

The Use of Artificial Intelligence among Students in Higher Education

Artificial intelligence (AI) impacts our everyday lives, from business to social areas, and, in recent years, more and more education. This paper discusses using artificial intelligence tools for educational purposes from the student's perspective. The research was conducted on different faculties of universities in Slovenia on a sample of 258 students. We investigated whether students are familiar with the AI concept, which AI platforms and tools they use, and how skilled they are in using them. We also investigated where artificial intelligence benefits them most in their study. Findings indicate that while most students reported familiarity with AI concepts, their ability to articulate this understanding in their own words was limited. ChatGPT and Grammarly emerged as the most frequently used AI tools, with students stating a moderate level of skills in using them. Furthermore, our investigation unveiled statistically important differences in using artificial intelligence tools based on gender and field of study. Most students are satisfied with using AI tools for study purposes, and the areas where AI tools help students the most are searching for information and generating ideas.

Keywords: artificial intelligence, AI tools, higher education, students, skills

Introduction

Artificial intelligence (AI) is influencing all areas of our lives today. It is used across various industries and applications, transforming how tasks are performed. It helps to solve complex problems in healthcare, finance, retail, transportation, manufacturing, customer service, marketing, cybersecurity, human resources, legal, and many other areas. Artificial intelligence technology is becoming the basis for business (Barrett et al., 2019). It is developing quickly and has enormously impacted today's world. AI technologies are beneficial not only to the business sector but also to the educational domain. The education community is already trying to find ways to successfully implement AI for staff and students (Barrett et al., 2019). Using AI in education goes beyond adopting technologies to facilitate easier learning. It also means reshaping, redesigning, and rethinking traditional education systems' content and methods. AI can be applied in education through three fundamental models (Luckin & Holmes, 2016): pedagogical model (knowledge and expertise of teaching), domain model (knowledge of the subject being learned - domain expertise), and learner model (knowledge of the learner). These models were developed to represent emotional, social, and metacognitive aspects of learning in education (Shen, Chen, Grey & Su, 2021).

Many benefits of using AI in education can improve the student's learning (Singh & Mishra, 2023). For example, a significant advantage is personalized education. The current educational system relies on a one-size-fits-all model, but no two people have the same skills. AI can provide a more individualized learning experience and create lesson plans to teach each student effectively. It can also

1 comprehend how a student is learning. AI can identify places where students are
2 struggling and offer them alternate learning strategies. The AI algorithm analyzes
3 students' learning behavior and adapts the course contents to support each student.
4 Then, we have task automation, monitoring, and feedback. AI can help identify
5 grammatical errors, sentence structure problems, and more. Monitoring and
6 feedback will help teachers understand how their students receive education so
7 that they can help them and also see the gaps in the curriculum that need to be
8 filled or improved (Seraydarian, 2021).

9 Because artificial intelligence is progressing at an accelerated pace in the
10 education domain, we wanted to research how familiar students are with artificial
11 intelligence. Are they familiar with the AI concept? Which AI platforms and tools
12 do they use, and how often? How skilled are they in using them? Do they think
13 using artificial intelligence helps them better understand the study content? Where
14 does artificial intelligence benefit them most in their study? Do they believe that
15 educational institutions should offer training in using artificial intelligence for
16 studying? We also wanted to know if there are differences between students using
17 AI tools regarding gender and the study field.

18 19 20 **Theoretical Background**

21
22 The ability to accumulate knowledge and then use it for solving problems is
23 generally termed intelligence. Although contemporary definitions of intelligence
24 vary considerably, experts generally agree that intelligence involves mental
25 abilities such as logic, reasoning, problem-solving, and planning. Specifically,
26 current definitions suggest that intelligence is the ability to learn from experience
27 and recognize and solve problems. The acquisition, retention, and use of
28 knowledge is a vital intelligence component. To use knowledge, one must first
29 identify the issues it might address and then use what he has learned to solve
30 problems (Jaarsveld & Lachmann, 2017).

31 People are termed as born intelligent. However, machines are created to
32 resolve what is outlined in their programming. Once a machine can show
33 intelligence like any other human being, it is called artificial intelligence (Arora,
34 2021). Artificial intelligence is the simulation of human intelligence processes by
35 machines, especially computer systems (Laskowski & Tucci, 2023). We can say
36 that artificial intelligence refers to the development of computer systems that can
37 perform tasks that typically require human intelligence. These tasks include
38 learning, reasoning, problem-solving, perception, language understanding, and
39 speech recognition. AI aims to create machines or software that mimic human
40 cognitive functions and sometimes surpass human capabilities.

41 AI can be categorized into narrow or weak AI and general or strong AI
42 (AGI). Narrow AI is designed and trained for a particular task. It excels in
43 performing specific functions but lacks the broad cognitive abilities of a human.
44 Weak AI is often focused on performing a single task extremely well. While these
45 machines may seem intelligent, they operate under far more constraints and
46 limitations than basic human intelligence (Schroer, 2023). Examples include

1 virtual personal assistants, image and speech recognition systems, and
2 recommendation algorithms. Artificial general intelligence, often portrayed in
3 science fiction, refers to machines that can understand, learn, and apply knowledge
4 across a wide range of tasks at a human level. Like human general intelligence,
5 AGI would have many advantages compared to narrow (limited, weak,
6 specialized) AI. An AGI system would be much more flexible and adaptive. AGI
7 systems also require fewer human interventions to accommodate the various loose
8 ends among partial elements, facets, and perspectives in complex situations
9 (Korteling et al., 2021).

10 Both narrow AI and AGI concepts have been explored and applied in
11 education, but most practical implementations fall under the narrow AI category.
12 For example, Personalized Learning Platforms (PLP) are AI systems that analyze
13 students' learning patterns and provide customized study materials, exercises, and
14 pacing recommendations. All the students have different aptitudes, learning skills,
15 and orientations. With AI's assistance, only content required and suited to the
16 student is delivered (Arora, 2021). Then, we have Intelligent Tutoring Systems
17 (ITS), which use AI to adapt the learning experience based on students' individual
18 needs. They can provide feedback, answer questions, and guide students through
19 learning. ITS replicates teachers' roles and increasingly automates pedagogical
20 functions (e.g., problem generation, problem selection, and feedback generation)
21 to help create new methods and redefine educational goals (Shen, Chen, Grey &
22 Su, 2021). Language Processing Applications: Natural Language Processing
23 (NLP) is used in educational tools for tasks like automated grading of essays,
24 language learning apps, and chatbots that assist students with queries. In the
25 education sector, chatbots are also used in different processes like admission,
26 career counseling, etc. (Malik & Solanki, 2021). In Learning Analytics, AI is
27 applied to analyze data generated by students' interactions with digital learning
28 platforms. This information helps educators understand student progress and
29 identify areas needing additional attention.

30 Many systems, platforms, or tools are available to students, helping them in
31 their educational process. Thinkers on mathematics were designed to help students
32 with any help in math. They relate maths with real-life situations and are also
33 appropriate for kids of a young age. For example, Math Thinker was designed for
34 free for K-12 students to have fun and help in math, but it is also suitable for older
35 students. It was initiated because of the problems during the Covid-19 school
36 shutdowns (<https://maththinker.org/about.html>). Thinkster Math provides the
37 student with specific issues fitting their scope of capacities and abilities. It
38 upgrades explanations by providing video help (<https://hellothinkster.com/>).

39 Some platforms support students' work on a specific text. They help to learn
40 and master content by breaking text down into manageable pieces of information.
41 For example, Cram101's AI technology can turn any textbook into an intelligent
42 study guide complete with chapter summaries, unlimited true-false and multiple-
43 choice practice tests, and flashcards drilled down to a specific book, ISBN, author,
44 and chapter (<https://contenttechnologiesinc.com/>). JustTheFacts101 highlights and
45 generates text and chapter-specific summaries on the spot. Platforms that check the
46 grammatical correctness of the text, as well as the appropriate formation of whole

1 sentences, are widely used today. For instance, Grammarly instantly generates
2 clear and compelling writing while maintaining the student's unique voice
3 (<https://www.grammarly.com/>). Platforms like ProWritingAid, Hemingway App,
4 WhiteSmoke, and WordTune, all similar to Grammarly, help students improve
5 spelling, grammar, style, and impact.

6 Very often used today are chatbots. A chatbot is a software application or
7 web interface designed to mimic human conversation through text or voice
8 interactions. It simulates a human conversation with an end user. Though not all
9 chatbots are equipped with artificial intelligence, modern chatbots increasingly
10 use conversational AI techniques like natural language processing (NLP) to
11 understand the user's questions and automate responses (IBM, 2023). ChatGPT is
12 a very well-known chatbot today, developed by OpenAI. Based on a large
13 language model, it enables users to refine and steer a conversation towards a
14 desired length, format, style, level of detail, and language. Similar to it is Bing, a
15 web search engine owned and operated by Microsoft. Bard is a conversational
16 generative artificial intelligence chatbot developed by Google, based initially on
17 the LaMDA (Language Model for Dialogue Applications), PaLM, (Pathways
18 Language Model), and Gemini families of large language models. Many others
19 exist, such as Jasper Chat, Claude 2, Llama 2, HuggingChat, etc. Also well-known
20 is PerplexityAI, a user interface strategy similar to ChatGPT, but it is less a chatbot
21 and more of a search bot. It closely resembles the Google search engine in its
22 layout and includes a prominent central search bar where users can input their
23 questions to the AI.

24 Brainly is the knowledge-sharing community where hundreds of millions of
25 students and experts put their heads together to crack their most challenging tasks
26 (<https://brainly.com/>). Mika is a personalized virtual tutor that easily adapts to
27 student's needs and provides real-time feedback to help them learn more
28 effectively. SmartEd allows students to easily customize learning materials such as
29 textbooks to the student's learning style and needs. It also has gamification features
30 that make learning more engaging and fun (Seraydarian, 2021).

31 32 33 **Method**

34 35 **Sample**

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37 The study sample consisted of 258 students from randomly selected faculties
38 of universities in Slovenia. Fourteen did not answer the general questions about
39 gender and study level. Of the 244, 46.3 % were male and 53.7 % were female;
40 65.6 % were undergraduate and 34.4 % postgraduate students. Sixteen did not
41 answer the general questions about the study field. Of the 242 students, 55.4%
42 were social science students, 12.4 % were natural science students, and 32.2 %
43 were technical sciences students (for more details, see Table 1).

1 *Table 1.* Frequency distributions of the study variables (n=258)

		Frequency	Percent	Valid percent
Gender	Male	113	43.8	46.3
	Female	131	50.8	53.7
	Missing	14	5.4	
Study level	Bachelor	160	62	65.6
	Masters	84	32.6	34.4
	Missing	14	5.4	
Study field	Social sciences	134	51.9	55.4
	Natural sciences	30	11.6	12.4
	Technical sciences	78	30.2	32.2
	Missing	16	6.2	

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Questionnaire and Procedure

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The questionnaire contained closed questions referring to (i) general data (gender, level of study, and field of study), (ii) the use of specific artificial intelligence tools, and open questions (iii) about using artificial intelligence for study purposes.

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The frequency of using specific AI tools was measured on a 5-point Likert-type scale. Students were asked to choose from "1=Never", "2=Rarely", "3=Medium often", "4=Often", and "5=Very often". The answers regarding the helpfulness of using the AI tools in different areas of their studies were measured on a 5-point Likert-type scale. Students were asked to choose from "1=Not helpful", "2=A little helpful", "3=Partially helpful", "4=Helpful", and "5=Very helpful".

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The skills in using AI tools were measured on a 5-point Likert-type scale from "1= Not very skilled", "2=A little skilled", "3=Partially skilled", "4=Skilled", and "5=Very skilled". Students were asked to rate their level of satisfaction with the use of AI tools on a 5-point Likert-type scale from "1= Dissatisfied", "2=Not too pleased", "3=Satisfied", "4=Very satisfied", and "5= Excited".

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The online questionnaire was presented to students by professors during lectures and tutorials. Participation in this research was voluntary and anonymous.

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All statistical tests were performed with SPSS. Parametric Independent – Samples *t*-Test and One-Way ANOVA tests were used for normal and near-normal distributions of the responses.

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Results

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The first set of questions concerns general knowledge about artificial intelligence. We asked students if they had heard of the term artificial intelligence, were familiar with the basic concepts of AI, and had ever encountered tools using AI. 255 (99.2 %) students had already heard of the term AI, and 2 (0.8 %) had not. 229 (88.8 %) answered that they know the basic concepts of AI, and 29 (11.2 %) that they do not. 229 (88.8 %) had encountered using tools or apps that involve

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1 artificial intelligence, thirteen (5 %) did not, and 16 (6.2 %) did not know if they
2 had (Table 2).

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4 *Table 2. Descriptive statistics for the first set of questions*

Question	N	Yes		No		Do not know	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
Have you heard of the term artificial intelligence?	275	255	99.2	2	0.8	/	/
Are you familiar with the basic concepts of artificial intelligence?	258	229	88.8	29	11.2	/	/
Have you ever encountered using apps or tools that involve AI?	258	229	88.8	13	5.0	16	6.2

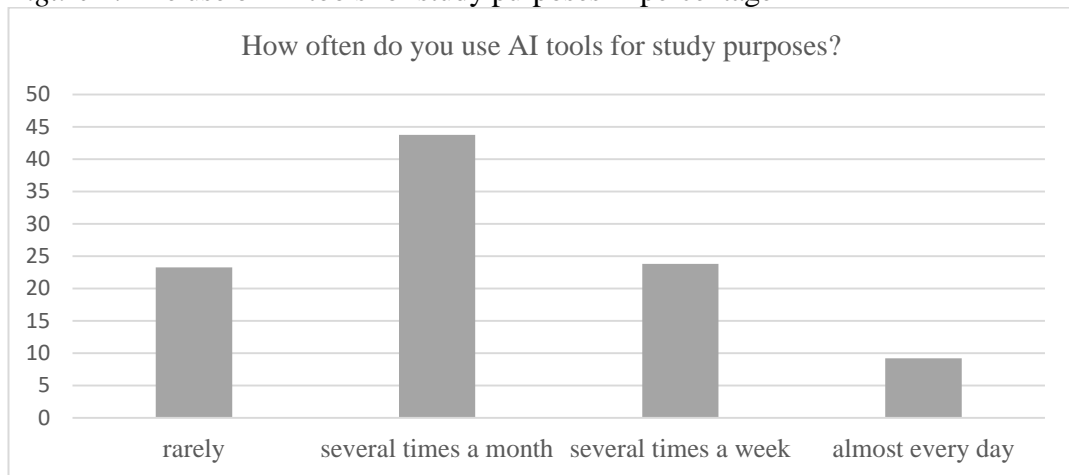
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6 We also wanted to know if there are differences between students using AI
7 tools regarding gender and the study field. First, we tested if there are any
8 differences between males and females regarding knowing the concepts of
9 artificial intelligence. No statistically significant differences were found ($t = -$
10 1.459 and $p = 0.146$). There were also no statistically significant differences
11 between students of different study fields regarding knowing the concepts of
12 artificial intelligence ($F = 2.429$ and $p = 0.090$).

13 The second set of questions concerns the use of artificial intelligence tools.
14 First, we asked students if they use apps or tools, including artificial intelligence,
15 for study (learning) purposes. We asked them to skip this set of questions if the
16 answer was no. 187 (12.5 %) use AI tools for study purposes, and 63 (24.4 %) do
17 not. Eight (8.1 %) students did not answer. Of 187 students, 43 (16.7 %) use AI
18 tools rarely, 81 (31.4 %) use AI several times a month, 44 (17.1 %) several times a
19 week, and 17 (6.6 %) use AI tools almost every day (Figure 1). Two students
20 didn't answer. We tested if there were any differences between males and females
21 regarding the frequency of using AI tools. No statistically significant differences
22 were found ($t = 1.796$ and $p = 0.074$). There were also no statistically significant
23 differences between students of different study fields regarding the frequency of
24 using AI tools ($F = 2.520$ and $p = 0.083$).

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1 *Figure 1. The use of AI tools for study purposes in percentage*2
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4 Next, we asked them which AI tools they use and how often. The results can
5 be seen in Table 3. Of all the tools, students use ChatGPT and Grammarly the
6 most. Some students also use other AI tools, but rarely. These tools are MS Bing,
7 Perplexity AI, Google Bard, Jasper Chat, ChatSonic, Claude 2, Llama 2,
8 HuggingChat, ProWritingAid, Hemingway App, WordTune, and Midjourney.

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10 *Table 3. Descriptive statistics for the use of AI tools (Mean and Std. Deviation)*

	Never	Rarely	Medium often	Often	Very often	N	Mean	Std. deviation
ChatGPT	6 (3%)	34 (18%)	51 (28%)	54 (29%)	40 (22%)	185	3.5	1.1
MS Bing	149 (84%)	11 (6%)	10 (6%)	3 (2%)	4 (2%)	177	1.3	0.8
Perplexity AI	155 (88%)	13 (7%)	6 (3%)	2 (1%)	1 (1%)	177	1.2	0.6
Google Bard	148 (84%)	21 (12%)	5 (3%)	2 (1%)	0 (0%)	176	1.2	0.5
Jasper Chat	166 (94%)	7 (4%)	2 (1%)	0 (0%)	1 (1%)	176	1.1	0.4
ChatSonic	166 (95%)	5 (3%)	3 (2%)	0 (0%)	1 (1%)	175	1.1	0.4
Claude 2	164 (95%)	5 (3%)	2 (1%)	1 (1%)	1 (1%)	173	1.1	0.5
Llama 2	171 (98%)	3 (2%)	1 (1%)	0 (0%)	0 (0%)	175	1	0.2
HuggingChat	170 (98%)	3 (2%)	0 (0%)	0 (0%)	0 (0%)	173	1	0.1
Grammarly	86 (49%)	34 (19%)	23 (13%)	26 (15%)	6 (3%)	175	2	1.2
ProWritingAid	165 (96%)	4 (2%)	2 (1%)	0 (0%)	0 (0%)	171	1	0.3
Hemingway App	168 (98%)	3 (2%)	1 (1%)	0 (0%)	0 (0%)	172	1	0.2
WhiteSmoke	169 (98%)	2 (1%)	1 (1%)	0 (0%)	0 (0%)	172	1	0.2
WordTune	161 (95%)	6 (4%)	2 (1%)	0 (0%)	0 (0%)	169	1.1	0.3
Midjourney	157 (92%)	7 (4%)	3 (2%)	2 (1%)	2 (1%)	171	1.2	0.6

11 1=Never, 2=Rarely, 3=Medium often, 4=Often, and 5=Very often

1 Since ChatGPT and Grammarly were the tools used most often among
 2 students, we tested if there were any significant differences between males and
 3 females and students of different study fields. No statistically significant
 4 differences were found between genders (ChatGPT: $T = -0.350$ and $p = 0.727$;
 5 Grammarly: $t = 0.460$ and $p = 0.646$) and between students of various study fields
 6 (ChatGPT: $F = 0.180$ and $p = 0.836$; Grammarly: $F = 1.134$ and $p = 0.324$).

7 The next question addressed using payable or free AI tools. One hundred
 8 eighty-six students answered the question, 161 (86.6 %) use only free AI tools, 24
 9 (12.9 %) use both free and payable AI tools, and one student uses only payable AI
 10 tools. We found statistically significant differences between genders regarding
 11 using both payable and free AI tools ($t = 3.183$ and $p = 0.002$). Males
 12 ($M = 0.2093$ and $SD = 0.4092$) are more likely to use payable and free AI tools
 13 than females ($M = 0.015$ and $SD = 0.2223$). We also found statistically significant
 14 differences between genders regarding using only free AI tools ($t = -2.919+$ and
 15 $p = 0.004$). Females ($M = 0.9381$ and $SD = 0.2421$) are likelier to use only free AI
 16 tools than males ($M = 0.7907$ and $SD = 0.4092$). We found statistically significant
 17 differences between technical and social students using payable and free AI tools.
 18 The Games-Howell test showed that students from the technical field are more
 19 likely to use payable and free AI tools than students from the social field
 20 ($Sig = 0.016$). Students from the social field are more likely to use only free AI
 21 tools than technical students ($Sig = 0.031$). No statistically significant differences
 22 were found between students from the social and natural fields and students from
 23 the technical and natural fields regarding using payable or free AI tools.

24 We also asked students how skilled they are using AI tools. We can see that
 25 most students (56.5 %) are partially skilled or skilled in using AI tools. More
 26 details can be seen in Table 4. The mean value is 2.71, with a standard deviation of
 27 1.020. We found statistically significant differences regarding skills of using AI
 28 tools between genders ($t = 3.881$ and $p < 0.001$) and also between students of
 29 various study fields ($F = 6.605$ and $p = 0.002$). Males ($M = 3.01$ and $SD = 1.035$)
 30 are more skilled in using AI tools than females ($M = 2.44$ and $SD = 0.946$). Most
 31 skilled in using AI tools are students from the technical field ($M = 3.02$ and
 32 $SD = 0.976$), then students from the natural field ($M = 2.88$ and $SD = 0.993$), and
 33 the least skilled are students from the social field ($M = 2.44$ and $SD = 1.018$).
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35 *Table 4.* Descriptive statistics for skills in using AI tools

		How skilled are you in using AI tools?			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not very skilled	25	9,7	13,4	13,4
	A little skilled	50	19,4	26,9	40,3
	Partially skilled	71	27,5	38,2	78,5
	Skilled	34	13,2	18,3	96,8
	Very skilled	6	2,3	3,2	100,0
	Total	186	72,1	100,0	
Missing	Prekinjeno	8	3,1		
	Leap (if)	64	24,8		
	Total	72	27,9		
Total		258	100,0		

The next question addressed satisfaction with using AI tools for study purposes. Of 186 students, 20 (10.8 %) are excited about using AI tools, 33 (17.7 %) are very satisfied, 120 (64.5 %) are satisfied, 12 (6.5 %) are not too pleased, and one is dissatisfied. We can see that the majority of students are satisfied or even more. The mean value is 3.32, with a standard deviation of 0.772. We found no statistically significant differences regarding satisfaction with using AI tools for study purposes between genders ($t = 1.562$ and $p = 1.120$) and between students of various study fields ($F = 0.203$ and $p = 0.817$).

Next, we wanted to know where the AI benefits them most in their study. The results can be seen in Table 5. We can see that the areas where AI tools help students the most are searching for information ($M = 3.8$ and $SD = 1.1$) and generating ideas ($M = 3.6$ and $SD = 1.1$).

Table 5. Descriptive statistics of areas where using AI tools benefits students

	Not helpful	A little helpful	Partially helpful	Helpful	Very helpful	N	Mean	Std. deviation
Faster Learning	18 (10%)	31 (17%)	55 (30%)	48 (26%)	31 (17%)	183	3.2	1.2
Generating ideas	6 (3%)	20 (11%)	51 (28%)	62 (34%)	42 (23%)	181	3.6	1.1
Writing seminar papers	17 (9%)	45 (25%)	63 (35%)	31 (17%)	25 (14%)	181	3	1.2
Searching for information	8 (4%)	9 (5%)	48 (26%)	65 (35%)	54 (29%)	184	3.8	1.1
Explanation of material	16 (9%)	33 (18%)	53 (29%)	46 (25%)	35 (19%)	183	3.3	1.2
Tasks solving	25 (14%)	43 (24%)	62 (34%)	28 (15%)	23 (13%)	181	2.9	1.2
Problem-solving	15 (8%)	39 (21%)	65 (36%)	38 (21%)	25 (14%)	182	3.1	1.1

Statistically significant differences between genders were revealed only for generating ideas ($t = -2.325$ and $p = 0.021$). There were no statistically significant differences between students of various study fields regarding the areas where using AI tools benefits them. However, we found statistically significant differences between undergraduate and postgraduate students regarding faster learning ($t = 2.218$ and $p = 0.014$) and task solving ($t = 1.998$ and $p = 0.047$). Undergraduate students find AI tools more helpful for faster learning ($M = 3.4$ and $SD = 1.076$) than postgraduate students ($M = 2.95$ and $SD = 1.371$). Undergraduate students also find AI tools more helpful for task solving ($M = 3.01$ and $SD = 1.185$) than postgraduate students ($M = 2.63$ and $SD = 1.139$).

We also asked them if they think using artificial intelligence helps them better understand the study content. Of 183 students, 158 (86.3 %) think AI helps them better understand the study content, and 25 (13.7 %) do not.

The third and last set of questions concerns the issue of involving artificial intelligence tools in the educational process. The questions and answers can be seen in Table 6.

1 *Table 6.* Descriptive statistics for the third set of questions

Question	N	Yes		No		Do not know	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
Do you think using artificial intelligence positively affects the quality of your study?	185	156	84.3	29	15.7	/	/
Do you think that artificial intelligence will be even more involved in educational processes in the future?	184	169	91.8	3	1.6	12	6.5
Do you think students should learn more about how artificial intelligence works during their studies?	184	155	84.2	11	6.0	18	9.8
Do you think that educational institutions should offer training in the field of using artificial intelligence for studying?	183	146	79.8	16	8.7	21	11.5

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Discussion

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6 Most students reported familiarity with AI concepts, which aligns with AI's
7 growing awareness and integration into various aspects of society. However, their
8 ability to articulate this understanding in their own words was limited. The best
9 explanation, in the words of a student, was "a software tool that "takes" data from
10 a wide database, according to our "requirements."". Students' statements about
11 missing "a single AI that can use text and images and can take a picture of text and
12 have it automatically written" or "AI tools for simplifying very general and broad
13 topics, so there's no need to search for information and read entire books or
14 articles" indicate that some are unfamiliar with AI tools and their capabilities.

15 ChatGPT and Grammarly emerged as the most frequently used AI tools,
16 which resonates with broader trends. Natural language processing tools and
17 writing assistance applications are widely adopted due to their versatility and
18 direct relevance to academic tasks. A few students listed to the majority lesser-
19 known AI tools like Kapwing, a known online video editing platform. It has
20 gained popularity, especially among users who seek easy-to-use tools for creating
21 and editing multimedia content. Next was DALL-E, an AI model OpenAI
22 developed that generates images from textual descriptions. It gained significant
23 attention due to its ability to create unique and imaginative images based on user
24 prompts. However, it may not be as widely used by the general public as some
25 more consumer-oriented applications. Students also mentioned they use the
26 Orange Data Mining AI tool, an open-source data visualization and analysis tool.

1 It is known in the data science and machine learning communities for its user-
2 friendly interface and versatility. It's famous for educational purposes and
3 exploratory data analysis. Some students also use rewriting AI tools or services
4 with text-rewriting capabilities for academic purposes. They did not reveal which
5 ones.

6 The study identified differences in using payable AI tools and skills based on
7 gender. Males are likelier to use payable and free AI tools than females. While this
8 aligns with the general acknowledgment of gender gaps in technology adoption,
9 the extent of these differences may vary across different studies and cultural
10 contexts. Students from the technical field are more likely to use payable and free
11 AI tools than students from the social field. Technical science students showing a
12 higher propensity to use also payable AI tools and demonstrating greater
13 proficiency align with the expectation that specific disciplines might engage more
14 deeply with AI technologies.

15 Students' moderate level of skills in using AI tools is consistent with the
16 learning curve associated with adopting new technologies. Further studies might
17 delve into the specific skills students find challenging or proficient in using AI
18 tools.

19 The predominant use of AI tools among students was for information
20 retrieval and idea generation. The perceived benefits of AI tools in faster learning,
21 idea generation, and information retrieval are commonly known. Students also use
22 AI tools for writing seminar papers, task-solving, problem-solving, material
23 simplification, and a more straightforward understanding of matter and tasks. One
24 student wrote he uses AI tools for reading and generating poetry.

25 Most students expressing satisfaction and excitement with AI tool usage
26 aligns with the generally positive attitude towards technology adoption in
27 education. However, specific factors contributing to satisfaction may vary and
28 could be explored further.

29 The anticipation of increased AI involvement in educational processes aligns
30 with the overall trajectory of AI adoption in education globally. Studies often
31 reflect an awareness of the evolving role of AI in shaping educational practices.
32 Most students supporting the incorporation of AI training into educational
33 curricula are consistent with recognizing AI as a crucial skill set for future
34 professionals. This aligns with the broader discourse on preparing students for the
35 AI-driven workforce.

36 Students stated that since there are many valuable artificial intelligence tools,
37 they should learn to use as many AI tools as possible at the faculty. They want to
38 involve artificial intelligence more in their studies and use it to assist them in
39 various projects they must complete at faculties. They want to learn how to use
40 artificial intelligence most skillfully. They think it would improve the quality of
41 learning and reduce the time needed for specific tasks related to the study
42 purposes. One student stated, "Instead of suppressing the use of AI, we should use
43 it to our advantage, such as obtaining key data." Another statement was, "It would
44 be excellent if we could use artificial intelligence without getting into trouble."

45 Some students miss easier fact-checking, like citing sources in responses,
46 which would enable the checking. They miss better guidance on sources when

1 searching for relevant professional literature. They would like to know "how to
2 best obtain as accurate information as possible from artificial intelligence since it
3 often happens that it does not provide accurate information or does not
4 'understand' what they need and gives completely wrong answers." Students also
5 miss better AI tools for solving mathematical problems, better assistance in
6 programming, and better and more accurate information. They state "most AI tools
7 cannot solve and explain more challenging tasks. For example, ChatGPT often
8 solves computational tasks incorrectly."

9 Many students see AI as a valuable asset for performing different tasks and
10 know that AI doesn't replace humans. They know that AI contributes only a part in
11 making it easier and faster for humans to perform tasks. One student stated, "I
12 firmly believe that we must make an effort for everything ourselves, and artificial
13 intelligence can only serve as assistance, as Google did initially, significantly
14 easing everything for us." One other said, "It would be right for people to be
15 acquainted with artificial intelligence and use it for assistance, not exploitation."
16 Students are aware that some students are exploiting AI tools with minimal effort
17 to perform different tasks regarding study.

18 Based on the results and students' statements, we suggest that educational
19 institutions should offer training in using AI for studying purposes.

20 21 22 **Conclusion** 23

24 Artificial intelligence is progressing at an accelerated pace, which already
25 impacts the profound nature of higher education (Popenici & Kerr, 2017). The
26 application of artificial intelligence to education has been the subject of academic
27 research for more than 30 years. The field investigates learning wherever it occurs,
28 in traditional classrooms or workplaces, to support formal education and lifelong
29 learning. It brings together AI, which is itself interdisciplinary, and the learning
30 sciences (education, psychology, neuroscience, linguistics, sociology, and
31 anthropology) to promote the development of adaptive learning environments and
32 other AI tools that are flexible, inclusive, personalized, engaging, and effective.

33 The article discusses using AI tools for educational purposes from the
34 perspective of students in higher education. Two hundred fifty-eight students from
35 different faculties of universities in Slovenia participated in the study. The findings
36 indicate that while most students reported familiarity with AI concepts, their
37 ability to articulate this understanding in their own words was limited. ChatGPT
38 and Grammarly emerged as the most frequently used AI tools. The predominant
39 use of AI tools among students was for information retrieval and idea generation.
40 The study also unveiled some statistically important differences in using AI tools
41 based on gender and field of study. The study's limitation is the sample size of 258
42 students from university faculties in Slovenia. The study's findings may also not be
43 generalized to a larger population because they are focused on students from a
44 specific geographic location and may not capture the full diversity of AI tool usage
45 and familiarity among students in higher education globally. Further research with
46 a more extensive and diverse sample and objective measures of AI tool usage and

1 skills could provide a more comprehensive understanding of the use of AI tools
2 among students in higher education.

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