Digital Transformation in Higher Education – Student's Angle

Tomislav Kesić[1], Denis Alajbeg[2], Luka Kučer[3]

[1]Zagreb School of Economics and Management, Zagreb, Croatia, tkesic@zsem.hr
[2]Zagreb School of Economics and Management, Zagreb, Croatia, dalajbeg@zsem.hr
[3]Zagreb School of Economics and Management, Zagreb, Croatia, lkucer@zsem.hr

Abstract

Digital transformation has been one of the key topics among the academic community over the last few decades and is one of the major forces shaping the behavior of both private individuals and legal entities. Digital transformation in higher education, especially involving artificial intelligence, will have significant consequences for higher education, just as it has already had for other sectors and economic participants. The goal of this paper was to provide insight in the use of generative AI from the students perspective mainly connected to their academic AI usage, and its benefits and downsides. In order to accomplish this goal, an extensive survey involving 92 students at the Zagreb School of Economics and Management regarding the use of generative AI was conducted. The study further confirmed that there are multiple areas where generative AI can assist students with their academic progress and teaching, while also stressing some of the apparent limitations of these tools. These results additionally highlight the need for thoughtful integration of AI into university education and policies.

Keywords: *Digital transformation, higher education, digitalization, students, ChatGPT, generative AI.*

1. Introduction

Digital transformation has been one of the key topics among the academic community over the last few decades and is one of the major forces shaping the behavior of both private individuals and legal entities. Digital transformation in higher education, especially that involving artificial intelligence, will have significant consequences for higher education, just as it has already had for other sectors and economic participants.

The goal of this paper was to provide insight in the use of generative AI from the students' perspective mainly connected to their academic AI usage, and its benefits and downsides. Various benefits and potential drawbacks of this transformation will be investigated. More

specifically, the paper focuses on literature concerning digital transformation, which has taken another significant step forward following the emergence of ChatGPT. The advent of generative AI technology has enabled higher education institutions to approach student education in entirely new ways, aiming to achieve better learning outcomes using these technological advances.

2. Review of the Scientific Literature

As a variety of businesses are undergoing digital transformation through Industry 4.0 (Fourth Industrial Revolution – the integration of advanced digital technologies into industrial processes), the same process seems inevitable for higher education institutions. Although the applications of AI in this sector are immense, many benefits may be forfeited if faculty engagement in adopting AI is inadequate [1]. The education and beliefs of AI educators should also be strengthened to enable faculty to fully benefit from the new technology [2]. According to these authors, AI technology has also introduced challenges, such as issues with student academic integrity and potential future employment concerns arising from the emergence of new technologies.

A balanced approach to AI usage is generally considered the best way to maximize the apparent benefits while mitigating some of the disruptive effects of new technology. One issue raised by Farrelly and Baker [3] is the occurrence of false positives in AI detection software, which could disproportionately affect certain student groups, such as international students or students with disabilities. While AI generators are advancing daily, another potential challenge is that the generated text may be inaccurate or even false. The issue of errors and hallucinations in AI generated content remains a significant challenge [4]. Although chatbots are improving rapidly, their ability to confidently provide false information is concerning, especially since one might expect false information to be limited to human-driven interactions.

In addition to the aforementioned issues, other shortcomings of AI usage in higher education institutions include the potential displacement of employees, concerns about educational quality, and privacy breaches [5]. Although the role of AI in higher education can be questioned in some respects, it is clear that recommendations, rulebooks, and regulatory frameworks for its application are almost non-existent. There is a pressing need for the introduction of institutional policies to help higher education institutions adopt a consistent approach to AI usage. According to Spivakovsky et al. [6], AI can be utilized in various segments of higher education, including classroom support, learning analytics, simulation-based learning, meeting individual student needs, and providing active learning experiences through simulations.

Individualization in learning can be achieved by recognizing and tailoring the learning needs of each student, using customized materials, and receiving feedback from students [7]. The key to realizing these benefits and incorporating them into policymaking is understanding that a transformation of this magnitude cannot occur in isolation. All stakeholders-including industry sectors, educational institutions, and regulators-must collaborate to guide this transformation in the right direction [8].

A potential alternative to the lack of sufficient regulatory infrastructure could be the introduction of AI generator technology through the curriculum. Although this may seem like a bottom-up approach, AI generators could be utilized in two main areas: omitting irrelevant content and extending curricular experiences through AI [9]. The authors further divide the omission of irrelevant content into curriculum streamlining and relevance, which enhances student engagement and supports personalized teaching approaches. Extended curricular experiences via AI are categorized into curriculum enhancement through AI, creative and engaging learning with ChatGPT, and personalized, dynamic learning strategies.

One important stakeholder to consider in the digitalization process is the student. Student perceptions of AI are generally positive. Major benefits from the student perspective include personalized learning, increased engagement, and the promotion of critical thinking. However, students were less positive about the impact of AI on practical, handson learning [10].

3. Methodology

The data for this study was collected through a student survey that examined the use, attitudes, and perceptions of artificial intelligence (AI) systems among students participating in various courses at ZSEM. Each figure presented corresponds to a specific aspect of the survey, with interpretations provided in an integrated, narrative academic style inspired by Walczak and Cellary [4], emphasizing context, implications, and potential consequences for educational practice and policy. The survey consisted of 18 closed-ended questions with multiple-choice options, allowing respondents to select from predefined answers.

The participants were surveyed between December 2024 and April 2025 among the students of the Zagreb School of Economics and Management. In total, 92 students participated: 52 (56,52%) were undergraduate students in their second, third, or fourth year, while the remaining 40 (43,48%) were enrolled in MBA programs at ZSEM.

Most respondents were enrolled in the Financial Institutions and Markets course (33 participants, 35,9%) and the Financial Management course (23 participants, 25%), together accounting for over 60% of the sample. Other courses represented included Public Finance (19 participants, 20,65%), Principles of Finance (9 participants, 9,78%), and Corporate Finance (8 participants, 8,7%). This concentration reflects a strong representation of students from fields typically characterized by exposure to data-driven and analytical content.

Of the 92 participants, 55 identified as male (59,78%), 36 as female (39,13%), and one as non-binary/other (1,09%).

4. Generative AI Survey Results

The aim of the survey was to determine the basic attitudes towards the use of AI chatbots among students in Croatia, based on a sample of 92 students at the Zagreb School of Economics and Management. According to the study the vast majority of students were already familiar with the use of AI technology, indicating that younger generations are highly receptive to adopting new technologies. Almost 95,65% of respondents had used AI systems before, while only 4,35% had not. When asked for what purpose they had used ChatGPT or other generative AI, students provided the following answers, listed from most to least common: To search for information (19,34%), To find a solution to a problem (16,98%), To understand a difficult subject (14,86%), To generate a summary of a text/book (12,03%), Out of curiosity (11,08%), To translate a text into another language (9,67%), To generate an essay on a topic assigned at university (8,96%), For programming/coding/excel (7,08%). Over 50% of responses were concentrated in the first three categories, indicating that students primarily use artificial intelligence for additional clarification, to refine their understanding of complex topics, and to gain new insights (Figure 1).

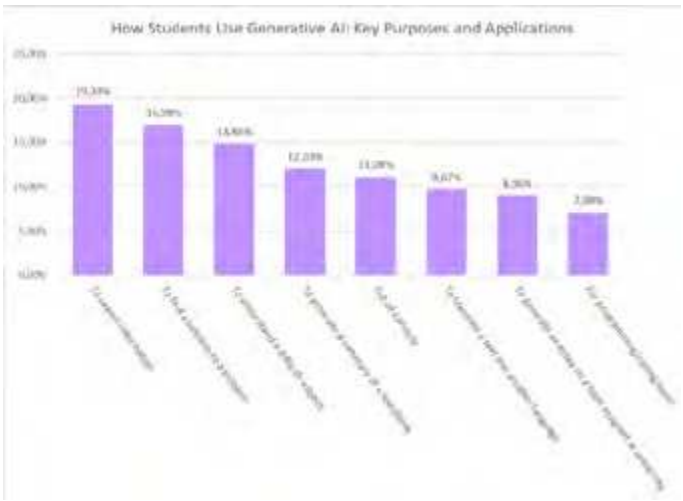

Figure 1 How Students Use Generative AI: Key Purposes and Applications
(*source: Authors' calculation 2025*)

As shown in the Figure 2, besides the aforementioned points, most students use AI tools equally for academic, personal, and professional purposes. However, there is a clear bias toward academic use, as the majority of students are not full-time employees.

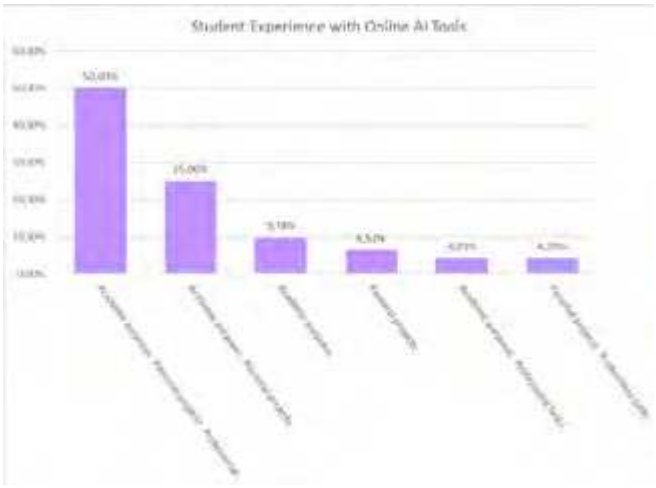

Figure 2 Student Experience with Online AI Tools
(*source: Authors' calculations 2025*)

Students use AI generators for a variety of academic purposes, from completing homework to preparing for classes, with usage distributed evenly across these activities. Additionally, 32,61% of students reported using generative AI tools even when specifically instructed not to, while the remaining 67,39% respected the restriction. As shown in Figure 3, within academic contexts, AI was most commonly used to solve homework assignments and complete projects, and somewhat less frequently to provide explanations needed for understanding classes and tests. Tools available to professors were successful in detecting prohibited AI usage for assignment completion in only 53,26% of cases. This suggests that detection tools are still lagging behind AI generators, indicating there is significant room for improvement in software designed to identify AI-assisted work

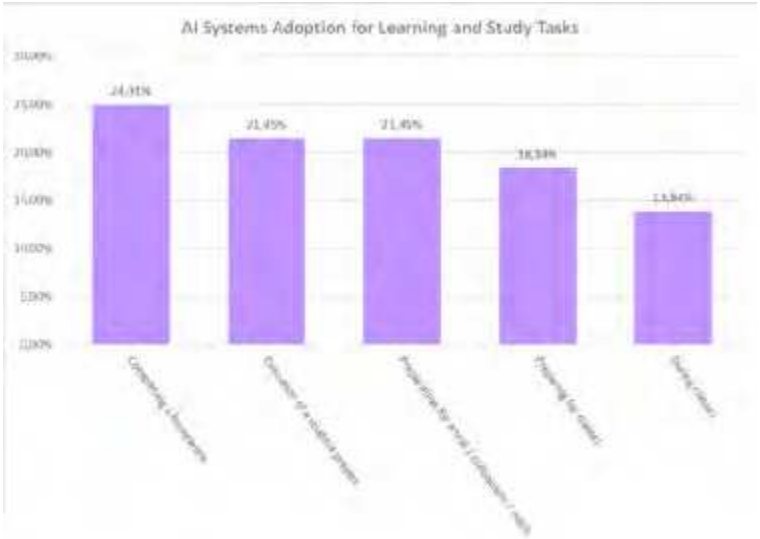

Figure 3 AI Systems Adoption for Learning and Study Tasks
(*source: Authors' calculations 2025*)

According to the responses to the question, "Why didn't you use generative AI to create files such as PowerPoint (pptx) and Excel (xlsx)?", shown in Figure 4, this appears to be an area where improvements can be expected in the future. It seems that generative AI is not yet sufficiently developed to handle more complex tasks at the desired quality, and, in part, students may not yet be skilled enough in prompting the AI to achieve the desired output. The results in Figure 4 show that over 60% of students believe AI is still not up to the task-either because the output did not meet their standards (29,35%), they were unaware of this functionality (22,83%), or it was only available in the paid version (9,78%). Additionally, 38,08% of students indicated that they preferred to maintain full control over the output.

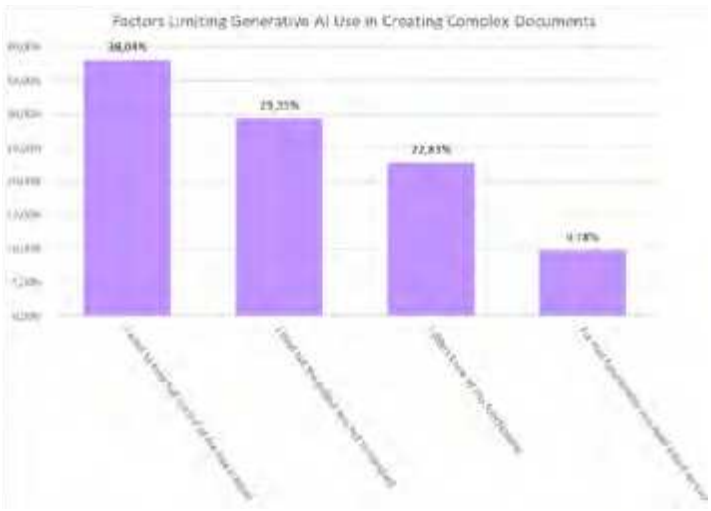

Figure 4 Factors Limiting Generative AI Use in Creating Complex Documents
(*source: Authors' calculation 2025*)

Around 55% of students individually refined the output generated by AI tools, while another 35% used the AI tool itself to further refine the initial output (Figure 5). As shown in Figure 5, only 10% of participants considered the initial version of the documents to be sufficiently well done from the start. This suggests that AI tools still require oversight and a "human touch." However, it is notable that almost half of the students did not contribute their own effort to editing the original AI-generated work, aside from providing additional prompts. Additionally, nearly 10% of students felt there was no need to intervene in the generative AI output at all.

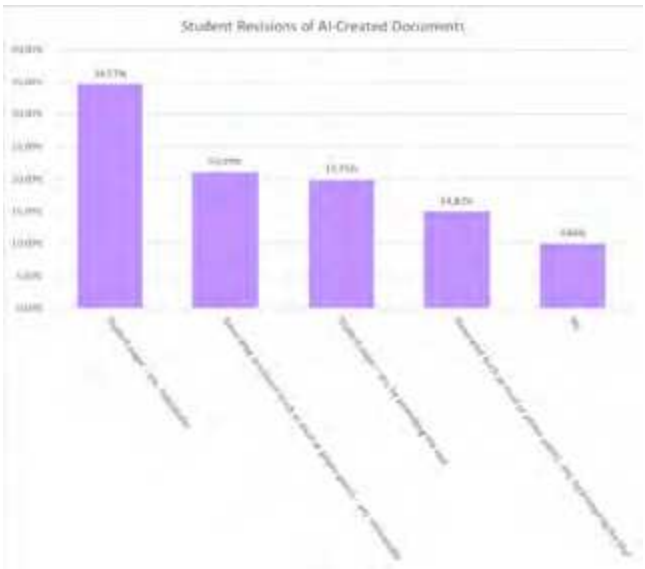

Figure 5 Student Revisions of AI-Created Documents
(*source: Authors' calculation 2025*)

Even more students – 60,87% of participants-were satisfied with the final output when it came to quantitative or visual documents, while 39,13% were not satisfied with the AI-generated files. This is particularly interesting in the context of questions about the need to learn about generative AI at universities. Nine out of ten students believe that generative AI should be taught at universities, and the same proportion (91,3%) think that generative AI skills will be sought after by their future employers. Surprisingly, although 91,3% of participants consider generative AI usage a necessary skill, a much lower number – 66,3% believe that the mandatory use of AI in their studies was a worthwhile endeavour. When all factors are considered, over 90% of students prefer predominantly human interaction in teaching, while less than 10% would prefer primarily AI-based learning (Figure 6).

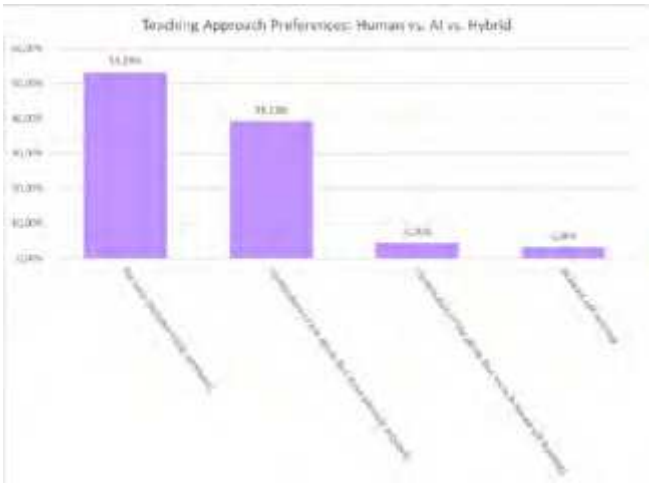

Figure 6 Teaching Approach Preferences: Human vs. AI vs. Hybrid
(*source: Authors' calculation 2025*)

An interesting finding is that at least part of the teaching could be replaced by AI, according to 60,87% of students, and students fully expect this to happen (Figure 7). On the other hand, students are not as enthusiastic about having their personal achievements graded by AI, with 60,87% indicating they would not want AI to grade their exams (Figure 8). This is notable, as one might expect generative AI to be more consistent in grading compared to human teachers.

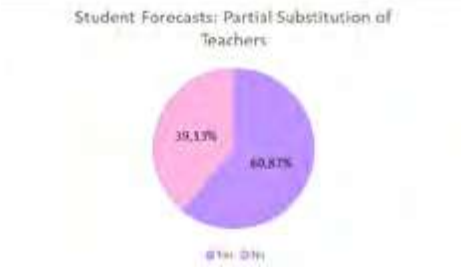

Figure 7 Student Forecasts: Partial Substitution of Teachers
(*source: Authors' calculation 2025*)

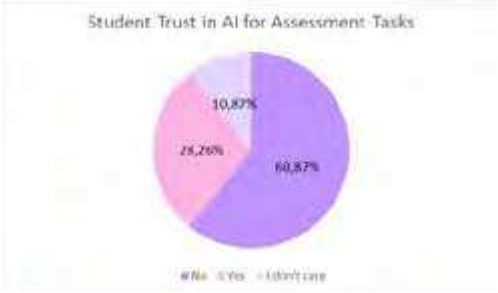

Figure 8 Student Trust in AI for Assessment Tasks
(*source: Authors' calculation 2025*)

The answers regarding outdated skills attained at the university based on the developed AI tools are sorted below (Figure 9): Writing short texts in native language (18,48%), Other skills (17,06%), Writing short texts in foreign language (17,06%), Writing long texts in native language (14,22%), Preparing presentations on a given topic (9,95%), Solving mathematical tasks (9,00%), Preparing multimedia content (images, videos, sounds, 3D models, animations) (7,58%), Programming computer applications / making models (6,64%). Most students feel that writing texts at the university level is becoming an obsolete skill, while mathematical tasks, creating multimedia content, and programming or modelling are considered somewhat less obsolete in the context of AI advancements.

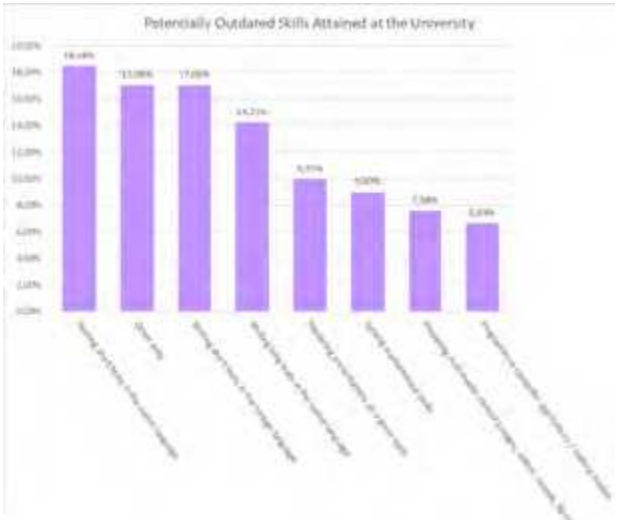

Figure 9 Potentially Outdated Skills Attained at the University
(*source: Authors' calculation 2025*)

The majority of open-ended responses in Table 1 given by students at the end of the survey indicate that AI is a great tool, useful in its own way, but it cannot fully replace the human mind, personal contact, or the personal touch. In addition, students emphasized that the use of AI (and modern technologies in general) should be properly incorporated and encouraged at universities, as this is seen as a very important skill for future professionals.

Open Question Answers	
1	Effect of AI predictions of the stock market and other markets? Effect of AI on conducting analysis in work environment? Effect of AI on human knowledge? Is AI making us idiots that are too lazy to find the answers on our own?
2	I love AI and like any great technology with great power comes great responsibility
3	AI is good but it can't replace humans
4	It would be interesting to study deeper the possible ways in which AI could evolve in the future.
5	Make them available for school projects, but teach us how to use it the correct way
6	Teaching about proper Generative AI use should be included in curriculum
7	I personally feel that generative AI is more of a guiding tool for students, as it helps them solve queries and generate answers for any assignment. Although downsides like total dependency might occur.
8	The proper use of AI should be taught in school, for one of my internships, I was taught how to prompt AI to create emails for reaching out to clients and potential clients, and it was extremely useful for that role.
9	AI is definitely here to stay and education should incorporate it into its studies to teach students how to use it in a proper way because it can be a exceptional tool for self education in many different topics
10	I believe that education about artificial intelligence and how to use it properly should be introduced into compulsory high school education, as well as in colleges. It is certainly necessary to educate the general public about how artificial intelligence is used and how much it can help on a daily basis. Of course, with the mandatory emphasis on the importance of learning and developing one's own competences, which could then be used when using artificial intelligence.
11	Everything in AI are good
12	AI can be included in some courses in which it has capacity to help
13	Well there are a lot of very thought provoking questions regarding AI and i would argue one of the most interesting would be how AI can solve a lot of issues and problems but is optimism blinding us when it come to what the world will look like after AI. What i mean by this is a lot of people have a lot of predictions about AI its capabilities and how its going to interact with real world. Should we calm down and reanalyze our optimism and along with the AI hype should their be revaluation to more pressing issues that cannot be solved with AI.
14	I think that Generative AI is becoming more and more an important tool among the people. I believe that would be better if it would act more as human.
15	I think professor should adopt to it and not tell us not to use it because we are all using it so it's better to promote the usage and teach us how to do it rather than punish us. At my work I am encouraged to use it so that I can focus on other more important things like learning a new skill.

ISSN 2991-9371

16	Education needs to adapt quickly to AI opportunities. Projects and tests can be done in seconds if the student does not mind cheating.
17	AI is sometimes good at explaining math, wish it were more accurate on the solutions though.
18	I believe that AI is still in its early stages and that were are seeing it grow very rapidly because of how low we had started. I am not necessarily afraid of what AI will do but what AI will not have us do, that we will become lazier and perhaps rely on it too much due to how convenient it is. I think it is a good tool for learning and perhaps aiding in certain tasks when it comes to homework such as research as the later versions (paying) of AI's such as Chat GPT or Perplexity cite their sources and you can double check what they have just told you.
19	I think that generative AI is still a work in progress but it will have serious implications in the future regarding to its use in academics and everyday life.
20	I think a course to know better AI in the future is very importante because AI will take a big place in our life
21	probably some researches based on why Generative AI cannot replace human, because a lot of research has been done on why it can replace

Table 1 Open Answers
(*source: Authors' compilation 2025*)

5. Discussion

The findings of this study align with previous research highlighting the growing integration of AI technologies in higher education and the openness of students and faculty toward adopting such tools [1,10]. Similar to Walczak and Cellary [4], our results underscore both the opportunities and challenges posed by generative AI. While students demonstrate strong engagement and recognize the benefits of AI for academic tasks, concerns regarding academic integrity and the accuracy of AI-generated content remain prevalent. This duality reflects an ongoing tension between embracing innovation and maintaining rigorous educational standards.

For professors and university policy makers, these insights emphasize the importance of developing balanced strategies that integrate AI proficiency into curricula without compromising ethical standards. Formal instruction on generative AI skills appears essential, given students' consensus on its future career relevance. However, voluntary and thoughtful adoption, supported by clear guidelines and improved detection mechanisms, will be crucial to address concerns about misuse and preserve the value of human oversight. Universities should thus aim to foster digital literacy, promote responsible AI usage, and encourage faculty engagement to navigate the complexities of digital transformation effectively.

6. Conclusion

The survey results demonstrate strong familiarity and engagement with AI technologies among ZSEM students, particularly with generative AI chatbots like ChatGPT. Nearly all respondents have used AI tools, primarily for academic purposes such as searching for information, solving problems, and clarifying difficult subjects. This reflects the openness and adaptability of younger generations towards emerging technologies and their willingness to incorporate AI into their learning processes.

Despite the widespread use and recognized benefits of AI, students also acknowledge its current limitations. Many reported that AI-generated outputs often require human refinement and oversight to meet academic standards, especially for more complex tasks such as creating presentations or spreadsheets. Additionally, a significant portion of students admitted to using AI tools even when prohibited, highlighting ongoing challenges in academic integrity and the need for more effective detection tools.

Students overwhelmingly prefer human interaction in teaching, with over 90% favoring predominantly human-led education and expressing reluctance to have AI fully replace teachers or grade exams. This preference underscores the value they place on personal contact, nuanced understanding, and the "human touch" in education-elements that AI cannot yet replicate.

At the same time, there is strong consensus that generative AI skills should be formally taught at universities, with more than 90% of students recognizing AI proficiency as a critical skill for their future careers. However, fewer students support mandatory AI use in coursework, suggesting some ambivalence about enforced integration and a desire for balanced, voluntary adoption.

The findings also indicate a shift in perceptions of traditional academic skills. Writing short texts in native and foreign languages is increasingly viewed as less essential, likely due to AI's ability to assist or automate such tasks. Conversely, skills related to mathematics, multimedia content creation, and programming remain more valued, reflecting areas where human expertise is still crucial.

Students view AI as a powerful and valuable tool that enhances learning and productivity but believe it should complement rather than replace human educators. They emphasize the importance of responsible AI integration in higher education, including the development of digital literacy, ethical guidelines, and effective detection mechanisms. Preparing students to use AI thoughtfully and skilfully will be essential for meeting the demands of the evolving professional landscape and ensuring that technology serves to augment, not diminish, human potential.

Generative AI is poised to significantly reshape higher education, augmenting the learning experience and productivity of students. However, its successful integration hinges not only on technical proficiency but also on the cultivation of responsible use, ethical awareness, and critical thinking. As AI becomes an ever-larger part of academic and professional life, it is crucial

for universities to equip students with digital literacy skills and to foster a mindset that goes beyond mastering the tools — one that emphasizes integrity, thoughtful engagement, and adaptability. By doing so, higher education can ensure that technology serves to strengthen, rather than diminish, the essential human qualities at the heart of learning and professional success.

The main limitation of the survey was the relatively small number of participants, all of whom were students at the Zagreb School of Economics and Management. In addition, the students involved in the study were mainly focused on finance programs, and the study might leave out students who are more interested in other areas of business and other sciences altogether. As for recommendations for future research, it appears that the use of AI generators by both educators and students, especially in conjunction with other programs (e.g., MS Excel), remains under-researched and could be a valuable area for scientific investigation.

7. References

[1] Rahiman, H.U., & Kodikal, R. (2024). Revolutionizing education: Artificial intelligence empowered learning in higher education. Cogent Education, 11. http://dx.doi.org/10.1080/2331186X.2023.2293431

[2] Xia, Q., Weng, X.J., Ouyang, F., Lin, T.J., & Chiu, T.K.F. (2024). A scoping review on how generative artificial intelligence transforms assessment in higher education. International Journal of Educational Technology in Higher Education, 21. http://dx.doi.org/10.1186/s41239-024-00468-z

[3] Farrelly, T., & Baker, N. (2023). Generative artificial intelligence: Implications and considerations for higher education practice. Education Sciences, 13, Article 1109. http://dx.doi.org/10.3390/educsci13111109

[4] Walczak, K., & Cellary, W. (2023). Challenges for higher education in the era of widespread access to generative AI. Economics and Business Review, 9, 71-100. http://dx.doi.org/10.18559/ebr.2023.2.743

[5] George, B., & Wooden, O. (2023). Managing the strategic transformation of higher education through artificial intelligence. Administrative Sciences, 13. http://dx.doi.org/10.3390/admsci13090196

[6] Spivakovsky, O.V., Omelchuk, S.A., Kobets, V.V., Valko, N.V., & Malchykova, D.S. (2023). Institutional policies on artificial intelligence in university learning, teaching and research. Information Technologies and Learning Tools, 97, 181-202. http://dx.doi.org/10.33407/itlt.v97i5.5395

[7] Castro, G.P.B., Chiappe, A., Rodríguez, D.F.B., & Sepulveda, F.G. (2024). Harnessing AI for Education 4.0: Drivers of personalized learning. Electronic Journal of E-Learning, 22, 1-14. http://dx.doi.org/10.34190/ejel.22.5.3467

[8] Jung, I. (2024). Personalized education for all: The future of open universities. Open Praxis, 16, 24-36. http://dx.doi.org/10.55982/openpraxis.16.1.612

[9] Kartas et al., 2024). Karataş, F., Eriçok, B., & Tanrikulu, L. (2025). Reshaping curriculum adaptation in the age of artificial intelligence: Mapping teachers' AI driven curriculum adaptation patterns. British Educational Research Journal, 51(1), 154-180.

[10] Capinding, A.T., & Dumayas, F.T. (2024). Transformative pedagogy in the digital age: Unraveling the impact of artificial intelligence on higher education students. Problems of Education in the 21st Century, 82, 630657. http://dx.doi.org/10.33225/pec/24.82.630