Student perspectives on using Artificial Intelligence tools for solving programming assignments

Perspektiva studenata o korištenju alata umjetne inteligencije za rješavanje programskih zadataka

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Abstract. *Students use various methods for solving their programming assignments. Notably, with the widespread adoption of artificial intelligence (AI) tools, it is unsurprising that students have incorporated them into their repertoire. The main question, however, revolves around the permissibility of such utilization. In this study a survey was conducted among university students in Croatia, aiming to clarify their perspectives on the deployment of AI tools. The primary objective is to discern the extent to which students employ these tools in solving programming assignments and investigate the ways in which the students use them.*

Keywords. programming, assignments, high education, Artificial Intelligence

Sažetak. *Učenici koriste različite metode za rješavanje programskih zadataka. S obzirom na široko prihvaćanje alata umjetne inteligencije (AI), nije iznenađujuće da su ih studenti uključili u svoj repertoar. Međutim, glavno pitanje se vrti oko dopuštenosti takvog korištenja. U ovoj studiji provedena je anketa među studentima u Hrvatskoj s ciljem razjašnjavanja njihovih perspektiva o implementaciji alata umjetne inteligencije. Primarni cilj je razlučiti u kojoj mjeri studenti koriste te alate u rješavanju programskih zadataka i istražiti načine na koje ih studenti koriste.*

Ključne riječi. programiranje, zadaci, visoko obrazovanje, umjetna inteligencija

1 Introduction

Programming is often perceived as a challenging subject to learn, as highlighted in prior research (Bain and Barnes, 2014; Guzdial, 2010). Notably, in the study by (Bain and Barnes, 2014) they "identified a major issue with problem-solving strategies: 50% had no strategy beyond 'Google it'". Studies of this nature indicate that certain students attempt to address programming assignments by seeking solutions on the Web.

Instances of students attempting to address programming assignments by seeking solutions on the Web raise ethical concerns, particularly when academic policies explicitly prohibit such practices. This behavior can result in a similarity between solutions, potentially leading to accusations of plagiarism, as outlined in the definitions provided by (Cosma and Joy, 2008) and (Novak, 2020).

Adding to the complexity, with the widespread adoption of artificial intelligence (AI) tools (e.g. ChatGPT),

1 Uvod

Programiranje se često doživljava kao izazovan predmet za učenje, kako je naglašeno u prethodnim istraživanjima (Bain and Barnes, 2014; Guzdial, 2010). Posebno, u istraživanju koje su proveli (Bain and Barnes, 2014), "identificiran je glavni problem sa strategijama rješavanja problema: 50% nije imalo strategiju osim 'Googlanja'". Studije ovakve vrste ukazuju na to da određeni studenti pokušavaju riješiti zadatke programiranja tražeći rješenja na Webu.

Pokušaji studenata da riješe zadatke iz programiranja tražeći rješenja na Webu izazivaju etičke zabrinutosti, posebno kada akademske politike izričito to zabranjuju. Ovakvo ponašanje može rezultirati sličnostima između rješenja, što potencijalno dovodi do optužbi za plagijat, kako je opisano u definicijama koje su navedene u radovima (Cosma and Joy, 2008) i (Novak, 2020).

Dodatno, sa sveprisutnom upotrebom alata umjetne inteligencije (eng. Artificial Intelligence - AI) (npr.

raise concerns regarding academic integrity and the preservation of originality in programming assignments.

Distinguishing between the application of AI tools and the conventional "Google it" approach lies in the capacity of such tools to generate comprehensive solutions merely by copying the problem. In contrast, conventional search engines may prove inadequate for more complex assignments, often failing to yield complete solutions. The distinctive aspect of AI tools is their ability to provide students with entire solutions, removing the need for integration or modification.

Moreover, a challenge arises when traditional similarity detection tools relying on string matching prove ineffective in scenarios where an AI tool generates varying solutions with each instance. While the importance of detection cannot be understated, first an emphasis should be placed on prevention. In order to prevent it is necessary to understand the student perspective on this matter.

In this study, the primary objective is to examine students' perspectives on AI tools. To explore this topic, a survey was administered to students in Croatia. The survey questions were predominantly open-ended to avoid influencing their opinions. Key inquiries focused on whether and how students utilized AI tools for resolving programming assignments. Furthermore, participants were asked to articulate their stance on whether these tools should be prohibited or permitted, along with providing explanations for their views. Additionally, students were prompted to explain the advantages and disadvantages they perceive in the utilization of such tools.

The rest of the paper is structured as follows. In Section 2, related work is presented. Section 3 presents the methodology and the main questions of the study. The results are presented in section 4. Section 5 contains the discussion and gives ideas for future work, and Section 6 concludes.

2 Related work

Various studies have been conducted to examine the usage of AI tools in the context of programming assignments. Some research focuses on detection, as demonstrated in (Ellis et al., 2024), where the authors investigated the likelihood of teachers identifying code generated by AI tools in the Python programming language. They asked teachers and used an AI detector tool (i.e. OpenAI Text Classifier) in their experiment to identify AI generated assignments. The findings from (Ellis et al., 2024) suggest "that although AI-generated results may not always be identifiable, they do not currently yield results approaching those of diligent students." Notably, using the AI detector poses a significant challenge. "Although the AI detector was largely able to identify AI-generated results accurately, it also had as many or more false positives as the human gra-

ChatGPT), javljaju se zabrinutosti u vezi s akademskom integritetom i očuvanjem originalnosti u programskim zadacima.

Razlika između primjene AI alata i konvencionalnog pristupa "Googlanju" leži u sposobnosti takvih alata da generiraju sveobuhvatna rješenja jednostavno kopiranjem problema. Za razliku od toga, konvencionalni pretraživači često se mogu pokazati neprikladnima za složenije zadatke, često ne pružajući potpuna rješenja. Distinktivna karakteristika AI alata je njihova sposobnost pružanja studentima cijelih rješenja, eliminirajući potrebu za integracijom ili modificiranjem.

Javlja se problem kod tradicionalnih alata za detekciju sličnosti, koji se oslanjaju na usporedbu nizova, da postaju neučinkoviti u scenarijima gdje AI alat generira različita rješenja svaki put. Iako važnost detekcije ne smije biti podcijenjena, prvo bismo trebali staviti naglasak na prevenciju. Kako bismo spriječili, nužno je razumjeti perspektivu studenata o ovom pitanju.

U ovom istraživanju, osnovni cilj je istražiti perspektive studenata o AI alatima. Kako bismo istražili ovu temu, provedena je anketa među studentima u Hrvatskoj. Anketna pitanja uglavnom su bila otvorenog tipa kako bi se izbjeglo utjecanje na mišljenje studenata. Ključna pitanja usmjerena su na to jesu li i kako studenti koristili AI alate za rješavanje zadataka iz programiranja. Nadalje, sudionike se potiče da izraze svoj stav o tome trebaju li ti alati biti zabranjeni ili dopušteni te da pri tome daju objašnjenja svojih stajališta. Osim toga, studenti su potaknuti da objasne prednosti i nedostatke koje percipiraju u korištenju takvih alata.

Ostatak rada je organiziran na sljedeći način. Poglavlje 2 sadrži povezane radove. Metodologija i glavna pitanja istraživanja predstavljena su u poglavlju 3. Rezultati su prikazani u poglavlju 4. Poglavlje 5 sadrži raspravu i daje ideje za buduće radove, dok poglavlje 6 zaključuje istraživanje.

2 Povezani radovi

Različita istraživanja provedena su kako bi se proučila upotreba AI alata u kontekstu zadataka iz programiranja. Dio istraživanja fokusira se na detekciju, kako je prikazano u (Ellis et al., 2024), gdje su autori istraživali vjerojatnost da nastavnici prepoznaju kod generiran od strane AI alata u programskom jeziku Python. Anketirali su nastavnike i koristili alat za detekciju umjetne inteligencije (npr. OpenAI Text Classifier) u svom eksperimentu kako bi identificirali zadatke generirane od strane AI alata. Zaključci iz (Ellis et al., 2024) sugeriraju "da iako AI-generirani rezultati možda nisu uvijek prepoznatljivi, trenutno ne daju rezultate koji se približavaju rezultatima marljivih studenata." Važno je napomenuti da korištenje AI detektora predstavlja značajan izazov. "Iako je AI detektor uglavnom bio sposoban točno prepoznati AI-generirane re-

ders." The authors also noted the importance of instructors being aware of how students use AI tools, regardless of whether their use is permitted in a class. In (Ellis et al., 2024), the authors also offer valuable advice to instructors on how to prevent or make it more difficult to use AI tools, such as using images instead of text in assignments to eliminate the possibility of copy-pasting.

To understand student perspectives, surveys have been undertaken among students like (Saari et al., 2022; Farhi et al., 2023) . In 2022, (Saari et al., 2022) conducted a survey involving 200 students at Tampere University, focusing on their perspective towards AI tools in the context of Java programming studies. In 2023, a research study conducted by (Farhi et al., 2023) gathered data from 388 students enrolled in two prominent universities in the United Arab Emirates (UAE), shedding light on their perceptions of ChatGPT. The survey from (Saari et al., 2022) posed two primary questions: firstly, whether the students employed AI tools in their studies, and secondly, in what situations they utilized these tools, or if they did not use them, the reasons behind such decisions. The results revealed that 45% of students used the tools infrequently, while 20% utilized them on a weekly basis, leaving 35% who did not use the AI tools. In response to the second question, approximately 50% used AI tools for learning, around 40% employed them as a search engine, roughly 38% for coding purposes, and about 25% for debugging. Among students who did not use AI tools, responses indicated that around 30% perceived no need for them, 30% expressed a desire to learn without their help, and 40% had an unspecified reason. Based on the results, the authors concluded that students do indeed utilize AI tools and highlight the need to educate students on the responsible use of such tools. Similarly in (Farhi et al., 2023) the findings unveiled that students consider ChatGPT to be a revolutionary technology, showcasing a dual impact characterized by positive advancements and simultaneous concerns regarding its effects on educational integrity. In both studies the limitations are the geographical focus but with the potential for further exploration of students' concerns in future research.

Similarly, in 2023, (Smolansky et al., 2023) conducted a survey focusing on the perspectives of both students and teachers, with a unique focus on assessment practices. The study questioned 389 students and 36 educators across two universities in Australia and the US. Among various queries, participants were asked to rate the impact of AI tools on different types of assessments, including computer code. Notably, both students and teachers concurred that computer code is significantly affected, with educators assigning higher impact ratings than students. Despite an initial anticipation of differences between educators and students, the study revealed a surprisingly high level of agreement. In contrast to (Saari et al., 2022), the authors

zultate, također je imao jednako ili više lažno pozitivnih rezultata u usporedbi s ljudskim ocjenjivačima." Autori također ističu važnost da nastavnici trebaju biti svjesni kako studenti koriste AI alate, bez obzira je li njihova upotreba dopuštena u nastavi. U (Ellis et al., 2024), autori nude korisne savjete nastavnicima o tome kako spriječiti ili otežati korištenje AI alata, poput korištenja slika umjesto teksta u zadacima kako bi se eliminirala mogućnost kopiranja.

Za dobivanje uvida u studentske perspektive, provedena su istraživanja među studentima poput (Saari et al., 2022; Farhi et al., 2023). Godine 2022., (Saari et al., 2022) proveli su anketu između 200 studenata na Sveučilištu Tampere, fokusirajući se na njihovu perspektivu prema AI alatima u kontekstu učenja programiranja u programskom jeziku Java. U 2023. godini, istraživanje provedeno od strane (Farhi et al., 2023) prikupilo je podatke od 388 studenata upisanih na dva istaknuta sveučilišta u Ujedinjenim Arapskim Emiratima (UAE), otkrivajući njihova stajališta o ChatGPT-u. Anketa iz (Saari et al., 2022) postavila je dva osnovna pitanja: prvo, jesu li studenti koristili AI alate, a drugo, u kojim situacijama su koristili te alate, ili ako ih nisu koristili, razlozi takvih odluka. Rezultati su pokazali da je 45% studenata rijetko koristilo alate, dok je 20% koristilo tjedno, ostavljajući 35% onih koji nisu koristili AI alate. Na drugo pitanje, otprilike 50% studenata koristilo je AI alate za učenje, oko 40% ih je koristilo kao tražilicu, otprilike 38% u svrhu programiranja, a oko 25% za otklanjanje grešaka. Među studentima koji nisu koristili AI alate, odgovori su pokazali da otprilike 30% ne vidi potrebu za njima, 30% želi učiti bez njihove pomoći, a 40% nisu naveli razloge. Na temelju rezultata, autori su zaključili da studenti doista koriste AI alate te su istaknuli potrebu za obrazovanjem studenata o odgovornom korištenju takvih alata. Slično u (Farhi et al., 2023), rezultati su ukazali na to da studenti smatraju da je ChatGPT revolucionarna tehnologija, s dvostrukim utjecajem koji se očituje pozitivnim napretkom, ali i istovremenom zabrinutosti u pogledu njezinog utjecaja na obrazovni integritet. U oba istraživanja, ograničenje predstavlja geografsko područje, ali postoji potencijal za daljnje proučavanje studentskih perspektiva u budućim istraživanjima.

Slično, u 2023. godini, (Smolansky et al., 2023) proveli su istraživanje usmjereno na perspektive studenata i nastavnika, s posebnim fokusom na postupak ocjenjivanja. Istraživanje je obuhvatilo 389 studenata i 36 nastavnika na dva sveučilišta u Australiji i SAD-u. Između ostalog, sudionici su trebali ocijeniti utjecaj AI alata na različite vrste ocjenjivanja, uključujući programski kod. Važno je istaknuti da su studenti i nastavnici suglasni da je programski kod značajno zahvaćen, pri čemu su nastavnici dali veći utjecaj nego studenti. Unatoč prvotnim očekivanjima da će postojati značajne razlike između nastavnika i studenata, istraživanje je pokazalo iznenađujuće visoku razinu suglasnosti. Za razliku od (Saari et al., 2022), autori tvrde da umjesto

argue that rather than enhancing students' capabilities in AI, it is more crucial to assist them in navigating the complex interplay between technology, cognition, social interaction, and values.

In 2023, (Yilmaz and Karaoglan Yilmaz, 2023) took a different approach and asked students to use Chat-GPT to solve programming assignments and to provide feedback. As the main benefits they listed: "providing fast and mostly correct answers to questions, improving thinking skills, facilitating debugging, and increasing self-confidence.". Regarding the downsides, they listed: "getting students used to laziness, being unable to answer some questions or giving incomplete/incorrect answers, and causing professional anxiety in students." Based on their results, they recommend integrating the use of AI tools into courses. However, they also emphasize the importance of educating students to check and verify the results they receive. In addition, they state that "It becomes essential to equip students with the knowledge and critical thinking abilities necessary to navigate the ethical considerations and potential biases associated with AI-generated outputs."

3 Methodology

In this study, a survey was distributed to students in Croatia across five courses at three faculties. In an effort to avoid influencing students' responses, the decision was made to predominantly utilize open-ended questions within the survey. Subsequently, these open-ended responses required coding for result analysis, enabling the summarization of data and facilitating quantitative analysis. While the results leaned toward a qualitative analysis due to their nature, for specific responses, quantitative data was provided.

The primary objective of the survey was to ascertain whether and how students utilize AI tools for programming assignments. Secondary, the aim was to understand their perspectives on the advantages and disadvantages of using such tools. To gather insights, the survey included the following questions:

1. Have you tried AI tools such as ChatGPT, Microsoft Copilot, etc., so far? Yes/No question.

2. Please list the tools you have used. Open-end question

3. Have you used AI tools to solve assignments? Yes/No question

4. How did you use tools to solve assignments? Please describe as thoroughly as you can. Open-end question

5. Have you used AI tools to solve programming assignments? Yes/No question.

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da se educiraju studenti u području korištenja AI alata, važnije je da im se pomogne u snalaženju u kompleksnoj interakciji između tehnologije, spoznaja, društvene interakcije i vrijednosti.

U 2023. godini, (Yilmaz and Karaoglan Yilmaz, 2023) su pristupili drugačije i zamolili studente da koriste ChatGPT za rješavanje zadataka iz programiranja, te pruže povratne informacije. Kao glavne prednosti naveli su: "brzo pružanje uglavnom ispravnih odgovora na pitanja, poboljšanje vještina razmišljanja, olakšavanje otklanjanja pogrešaka i povećanje samopouzdanja." Što se tiče nedostataka, istaknuli su: "navikavanje studenata na lijenost, nemogućnost odgovaranja na neka pitanja ili davanje nepotpunih/netočnih odgovora te uzrokovanje profesionalne anksioznosti kod studenata." Na temelju njihovih rezultata, preporučuju integriranje upotrebe AI alata u nastavne programe. Ističu i važnost obrazovanja studenata kako bi provjeravali i potvrđivali rezultate koje dobivaju. Također, navode da "postaje ključno unaprijediti znanje studenata i sposobnost kritičkog razmišljanja koji su potrebni za snalaženje u etičkim pitanjima i potencijalnim pristranostima povezanima s AI generiranim rezultatima."

3 Metodologija

U ovom istraživanju, anketa je provedena među studentima u Hrvatskoj, na pet kolegija, na tri fakulteta. S ciljem izbjegavanja utjecaja na odgovore studenata, donesena je odluka da će se u anketi uglavnom koristiti otvorena pitanja. Stoga su ovi otvoreni odgovori zahtijevali šifriranje radi analize rezultata, omogućavajući sumiranje podataka i time kvantitativnu analizu. Iako su rezultati, zbog svoje prirode, više naginjali kvalitativnoj analizi, za određene odgovore dani su i neki kvantitativni podaci.

Osnovni cilj ankete bio je utvrditi koriste li studenti i na koji način alate AI za zadatke iz programiranja. Sekundarno, cilj je bio razumjeti njihova razmišljanja o prednostima i nedostacima korištenja takvih alata. Kako bismo prikupili podatke, anketa je uključivala sljedeća pitanja:

1. Jeste li do sada isprobali alate AI poput ChatGPT-a, Microsoft Copilot-a itd.? Da/Ne pitanje.

2. Molimo navedite alate koje ste koristili. Otvoreno pitanje.

3. Jeste li koristili AI alate za rješavanje zadataka? Da/Ne pitanje.

4. Na koji način ste koristili alate za rješavanje zadataka? Molimo vas da opišete što je detaljnije moguće. Otvoreno pitanje.

5. Jeste li koristili AI alate za rješavanje zadataka iz programiranja? Da/Ne pitanje.

6. Na koji način ste koristili AI alate za rješavanje

6. How did you use tools to solve programming assignments? Please describe in as much detail as possible. Open-end question

7. Do you believe that AI tools for programming assignments should be: entirely allowed, partially allowed and partially forbidden, entirely forbidden.? One choice possible.

8. Do you believe that AI tools should be allowed or prohibited for solving programming assignments? Explain your reasoning and attempt to clarify for which types of assignments.

9. What is your overall impression of these tools? What advantages and disadvantages do you see in the context of studying?

10. If there's anything else you would like to add, feel free to write it here.

Except for the main questions there were four other questions:

• What faculty are you attending.

• Select the level of study. (graduate, undergraduate)

• What study program you are enrolled in.

• What is your current study year? (1,2,3,4,5)

The first major limitation of this survey is the uneven distribution of students between graduate (15 responses) and undergraduate (74 responses), and secondly, the fact that the majority of students come from one university (74 responses). This circumstance will limit the possibility of drawing conclusions regarding differences between groups. Nonetheless, interesting and relevant results were obtained. When appropriate, the survey described the number of students in the graduate and undergraduate categories.

4 Results

A total of 89 responses were received. The majority of responses (74) were from undergraduate students, while 15 responses came from graduate students. Among the undergraduate students, all were in their 3rd year of the study program. For graduate students, there were 8 in their 4th year and 7 in their 5th year.

In response to the initial question about whether students used AI tools, only 5 indicated "no", whereby 1 (i.e. 6.6%) was graduate student and 4 (i.e. 5.4%) were undergraduate students. Given that the primary focus of this research revolves around the usage of AI tools, the responses from these 5 students are excluded from the analysis but will be examined separately at the end. This leaves 84 valid responses.

Concerning the second question, the majority mentioned using ChatGPT (62%), as illustrated in Fig. 1.

zadataka iz programiranja? Molimo vas da opišete što je detaljnije moguće. Otvoreno pitanje.

7. Smatrate li da bi AI alati trebali biti: u potpunosti dopušteni, djelomično dopušteni i djelomično zabranjeni, potpuno zabranjeni? Jedan odabir je moguć.

8. Smatrate li da bi AI alati trebali biti dopušteni ili zabranjeni za rješavanje zadataka iz programiranja? Obrazložite svoje razloge i pokušajte pojasniti za koje vrste zadataka.

9. Kakav je vaš opći dojam o ovim alatima? Koje prednosti i nedostaci po vašem mišljenju postoje u kontekstu učenja?

10. Ukoliko imate još nešto što želite dodati, slobodno napišite ovdje.

Osim glavnih pitanja, postavljena su još četiri dodatna pitanja:

• Koji fakultet pohađate?

• Odaberite razinu studija. (diplomski, prijediplomski)

• Koji studijski program pohađate?

• Koja je vaša trenutna godina studija? (1,2,3,4,5)

Prvo značajno ograničenje ovog istraživanja je neujednačena distribucija studenata između diplomskog (15 odgovora) i prijediplomskog (74 odgovora) studija, te činjenica da većina studenata dolazi s jednog sveučilišta (74 odgovora). Ova okolnost ograničava mogućnost donošenja zaključaka o razlikama između grupa. Ipak, dobiveni su zanimljivi i relevantni rezultati. Kada je to bilo prikladno, prikazan je broj studenata u kategorijama diplomskog i prijediplomskog studija.
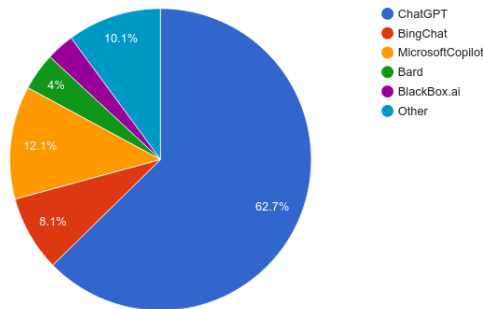
4 Rezultati

Prikupljeno je ukupno 89 odgovora. Većina odgovora (74) odnosi se na prijediplomske studente, dok se 15 odgovora odnosi na diplomske studente. Među prijediplomskim studentima, svi su bili na trećoj godini studijskog programa. Kod diplomskih studenata, 8 ih je bilo na četvrtoj godini i 7 na petoj godini.

Na početno pitanje o korištenju alata umjetne inteligencije, samo 5 ispitanika navelo je odgovor "ne", pri čemu je 1 (tj. 6,6%) bio student diplomskog studija, a 4 (tj. 5,4%) studenta prijediplomskog studija. S obzirom na to da je glavni fokus ovog istraživanja usmjeren na upotrebu AI alata, odgovori tih 5 studenata isključeni su iz analize, ali će se razmatrati zasebno na kraju. Time ostaju 84 valjana odgovora.

Što se tiče drugog pitanja, većina je navela korištenje ChatGPT (62%), kako je prikazano na slici 1. Mi-

Microsoft Copilot was utilized by 12%, Bing Chat by 8%, Google Bard by 4%, and BlackBox.ai by 3%. A few other tools (10%) were mentioned by three or fewer students, including PHIND, you.com, Gencraft, Dall-E, RunwayML, Liama, ForeFront.ai, Amazon CodeWhisperer, and Codeium AI.

crosoft Copilot koristilo je 12%, Bing Chat 8%, Google Bard 4%, a BlackBox.ai 3%. Nekoliko drugih alata (10%) spomenuli su tri ili manje studenata, uključujući: PHIND, you.com, Gencraft, Dall-E, RunwayML, Liama, ForeFront.ai, Amazon CodeWhisperer i Codeium AI.

Percentage of AI tool used by students

Fig. 1: Percentage of AI tool used by students

Postak korištenja AI alata od strane studenata

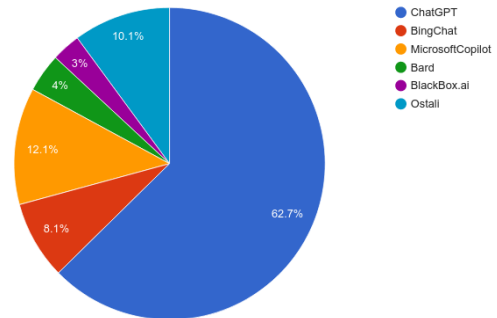**Slika 1:** Postak korištenja AI alata od strane studenata

When they were asked if they used AI tools to solve assignments only 8 answered "no" (1 of them being graduate) and 76 answered "yes" (13 of them being graduates), while when asked specifically for programming assignments 17 answered "no" (6 of them being graduates) and 67 answered "yes" (8 of them being graduates). In other words, 10% (1 of 14) of graduates and 7% (7 of 70) of undergraduates answered "no" for using AI tool in assignments. On the other hand, 43% (6 of 14) of graduates and 16% (11 of 70) of undergraduates answered "no" for using AI tools in programming assignments. Based on this data, there is an indication that graduate students use fewer AI tools for programming assignments than undergraduates, although they exhibit similar overall usage in assignments in general. However, additional research is necessary to confirm this conclusion due to the limited number of graduate students. Moreover, it's noteworthy that nearly all undergraduate students (63 out of 70) are from a single university, whereas half of the graduate students (7 out of 14) belong to another university.

A total of 76 students declared their use of AI tools in solving assignments. Based on their essay responses, the following categories were identified and mentioned:

- Programming – 39 students (51.3%)

- Additional task explanations, including obtaining examples and visualizations – 11 students (14.5%)

- Generating ideas for solving problems – 10 students (13.2%)

- Literature search – 9 students (11.8%)

Na pitanje koriste li AI alate za rješavanje zadataka, samo 8 ih je odgovorilo "ne" (1 od njih bio je student diplomskog studija), dok je 76 odgovorilo "da" (13 od njih bilo je studenata diplomskog studija). Međutim, na pitanje o zadacima iz programiranja, 17 je odgovorilo "ne" (6 od njih bili su studenti diplomskog studija), dok je 67 odgovorilo "da" (8 od njih bili su studenti diplomskog studija). Drugim riječima, 10% (1 od 14) studenata diplomskog studija i 7% (7 od 70) prijediplomskih studenata odgovorilo je "ne" na korištenje AI alata u zadacima. S druge strane, 43% (6 od 14) studenata diplomskog studija i 16% (11 od 70) prijediplomskih studenata odgovorilo je "ne" na korištenje AI alata u zadacima programiranja. Na temelju ovih podataka, postoji indikacija da studenti diplomskog studija manje koriste AI alate za zadatke iz programiranja u usporedbi s prijediplomskim studentima, iako je slična ukupna upotreba AI alata u zadacima općenito. Međutim, potrebna su dodatna istraživanja kako bi se potvrdio ovaj zaključak zbog ograničenog broja studenata diplomskog studija. Također, važno je napomenuti da su gotovo svi prijediplomski studenti (63 od 70) s jednog sveučilišta, dok polovica studenata diplomskog studija (7 od 14) pripada drugom sveučilištu.

Ukupno 76 studenata izjavilo je da koriste AI alate u rješavanju zadataka. Na temelju njihovih esejskih odgovora, identificirane su i spomenute sljedeće kategorije:

- Programiranje – 39 studenata (51.3%)

- Dodatna pojašnjenja zadataka, uključujući dobivanje primjera i vizualizacija - 11 studenata (14.5%)

- Generiranje ideja za rješavanje problema - 10 studenata (13.2%)

- Pretraživanje literature – 9 studenata (11.8%)

- Completing assignments with the help of AI tools – 4 students (5.3%)

- Other (proofreading, sentence construction, writing summaries and reviews) – 3 students (3.9%)

Within the category of programming (51.3%), the following subcategories stand out:

- Debugging code – 16 students (21.1%) - they had an error that they could not solve and they asked the AI tool to find the error and correct the code.

- Generating partial solution – 8 students (10.5%) - asking AI tool to program for them a part of the solution like a function or class given in the assignments or generating SQL statements or database creation.

- Interpretation of program code – 8 students (10.5%) - they have a code from teachers of AI tool generated and they do not understand it and asked for explanation of the code.

- Assignment explanation – 5 students (6.6%) - asking the AI tool to explain what is meant in the assignment because the student did not understand it.

- Data generation – 2 students (2.6%) - generating data for a database.

From this it is clear that programming is the main reason why students use AI tools and that debugging and generating solutions is the main usage purpose. This is confirmed in the subsequent question, where they were specifically asked about the use of AI tools in programming assignments. For programming assignments a total of 67 students (8 of them being graduates) stated that they used AI tools, which is a larger number than in the previous question. For this question the answers of graduate and undergraduate level were analysed separately and no difference in views was seen. It is a small number of graduate students but still the percentages of students that mentioned certain category is very similar for both groups. In table 1 the number of students that mentioned using AI tools in certain way for programming assignments is presented. Again, the categories "Debugging code", "Generating partial solution" and "Interpretation of program code" where identified. In addition, two more categories where identified "For learning purposes" and "Code improvement ". Here "for learning purposes" means asking the AI tool to explain some concepts or to generate code examples for some things; in this category, only responses were counted if the students explicitly stated that the AI tool was used for learning purposes. The category "Code improvement" means optimization of the code, refactoring, clean code, etc. Next to the number of students the percentage is displayed. In all questions, some students wrote comments such as "for searching" or "for various reasons," but these answers were not counted as they did not provide expla-

- Dovršavanje zadataka uz pomoć AI alata - 4 studenta (5.3%)

- Ostalo (lektura, konstrukcija rečenice, pisanje sažetaka i recenzija) – 3 studenta (3.9%)

U okviru kategorije programiranja (51,3%), ističu se sljedeće podkategorije:

- Otklanjanje pogrešaka u kodu - 16 studenata (21,1%) - imali su pogrešku koju nisu mogli riješiti, pa su zatražili od AI alata da pronađe pogrešku i ispravi kod.

- Generiranje djelomičnog rješenja - 8 studenata (10,5%) - tražili su od AI alata da programira dio rješenja poput funkcije ili klase navedene u zadatku ili generiranja SQL naredbi ili stvaranja baze podataka.

- Objašnjenje programskog koda - 8 studenata (10,5%) - studenti imaju kod koji su dali nastavnici ili ga je generirao AI alat, ali ga ne razumiju, pa su zatražili objašnjenje koda.

- Objašnjenje zadatka - 5 studenata (6,6%) - tražili su od AI alata da objasni što se misli u zadatku jer nisu razumjeli.

- Generiranje podataka - 2 studenta (2,6%) - generiranje podataka za bazu podataka.

Iz ovoga je jasno da je programiranje glavni razlog zbog kojeg studenti koriste AI alate, a otklanjanje pogrešaka i generiranje rješenja glavna je svrha korištenja. To je potvrđeno u sljedećem pitanju, gdje su izravno pitani o korištenju AI alata u zadacima iz programiranja. Za ovakve zadatke ukupno 67 studenata (od toga 8 diplomskih studenata) navelo je da koristi AI alate, što je veći broj u odnosu na prethodno pitanje. Za ovo pitanje odgovori diplomskih i prijediplomskih studenata analizirani su zasebno i nije uočena razlika u stavovima. Iako se radi o malom broju studenata diplomskog studija, postotci studenata koji su naveli određenu kategoriju vrlo su slični za obje skupine. U Tablici 1 prikazan je broj studenata koji su naveli korištenje AI alata na određeni način za zadatke iz programiranja. Ponovno su identificirane kategorije "Otklanjanje pogrešaka u kodu", "Generiranje djelomičnog rješenja" i "Objašnjenje programskog koda". Dodatno su identificirane dvije kategorije "Za učenje" i "Poboljšanje koda". Ovdje "Za učenje" znači da studenti traže od AI alata objašnjenje pojedinih pojmova ili generiranje primjera koda za određene stvari; u ovoj kategoriji su uračunati samo odgovori ako su studenti izričito naveli da su AI alat koristili u svrhu učenja. Kategorija "Poboljšanje koda" odnosi se na optimizaciju koda, refaktoriranje, čisti kod itd. Pored broja studenata prikazan je postotak. U svim pitanjima neki studenti napisali su komentare poput "za pretraživanje" ili "iz raznih razloga", ali ti odgovori nisu uračunati jer nisu pružili objašnjenje specifične svrhe korištenja AI alata.

nations for the specific purposes of the AI tool usage.

Table 1: Number of mentioned usages of AI tools for programming assignments

Category	G (8)	UG (59)	Total (67)
Debugging code	4 (50%)	37 (63%)	41 (61%)
Generating partial solution	4 (50%)	31 (53%)	35 (52%)
Interpretation of program code	2 (25%)	16 (27%)	18 (27%)
For learning purposes	2 (25%)	12 (20%)	14 (21%)
Code improvement	1 (13%)	2 (3%)	3 (4%)
Note: G - Graduate, UG - Undergraduate			

Tablica 1: Broj spomenutih načina korištenja AI alata za zadatke programiranja.

Kategorija	D (8)	PD (59)	Ukupno (67)
Otklanjanje pogrešaka u kodu	4 (50%)	37 (63%)	41 (61%)
Generiranje djelomičnog rješenja	4 (50%)	31 (53%)	35 (52%)
Objašnjenje koda	2 (25%)	16 (27%)	18 (27%)
Učenje	2 (25%)	12 (20%)	14 (21%)
Poboljšanje koda	1 (13%)	2 (3%)	3 (4%)
Napomena: D - Diplomski, PD - Prijediplomski			

The next question sought their opinion on whether AI tools should be entirely allowed, partially allowed, or entirely forbidden for programming assignments. In this case, only one student answered "entirely forbidden" and provided an explanation, stating that students should seek help from teachers or other students to engage in meaningful conversation. Also, it was stated that this will then help collaboration and learn program solving as a team. Since some students on the previous question answered that they did not use the AI tools for programming assignments in Table 2 the data is presented for both groups how they responded to this question about allowing AI tools. It seems that students that did not use AI tools are more inclined to allow the tools while students that used AI tools are more inclined to partially allow. More data is needed to confirm such indications.

Sljedeće pitanje tražilo je mišljenje studenata o tome trebaju li AI alati biti u potpunosti dopušteni, djelomično dopušteni ili u potpunosti zabranjeni za zadatke iz programiranja. U ovom slučaju, samo je jedan student odgovorio "potpuno zabranjeni" i pružio objašnjenje, navodeći da bi studenti trebali tražiti pomoć od nastavnika ili drugih studenata kako bi se uključili u svrsishodan razgovor. Također je istaknuto da će to pomoći u suradnji i učenju rješavanja programa timski. Budući da su neki studenti u prethodnom pitanju odgovorili da nisu koristili AI alate za zadatke iz programiranja, u Tablici 2 prikazani su podaci za obje grupe kako su odgovorile na ovo pitanje o dopuštanju AI alata. Čini se da su studenti koji nisu koristili AI alate skloniji dopuštanju alata, dok su studenti koji su koristili AI alate skloniji djelomičnom dopuštanju. Potrebni su dodatni podaci kako bi se potvrdile takve indikacije.

Table 2: Student opinion about allowing or forbidding AI tools

Group	Used AI	Not used AI
Allow	41 (53%)	7 (41%)
Partially Allow	26 (39%)	9 (53%)
Forbid	0 (0%)	1 (6%)
Total	67	17

Tablica 2: Mišljenje studenata o dozvoli ili zabrani korištenja AI alata

Grupa	Koristili AI	Nisu koristili AI
Dozvoliti	41 (53%)	7 (41%)
Djelomično dozvoliti	26 (39%)	9 (53%)
Zabraniti	0 (0%)	1 (6%)
Ukupno	67	17

Based on the explanations that students gave for such answer the results were as follows. The students that responded completely allow reasoned in this way because:

- The AI tools can only give part of solutions - 29 students (63%)

- The AI tools are just help to program faster, nothing more - 27 students (59%)

- The code must be understood regardless, so why for-

Na temelju objašnjenja koja su studenti dali za svoj odgovor, rezultati su sljedeći. Studenti koji su za potpunu dozvolu razmišljaju tako jer:

- AI alati mogu pružiti samo dio rješenja - 29 studenata (63%)

- AI alati su samo pomoć za brže programiranje, ništa više - 27 studenata (59%)

- Programski kod treba razumjeti. Stoga, zašto zabranjivati ako ga studenti razumiju - 21 student (46%)

bid if a students understand - 21 students (46%)

- The AI tools help faster debugging - 14 students (30%)

- This is the same as searching on Google, only faster - 7 students (15%)

- Teachers can not know if a AI tool was used, why forbid it then? - 3 students (6%)

- It helps in complex assignments, but it needs to be forbidden in simple assignments in introductory courses - 3 students (6%)

- Students can learn more by using the tool - 2 students (4%)

- It is teachers job to make better evaluations - 1 student (2%)

On the other hand, the students that said partially allow, reasoned that this is so because:

- The tool is only for assistance and learning – 21 students (61.8%)

- It can be used for assistance and learning, but if usage of AI tools is regulated – 4 students (11.8%)

- The AI tools help faster debugging – 4 students (11.8%)

- It helps for simple and repetitive tasks – 3 students (8.8%)

- It helps solving complex tasks – 2 students (5.9%)

What's interesting when comparing these two groups is that students who are for entirely allowing AI tools provided more reasons to support their stance. In both cases, students perceive the tools as help for learning and problem-solving. However, it is concerning that only a small number of students recognize potential issues associated with using these tools. For instance, only one student expressed concern about the ownership of the code generated by AI tools. To further explore this matter, the next question asked students to enumerate the benefits and downsides of using AI tools.

What stands out in benefits (Table 3), both groups list the same benefits or they can be summarized in the same 3 categories, but the group that allow completely AI tools at first place has the benefit "Faster problem and assignments solving", while the group partially allow has the benefit "Learning support".

Regarding the downsides (Table 4), the results are more similar, but if one looks at the percentages can see the folowing. The group for allow the AI tools is more concerned about the tools not being reliable (answers that the tool generates are not always correct and not easy to use because of the missing context) than the

- AI alati pomažu bržem otklanjanju pogrešaka u kodu - 14 studenata(30%)

- To je isto kao i traženje na Googleu, samo brže - 7 studenata (15%)

- Nastavnici ne mogu znati je li korišten AI alat - zašto ga onda zabranjivati? - 3 studenta (6%)

- Pomaže kod složenih zadataka, ali treba biti zabranjeno kod jednostavnih zadataka - 3 studenta (6%)

- Studenti mogu više naučiti koristeći ovaj alat - 2 studenta (4%)

- Posao je nastavnika napraviti bolju evaluaciju - 1 student (2%)

S druge strane, studenti koji su za djelomičnu dozvolu, razmišljaju tako jer:

- Alat je samo za pomoć i učenje - 21 student (61.8%)

- Može se koristiti za pomoć i učenje, ali uz regulaciju korištenja AI alata - 4 studenta (11.8%)

- AI alati pomažu bržem otklanjanju pogrešaka u kodu - 4 studenta (11.8%)

- Pomažu kod jednostavnih i ponavljajućih zadataka - 3 studenta (8.8%)

- Pomaže u rješavanju složenih zadataka - 2 studenta (5.9%)

Ono što je zanimljivo prilikom usporedbe ove dvije skupine je da studenti koji su za potpunu dozvolu korištenja AI alata pružaju više razloga kako bi argumentirali svoje stajalište. U oba slučaja, studenti percipiraju AI alate kao pomoć pri učenju i rješavanju problema. Međutim, zabrinjavajuće je što samo mali broj studenata prepoznaje potencijalne probleme povezane s korištenjem tih alata. Primjerice, samo je jedan student izrazio zabrinutost u vezi vlasništva nad programskim kodom koji generiraju AI alati. Kako bi se dalje istražila ova tema, sljedeće pitanje odnosi se na prednosti i nedostatke korištenja AI alata.

Ono što se ističe u pogledu prednosti (Tablica 3) jest da obje skupine navode iste prednosti ili ih se može sažeti u iste 3 kategorije, ali skupina koja potpuno dopušta korištenje AI alata na prvom mjestu ističe prednost "Brže rješavanje problema i zadataka", dok skupina koja djelomično dopušta AI alate ističe prednost "Podrška u učenju".

Što se tiče nedostataka (Tablica 4), rezultati su sličniji, ali ako se pogledaju postoci se može vidjeti sljedeće. Grupa koja podržava korištenje AI alata više se brine o pouzdanosti tih alata (odgovori koje alat generira nisu uvijek točni i nisu jednostavni za korištenje zbog izostanka konteksta) u usporedbi s grupom koja

Table 3: Benefits of using AI tools for programming assignments

Category	A	PA
Faster problem and assignments solving	35 (76%)	8 (23%)
Learning support	18 (39%)	19 (54%)
Quick source of information	13 (28%)	14 (40%)
Note: A - Allow (48 students) PA - Partially allow (35 students)		

Tablica 3: Prednosti korištenja AI alata za zadatke iz programiranja

Kategorija	D	DD
Brže rješavanje problema i zadataka	35 (76%)	8 (23%)
Podrška u učenju	18 (39%)	19 (54%)
Brzi izvor informacija	13 (28%)	14 (40%)
Napomena: D - Dozvoliti (48 studenata) DD - Djelomično dozvoliti (35 studenata)		

group that is for partial allow. On the other hand, regarding learning, the group that is for partial allow is more concerned. This group is concerned that students may not truly learn, expressing worries about potential "knowledge gaps" and a lack of understanding of concepts if they become too reliant on AI tools.

podržava djelomično korištenje. S druge strane, što se tiče učenja, grupa koja podržava djelomično korištenje izražava veću zabrinutost. Ta grupa brine se da studenti neće stvarno naučiti, izražavajući zabrinutost zbog mogućih "rupa u znanju" i nedostatka razumijevanja koncepata, ako postanu previše oslonjeni na AI alate.

Table 4: Downsides of using AI tools for programming assignments

Category	A	PA
Not reliable	30 (65%)	16 (46%)
Learning issue	14 (30%)	13 (37%)
Ethical concerns	4 (9%)	3 (9%)
Note: A - Allow (48 students) PA - Partially allow (35 students)		

Tablica 4: Nedostaci korištenja AI alata za zadatke iz programiranja

Kategorija	D	DD
Nepouzdanost	30 (65%)	16 (46%)
Problematika učenja	14 (30%)	13 (37%)
Etička pitanja	4 (9%)	3 (9%)
Napomena: D - Dozvoliti (48 students) DD - Djelomično dozvoliti (35 students)		

From this, it can be concluded that the students who are skeptical of using AI tools are those who prioritize learning and aim to improve their knowledge. On the other hand, students who blindly trust AI tools seem to prioritize generating solutions rather than attempting to work through problems independently. To confirm these differences, further research is needed. It would be particularly interesting to examine the final grades that students received and explore whether there is any correlation between their answers and academic performance.

In the last question, only 17 students responded and they did not give any additional information that was not already mentioned in previous questions. Finally, the responses of the 5 students that were excluded at the beginning because they stated that they did not use any AI tool were analysed. All of them support partial allowance, and their reasons align with the students who used the tools and said partially allow, but one thing that was not mentioned before was as follows. "A change in the approach to creating assignments is needed because the emergence of AI tools has made solving assignments independently pointless."

Iz ovoga se može zaključiti da su studenti koji su skeptični prema korištenju AI alata oni koji stavljaju naglasak na učenje i teže unapređenju svog znanja. S druge strane, studenti koji slijepo vjeruju u AI alate čini se da daju prednost generiranju rješenja umjesto da pokušaju samostalno riješiti problem. Kako bismo potvrdili ove razlike, potrebna su daljnja istraživanja. Bilo bi posebno zanimljivo istražiti konačne ocjene koje su studenti dobili i istražiti postoji li povezanost između njihovih odgovora i akademskih rezultata.

U posljednjem pitanju, samo je 17 studenata odgovorilo. Nisu pružili nikakve dodatne informacije koje već nisu bile spomenute u prethodnim pitanjima. Konačno, analizirani su odgovori 5 studenata koji su isključeni na početku jer su naveli da ne koriste nijedan AI alat. Svi oni podržavaju djelomično dopuštanje, a njihovi razlozi podudaraju se sa studentima koji su koristili AI alate i odabrali djelomičnu dozvolu. No, jedna stvar koja nije bila spomenuta prije bila je sljedeća: "Potrebna je promjena pristupa u izradi zadataka jer je pojava AI alata učinila bespredmetnim rješavanje zadataka samostalno."

5 Discussion

While there is no distinction between graduate and

5 Diskusija

Iako nema razlike između diplomskih i prijediplom-

undergraduate students regarding the use of AI tools for assignments, a difference does emerge when considering the utilization of AI tools specifically for programming assignments among graduate and undergraduate students. It is essential to note that only 14 responses were gathered from graduate students, necessitating further research for a comprehensive understanding.

From the survey it is clear that students use the AI tool mostly for programming. The utilization of AI tools for debugging and learning is not perceived as an issue. However, the elevated reliance on these tools for generating either partial or complete solutions is a cause for concern and should be addressed appropriately. This observation is evident from the enumerated benefits and downsides. Students perceive the potential for assistance in learning and faster assignments solving. But do they really learn faster? What is concerning is that the primary issue with AI tools, as identified by students, is their occasional generation of incorrect answers and inability to solve entire assignments. Surprisingly, only 7 out of 84 students mentioned ethical issues associated with using such tools. Of the total, 27 students recognize that the improper use of tools can result in knowledge gaps, constituting approximately 30%. This leaves around 70% who did not raise this particular concern.

Based on this, it becomes evident that supporting the suggestion made by other studies, students require additional instructions and information on the correct utilization of tools. Prohibiting the use of AI tools outright is not feasible. Despite the existence and enhancement of tools designed to verify the authenticity of text or code generation, the AI tools themselves will continue to evolve. One potential scenario is the commercialization and restriction of access to many AI tools, which may potentially reduce their usage among students, although this remains uncertain.

As some students acknowledged, teachers need to design more complex assignments and enhance their assessment methods to better evaluate understanding. In this context, traditional pen-and-paper exams still play a crucial role. Efforts should be made to prevent the easy copying and pasting of assignments into AI tools. Providing students with a picture in the assignment that needs to be developed could be more effective, as it requires them to put effort into describing the problem, which might not be trivial. Our hope is that some students understand the downsides and will assist their colleagues in understanding them as well.

Compared to (Saari et al., 2022), where 35% of students reported not using the tool, our results indicate a significantly lower percentage, with only 5% of students reporting no tool usage. Additionally, while (Saari et al., 2022) reported a 25% usage for debugging, our findings show a notably higher figure at around 61%. This variance could be attributed to either a

-skih studenata u vezi korištenja AI alata za zadatke, razlika se pojavljuje kada se razmotri korištenje AI alata posebno za zadatke iz programiranja među diplomskim i prijediplomskim studentima. Važno je napomenuti da je prikupljena samo 14 odgovora diplomskih studenata, što zahtijeva daljnja istraživanja radi potpunijeg razumijevanja.

Iz ankete je jasno da studenti uglavnom koriste AI alate za programiranje. Upotreba AI alata za otklanja-nje pogrešaka i učenje ne percipira se kao problem. Međutim, oslanjanje na te alate za generiranje djelo-mčnih ili potpunih rješenja izaziva zabrinutost i tre-balo bi ih adekvatno rješavati. Ova zapažanja proizlaze iz nabrojenih prednosti i nedostataka. Studenti perci-piraju potencijalnu pomoć u učenju i brže rješavanje zadataka. No, pitanje je postižu li zaista brže razu-mijevanje gradiva? Ono što zabrinjava jest da je pri-marni problem s AI alatima, prema studentima, njihovo povremeno generiranje netočnih odgovora i nesposob-nost rješavanja cjelovitih zadataka. Iznenadujuće je da samo 7 od 84 studenta spominje etičke probleme po-vezane s korištenjem takvih alata. Od ukupnog broja, 27 studenata prepoznaje da neprikladna upotreba AI alata može rezultirati rupama u znanju, što čini otpri-like 30%. To znači da oko 70% studenata nije izrazilo takvu zabrinutost.

Na temelju ovoga postaje očito da uvažavajući pri-jedloge drugih istraživanja, studentima trebaju dodatne upute i informacije o ispravnoj upotrebi AI alata. Pot-puna zabrana korištenja AI alata nije izvediva. Unatoč postojanju i poboljšanju alata dizajniranih za provjeru autentičnosti teksta ili generiranja koda, sami AI alatiće se nastaviti razvijati. Jedan potencijalni scenarij je komercijalizacija i ograničavanje pristupa mnogim AI alatima, što potencijalno može smanjiti njihovu upo-trebu među studentima, iako to nije sigurno.

Kako su neki studenti naveli, nastavnici trebaju osmis-liti složenije zadatke i poboljšati svoje metode procjene kako bi bolje procijenili razumijevanje od strane stude-nata. U tom kontekstu, tradicionalni ispiti s olovkom i papirom i dalje igraju ključnu ulogu. Trebalo bi uložiti napore kako bi se spriječilo jednostavno kopiranje za-dataka u AI alate. Davanje zadatka u obliku slike može biti učinkovitije od tekstualnog zadatka, jer je potreban trud u opisivanju problema, što nije nužno trivijalno. Nadamo se da će neki studenti shvatiti nedostatke AI alata i pomoći svojim kolegama da ih isto shvate.

U usporedbi s (Saari et al., 2022), gdje se 35% stu-denata izjasnilo da ne koristi alat, naši rezultati ukazuju na značajno niži postotak, sa samo 5% studenata koji nisu koristili alat. U usporedbi s (Saari et al., 2022) gdje se stopa korištenja od 25% odnosi na otklanjanje pogrešaka, naša istraživanja pokazuju primjetno veću brojku od otprilike 61%. Ova razlika može se pripisati

distinct group of students or, more likely, the evolving landscape over time, with AI tools now being more widely accepted.

What we perceive as a potential issue is that in the EU, the "Bologna Process" (Bobić et al., 2005) of teaching in higher education, which emphasizes continuous learning and regular homework assignments may now be endangered by the widespread use of AI tools. With this in mind, it becomes essential for us to revisit and reassess our evaluation models, as well as reexamine our teaching strategies.

6 Conclusion

The widespread use of AI tools has become a reality, and students will use them regardless of whether they are allowed or not. While it's unsurprising that ChatGPT is a prevalent choice, it's evident from the survey that many other tools are also in use. Given the inevitable use of AI tools, the most prudent approach is to educate students on their usage, outlining both the benefits and ethical concerns associated with them. Teachers should emphasize the positive aspects of these tools while taking on the responsibility of instructing students on their responsible use, including awareness of potential harm to themselves and/or others. Additionally, there is a need for concurrent changes in evaluation methods aligned with evolving educational challenges.

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različitoj skupini studenata ili ono što je vjerojatnije, promjenama tijekom vremena, i sve većom prihvaćenošću AI alata.

Ono što prepoznajemo kao potencijalni problem je da bi "Bolonjski proces" (Bobić et al., 2005) visokog obrazovanja u EU, koji naglašava kontinuirano učenje i redovne domaće zadaće, sada mogao biti ugrožen zbog širokog korištenja AI alata. S obzirom na to, postaje ključno ponovno razmotriti i procijeniti naše modele vrednovanja, kao i ponovno ispitati naše metode poučavanja.

6 Zaključak

Sveprisutno korištenje AI alata postalo je stvarnost i studenti će ih koristiti bez obzira jesu li dopušteni ili ne. Iako nije iznenađujuće da je ChatGPT čest izbor, očito je iz ankete da se koriste i mnogi drugi alati. S obzirom na neizbježnu upotrebu AI alata, najrazboritiji pristup je educirati studente o njihovoj upotrebi, ističući prednosti, ali i etička pitanja povezana s njima. Nastavnici bi trebali naglasiti pozitivne aspekte ovih alata, preuzeti odgovornost za upućivanje studenata na njihovu odgovornu upotrebu, uključujući podizanje svijesti o mogućim štetnim posljedicama za njih i/ili druge. Konačno, potrebne su promjene u metodama vrednovanja koje su usklađene s novim izazovima u obrazovanju.

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