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Towards identifying the components of students' AI literacy: An exploratory study based on Hungarian higher education students' perceptions

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Abstract

With the advent of the popular use of artificial intelligence (AI), the higher education (HE) sector is now facing a new challenge regarding how to exploit the educational potentials of Human-computer interaction (HCI). Developing students' AI literacy is now attracting the attention of the HE and HCI research community. This paper aims to explore HE students' perceptions of efficient and critical use of AI tools, and to systematically map the potential components of AI literacy as a new 21st century skill for HE students. This study applied a qualitative, exploratory approach in the form of semi-structured interviews with HE students. Results indicate that the participants primarily use ChatGPT for tasks such as brainstorming, topic selection, searching for information, and translation. While many find it useful for creating and reformatting texts, some encountered challenges, including generality in responses, outdated information, and issues during exams. Students highlighted its effectiveness in various academic tasks, from writing essays and CVs to language learning and transcription. Instructors' perspectives on ChatGPT varied, with some advocating for its integration, while others expressed concerns about job security and misinformation. The implications of the study call for a more systematic introduction and discussion around AI literacy in educational settings.

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Introduction

The educational use of generative artificial intelligence (AI) programmes is currently at the forefront of higher education (HE) pedagogy discourse (e.g., Banele, 2023; Chiu, 2023; Crawford et al., 2023; Ilieva et al., 2023; Kelly et al., 2023; Lodge et al., 2023) with the aim of finding answers to the new challenges regarding how to exploit the educational potentials of Human-computer interaction (HCI).

In the last two years, a growing body of literature has emerged to describe the AI-phenomenon in HE and offer viable solutions and recommendations on how to incorporate the use of AI tools in the HE classrooms consciously and effectively. The discussion surrounding generative AI systems often revolves around the concerns related to learner autonomy, self-assessment, data quality, biases, and unethical use (Atlas, 2023; Chiu, 2023; Crawford et al., 2023; Kostka & Toncelli, 2023; Lodge et al., 2023; Sætra, 2023). However, there is a need for more extensive research that explores the factors enabling learners and instructors to develop their proficiency in AI with the aim of enabling them to make well-informed decisions that facilitate the pedagogically motivated use of AI in 21st century education.

There is, notwithstanding, a niche in exploring particular educational contexts when it comes to the use of OpenAI's ChatGPT in the classrooms because it has become the most widely used text generator. Educational research has always been very time and space sensitive (Fekete, 2023; Lim, 2002; McDougall & Jones, 2006; Sutherland et al., 2004), and thus, we argue that a Hungarian take on the use of ChatGPT would result in discovering how Hungarian learners use its functions, to what extent they use it for entertainment and/or educational purposes and what their perceptions are on how their instructors refer to it in the classroom. As another focal point of research, ChatGPT experiences in its Hungarian language use can also give us valuable insights into the cognitive processes of learners at what could be called the dawn of another technological revolution. In the Hungarian HE context, institutional regulations concerning AI use are still not available to date to provide guidance and standards for both instructors and students. Hence, the status quo calls for a more thorough analysis and detection of bottom-up processes and practices, which could provide the foundations for establishing university regulations. Therefore, this study sought to examine the views and experiences of university students in Hungary regarding their use of ChatGPT and list the different aspects of AI-related knowledge as an essential skill for 21st century learners. This paper seeks to address the following research questions:

1. What experiences and beliefs do Hungarian university students have with ChatGPT in various study scenarios with a special focus on success, challenges, reliability, and insecurities?
2. What effects does the use of ChatGPT have on Hungarian university students' attitude to learning?
3. What components of AI literacy can be identified based on the Hungarian university students' perceptions?

Review of Literature

Generative AI in the HE Classrooms

The inclusion of AI literacy in academic curricula will arguably bring about a significant change in readying students for the demands of the digital era (Kelly et al., 2023). Educational institutions

are restructuring their programs to incorporate AI-related material seamlessly, spanning across disciplines rather than standalone courses (Charow et al., 2021; Kim et al., 2021; Krakowski et al., 2022). By integrating AI literacy throughout various fields, students gain exposure to its applications and develop a comprehensive understanding of its potential impact on their future careers.

Teachers' leadership role contributes to the development of student character to use AI tools effectively to assist their learning process (Crawford et al., 2023). Recognizing the essential role of educators in shaping students' AI literacy, there is an increasing focus on professional development efforts (Eager & Brunton, 2023). Educators are navigating the intricacies of AI literacy through tailored training initiatives that aim to equip teachers with the necessary skills to navigate the ever-changing realm of AI (Lee et al., 2022; Williams et al., 2021). This ensures they can effectively guide students through ethical considerations, technological applications, and critical evaluations. The evolution of educators into mentors well-versed in AI enhances their ability to cultivate the next generation of digitally literate individuals.

The incorporation of AI literacy into education is not without its difficulties. One key obstacle is the requirement for sufficient resources, such as modernized technology and skilled educators (Kamalov et al., 2023; Ng et al., 2022). Moreover, dealing with misunderstandings and concerns regarding ethical AI use presents another challenge. Resolving these issues entails building instructor and student awareness to clarify misconceptions about AI. By recognizing and proactively dealing with these obstacles, educational institutions can guarantee a more seamless progression toward student and teacher AI literacy.

Fostering AI Literacy

The rise of artificial intelligence (AI) in the field of education is arguably another major impact of technological advancement on society to which educational contexts are no exceptions (Chiu, 2023; Lacey & Smith, 2023; Lim et al., 2023). It is crucial, however, to approach this development with a sense of criticality. With the increasing prevalence and influence of AI technologies, it becomes necessary to adapt our approaches to learning and teaching in order to fully exploit their potential benefits in the classrooms. In order to navigate this changing educational landscape effectively, acquiring knowledge about AI should become a lifelong priority for individuals (Banele, 2023; Chiu, 2023; Muñoz et al., 2023) and a must for all in the 21 century higher education and workplace contexts (Ng et al., 2021).

AI literacy "means having the essential abilities that people need to live, learn and work in our digital world through AI-driven technologies" (Ng et al., 2021, p. 2). The four aspects of AI literacy put forward by Ng et al. (2021) correspond to the six levels of the Bloom's Taxonomy (Bloom, 1956) for learning, and similarly the various aspects of AI literacy also require different levels of complex thinking skills from students. Fostering AI literacy, students need to master the skills in the order of complexity: starting with the basic understanding of AI functions, followed by using an applying AI knowledge, and finally being able to critically evaluate and design AI applications as well as using AI ethically (Table 1). Not all students in all educational and workplace contexts need to master the higher-order thinking skills of AI literacy. For most disciplinary programs and professions, effective application of AI tools in various scenarios is sufficient, but essential.

Therefore, higher educator's pivotal role in developing students' AI competences cannot be questioned (Crawford et al., 2023).

Table 1

Levels of AI literacy and Bloom's Taxonomy (Based on Ng et al., 2021, pp. 4-5)

Bloom's Taxonomy	Levels of AI literacy	Definition	Activities
Know	Know and understand AI	Know the basic functions of AI and how to use AI application in different scenarios.	Copy, reproduce, recall, memorize AI concepts
Understand			Describe, explain, interpret, demonstrate the meaning of AI
Apply	Use and Apply AI	Apply AI knowledge, concepts and applications in different scenarios.	Execute, implement, use, apply, AI applications in different contexts
Analyse			Organize, compare, decompose, abstract an AI problem
Evaluate/ Create	Evaluate and create AI	Higher-order thinking skills (e.g., evaluate, appraise, predict, design) with AI applications.	Appraise, predict, detect, justify decisions with AI applications
Evaluate	AI ethics	Human-centred considerations (e.g., fairness, accountability, transparency, ethics, safety).	Design, assemble, construct, build, develop AI applications

According to Long and Magerko (2020), AI literacy entails "a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online" (p. 2). Comparing these competencies with the levels of the Bloom's Taxonomy, it can be concluded that in order to become AI literate, students would need to reach the level of application, analysis and evaluation of AI tools and technologies. To address the inaccurate perception of students about the perfection of AI tools, there is a need to develop all students' AI literacy competence. Once students are able to exercise self-regulated learning and critical-thinking (Lodge et al., 2023) and evaluate AI generated texts critically and detect potential pitfalls of misuse, its efficient application can be enhanced.

Method

Aims of the study

The aim of our research was to explore the perceptions and experiences of students in higher education regarding the use of ChatGPT and to systematize the potential components of AI-related knowledge as a new 21st century skill for students. This study was conducted using a qualitative approach with a written questionnaire methodology among native Hungarian speaking university students.

Method of Data Collection

In the design phase of the study, we initially chose a semi-structured interview approach to data collection. However, as we began to implement it, we encountered a challenge with regard to the anonymity of respondents, as we teach a subset of the students interviewed, so a high degree of anonymity was essential in order to prevent possible bias in the data collected and to encourage

student participation. Overall, the AI policy of Hungarian universities is not yet uniform, which is why it was very important to ensure anonymity. Consequently, we decided to change the methodology and instead opted for the written interview format (Creswell, 2009, 2015). Furthermore, we aimed to involve as many Hungarian universities as possible, but it was not feasible to visit more universities, so we could reach more respondents by using the online written interview method.

The research was conducted through an online questionnaire survey, which was completed by the respondents, i.e. students, on their own devices, predominantly mobile phones, during October 2023. Completion was voluntary and anonymous, and responses were used for research purposes and in aggregate only. No personal data were collected in the questionnaire and therefore no such data were stored or processed during the research.

A limitation of the survey is that respondents were selected using convenience sampling, i.e., responses were collected from groups who were readily available and willing to participate in the research. The sampling was therefore not random, the selected participants are not representative of the whole population (Babbie, 2003, p. 210), but the results of the study group can reveal trends due to their specific characteristics.

Participants

The research participants were selected from six different higher education institutions in Hungary. These higher education institutions are mostly located in Budapest, with one exception in a large rural city. The online questionnaire was completed by 69 respondents, aged between 18 and 49, with an average age of 20.5 years (*SD*=4.04). Of the 69 informants, 58% were female and 42% male, and 100% were in full-time education, but at different levels of education. 13% of the students are in higher vocational education, 71% in bachelor's and 16% in master's degrees. The majority of students are studying Commerce and Marketing (40 students), with the remainder studying English (13 students), International Studies (12 students) or Teacher Education (4 students). All participants volunteered to take part in the research.

Instrument

The questionnaire asked about the experiences of Hungarian native speaking students in higher education with ChatGPT in general and in learning. At the beginning of the questionnaire, we asked our respondents to answer a few explanatory questions, followed by click-and-answer questions. It took students about 15 minutes to complete the form. The questionnaire consisted of structured questions in four units, 22 in total, focusing on how and how often ChatGPT is used, but also on the motivations for using the system, its benefits, possible challenges and limitations.

The four units were made up of the following sections:

- Section 1 consisted of a question asking whether the respondent has ever used the Chat GPT. If not, this is the end of the question, as we want to collect our own empirical experiences from the students.
- Section 2 contained nine questions, most of which were related to the respondent, such as gender, age, university and degree. We also asked what kind of text generation software they had experience with and specifically how often they use ChatGPT.
- Section 3 aimed to explore experiences with ChatGPT in more detail, using a total of nine questions. These questions required longer, more elaborate answers. Among other things, we asked what they think ChatGPT is effective for and what techniques they use when

they are not satisfied with the AI's responses. We asked them for examples of successful and unsuccessful use. We also asked whether the use of ChatGPT in classrooms has been introduced at the university and, if so, in what context. As our respondents are Hungarian native speaking students, we asked about their experiences (if any) of using ChatGPT in Hungarian.

- Section 4 contained only scalable, clickable questions. In this last part of the questionnaire, we asked students to rate, on a scale of 0 to 4, how well they felt ChatGPT was able to generate the 13 text types we listed. Then, for each of 17 uses, we asked them, on a scale of 0 to 4, how effectively they could use ChatGPT.

Reliability and Ethical Considerations

To ensure ethical compliance, we sought approval from the Ethics Committee at our university before conducting our research. We obtained written consent from the participants. Transparent information regarding the research objectives and data handling procedures was provided to all participants.

In order to pilot the questionnaire, we defined the scope of the data to be collected through the questionnaire, in line with the aim of the research, and based on this we designed the questions of the questionnaire. We decided what we would ask using a free-word response and what we would ask using a multiple-choice or scaled response method. We then selected the mandatory fields and had the questions validated with our colleagues before filling them in. As the responses were received, we monitored whether they were scored and fell into the right categories.

Methods of Data Analysis

A small-sample qualitative questionnaire study was conducted (Dörnyei, 2007), using data analysis methods of coding, content analysis and thematic analysis. The responses to our online questionnaire were downloaded as an Excel file from Google Forms. We excluded answers that did not yield substantial data, such as those that did not answer a particular question or did not fit the question. Closed questions were averaged, and open questions were analysed using thematic content analysis (Creswell, 2009, 2015; Friedman, 2012). We categorised identical or similar responses and then interpreted the results in detail, reflecting on our research questions. Frequently occurring themes in the responses were identified and ranked according to their frequency, a method that helped to highlight and understand the key experiences and motivations along which students use the AI language model. The use of the co-coding method, i.e., the fact that all three researchers in the study were involved in the development of the research instrument, the conduct of the research and the data analysis, contributed greatly to the quality assurance of the study (Creswell, 2009, 2015).

Results

Student Experiences and Beliefs (RQ1)

Our first research question is answered by the results obtained along the following four questions from the questionnaire. We asked our respondents what they do most when they are not satisfied with a ChatGPT-generated text. All 69 respondents answered to this question. Mostly, they either add new commands or new questions to the program (34 respondents) or correct or modify the generated text (24 respondents). Only five respondents indicated that they were typically satisfied with the material received. Finally, four respondents stopped asking for help from ChatGPT if they

were not satisfied with the answer the first time. A total of two respondents referred to prompting, one saying, "If I am not satisfied, I will be more specific about what I want to know" and the other considering not using the language model or trying to get the program to do what he/she wants with new prompts. The results show that the tool of prompting, i.e. when users use an appropriate, well-defined, well-specified request, is still underused among Hungarian students.

The results of our research reveal that the students are able to use the language generator for higher-level operations, but it is very important to make them aware and treat the texts generated by ChatGPT with sufficient criticism. 60% of the students surveyed (41 students) said that ChatGPT was useful for creating and reformatting texts, and five respondents mentioned that they had used the text generator to improve their own comprehension. Out of 69 respondents, 13 had used the language model to gather information quickly and accurately, while four respondents had used it as a search engine. For higher level operations such as language learning and transcription, six respondents had successfully used it, while five respondents referred to it for generating project starter ideas and project titling. For assistance with university tasks, such as school assignments, AI had been used by four students. It was used for translating and summarizing texts by seven respondents and for basic code generation by two respondents. 12 respondents used it for writing submissions, CVs and official letters, while six respondents used it for research and learning. It was used for brainstorming by eight respondents. Notably, the stakes are particularly high in university settings, where AI has been harnessed by students for tasks ranging from assignments to translation and code generation. This draws attention to the growing influence of AI technologies in shaping and enhancing educational practices, emphasizing the need for thoughtful consideration and integration of such tools into academic environments.

We asked the students who participated in the survey to give examples, if any, of when they had asked ChatGPT for help and were able to use the generated text. Some respondents reported that they had successfully used ChatGPT to collect material for writing essays (8/69 respondents) and to rewrite, summarise or improve texts (9/69 respondents). Some wrote CVs (3/69 respondents) or official letters (3/69 respondents) using ChatGPT. Three mentioned that they had successfully used the generated text to write the outline of their presentation.

Reflecting on their experiences at secondary school, several students (17/69 respondents) mentioned that they had used ChatGPT to gather ideas and information for school homework, such as English, German, Spanish, literature, and for writing history and ethics papers. When learning and gathering information, the language model was typically used to help them collect and formulate information and summarize long texts. Three respondents successfully used ChatGPT for programming, and one respondent mentioned having used it for scientific abstract writing.

An integral part of answering our first research question is to find out in which cases the students were unable to use the text generated by Chat GPT. A student tried to get creative with the language model to write his/her speech, but according to his/her opinion, the resulting text was very general, did not contain specifics, and lacked creativity. It was not usable for making a speech. For essay writing, two students indicated that they could only partially use the text generator, their explanation being the same as for speech writing, i.e., that the resulting text was too general and lacked specifics. ChatGPT would probably have produced better results with more precise assignment or prompting.

Table 2

Students' Perceptions on ChatGPT's Suitability for Generating Different Text Types

Text Type	Mean suitability (Stnd.D.)	I don't know / no experience	Completely unsuitable	Rather unsuitable	Rather suitable	Highly suitable
Definition	3.27 (1.23)	6 (8.7%)	3 (4.3%)	7 (10.1%)	23 (33.3%)	30 (43.5%)
Summary	3.15 (1.02)	3 (4.3%)	1 (1.4%)	14 (20.3%)	25 (36.2%)	26 (37.7%)
Question for course material	2.97 (1.3)	10 (14.5%)	1 (1.4%)	18 (26.1%)	22 (31.9%)	18 (26.1%)
Essay	2.92 (1.29)	10 (14.5%)	5 (7.2%)	8 (11.6%)	33 (47.8%)	13 (18.8%)
Formal letter	2.84 (1.47)	14 (20.3%)	8 (11.6%)	10 (14.5%)	20 (29%)	17 (24.6%)
To be submitted	2.79 (1.41)	11 (15.9%)	9 (13%)	12 (17.4%)	19 (27.5%)	18 (26.1%)
Note	2.76 (1.34)	11 (15.9%)	6 (8.7%)	17 (24.6%)	20 (29%)	15 (21.7%)
Creative text (story, lyrics, poem, etc.)	2.73 (1.44)	14 (20.3%)	8 (11.6%)	15 (21.7%)	16 (23.2%)	16 (23.2%)
Post, comment, opinion	2.65 (1.38)	15 (21.7%)	7 (10.1%)	15 (21.7%)	22 (31.9%)	10 (14.5%)
Report	2.49 (1.33)	16 (23.2%)	9 (13%)	15 (21.7%)	23 (33.3%)	6 (8.7%)
Case study	2.38 (1.35)	17 (24.6%)	12 (17.4%)	15 (21.7%)	18 (26.1%)	7 (10.1%)
Reflection, evaluation	2.35 (1.3)	20 (29%)	8 (11.6%)	21 (30.4%)	15 (21.7%)	5 (7.2%)
Literature review	2.34 (1.36)	19 (27.5%)	12 (17.4%)	17 (24.6%)	13 (18.8%)	8 (11.6%)

It is important that students learn and become aware of the limitations of ChatGPT and how to prompt well, otherwise they will receive too general texts. They must be somewhat proficient in the given topic, because the language model does not reject to answer even if it has no specific clues. It will still create a text that seems to be the best solution based on its knowledge but may be full of misleading information. One respondent mentioned that ChatGPT was not able to provide up-to-date information because the person asked for data after 2021, which was not possible due to the fact that the pre-uploaded databases of ChatGPT go as far as the early 2020s. According to the experience of two students, when they tried to use the text generator during an online or offline exam, it did not give a meaningful or correct answer to the question asked. Two other students indicated that the program either did not know the answer - for example, when asked about the use of artificial intelligence in the economy or gave completely different answers to the same phonetic question on two occasions. Furthermore, one respondent found that ChatGPT gave ideologically modified answers to certain questions. A total of 26 out of 69

informants indicated that they had not experienced any problems in using all or part of the generated text.

Table 2 illustrates how suitable ChatGPT is for generating certain types of text in the informants' experience. It can be clearly seen that the students consider it most suitable for writing definitions and preparing summaries, while the least suitable for analysing case studies, writing reflections or reviewing literature.

Learner Experiences, Linguistic Challenges, and Instructor Perspectives (RQ2)

Using ChatGPT in Hungarian

The aims of the second research question were twofold, it first aimed to gain a general understanding of how Hungarian university learners participating in the study reflect on their experiences with using ChatGPT in Hungarian as well as in what form they have encountered it in their university classes.

The participants were asked if they mainly use ChatGPT in English or in Hungarian. 33 participants mainly claimed to use it in Hungarian, while 36 in English, which indicates a relatively balanced distribution within the sample. Two participants specifically expressed that they were forced to use ChatGPT in English, because the model had not been reliable enough in Hungarian, but since then it has become more proficient. One participant praised ChatGPT's multilingual capabilities claiming that its texts are "just as good" in both (i.e., English and Hungarian) languages.

Respondents also provided examples of ChatGPT's Hungarian and English text production skills (albeit their answers did not contain any specific linguistic references). An analysis of the responses concluded that the Hungarian text production skills of ChatGPT were sometimes problematic for different reasons. One general problem experienced by the respondents could be ChatGPT's difficulty in conjugating stem-changing verbs. Conjugations, stem changes and suffix variations are extensive in Hungarian with many suffixes sensitive to vowel length.

Other issues occurred because of the fact that ChatGPT operates in English and then translates its responses to Hungarian. This also means when Hungarian prompts are provided, they are first translated to English, then text is produced and 'translated back' into Hungarian. While these translations are objectively "not bad" in some of the participants' reflections, they sometimes "feel alien to" Hungarian and seem too mirror-translated (e.g., "like our [social media] post" translated word for word). It is also typical that more creative, literary translations are kept in English followed by a Hungarian suffix, e.g., in the case of the fictional houses of Hogwarts. Another particular issue voiced by some participants regards the plural form of nouns, as in Hungarian, plurals are used much less than in English. Most predominantly, in English, countable nouns are always in the plural following quantifiers, which sound unnatural to Hungarian speakers (in fact, it is one of the red flags for teachers in detecting generative AI use in student assignments besides American spelling in English language assignments).

Perceptions on Instructor Attitudes

In the participants' perceptions, their university instructors portrayed mixed opinions on ChatGPT. Ten students claimed that their teachers expressed positive views and advocated for its integration into the curriculum highlighting its usefulness, 16 teachers portrayed negative opinions due to concerns about job security, spear of misinformation, and limited capabilities. Six teachers

seemed to have a neutral position, while 11 respondents could not provide information regarding their instructors' approaches.

Out of the 45 respondents, none reported encountering the use of ChatGPT in their classroom learning. However, among the instances where it was introduced, a few respondents mentioned specific tasks that required its use and others highlighted how it expanded beyond what was taught by teachers. One respondent even mentioned experimenting with ChatGPT after learning about it in class.

Out of all the respondents, only seven mentioned being assigned tasks involving ChatGPT by their instructors. Among those instances, five involved using ChatGPT to search for information related to their course material, similar to a Google-like usage. One respondent vaguely remembered an assignment related to ChatGPT, while another mentioned using it for a specific task. However, the majority of participants stated that their teachers did not assign them any tasks involving ChatGPT.

These findings reveal a range of viewpoints among educators and students regarding the incorporation and application of ChatGPT in educational settings. While some teachers appreciate its usefulness, others have concerns, and a significant number of students have yet to encounter it in their academic experiences. Nevertheless, similar to technology's use in educational settings, it can be observed that learners' ChatGPT use, and AI literacy will largely be shaped by their instructors.

Students' AI literacy (RQ3)

Students Perceptions of Using ChatGPT Skilfully

As part of mapping the components of AI literacy we asked the participating students of our survey to indicate how skilfully they were able to use ChatGPT to produce different text types. In this question, focus was not on the text types that students typically generate with the help of ChatGPT, but on their perceived levels of expertise in prompting the tool to produce an outcome they wished for. Table 3 summarizes participants' perceived abilities in order of the mean skilfulness value.

Table 3

Ability to Use Various Functions of ChatGPT or to Produce Various Text Types

Text Type / Function	Mean skilfulness (Stnd.D.)	I don't know / no experience	Absolutely cannot use	Rather cannot use	Rather can use	Absolutely can use
Brainstorming	3.19 (1.00)	11 (15.9%)	4 (5.8%)	12 (17.4%)	11 (15.9%)	31 (44.9%)
Searching for information	3.16 (1.01)	7 (10.1%)	6 (8.7%)	9 (13.0%)	16 (23.3%)	31 (44.9%)
Topic selection (for a presentation / assignment)	3.00 (0.95)	17 (24.6%)	3 (4.3%)	14 (20.3%)	15 (21.7%)	20 (29.0%)
Short assignments	2.98 (0.87)	11 (15.9%)	4 (5.8%)	10 (14.5%)	27 (39.1%)	17 (24.6%)
Translation	2.93 (1.04)	13 (18.8%)	7 (10.1%)	11 (15.9%)	17 (24.6%)	21 (30.4%)
Applications (grants, study abroad)	2.78 (0.99)	28 (40.6%)	6 (8.7%)	7 (10.1%)	18 (26.1%)	10 (14.5%)

Text Type / Function	Mean skilfulness (Stnd.D.)	I don't know / no experience	Absolutely cannot use	Rather cannot use	Rather can use	Absolutely can use
Career plans (CV, letter of motivation)	2.77 (1.01)	25 (36.2%)	7 (10.1%)	7 (10.1%)	19 (27.5%)	11 (15.9%)
To kill time / for fun	2.75 (1.20)	25 (36.2%)	10 (14.5%)	8 (11.6%)	9 (13.0%)	17 (24.6%)
Creative text generation	2.75 (1.00)	21 (30.4%)	7 (10.1%)	10 (14.5%)	19 (27.5%)	12 (17.4%)
Leisure, hobby activities (recipes, travel tips)	2.73 (1.11)	21 (30.4%)	9 (13.0%)	10 (14.5%)	14 (20.3%)	15 (21.7%)
Language learning / development	2.71 (1.12)	20 (29.0%)	10 (14.5%)	9 (13.0%)	15 (21.7%)	15 (21.7%)
Chat partner	2.64 (1.22)	33 (47.8%)	9 (13.0%)	8 (11.6%)	6 (8.7%)	13 (18.8%)
Project planning (deadlines, scheduling, prioritizing)	2.59 (1.09)	28 (40.6%)	9 (13.0%)	9 (13.0%)	13 (18.8%)	10 (14.5%)
Longer, complex assignments	2.58 (1.09)	17 (24.6%)	12 (17.4%)	10 (14.5%)	18 (26.1%)	12 (17.4%)
Finding literature / sources	2.47 (1.08)	20 (29.0%)	12 (17.4%)	12 (17.4%)	15 (21.7%)	10 (14.5%)
Learning mathematics / statistics	2.34 (1.16)	34 (49.3%)	11 (15.9%)	9 (13.0%)	7 (10.1%)	8 (11.6%)
Solving personal problems	2.13 (1.07)	29 (42.0%)	15 (21.7%)	10 (14.5%)	10 (14.5%)	5 (7.2%)

The results indicate that the students mainly used ChatGPT for brainstorming and topic selection, searching for information and translation. While the standard deviation values suggest that there are differences within the answers in the sample, it seems that students spent enough time experimenting with the text generator to discover that it is most suitable as idea generator for them, while it is also an excellent translation tool. It seems that ChatGPT's use to complete longer assignments or find sources is sparse, which might point towards a certain level of criticality.

It can be observed, however, that students' experiences with ChatGPT use stems from experimentation, while substantial background information on how the tool operates, what its limits are, and how ethical its use is are lagging behind. While experimentation is natural when it comes to new technologies and is seen as a welcome approach, young professionals would arguably benefit from a more systematic introduction to generative AI systems, perhaps or particularly as part of their studies.

Ethicality of ChatGPT Use

Ethical considerations regarding ChatGPT use exhibited variability among surveyed students, with a wide range of opinions expressed. A notable theme that emerged is the dependence of ethical judgments on the mode of usage and the specific context. Some students mentioned the ethicality of ChatGPT use for generating ideas, synonyms, text composition, or error correction. Conversely, others claimed that using ChatGPT for entire task completion or essay writing is

unethical. Additionally, opinions varied on the extent of ethicality, depending on how users reference or modify the text generated by ChatGPT, and the justification for AI use in a given situation.

The frequency of mentions regarding ethical considerations, as identified in the survey responses, amounted to 28 instances. The concept of usability and the objectives behind ChatGPT use was mentioned 18 times, reflecting the mixed nature of considerations related to practical use. Specific mentions related to tasks and homework totalled 6 instances, indicating a subset of concerns associated with academic applications. Using ChatGPT for tasks was mentioned 20 times, pointing towards the necessity of ethical deliberations in task-oriented scenarios. Source searching was mentioned once, which is a marginal yet present concern among the participating students.

Students were also asked if their instructors referred to the ethicality of ChatGPT use in their conduct. The opinions of teachers with regards to ChatGPT use were cited 18 times, suggesting a potential influence of educators in shaping student perspectives on ethical considerations. Notably, the phrase "not ethical" in reference to certain applications of ChatGPT was mentioned 11 times, indicating instances where instructors referred to specific use cases as ethically questionable or unacceptable. These perspectives reflected in these results point towards the complexity of the now-forming ethical considerations surrounding the use of language models like ChatGPT in educational settings.

Discussion

The findings regarding student experiences and beliefs regarding ChatGPT use indicated that while the Hungarian university students participating in our sample perceived to be proficient in using ChatGPT for various tasks, prompting emerged as a skill in need of systematic and context-specific development (Kelly et al., 2023). Despite being capable of higher-level operations such as adding commands or modifying generated text, students often failed to employ well-defined requests, leading to generalized or inaccurate outputs (Kelly et al., 2023). The results point toward the necessity of fostering critical thinking skills alongside with AI literacy (Chiu, 2023; Crawford et al., 2023; Long & Magerko, 2020). While a majority of students found ChatGPT useful for creating and reformatting texts, there is a need to promote awareness of the tool's limitations and potential biases (Chiu, 2023). The findings emphasize the necessity of guiding students in differentiating between reliable and unreliable information generated by AI models (Chiu, 2023; Long & Magerko, 2020).

The findings also support the importance of integrating AI literacy across various disciplines to enhance students' proficiency in using AI tools effectively (Charow et al., 2021; Kim et al., 2021; Krakowski et al., 2022). The findings on learner experiences with ChatGPT in Hungarian revealed a balanced language use among students, with improvements noted over time (Kelly et al., 2023). However, linguistic challenges persisted in generated texts in Hungarian, including difficulties with verb conjugation and translation accuracy, which can be telltale signs of misuse.

Student perceptions of their instructors varied widely, with some advocating for ChatGPT's integration into the curriculum while others expressed concerns about its limitations and potential drawbacks (Crawford et al., 2023). Despite this, ChatGPT's integration into classroom learning remained limited, with only a few instances of assigned tasks (Charow et al., 2021). However, where introduced, students engaged with the technology to varying degrees, suggesting potential for further exploration (Charow et al., 2021).

The findings on students' AI literacy highlighted their predominant use of ChatGPT for brainstorming, topic selection, and translation, indicating familiarity but limited criticality (Kelly et al., 2023). However, there seemed to be a lack of substantial background knowledge on its operation and ethical considerations (Chiu, 2023). It is unquestionable that educators play a significant role in shaping student perspectives on ethical considerations (Crawford et al., 2023) and raising awareness to opposing viewpoints on complex global issues (Divéki, 2024). Overall, comprehensive AI literacy education in a variety of contexts is needed to ensure responsible and effective use of AI tools in education (Chiu, 2023; Crawford et al., 2023). Based on our study, we argue for taking a positive, forward-looking approach, which should also be adopted by educators, who can be the source of their students' AI knowledge.

Conclusion

AI literacy is a multifaceted concept, requiring technical understanding, ethical considerations, and critical thinking skills. Our study identified key components, echoing prior research findings by e.g., Kelly et al. (2023) and Chiu (2023). Understanding AI basics, types, and data processes are foundational, as is awareness of algorithmic biases (Chiu, 2023). In the absence of uniform regulations, teachers must lead in guiding students' understanding (Crawford et al., 2023; Fekete, 2023). Our findings are in support of the argument that educators play a pivotal role in fostering critical thinking and ethical AI use. By encouraging students to use AI-generated content as a starting point for analysis, instructors can introduce and elaborate on ethical concerns (Crawford et al., 2023). Our findings provided insights into student competences; however, its scope is limited to the context of data collection. Albeit its results might be transferable to other similar educational contexts. Future research should explore students' and instructors' AI literacy more systematically, comparing AI literacy needs and skills to offer more grounded pedagogical implications (Crawford et al., 2023) as comprehensive AI education could result in responsible AI use in the 21st century.

Conflict of Interest

The authors disclose that they have no actual or perceived conflicts of interest, and did not use artificial intelligence in the construction or writing of this article. The authors disclose that they have not received any funding for this manuscript beyond resourcing for academic time at their respective university.

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