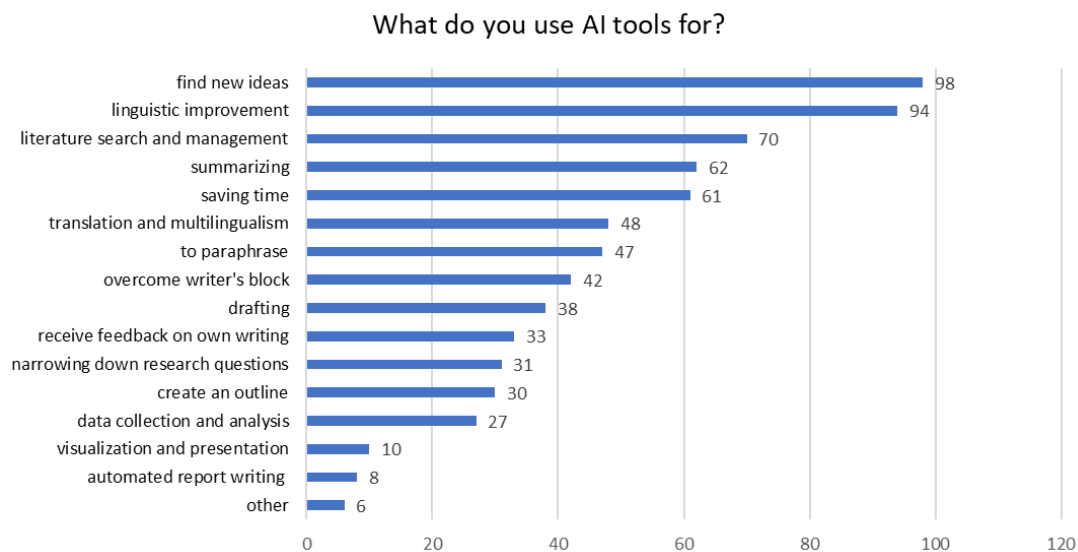
Figure 3. What participants use GenAI tools for, in raw numbers

Of all respondents (N=156), 81% stated that they have used GenAI-based tools in their academic work. This shows that most participants have at least tried incorporating GenAI support (while not sure to what extent), regardless of how digitally competent they rate themselves. They use different tools as follows: ChatGPT, Google Scholar, and DeepL Write are among the most frequently used tools in both DACH and non-DACH countries. However, there are also differences in the use of GenAI-based tools between DACH and other countries. For example, participants at universities outside DACH tend to use *ChatGPT* more and use *Google Scholar* less for literature research than DACH participants, while DACH respondents seem to use *Google Scholar* more often to support their academic writing process (for more information on the results pertaining to the tools used, see Wulff et al., 2024).

Among the open questions in the study, participants were asked to indicate the challenges in academic research or academic writing that could and could not be solved with the support of GenAI. One of the major challenges in academic work was *finding topics and ideas*. GenAI seems to provide good support in this area by generating initial ideas, or providing topics. Most respondents mentioned *literature research and literature management* to be another challenge and many answered that they were able to benefit from using GenAI in order to compile a first literature overview for a topic, and to quickly create bibliographies. However, participants also mention that GenAI can generate incorrect literature references. Respondents also use GenAI-based tools to select research methods and to formulate research questions – two aspects mentioned by many participants as a challenge in academic work.

The participants also mention specific problems pertaining to the academic writing process where GenAI does not seem to provide support: GenAI can introduce a topic, but not discuss it in more depth, GenAI cannot answer complex questions that seek to close knowledge gaps, and GenAI is not able to respond to complex writing assignments with appropriate references or with scientific depth. The most common answer in the area of challenges using GenAI is that

of incorrect information: participants are aware that GenAI makes mistakes and provides incorrect information, be it technical and linguistic errors or generated misinformation.

Discussion

The results obtained in this survey help to understand students' needs and comfort in their use of GenAI-based tools, which, in turn, allows us to identify the areas that educators should develop. The findings provide some pointers that educators will need to consider in their teaching of academic writing and GenAI overall, and, in particular, in designing and structuring writing assignments for content courses that include and acknowledge the use of GenAI. Furthermore, the results allow us to comment on the usability and potential expansion of the DigCompEdu framework.

It should be noted that students use GenAI tools in all phases involved in the writing process, to the extent captured in the survey. The most common challenges that students seem to encounter pertain to some part of the academic writing process, for example, difficulties with literature search, time management, or developing research questions. Educators thus need to help students develop the necessary skills to navigate digital tools that would help in those areas.

With respect to the participants' self-rated digital competence, it is not surprising that most of them claim to possess a generally high level of digital proficiency, which suggests that they are likely to be able to engage with various digital tools and platforms, at least, from the technical side. They know that tools exist and how to use them; however, they may need more guidance in order to use them efficiently and in a way to overcome the challenges mentioned above. Furthermore, the regional differences indicate that educators in non-DACH countries might need to provide more foundational digital skills training.

Concerning the participants' preferred methods of support, there is an observable difference between DACH and non-DACH participants. In DACH countries, there is a preference for self-learning (35%), whereas non-DACH countries have an equal preference for self-learning and help from teachers.[1] The most crucial point to take away from this part of the survey is that teachers from different world regions may want to focus on different areas in their professional development. In DACH countries, teachers could develop explainer videos and design self-learning assignments to support students in becoming more independent learners. These two approaches will help students to acquire the knowledge necessary and intended by the teacher. With respect to literature search, for example, teachers could design activities that help students use various prompts and digital tools to find articles from discipline-specific journals. In non-DACH countries, a more balanced approach that includes more direction from the teacher (cf. Murphy et al., 2021) might be more effective, depending on various factors such as access to certain tools or the internet or class size (cf. Daniel et al., 2013). This could be achieved by including activities and demonstrations in the classroom.

A significant majority (81%) of respondents have used GenAI tools in their academic work, with varying preferences for specific tools like ChatGPT, Google Scholar, and DeepL Write. Here, again, there is a notable difference in the answers given by participants from DACH and non-DACH countries: non-DACH respondents use ChatGPT more frequently and Google Scholar less frequently than students from DACH countries. Because of students' frequent use of these tools, we suggest that, following Häusler et al. (2024), university teachers also need to familiarize themselves with GenAI tools such as ChatGPT and Google Scholar so that they can

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[1] An anonymous reviewer raised the question whether *explainer videos* would fall under *self-learning.* We agree to the extent that actively looking for explainer videos, watching them and learning from them is part of *self-learning.* However, the study was conducted in German and what we refer to as *self-learning* in this article refers to the German word 'Selbststudium', which refers to a method of learning in which the learner acquires knowledge independently, without the assistance of others. The process usually involves various learning resources. Furthermore, it implies the students' initiative to explore subjects at their own pace and according to their own learning preferences, highlighting their personal responsibility in the learning process.

provide better guidance to students. Furthermore, they should educate students on the strengths and limitations of these tools, particularly the risk of incorrect information such as made-up publications from GenAI tools. Critical evaluation skills are another crucial ability pertaining to the (pre-)writing process, and university teachers will need to know how to support students in discerning and verifying the accuracy of GenAI-generated content.

The respondents also shared that they use GenAI to select research methods and to formulate research questions – two aspects mentioned as a challenge in academic research. However, they also recognize that GenAI tools fall short in deeper analyses, answering complex questions, and providing scientific depth, which is related to the frequently noted issue of false information. While students are aware of these flaws, it is crucial that teachers emphasize them and teach students how to verify GenAI-generated information such as academic publications. Interestingly, the majority of answers regarding the goals of GenAI use can be summarized as *language use,* that is, the students use GenAI to take over some of the actual writing (*linguistic improvement, summarizing, translation and multilingualism, paraphrasing, overcoming writer's block,* or *drafting*). In this context, no flaws were mentioned: participants did not express concerns that the actual texts GenAI produces as translations or drafts, for example, contain errors. Therefore, it is important that educators raise awareness of potential errors such as language use that is inappropriate or uncommon in a specific discipline, or translation errors.

In line with López-Nuñez et al. (2024), students' regular use of GenAI tools highlights the importance of teachers' professional development in this area. Not only should educators develop their professional competences (reflective practice and digital professional development), but they need to focus on the connection between their knowledge and expectations on one hand and their teaching, guidance and feedback on the other. It is clear that, in order to help improve student writing with GenAI, content teachers of all disciplines need to teach at least parts of the academic writing process, for example, skills required to perform literature searches and to verify scholarly sources, and actual writing skills that may be specific to their disciplines.

The overall results mostly support the goals the DigCompEdu framework sets out to achieve, that is, to provide a baseline for a discussion of the topic. It also supports other case studies' findings that have connected the usage and perceptions of GenAI by university students with concerns, challenges and impacts that need to be addressed by teaching faculty (e.g., Malik et al., 2023). Writing teachers, along with other educators in general, should engage in continuous professional development in order to know the digital tools and GenAI technologies that are important to their field of research as well as to writing in their discipline (especially with respect to literature search and writing styles specific to their areas). Furthermore, they should try to create their own digital resources, such as explainer videos and interactive GenAI assignments to support student learning in this field. (Writing) teachers should include GenAI tools in their teaching in order to help students to develop critical thinking skills and strategies required to verify information and literature generated by GenAI. Educators across the disciplines should continuously develop their assignment design skills, so that they can create scaffolded and structured activities that help students to become more proficient in using specific GenAI tools for academic writing in their disciplines. Finally, since there have been some patterns in GenAI use specific to certain geographical regions (e.g. DACH vs. non-DACH), it is crucial that instructors be aware of local usage and needs and adapt assignments and activities accordingly.

Conclusion and Outlook

The rapid development of GenAI technologies, particularly interactive 'chatbot' systems like ChatGPT, presents new challenges and opportunities for the academic landscape. Both educators and learners must increasingly engage with the potential of these tools and critically reflect on their use. In the context of academic writing, this necessitates a continuous adaptation of teaching and learning processes to optimally leverage the opportunities offered by GenAI while also recognizing its limitations.

The overall results of our study largely align with the objectives set forth by the DigCompEdu framework, providing a solid foundation for discussions on the topic. Writing teachers and educators should pursue continuous professional development to keep up with relevant digital/GenAI tools that are critical to their respective research fields, particularly for literature search and writing styles specific to their disciplines. Additionally, they should strive to create their own digital resources, such as explainer videos and interactive GenAI assignments, to enhance student learning. Incorporating GenAI tools in teaching can aid in developing students' critical thinking skills and strategies for verifying GenAI-generated information and literature. Educators across various disciplines should refine their assignment design skills to create structured activities that enhance students' proficiency in using GenAI tools for academic writing. Lastly, it is essential for instructors to recognize and adapt to the local patterns of GenAI use in different geographical regions, tailoring their assignments and activities to meet these specific needs.

It is desirable for universities and colleges to proactively establish legal and institutional frameworks for the use of GenAI tools, ensuring equitable access for all students. Such regulations should be integrated into curricula early on to adequately prepare both students and educators for the meaningful application of these technologies. Furthermore, it is important to continuously train the necessary competences for handling GenAI tools and to integrate these directly into the teaching practice. The DigCompEdu framework provides a solid basis for understanding and utilizing the interactions between various areas of competence.

We also consider it crucial for educators to stay informed about the current functions and capabilities of the tools used by students. This knowledge is essential for providing informed guidance and support. The focus should be increasingly placed on the numerous skills involved throughout the writing process rather than the final product, to better track and promote student learning.

Finally, the following valuable and goal-oriented considerations should be acknowledged when contemplating GenAI and academic writing, even in established teaching and learning processes and curricula (partially based on Häusler et al., 2024):
1. **Legal and institutional frameworks** need to be considered in the decision-making process as to whether and how GenAI tools should be allowed to be used.
2. **Continuous professional development and practical application** in the field of GenAI tools are a given. Teachers should be continuously trained and need to integrate GenAI into their teaching. The DigCompEdu framework can serve as a guideline for developing and promoting the required skills.
3. It is crucial to raise **students' awareness** of the opportunities and limitations of GenAI tools. They should learn to critically question and evaluate the results of these tools.
4. Educators should regularly update their knowledge about the **latest developments and functions** of GenAI tools used by students to provide informed guidance and appropriate support.
5. The use of GenAI tools should increasingly **focus on the writing process** to better track and promote students' learning progress.
6. **Criteria for assessing and evaluating** individual steps in the writing process should be developed together with students. This can help operationalize and assess the learning progress more effectively.
7. Various GenAI tools should be used for certain steps in the writing process, and the results of working with the different tools should be compared. Through this **comparative approach**, students learn to recognize which steps are more or less conducive to learning and why.

Overall, it is evident that the use of GenAI tools in academic writing offers a wide range of possibilities, but also requires careful reflection and adaptation, particularly in the teaching process. Future research should increasingly address these desiderata and methodological modifications to provide a solid foundation for the integration of GenAI in higher education. This will require further data collection and learning analyses to comprehensively understand and optimize the impact of GenAI-supported writing processes.

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