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Analysis of the Use of and Attitudes Towards Generative Artificial Inteligence Among Graphic Art Students

ABSTRACT

The rapid development of generative artificial intelligence (genAI) is reshaping higher education by transforming learning processes, teaching practices, and creative disciplines such as graphic design. Despite the growing adoption of genAI tools, empirical evidence on their use and perceived impact among graphic arts students remains limited. This study examines the frequency and purposes of genAI use, students' perceptions of its benefits and risks, and the relationships between AI literacy, usage patterns, and responsible use in higher education. Data were collected through an anonymous online questionnaire completed by 202 undergraduate and postgraduate graphic arts students at the Faculty of Natural Sciences and Engineering, University of Ljubljana. Descriptive statistics and Spearman's rank correlation analysis were used to examine the data. The findings indicate that most students are familiar with genAI and use it regularly, primarily to explain course content, generate ideas, write academic texts, summarise materials, and search for information. A statistically significant positive correlation was found between self-assessed knowledge of genAI and the frequency of its use, suggesting that greater familiarity with the technology encourages its integration into academic work. However, no statistically significant relationships were identified between self-assessed AI literacy and either the perceived benefits and risks of genAI or students' self-control in using these tools. Participants recognised substantial advantages, including increased efficiency, time savings, and improved access to information, while simultaneously expressing concerns about unreliable outputs, plagiarism, reduced critical thinking, ethical issues, privacy, and dependence on technology. The results show that effective integration of genAI into graphic art education requires not only technical proficiency but also the systematic development of AI literacy, critical evaluation skills, ethical awareness, and clear institutional guidelines for responsible and sustainable use.

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KEY WORDS
Generative artificial intelligence (genAI), graphic arts students, AI literacy, self-control, technology dependence, ethics

1. Introduction

The field of artificial intelligence (hereafter AI) is developing rapidly. Research by the Statistical Office of the Republic of Slovenia (Mlakar, 2025) indicates that more than half of the population aged 16 to 74 have already heard of AI technologies, with secondary school pupils and university students standing out at 94%. Generative artificial intelligence tools (hereafter genAI), such as ChatGPT, Copilot, Gemini and DALL-E, are used by 21% of Slovenia's population, while this share is again considerably higher among secondary school pupils and university students (70%). AI has moved from research laboratories into all areas of everyday life, and the educational environment is by no means

exempt from this development. AI is transforming the ways in which learning and teaching take place (Cvajdik, 2025), and is used by both students and teachers for a variety of purposes and in a range of ways.

AI serves as a learning aid (Jarc, 2026; Pitts, Marcus & Motamedi, 2025), providing students with immediate support through easier access to information (Cvajdik, 2025; Pitts, Marcus & Motamedi, 2025; Stephenson & Armstrong, 2026), data organisation (Molek, 2023), analysis, and quicker, better understanding of complex subject matter (Adil, 2025; Cvajdik, 2025; Molek, 2023; Stephenson & Armstrong, 2026; Zhang, Jantakoon & Laoha, 2025). In this way, it saves students time (Stephenson & Armstrong, 2026), and allows them to adapt their learning to their own needs. AI also enables the creation of coherent texts and supports research activities (Molek, 2023). Students use AI tools for essay writing, sourcing materials, explaining course content, solving tasks, and creating summaries (Cvajdik, 2025). Several studies confirm that AI contributes to self-evaluation (Tan, Cheng & Ho Ling, 2025) and improves learning outcomes (Adil, 2025) although this effect is weakest among primary school pupils and stronger among secondary school pupils and university students; among different types of AI, chatbots have shown the strongest effect on learning outcomes (Dong, Tang & Wang, 2025). Research further reports that the use of AI is associated with higher levels of student engagement and motivation (Adil, 2025; Sun et al., 2026; Tan, Cheng & Ho Ling, 2025), while AI tools are used more frequently by students with slightly lower levels of creativity (Sun et al., 2026; Tan, Cheng & Ho Ling, 2025).

Despite its many advantages, the use of AI also entails risks and challenges. Jarc (2026) emphasises that AI should not replace independent thinking, while Jaca (2024) points out that AI cannot replace empathy or the personal relationship between teacher and student. AI users must be aware of errors in texts and of incorrect information that AI can spread as misinformation (Mlakar, 2025). AI may generate texts that are cognitively, demographically, ideologically and linguistically biased, or reproduce stereotypes relating to gender, race or social status. It is therefore important for users to evaluate AI-generated information critically (Adil, 2025; Licardo, Puncer & Todorović, 2025; Mlakar, 2025; Molek, 2023).

Accordingly, developing digital literacy and the ability to verify sources is of vital importance. Several authors have raised concerns about the risks of plagiarism (Cvajdik, 2025; Licardo, Puncer & Todorović, 2025; Molek, 2023). AI tools can generate original text that is sometimes difficult to identify as inauthentic; therefore, it is essential to establish clear guidelines for AI use and employ plagiarism detection tools. Licardo, Puncer and Todorović (2025) also highlight the possibility of the anthropomorphisation of AI, where a user attributes human characteristics to the technology, potentially leading to over-reliance or dependency.

Furthermore, several authors urge caution against excessive reliance on technology (Cvajdik, 2025; Mlakar, 2025), since dependency may undermine the development of critical thinking, reduce creativity and originality, and weaken independent problem-solving skills (Jaca, 2024; Licardo, Puncer & Todorović, 2025; Molek, 2023; Pitts, Marcus & Motamedi, 2025; Sun et al., 2026).
The use of AI must be responsible (Jarc, 2026; Mlakar, 2025; Molek, 2023) and should support the development of higher-order cognitive skills (Molek, 2023). Moreover, challenges persist regarding technological limitations and unequal access to these technologies.

The use of large-scale data centres can also have significant environmental consequences (Molek, 2023) due to their high energy consumption, as well as social implications arising from an increased digital divide between different social groups (Licardo, Puncer & Todorović, 2025). Furthermore, the application of AI raises questions regarding intellectual property, as it is not always clear who holds the authorship of AI-generated content, or whether copyright-protected data may be used for model training (Licardo, Puncer & Todorović, 2025). Challenges associated with AI also include a lack of transparency and the opacity of algorithms (Adil, 2025; Jarc, 2026; Mlakar, 2025), alongside infrastructure-related issues (Adil, 2025). The implementation of AI must be oriented towards inclusion and equity to ensure equal access to knowledge and emerging technologies (UNESCO, 2025).

When using AI, it is essential to respect academic integrity (Jarc, 2026; Licardo, Puncer & Todorović, 2025; Pitts, Marcus & Motamedi, 2025), as well as privacy and personal data protection (Adil, 2025; Jarc, 2026; Molek, 2023). AI systems frequently collect large amounts of user information, which may pose significant risks of data misuse. European legislation, particularly the GDPR and the Artificial Intelligence Act, sets out rules for protecting personal data and restricts certain high-risk practices, such as social scoring or the mass collection of biometric data (Licardo, Puncer & Todorović, 2025).

The use of AI creates an urgent need for clear ethical guidelines to ensure its fair, secure, and inclusive application in education (Cvajdik, 2025; Jarc, 2026), and to promote the use of technologies in a manner that respects human rights, safety, and dignity (Licardo, Puncer & Todorović, 2025). Within the framework of the Beijing Consensus on Artificial Intelligence and Education, UNESCO has developed guidelines for educational policymakers, as well as competency frameworks for students and teachers. These documents aim to help countries understand the opportunities and risks associated with AI, while supporting the development of the skills necessary for life and work in the AI era (UNESCO,

2025). Consequently, universities are formulating guidelines that specify how and when students may use AI in their studies (Cvajdik, 2025), alongside appropriate legislation and education and training programmes for both teachers and students to ensure the responsible use of AI (Molek, 2023; Pitts, Marcus & Motamedi, 2025). Only through such measures can AI contribute to the enhancement of the learning process while simultaneously mitigating risks to society, individuals, and the environment (Licardo, Puncer & Todorović, 2025).

In a study by Xiaoyu, Zainuddin and Leng (2025), the authors investigated how specific genAI tools, such as ChatGPT, Midjourney, Stable Diffusion and Telegram Bot, influence pedagogical practices. GenAI enables the generation of text, images and audio content, which simplifies the personalisation of teaching, fosters interactive learning and enhances content creation. Likewise, in this study, the authors highlighted that genAI enhances teaching efficiency by enabling the faster production of learning materials, providing instantaneous feedback, and reducing teacher workload. Furthermore, genAI increases student engagement and motivation, facilitates self-paced learning, and reduces stress. It also encourages idea generation and the development of generic skills, such as critical thinking, problem-solving, collaboration and communication.

In her research, Molek (2023) notes that AI cannot replace human cognition, creativity, and critical judgement and must therefore remain a supplement to the pedagogical process. Students must develop critical thinking and their own sense of judgement, while lecturers should establish clear rules for AI use, encourage creative and non-written forms of knowledge presentation, and ensure that the use of technology supports long-term learning objectives. Xiaoyu, Zainuddin and Leng (2025) state that challenges are emerging regarding the accuracy of AI, academic integrity, and its limited effectiveness. To mitigate these risks, the authors advocate a hybrid approach that combines genAI with teacher supervision. While AI in education is a beneficial tool with numerous advantages, its use demands a thoughtful and responsible approach and, above all, appropriate regulation (Jaca, 2024).

AI enables the automation of administrative tasks, such as marking and organising learning activities, allowing teachers to devote more time to lesson preparation and student engagement. It also facilitates data-driven decision-making through the analysis of large amounts of student performance data and supports the improvement of teaching strategies.

Research conducted by the Slovenian Student Organisation (2025), reported by Jarc (2026), concludes that AI is becoming an indispensable part of study at Slovenian universities. It enables students to access information more easily, solve tasks more efficiently, summarise and rephrase texts, and organise their work. Survey results from ŠOS (2025) indicate that 90% of students use AI, with 39% using it daily. The most popular tools are ChatGPT, Google AI, Grammarly, and Copilot, which assist students with information retrieval, learning, assignment writing, idea development, and study organisation. The application of AI varies according to the field of study; however, it generally supports students by summarising and rephrasing text, explaining course material, and generating graphs or analyses. Although AI facilitates the study process, some students have admitted to breaches of academic integrity, highlighting the need for clear ethical guidelines and rules for responsible use. Furthermore, AI can contribute to the development of digital literacy, critical thinking, and creativity. ŠOS (2025) adopted the Resolution on the use of AI in daily studies (ŠOS, 2025) which emphasises that AI should support learning rather than replace human cognition and interaction.

1.1. Applications of genAI in graphic design studies

Fundamental aspects of the graphic design curriculum include UI and UX design, photography, 3D design and animation, corporate identity creation, marketing graphics (such as posters, catalogues and flyers), and prepress-related tasks. Throughout all stages of the creative process, a range of tools and software applications incorporating genAI technology are utilised.

In a study by Fleischmann (2024) involving a small group of 17 students, several advantages of using genAI were identified: improved efficiency in design tasks (76%), enhanced creativity and inspiration (80%), data-driven insights (53%), and the potential for the adaptation and personalisation of designs (35%). Conversely, drawbacks included ethical challenges such as content theft and plagiarism (94%), along with concerns about the loss of human touch and the limited ability of genAI to comprehend emotion and aesthetics (82%). Notably, none of the students regarded genAI as a threat to employability, despite 82% acknowledging that AI will replace certain traditional tasks. Furthermore, 82% of students expressed a desire to deepen their knowledge of genAI, highlighting a strong need for the systematic, project-oriented integration of prompt engineering and ethical reflection into the curriculum.

In his study, Alsswey (2025) examined utilitarian and hedonic benefits, user experience, and learnability. Accordingly, a questionnaire based on several existing studies (Laugwitz, Held & Schrepp, 2008; Silva, 2015; Venkatesh, Thong & Xu, 2012) was developed, refined, and adapted to the specific characteristics of the graphic design field. The research involved 112 graphic design students, divided into an experimental and a control group. The former utilised tools such as Midjourney,

Leonardo, and Adobe Express, while the latter used traditional graphic software, including Adobe Illustrator, Adobe InDesign, and Adobe Photoshop. Students in the experimental group reported that these tools facilitated their workflow, reduced cognitive load, and increased their confidence during creative tasks. They particularly highlighted the ability to quickly generate multiple design iterations, which gave them the freedom to explore potential solutions without the fear of irreversible errors. Participants also identified real-time feedback and intelligent suggestions as key advantages that enhanced learnability and supported a more relaxed user experience. The author concludes that the integration of genAI into graphic design curricula can significantly benefit both the functional and experiential aspects of the learning process.

1.2. Research purpose and hypotheses

The aims of this research are to compare the attitudes of graphic arts students towards genAI and to analyse perceived benefits and risks, ethical concerns, and their understanding of the impact of genAI on the future development of graphic design. We examined how graphic arts students utilise genAI tools within the study process, which advantages and risks they perceive, and which individual factors – particularly AI literacy, self-control, perceived creativity, and study workload – are associated with a more profound, critical, and responsible application of genAI. We formulated the following hypotheses:

H1: Students with a higher level of self-rated knowledge of genAI integrate this technology into their study process more frequently.

H2: A higher level of AI literacy among students leads to a stronger perception of the benefits and risks associated with the use of genAI.

H3: Students with a higher level of AI literacy demonstrate better self-control and a more considered use of artificial intelligence tools.

2. Methodology

The research was conducted in three phases:

4. Literature review and analysis: Domestic and international literature on the use of various genAI tools in graphic arts, education, and creative processes was analysed. Professional articles, scientific studies, and case studies of different genAI tools were reviewed, with particular attention to their impact on the learning process, creativity, and the evolution of graphic arts.
5. Survey design and data collection: Based on the literature review and similar studies, a student survey questionnaire was developed. The survey was conducted anonymously.
6. Data analysis and comparison: The survey results were processed, analysed, and compared with findings from comparable research.

2.1. Research tools

The online survey tool Arnes 1KA, developed by the Centre for Social Informatics at the Faculty of Social Sciences, University of Ljubljana, was used to design and administer the questionnaire. Data obtained from the survey were exported and organised in Microsoft Excel (Microsoft Corp., USA). Statistical analysis of the data was conducted using IBM SPSS Statistics (IBM Corp., USA).

2.2. Survey questionnaire

Source frameworks and structure of the survey questionnaire. The questionnaire was based on the studies cited in the introductory chapter, with its primary objective being to gain insight into students' familiarity with and general attitudes towards generative artificial intelligence tools in the context of their study obligations. The survey algorithm is presented in the appendix.

The survey covered demographic characteristics, the frequency of genAI use, respondents' subjective assessments of their own literacy in this field, and reflections on the impact of these technologies on creativity, academic integrity, and associated risks. The questionnaire consisted of 20 questions and employed a combination of methodological approaches. Most questions were closed-ended. In three questions, respondents were asked to indicate their level of agreement with statements on a five-point Likert scale, allowing precise quantitative analysis of student attitudes. To gain a deeper understanding of specific areas, open-ended questions were included, giving respondents the opportunity to justify their answers in their own words. To ensure the survey was as efficient as possible and tailored to each individual, logical branching was implemented using conditional logic (if statements). This mechanism ensured that students, based on key responses – for instance, whether they use genAI at all – were directed only to the relevant sections of the questionnaire. This approach prevented the completion of unnecessary questions, reduced the time required for participation, and enhanced the reliability of the collected data.

Participants. The survey questionnaire was completed by 202 students, of whom 34.1% were enrolled in the Graphic and Media Technology higher education professional programme (VS GMT), 51.4% in the Graphic and Interactive Communication university programme (UNI GIK), and 14.5% in the Graphic and Interactive

Communication master's programme (MAG GIK). The study included students from the first, second, and third years of their respective programmes, as well as those in their final thesis year. In terms of gender distribution, 77.1% of respondents were female, 18.9% were male, and 4% preferred not to answer.

Statistical analysis. Survey results were organised in Microsoft Excel, and Spearman's rank correlation coefficients were calculated in IBM SPSS Statistics.

Ethical approval. The survey questionnaire was approved by the Research Ethics Committee of the Faculty of Natural Sciences and Engineering, University of Ljubljana (UL NTF), at its session on 15 June 2026.

3. Results

3.1. Familiarity with and Use of genAI Among Graphic Arts Students

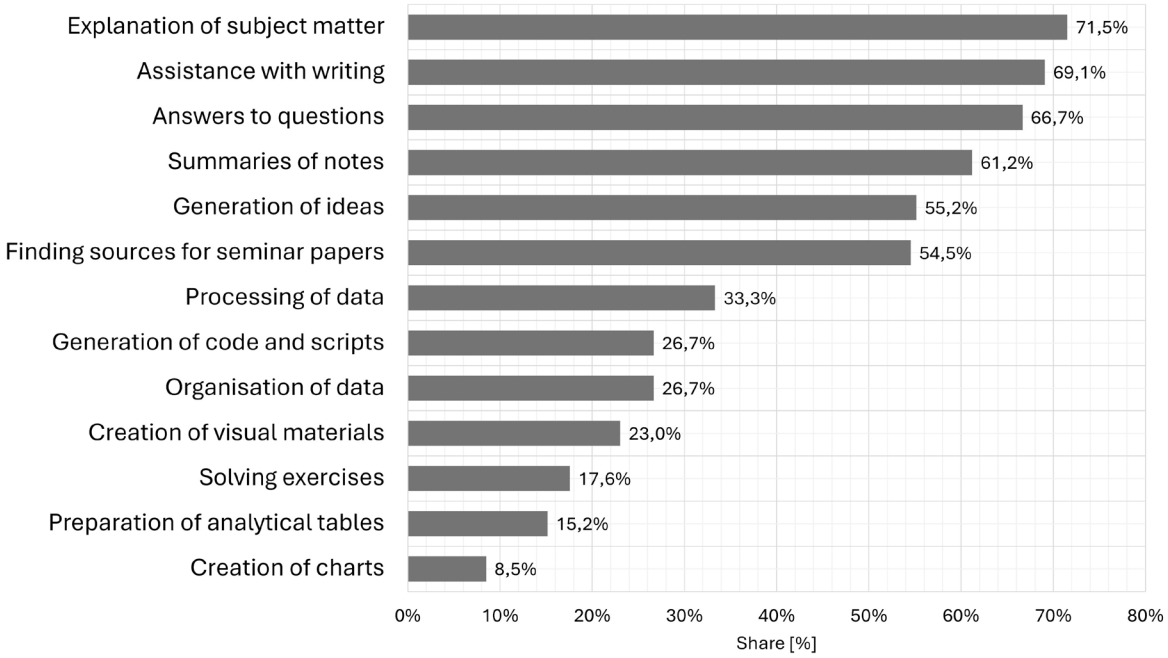
The research findings indicate that only 6.4% of students rate their familiarity with genAI as very good, while the majority (74.2%) assess their knowledge as either good or fair. Furthermore, 12.9% of students rate their familiarity as very poor, while 6.4% report that they are not familiar with genAI at all. The mean score for self-rated familiarity with genAI was $\bar{x} = 2.77$ (SD = 0.98, n = 189). These results align with findings that genAI is widely recognised among pupils and students. Within the Slovenian population aged 16–74, more than half have heard of AI, while among pupils and students this proportion reaches 94% (Mlakar, 2025).

This high level of awareness is also consistent with the results of the ŠOS (2025) study, in which 90% of students stated that they use AI in their studies (Jarc, 2026).

Generative AI is used daily by 10.6% of students and several times a week by 21.2%, while over a third (38.1%) use genAI occasionally. Nearly one-third (39.2%) use genAI rarely or never. The mean score for the frequency of genAI use was $\bar{x} = 3.01$ (SD = 1.15, n = 189). These results partially align with the study by Jarc (2026), which reports less intensive daily use, whereas some reviews highlight growth in regular genAI use among students (Stephenson & Armstrong, 2026).

The results of the Spearman's rank correlation analysis revealed a statistically significant, moderate positive correlation between self-rated familiarity with genAI and the frequency of its use in student work ($\rho s = 0.409$, $p < 0.001$). This indicates that students who are more familiar with genAI tend to integrate the technology into their work more often. Better technical knowledge may reduce uncertainty about its application and enhance the ability to identify opportunities for its integration into the study process. Conversely, more frequent use may also lead to greater familiarity, as students develop additional skills and understanding through practical experience. Since the correlation is moderate, it can be inferred that familiarity with genAI is not the sole factor determining its use. The frequency of use is likely influenced by other factors, such as tool accessibility, the nature of the tasks, digital competencies, perceived usefulness, and potential ethical or security concerns.

As illustrated in Figure 1, students most frequently use genAI for explaining course material, assisting with text



» **Figure 1:** *Purpose of using generative artificial intelligence tools (n = 165)*

writing, answering questions, creating summaries of study notes, generating ideas, and searching for sources for assignments. In contrast, it is used somewhat less often for data processing and for generating code or scripts. The use of genAI among the students in this study aligns with the findings of Cvajdik (2025) and Molek (2023), who observe that students primarily use genAI as a learning support tool for comprehension, summarisation, writing, and research, rather than as a complete substitute for their academic work. These results are also consistent with the observations of Jarc (2026) and Stephenson and Armstrong (2026), who note that students mainly employ AI to support their studies and the preparation of academic assignments.

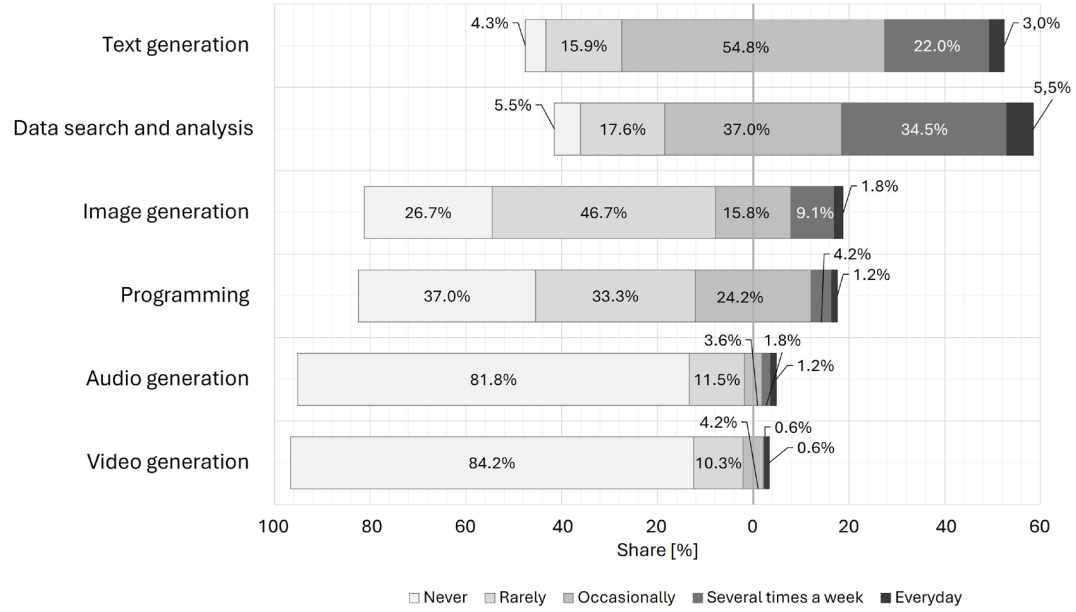
Students use genAI on a daily or several-times-weekly basis primarily for data search and analysis, and for the generation of text and images, whereas it is used considerably less for programming and for the generation of audio and video content (Figure 2). This finding is consistent with studies by Cvajdik (2025) and Molek (2023), which indicate that, in educational contexts, genAI is most commonly used for text generation, explanation, information retrieval and information organisation. The less frequent use of image-generation tools diverges from research in the field of design, which emphasises the importance of such tools in the development of visual ideas (Alsswey, 2025; Xiaoyu, Zainuddin & Leng, 2025).

The most frequently used genAI tools are ChatGPT (94.5%), Gemini (50.3%), Canva AI and Adobe Firefly (both 15.2%), Copilot (13.9%), and NotebookLM (11.5%). Other tools used by fewer than 10% of students include Grok, Claude, Perplexity, Midjourney, DALL-E, DeepSeek, and Stable Diffusion. These results are consistent with the findings of other studies (Jarc, 2026; Mlakar, 2025), although a slight divergence is evident when compared with the studies by Alsswey (2025) and Xiaoyu, Zainuddin and Leng (2025) in the field of graphic design, which report a higher proportion of use of tools such as DALL-E, Midjourney, and Stable Diffusion, all of which are important for the creation and exploration of visual imagery.

3.2. AI literacy and self-regulation in AI use

In this study, we were interested in how students self-assess their AI literacy (e.g. the appropriate selection and use of AI tools according to purpose, the critical evaluation of solutions generated by genAI, and the responsible use of genAI, including issues such as privacy and bias). However, as AI literacy was assessed through self-report, the measure primarily reflects students' confidence in, and perceptions of, their own competences rather than their actual technical knowledge.

The results showed that only 10.3% of students rated their self-assessed AI literacy as very good, while more than half (53.9%) rated it as good. A further 32.1% considered their AI literacy to be moderate, whereas 3.6% rated it as poor. The mean self-assessed AI literacy score was $\bar{x} = 2.29$ (SD = 0.70, n = 165). This finding is consistent with studies indicating that frequent use of genAI does not necessarily imply a high level of critical and ethical AI literacy, as responsible use requires an understanding of its limitations, the ability to verify outputs, and awareness of potential risks (Adil, 2025; Licardo, Puncer & Todorović, 2025).
The results indicate a relatively positive self-perception of AI literacy; however, they also suggest a continuing need for systematic training (Mlakar, 2025).



» **Figure 2:** *Frequency of use of generative artificial intelligence tools by purpose (n = 163)*

A total of 16.8% of students rated their self-regulation in the use of genAI as very good, while 45.3% and 33.5% rated it as good and average, respectively. A further 4.3% of students considered their self-regulation in the use of genAI to be poor; the mean score was $\bar{x}$ = 2.25 (SD = 0.78, n = 161). Self-regulation is an important factor in preventing excessive reliance on genAI and in maintaining active, independent learning (Sun et al., 2026). Strong self-regulation reduces the risk of students using the tool uncritically or as a substitute for their own effort (Licardo, Puncer & Todorović, 2025). The results of our analysis indicate a relatively high level of responsible use of the technology.

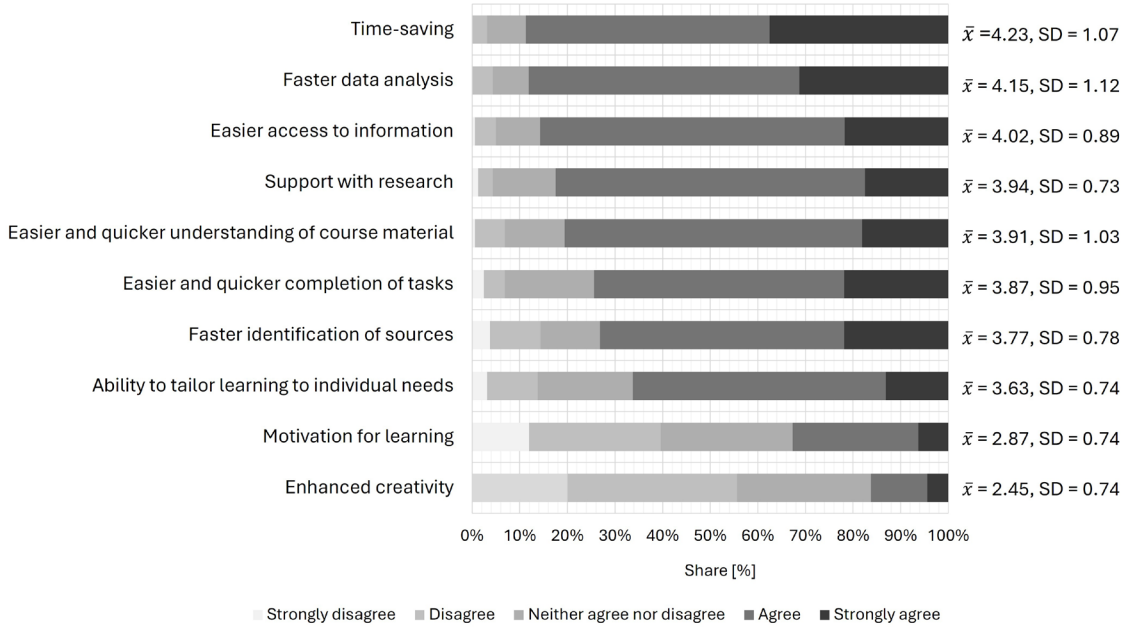
The results of Spearman's rank correlation analysis in our sample did not show a statistically significant association between self-assessed AI literacy and self-regulation in the use of AI (ρ_s = 0.092, p = 0.245). This finding suggests that knowledge of, or literacy in, AI does not necessarily imply more controlled, reflective, or self-regulated use of AI tools. An individual may have a good understanding of the functioning, possibilities, and limitations of artificial intelligence, yet this does not in itself guarantee a higher level of self-control in its use. Self-regulation may be more closely related to other factors, such as personality traits, work habits, digital discipline, the level of dependence on technology, organisational rules, ethical awareness, or perceived risks associated with AI use. Although AI literacy and self-regulation may be conceptually related in the context of AI use, in practice they do not necessarily occur together and should therefore be treated as partially distinct dimensions of digital behaviour. In practical terms, this means that measures aimed at developing AI literacy may not, in themselves, be sufficient to promote responsible and self-regulated use of AI. In addition to education about how AI functions, it would be advisable to include content on critical evaluation, ethical use, setting boundaries for AI use, verifying outputs, preventing excessive reliance on AI tools, and fostering digital self-regulation.

In this study, we examined whether creativity, the ability to solve problems creatively, workload-related pressure, and commitment to completing academic tasks influence the frequency with which students use genAI in their work (Sun et al., 2026; Tan, Cheng & Ho Ling, 2025). Spearman's correlation coefficients did not reveal any statistically significant associations among these variables in our sample.

3.3. Perceived advantages of using genAI and their relationship with self-assessed AI literacy

Students identified the main advantages of using genAI (Figure 3) as saving time, faster data analysis, easier access to information, support for research, easier and quicker understanding of course material, more efficient task completion, faster identification of sources, and the ability to tailor learning to individual needs. These findings are consistent with several studies (Adil, 2025; Cvajdik, 2025; Stephenson & Armstrong, 2026), which indicate that genAI primarily facilitates students' access to information, research activities, explanation of subject matter, and more efficient task completion. By contrast, our students did not regard motivation for learning or enhanced creativity as principal advantages, which partly diverges from the findings of some studies (Sun et al., 2026; Tan, Cheng & Ho Ling, 2025) that highlight the potential of AI to foster creativity.

The influence of students' self-assessed AI literacy level (categorised as very good, good, moderate, or



» **Figure 3:** *Advantages of using genAI (n = 160)*

poor) on their perceptions of the benefits of using genAI tools in the study process was examined. Associations were assessed using Spearman's rank correlation coefficient (ρs), with statistical significance determined based on the p-value (p) (Table 1).

Based on the results presented in Table 1, no statistically significant correlations were found between the level of self-assessed AI literacy and any of the listed benefits (all $p > 0.05$). It can therefore be concluded that students' perceptions of the benefits of genAI are independent of their perceived competence in using these technologies. In most cases, Spearman's coefficients were weak and negative, indicating that a higher level of self-assessed AI literacy was not associated with higher ratings of these benefits.

Regardless of their level of self-assessed AI literacy, students gave the highest ratings to benefits related to efficiency and speed. In particular, time savings received notably high scores ($\bar{x}$ = 4.17–4.28), indicating widespread recognition of genAI as a tool for improving efficiency. The correlation with self-assessed AI literacy was not statistically significant ($\rho s = -0.042$, $p = 0.599$). Ratings for faster data analysis ranged from $\bar{x}$ = 4.08–4.33, confirming that students perceive the greatest value of genAI in information processing. Students also assigned high ratings to easier access to information ($\bar{x}$ = 3.67–4.09), reflecting the role of genAI as an advanced information retrieval tool.

Cognitive and research-related benefits include support in conducting research, as well as easier and faster comprehension of study material. Although the correlation between research support and self-assessed AI literacy was not statistically significant, the p-value (0.056) was closest to the significance threshold ($\rho s = -0.152$). This finding suggests a slight trend whereby students with lower self-assessed AI literacy may have emphasised this benefit somewhat more than those with the highest levels of literacy ($\bar{x}$ = 4.05 for "good" literacy compared with $\bar{x}$ = 3.81 for "very good" literacy). Ratings for easier and faster comprehension of study material were more stable ($\bar{x} \approx 3.80$), indicating that genAI is perceived as an important cognitive aid regardless of prior knowledge of the technology. An interesting pattern emerges regarding the adaptation of learning to individual needs, with higher ratings reported by students with lower self-assessed AI literacy. This may suggest that students who feel less proficient in using genAI perceive it as a valuable source of support for tailoring their study process to their individual needs. By contrast, more proficient users may approach these benefits more selectively and critically, as they may be more aware of the technology's limitations, particularly in academically demanding tasks. The lowest-rated benefits were motivation for learning and increased creativity. Mean values for these two items remained low across all groups, suggesting that students generally do not perceive genAI as significantly enhancing intrinsic motivation for learning or contributing substantially to the development of originality, but rather as a functional tool for improving productivity.

3.4. Risks associated with the use of generative artificial intelligence and their association with AI literacy

As shown in Figure 4, students rated all challenges and risks relatively highly. They recognised that excessive use of genAI tools may weaken an individual's critical thinking skills. They were particularly aware of issues related to "hallucinations", namely the citation of sources that do not actually exist, and they also perceived risks associated with over-reliance on technology and inaccurate

Table 1

Mean ratings of perceived genAI benefits ($\bar{x}$) according to students' level of self-assessed AI literacy, and the analysis of Spearman's rank correlation coefficients (ρs) (n = 160)

Advantages of using genAI	AI literacy categories ($\bar{x}$)				Spearman's rank correlation coefficient	
	Very good	Good	Moderate	Poor	ρ_s	p
Easier access to information.	3.94	4.09	3.96	3.67	-0.096	0.229
Support with research.	3.81	4.05	3.83	3.83	-0.152	0.056
Faster data analysis.	4.31	4.15	4.08	4.33	-0.057	0.471
Easier and quicker understanding of course material.	3.75	3.99	3.85	3.83	-0.072	0.364
Ability to tailor learning to individual needs.	3.81	3.67	3.42	4.17	-0.115	0.147
Faster identification of sources.	3.38	3.79	3.83	4.00	0.055	0.487
Time-saving.	4.19	4.28	4.17	4.17	-0.042	0.599
Easier and quicker completion of tasks.	3.50	4.05	3.67	4.00	-0.094	0.235
Motivation for learning.	3.06	2.96	2.67	2.83	-0.122	0.124
Enhanced creativity.	2.81	2.49	2.19	3.17	-0.087	0.276

responses (x^{-} = 4.05), reflecting limited trust in the technical reliability of AI systems. Considerable concern was expressed regarding copyright and intellectual property issues (plagiarism and the inappropriate use of others' ideas), as well as ethical issues and privacy threats. Environmental impacts appear to be an area about which students are either less informed or to which they attach less immediate importance. Although bias and stereotypes are frequent topics of discussion among experts, students rated this risk as the least critical compared with the others, albeit still with a relatively high mean score. For all statements, the mean score (x^{-}) exceeded 3.5, indicating that respondents generally agreed that all listed risks exist. The standard deviation (SD) values were fairly consistent (0.8–1.0), suggesting that students' opinions were relatively similar, with no extreme variability.

These results are consistent with findings from previous studies, which identify "hallucinations", unreliable sources, plagiarism, bias, privacy issues, and over-reliance on technology as key risks associated with genAI (Licardo, Puncer & Todorović, 2025; Mlakar, 2025; Molek, 2023). This strong agreement regarding the potential decline in independent critical thinking is further supported by authors who emphasise that the use of genAI should be pedagogically guided and critically integrated rather than left solely to students' individual discretion (Cvajdik, 2025; Jarc, 2026).

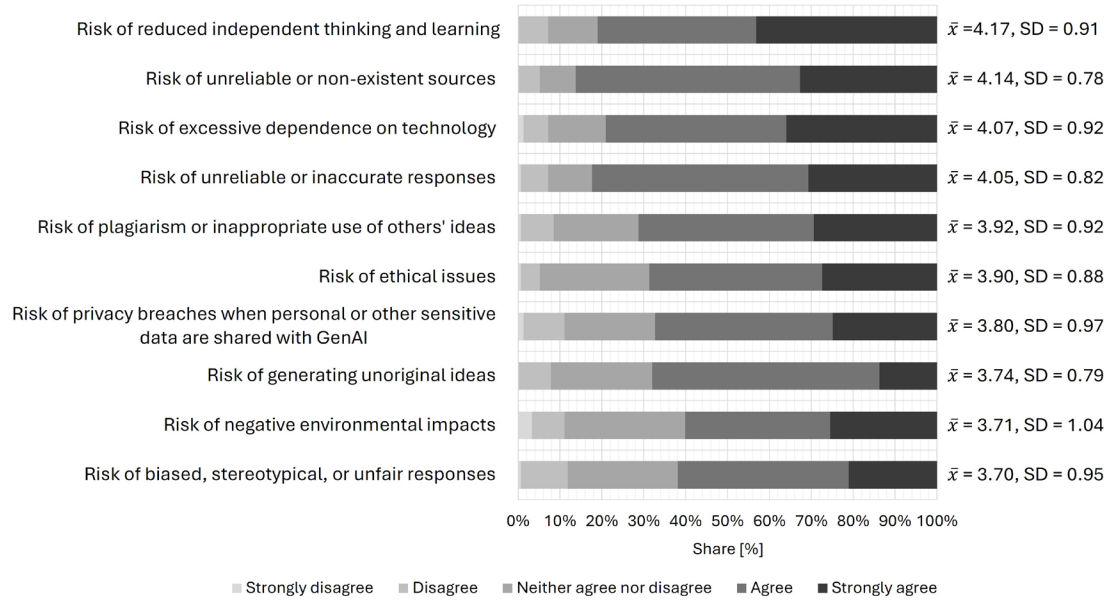
Students' perceptions of the risks associated with the use of genAI were analysed in relation to varying levels of self-assessed AI literacy. Table 2 presents the results of a comparative analysis of self-assessed AI literacy levels and perceived risks associated with genAI use.
The data include mean scores for risks associated with genAI use, categorised according to students' AI literacy levels, together with Spearman's rank correlation coefficients.

The results in Table 2 indicate a generally high level of awareness regarding potential hazards; however, no statistically significant differences were observed between the AI literacy categories.

Perception of technical and academic risks. Students highlighted the unreliability, or even the non-existence, of sources cited by genAI as one of the most prominent risks. This item achieved the highest scores among students with very good self-assessed literacy (x^{-} = 4.40), suggesting that those with greater knowledge are particularly aware of the phenomenon of so-called AI "hallucinations". The risk of unreliable or inaccurate answers was rated similarly highly, with mean scores (x^{-}) of 4.00 or above across all AI literacy categories.

Academic integrity. Students expressed concern about a decline in independent thinking and learning. Interestingly, this concern was most pronounced among students with a medium level of literacy (x^{-} = 4.31), whereas students with poor self-assessed AI literacy rated this risk slightly lower (x^{-} = 3.60).
The issue of plagiarism and the inappropriate use of others' ideas remains constant across all groups, with the highest mean score observed among students with poor self-assessed AI literacy (x^{-} = 4.20).

Ethical, privacy, and social risks. In the field of ethics, students with poor literacy stand out, having rated ethical issues with an exceptionally high mean score (x^{-} = 4.80). This may indicate a certain level of mistrust



» **Figure 4:** *Perceived challenges and risks associated with the use of genAI (n = 160)*

Table 2
Mean risk ratings associated with the use of genAI by students' level of self-assessed AI literacy and analysis of Spearman's rank correlation coefficients (n = 153)

Advantages of using genAI	AI literacy categories (x^-)				Spearman's rank correlation coefficient	
	Very good	Good	Moderate	Poor	ρ_s	p
Risk of generating unoriginal ideas.	3.53	3.75	3.80	3.60	-0.062	0.450
Risk of unreliable or non-existent sources.	4.40	4.11	4.12	4.00	0.050	0.541
Risk of unreliable or inaccurate responses.	4.20	4.00	4.10	4.00	-0.013	0.875
Risk of reduced independent thinking and learning.	3.93	4.17	4.31	3.60	0.071	0.380
Risk of plagiarism or inappropriate use of others' ideas.	3.93	3.93	3.86	4.20	-0.044	0.588
Risk of biased, stereotypical, or unfair responses.	3.93	3.67	3.69	3.80	-0.052	0.521
Risk of privacy breaches when personal or other sensitive data are shared with genAI.	3.80	3.75	3.84	4.20	0.037	0.649
Risk of excessive dependence on technology.	3.60	4.06	4.18	4.40	0.103	0.206
Risk of ethical issues.	4.13	3.92	3.71	4.80	-0.073	0.369
Risk of negative environmental impacts.	3.60	3.77	3.67	3.40	-0.011	0.897

towards technology due to a lack of understanding of how it operates. The group with poor literacy is also the most concerned about over-reliance on technology (x^- = 4.40) and threats to privacy (x^- = 4.20), which could be a consequence of limited technical understanding of how data are actually processed and protected.

On the other hand, environmental issues received, on average, the lowest scores among all risks (x^- = 3.40–3.77), suggesting that students currently regard the impact of genAI on the environment as less critical than direct academic or ethical challenges.

Statistical analysis of the correlation between literacy and risk perception. Statistical analysis using Spearman's correlation coefficients (ρs) showed no statistically significant correlations between students' self-assessed AI literacy and their perception of risks. All p-values were substantially higher than the significance threshold (p > 0.05). The lowest p-value was associated with the issue of over-reliance on technology (p = 0.206), yet it still did not reach statistical significance. It can therefore be concluded that the level of knowledge regarding genAI does not significantly influence how hazardous students perceive the technology to be. Awareness of risks such as information inaccuracy, lack of originality, and ethical dilemmas is evident among all students, regardless of how proficient they feel in using these tools.

3.5. Ethical and moral concerns regarding the use of genAI

A majority of students (56.6%) reported having no ethical or moral concerns when using genAI, while 43.4% reported such concerns. The most frequently cited concerns were copyright infringements involving the use of others' work, environmental impacts, the erosion of creativity and critical thinking, data privacy, plagiarism, and issues concerning the credibility of information. Concerns regarding the use of genAI are discussed by numerous authors (Cvajdik, 2025; Licardo, Puncer & Todorović, 2025; Molek, 2023), who highlight authorship, plagiarism, privacy, bias, information credibility, and the need for clear ethical guidelines. Students' responses further confirm that these concerns relate not only to academic integrity but also to the broader social and environmental consequences of AI use (Jarc, 2026; Mlakar, 2025).

3.6. The future of genAI integration in the study process

An analysis of students' open-ended responses reveals a complex and ambivalent outlook on the future of genAI in the academic environment.

- Inevitability of integration and radical systemic change. The vast majority of students recognise genAI as a technology that has become a constant in the academic environment. They predict that its use will only intensify, necessitating a radical adaptation of the educational system. They place particular emphasis on the need to update curricula, assessment methods, and approaches to coursework, as traditional methods are losing their original value due to AI capabilities.
- The binary nature of use. Students present both constructive and destructive possibilities for genAI use. Constructive use involves genAI as a "tool" or "assistant" for faster resource searching, explaining complex subjects, aiding

idea generation, translation, and summarising. Destructive use frames it as a means of ”easier work”, leading to the passive transcription of answers without actual understanding (“laziness”, “solving tasks instead of the student”).
- Cognitive and pedagogical risks. In their responses, students highlight the atrophy of critical thinking (less independent thought and analysis), a reduction in creativity (generated content is accepted as fact, which stifles personal innovation), and increasingly superficial knowledge (the fear that future generations will graduate with significantly less actual knowledge and critical distance from information).
- Ethical responsibility and regulation. Students emphasise that responsibility for a secure future lies not only with the technology itself but also with users and institutions. They highlight the need for regulations on ethical use (defining where use is permitted and where it is not) and for education focused on critical application (how to verify and evaluate genAI outputs instead of relying on them blindly).

Students perceive genAI as a "double-edged sword". While they welcome increased productivity and greater access to information, they recognise a clear risk of intellectual regression. Consistent with these student views, findings from other research (Cvajdik, 2025; Molek, 2023; UNESCO, 2025) emphasise that genAI will become a permanent part of the educational landscape. However, its value will depend on thoughtful integration, clear rules of use, transparency, the development of critical literacy, and the responsible application of AI in higher education.

4. Conclusion

The study confirmed H1, which posits that students with higher levels of self-assessed AI literacy integrate genAI technology into their study processes more frequently. The results of Spearman’s correlation analysis revealed a statistically significant, moderately positive correlation between self-assessed knowledge of genAI and frequency of use ($\rho s = 0.409$, $p < 0.001$). This suggests that greater familiarity with the technology reduces uncertainty and enables students to identify opportunities for its application more readily.

Hypothesis H2, which proposed that a higher level of AI literacy leads to a stronger perception of the benefits and risks associated with genAI use, was rejected. Statistical analysis showed no significant correlation between the level of AI literacy and the perception of benefits such as time savings or faster data analysis ($p > 0.05$). Similarly, regarding risks, AI literacy does not significantly influence how hazardous students perceive the technology to be. Students perceive the benefits and dangers of genAI independently of how competent they feel in using it.

Finally, the third hypothesis (H3), which proposed that students with higher levels of AI literacy would demonstrate better self-control and more deliberate use of AI tools, was also rejected. The research found no statistically significant correlation between self-assessed AI literacy and self-control during use ($\rho s = 0.092$, $p = 0.245$). This indicates that technical knowledge and AI literacy alone do not necessarily guarantee more controlled or self-regulated use; self-control is likely to be more closely related to an individual’s personality traits and work habits.

GenAI in the academic environment represents a "double-edged sword". The vast majority of students recognise it as an inevitable, permanent tool that will require radical adaptation of the educational system, assessment methods and curricula. Although the technology significantly enhances productivity and access to information, it poses a serious risk of intellectual regression and the atrophy of critical judgement if used uncritically.

The results indicate that educational institutions must not assume that students with superior technical knowledge (higher AI literacy) will automatically be more critical or less concerned about risks. As risks are rated highly across all groups, it is essential to integrate critical judgement and the ethical use of genAI into study programmes for all students, regardless of their prior knowledge. In the specific field of graphic design, while AI automates repetitive tasks and expands creative possibilities, it cannot fully replace human empathy, an authorial approach, or creative depth.

The future of education will therefore be based on a hybrid approach in which genAI serves as a supplement to support the development of higher-order cognitive abilities, while human oversight remains crucial for ensuring academic integrity and upholding ethical standards. Only through thoughtful integration and the promotion of critical literacy can genAI genuinely contribute to improving learning without compromising long-term educational goal.

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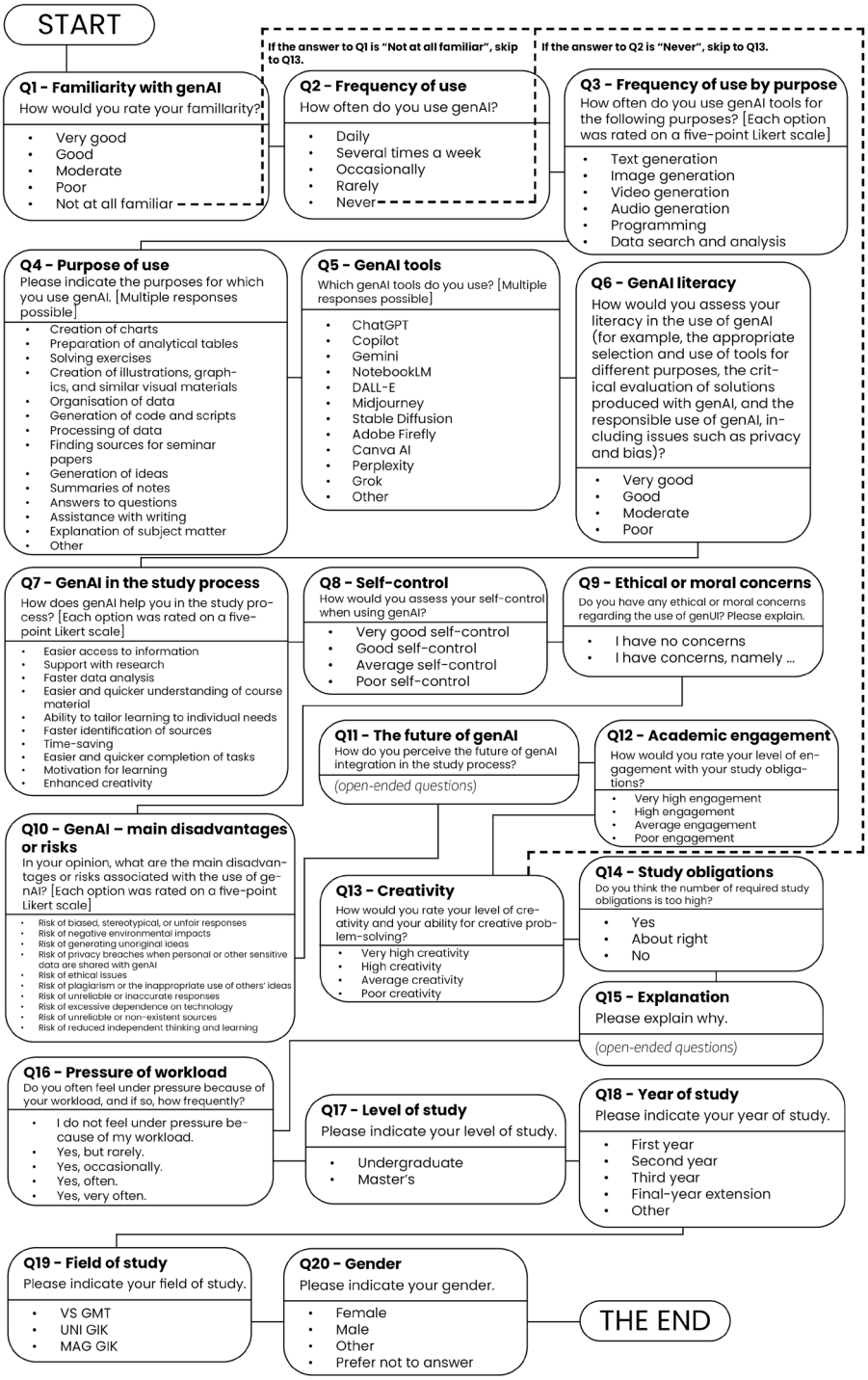
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7. Appendix: Survey questionnaire flowchart



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