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Integrating Artificial Intelligence into Economics Education: A Case Study on Educational Innovation in Türkiye

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Abstract

This study examines the role of artificial intelligence (AI) as a student support tool in higher education, specifically analyzing its benefits, limitations, and ethical challenges. The research explores students' perceptions of AI, its impact on academic performance, and accessibility issues Utilizing a qualitative case study approach, the study was conducted with students enrolled in the Environmental Economics course at Istanbul University, Faculty of Economics Data were collected through focus group interviews to assess experiences with AI tools Findings indicate that students view AI as a valuable asset that enhances productivity and facilitates learning by providing rapid access to information However, concerns persist regarding the "robotic" quality of AI content, potential inaccuracies, and originality issues Additionally, the study identifies digital inequality arising from paid AI features By shifting the focus from the predominant medical applications of AI in Türkiye to the social sciences, this research fills a significant gap in the literature on AI integration in economics education.

Keywords: artificial intelligence, higher education, AI in higher education, student attitudes, digital literacy.

1. Introduction

Artificial intelligence (AI), one of the leading innovations in technology, is becoming an integral part of higher education processes today. The integration of AI into higher education represents a critical juncture for pedagogical innovation, particularly within the social sciences, where data-intensive reasoning and applied problem-

solving are central to learning outcomes. A systematic review highlights the rapid proliferation of AI tools in educational settings, indicating a marked increase in their application over the past five years (Crompton and Burke, 2023). With digital transformation, AI applications facilitate access to information, accelerate analysis processes, and redefine learning experiences for academics and students (Luckin *et al*., 2016; Holmes *et al*., 2019). In recent years, AI-supported platforms like ChatGPT have particularly helped students increase efficiency in academic tasks, including idea development, text creation, and literature review. This highlights the democratizing effect of AI on access to knowledge, but also raises new issues, such as information accuracy, ethical concerns, and digital inequality (Baker and Smith, 2019; Williamson, 2018).

The use of AI in higher education institutions not only facilitates students' access to information but also provides an infrastructure that supports the development of critical thinking, analytical skills, and problem-solving processes in students (Aoun, 2017). While AI is seen as a tool to improve students' academic performance, many studies emphasize the need to strengthen digital literacy skills to use this technology effectively in higher education. Digital literacy requires approaching the information provided by AI tools with a critical perspective and evaluating their accuracy (Selwyn, 2019). Therefore, students' interactions with AI are not only limited to the use of technology, but the impact of these interactions on students' academic and personal development also emerges as an essential research topic (Williamson, 2018; Holmes *et al*., 2019).

In the literature, considerable attention is given to both the opportunities and challenges of integrating AI technologies into education. AI is recognized for its ability to create personalized learning experiences and enhance academic processes by accelerating students' access to information (Seldon and Abidoye, 2018). It supports tasks such as text summarization, language translation, and data analysis, as well as stages like literature review, idea development, and topic narrowing (Luckin *et al*., 2016; Aoun, 2017). However, researchers have raised significant concerns about the accuracy of information, the ethical implications of AI usage, and digital inequality, all of which can hinder the effective adoption of AI in education (Baker and Smith, 2019; Holmes *et al*., 2019).

In Türkiye, AI research in higher education has predominantly focused on medical and health-related fields, demonstrating its transformative potential across disciplines such as dentistry, medical education, and clinical diagnostics. Yüzbaşıoğlu (2020) and Yılmaz *et al*. (2024) highlighted both optimism and gaps in dental students' knowledge and attitudes toward AI, emphasizing the need for its integration into dental curricula while recognizing its role in improving diagnostics and treatment planning. In medical education, Civaner *et al*. (2022) conducted a nationwide survey with over 3,000 medical students, revealing enthusiasm for AI's potential to enhance diagnostic accuracy alongside concerns about its impact on professional values, such as patient-physician relationships and confidentiality. In

contrast, research in fields such as computer science has focused on educational outcomes, with Yılmaz and Karaoğlan Yılmaz (2023) examining the impact of generative AI tools such as ChatGPT on students' computational thinking skills, programming self-efficacy, and motivation. Despite these advances, a notable gap remains in research addressing AI's use in the social sciences, particularly in disciplines such as economics.

In economics, the case for AI integration is strengthened by two converging dynamics: traditional curricula often struggle to deliver personalized learning and practical skill application, potentially widening the gap between theory and real-world economic problems (Wan et al., 2025), while generative AI tools have demonstrated strong technical proficiency in the domain—e.g., ChatGPT performing in very high percentiles on standardized microeconomics and macroeconomics assessments (Geerling et al., 2023). This combination challenges the adequacy of conventional assessment practices and points toward "AI-empowered" reforms that emphasize interdisciplinary integration, data analysis, and higher-order reasoning over rote memorization. Recent studies highlight that economics is particularly well-suited for AI integration due to its reliance on data-driven analysis and complex modeling (Stöhr *et al*., 2024). However, in Türkiye, little attention has been given to how AI could transform learning and research processes in social sciences, highlighting an important avenue for future investigation. This study, conducted specifically with students in the Environmental Economics course at Istanbul University Faculty of Economics, aims to address this gap in the literature by exploring the role and implications of AI in social sciences education.

This study aims to explore the multifaceted impact of AI technologies on students by addressing the following research questions: (1) How are students introduced to AI, and what are their perceptions of this technology in the context of their academic lives? (2) What academic tasks do students perform using AI tools, and how do these tools affect their academic performance? (3) What ethical and technical challenges do students face when using AI in their educational activities? Through a qualitative analysis, the study aims to explore the opportunities AI offers to enhance students' academic achievement while examining their concerns about the reliability, accuracy, and authenticity of information generated by these tools. Furthermore, this research explores broader issues, including digital literacy and the implications of AI for academic integrity. It also aims to contribute to the existing literature by evaluating the conditions necessary for the effective and responsible integration of AI technologies in education. By addressing these questions, the study provides insights into AI's benefits and limitations in academic settings and offers recommendations for its future application.

The rest of the study is organized as follows: Section 2 details the methodology, explaining the qualitative research design, data collection through focus group interviews, and content analysis methods used in the study. Section 3 presents the findings, offering insights into students' experiences and perceptions of AI

technologies in their academic activities. Section 4 discusses these findings in light of the existing literature and addresses their implications for educational practices and policies. Finally, Section 5 concludes the study by summarizing the key insights, addressing its limitations, and offering recommendations for future research and policy development.

2. Methodology

The present study evolved from an earlier research project titled "The Effect of Environmental Economics Course on Young People's Ecological Awareness," conducted between April 1 and June 30, 2024, which aimed to explore how course content and implementation foster ecological awareness among third-year students at Istanbul University's Faculty of Economics. Data collection involved in-depth interviews with 17 students and assignments from 15 groups (82 students in total), who examined various environmental and economic issues in Türkiye, such as renewable energy, urban air pollution, biodiversity conservation, and waste management. Each group, consisting of three to six students, evaluated the economic and environmental impacts of local problems (Table 1). At the time of the course, the syllabus specified that the assignment similarity ratio should not exceed 20%. However, it included no explicit rules on AI use, as institutional policies were still evolving. During the analysis of the assignments, the widespread and varied use of artificial intelligence (AI) tools became increasingly evident. This unexpected finding prompted a shift in the research focus toward investigating the role, usage patterns, and implications of AI in higher education contexts.

Table 1. Assignment Groups in the Environmental Economics Class (2023-24 Spring Term)

No.	Group Name	Assignment Title	Students
1	Table of Five	Cost-Benefit Analysis of Renewable Energy Investments in Türkiye: Hydropower	5
2	Environmental Economics-Homework Group	Economic Analysis of Wildlife Trafficking and Illegal Trade in Türkiye	4
3	Undergraduates	Assessing The Implications of The European Green Deal: Opportunities and Challenges	6
4	Econmatic	Evaluation of Environmental Education Programs in Türkiye	4
5	Economic Case Circle	Cost-Benefit Analysis of Renewable Energy Investments in Türkiye: Biofuels	5

6	Green Economists	Economic Analysis of Urban Air Pollution in Türkiye	5
7	Greta's Soldiers	Defining Biodiversity Conservation in Türkiye	5
8	Group Blue	The Economics of Marine Resource Management in the Mediterranean Region	5
9	Guardians of the Galaxy	Cost-Benefit Analysis of Renewable Energy Investments in Türkiye: Solar Energy	5
10	The Masked Five	The Impact of Climate Change on Agriculture and Food Security in Türkiye	5
11	Nature Economics	Economic Analysis of Desertification in Türkiye	5
12	Don't Make Me Turn on My Greenhouse Gas	The Economics of Waste Management in Turkish Cities	6
13	The Last Disastrous Economy	Cost-Benefit Analysis of Renewable Energy Investment in Türkiye: Wind Energy	5
14	Social Anxiety Group	The Impact of Tourism on Coastal Ecosystems in Türkiye	6
15	Sustainable Breezes	Green Entrepreneurship and Green Innovation in Türkiye	5
16	Water Pollution Group	Investigating the Economic Costs of Water Pollution in Turkish Rivers	3
17	Green Future	Economic Analysis of Sustainable Transportation Policies in Turkish Cities	3
		TOTAL	82

Source: Obtained from research data.

This research is grounded in qualitative research methods, which are particularly effective for exploring individuals' experiences, perceptions, and the meanings they assign to their interactions. Qualitative research is widely recognized for its ability to provide detailed and nuanced insights into complex phenomena, making it a crucial approach in the social sciences (Merriam and Tisdell, 2016). By focusing on participants' lived experiences, this method enables researchers to gain a deeper understanding of how students interact with AI in educational contexts. Given the exploratory nature of this study, a qualitative approach was deemed the most suitable.

Within this qualitative framework, a case study design was chosen to enable an in-depth examination of students' use of AI in real-life contexts. Case studies are particularly valuable for investigating specific topics or situations within defined boundaries, as they allow researchers to capture the multidimensional nature of complex phenomena (2018; Yin, 2018). This approach facilitates a comprehensive analysis of students' interactions with AI, offering insights that extend beyond surface-level observations. By focusing on real-life experiences, the case study design ensures a rich understanding of how AI tools are integrated into students' academic and personal activities (Stake, 1995; Yin, 2018).

To further refine the study, an illustrative case study approach was employed. This type of case study is descriptive and aims to shed light on particular situations, often serving as a means to interpret data for readers who may be less familiar with the topic (Davey, 1991; Yin, 2018). By analyzing students' use of AI in a detailed and contextualized manner, the illustrative case study provides a framework for understanding broader patterns in educational technology research. This approach not only highlights the specific dynamics of AI usage in this study but also offers valuable insights for future research in similar contexts.

The present study included content analysis of assignments alongside similarity and AI contribution reports generated via the Turnitin program (Table 2). It is essential to note that while Turnitin offers AI detection features, the accuracy of these tools remains a topic of debate in the literature, as they can produce both false positives and false negatives. Therefore, in this study, AI detection scores were not shared with students and were used solely to guide participant selection for the focus group. This approach aimed to avoid bias and ensure that students' reflections were based on their own experiences rather than influenced by potentially inaccurate detection results. Additionally, a focus group interview was conducted on August 19, 2024, with six students selected from different assignment groups in which AI use was identified. Although seven students were invited, one was unable to participate due to health reasons. The interview consisted of two parts: the first examined how students initially encountered AI and whether it met their expectations, while the second focused on their use of AI in academic tasks, such as assignments and presentations, and its influence on their daily lives. Students also shared their perspectives on AI's future potential and opportunities. The study was approved by the Istanbul University Social and Human Sciences Research Ethics Committee (file number 2024/126).

Table 2. AI contribution reports of assignments

Assignment No.	Detected as AI *	Generated solely by AI**	AI-generated text revised by AI***
1	23%	13%	9%
2	60%	43%	17%
3	42%	42%	0%
4	87%	87%	0%
5	56%	56%	0%
6	33%	33%	0%
7	95%	95%	0%
8	68%	68%	0%
9	**0%**	**0%**	**0%**
10	30%	30%	0%
11	20%	20%	0%
12	41%	41%	0%
13	24%	24%	0%
14	80%	45%	35%
15	**0%**	**0%**	**0%**
16	35%	35%	0%
17	45%	45%	0%

* The percentage indicates the total amount of texts likely generated by AI and texts generated by AI with possible AI adjustments.

** Likely a text generated by a large language model with AI.

*** Likely a text revised using an AI editing tool or word processing software with AI assistance.

Source: Obtained from research data.

The students for the focus group interview were selected using criterion sampling, a common approach in qualitative research, based on their use of AI in their assignments. The criterion sampling method enables the selection of individuals with specific characteristics, providing detailed information relevant to the research topic (Patton, 2002). The focus group interview could not be conducted face-to-face due to

the university's summer vacation; instead, it was conducted online via Zoom. Online focus group interviews are increasingly preferred in social research because they offer flexible data collection opportunities that overcome geographical constraints (Stewart and Williams, 2005). A semi-structured focus group interview form was used, intended to be flexibly directed to the participants. Participants were asked to sign an informed consent form prior to the focus group interview. The semi-structured form provides the researcher with the opportunity to obtain in-depth information from participants' responses while remaining within a specific framework (Krueger and Casey, 2014). The interview process was recorded and then transcribed, making it ready for analysis. Data analysis was conducted using the MAXQDA Qualitative Data Analysis program. Computer-assisted qualitative data analysis programs facilitate the systematic and reliable organization and analysis of data (Silver and Lewins, 2014).

This study employed thematic analysis. Thematic analysis is a flexible analytical method focused on identifying, analysing, and reporting recurring patterns of meaning within qualitative data (Braun & Clarke, 2006). This approach offers the researcher the opportunity to examine the data in both detail and holistically, while providing high methodological flexibility due to its compatibility with different theoretical paradigms (Braun & Clarke, 2019). In this respect, thematic analysis is considered a powerful analytical tool, particularly in studies aiming to reveal participants' experiences, perceptions, and ways of making sense of things (Nowell et al., 2017).

This case study and focus group interviews aimed to explore how students use AI as an academic support tool and how they perceive the associated challenges within their unique learning contexts. In this context, this qualitative approach to understanding students' interactions with AI offers a comprehensive and in-depth perspective on the role of AI in education. Various methods were used to ensure the study's validity. Yin (2018) suggests considering different types of validity, such as construct validity, internal validity, and external validity. For the construct validity of the research, a chain of evidence was tried to be created regarding the data collected during the focus group interview; similar patterns were asked of other participants; in addition, the case study report was read by a participant from whom data was collected during the data collection process and their opinions were taken (Yıldırım and Şimşek, 2008).

3. Findings

This study comprehensively explores students' introduction to AI, the ways and purposes for which they use this technology, the benefits they derive from these experiences, and the challenges they encounter. First, the starting points of students' use of AI and the ways they were introduced to it were examined. Issues such as the tools and devices through which students first encountered AI, the reasons for its use, and the extent to which this technology meets students' expectations were discussed

in detail. In the academic context, the use of AI by students in preparing assignments, making presentations, and performing other academic tasks was evaluated. The findings also include positive and negative statements about AI, the challenges it poses, and students' use of AI in their daily lives. Finally, students' views and expectations about the future role of AI constitute a critical dimension of the research. This comprehensive analysis examines how AI has become an integral part of students' academic and personal lives, exploring their diverse perspectives on this technology.

The Beginning of AI Use: In the first part of our focus group discussion, we explored how students were introduced to artificial intelligence. Most students reported that they began using artificial intelligence during significant global events such as the pandemic or the 2023 earthquakes in Turkey, when universities transitioned to online education. In this context, 2022 is seen as a critical threshold. An increase in AI usage was observed from the spring term of 2023 onwards. During this period, students indicated that they needed new tools for academic success. They stated that after encountering artificial intelligence, its use became a habit in their academic lives and daily practices.

The Way to Meet AI: In our focus group, students shared their experiences of encountering AI for the first time. The most common introduction to AI came through three primary channels: friends, social media, and computer programs. Many students discovered AI tools through recommendations from their peers, while others were exposed to them via social media platforms, where AI applications are frequently discussed and advertised. Additionally, several students encountered AI directly through the computer programs they used for academic or personal purposes.

*AI Tools and Devices Used: During the focus group, students identified several AI tools they have utilize*d in their academic and personal lives. ChatGPT was the most commonly mentioned tool, followed by Veem, translation dictionaries, and minor releases of AI applications. These tools were primarily accessed through two main devices: computers and smartphones. The flexibility of AI tools across devices demonstrates their accessibility and adaptability to a range of student needs, whether for quick assistance on mobile devices or for more extensive tasks on computers. This variety of tools and devices highlights how AI is becoming a versatile aid in academic and daily contexts.

Reasons for the First Use of AI: When asked about their reasons for initially using AI, students highlighted three main areas. First, some used AI for general purposes, such as exploring its capabilities or experimenting with new technology. Second, many students began using AI in academic courses, where AI tools supported tasks such as research and writing. Lastly, translation needs played a significant role in students' first interactions with AI, as translation tools provided quick, accessible assistance in overcoming language barriers in both academic and personal contexts. These findings

indicate that students were motivated by both practical academic needs and curiosity when initially engaging with AI.

The Positives and Downsides of AI in Meeting Expectations: One of the primary benefits of AI, as students highlight, is its ability to generate ideas and offer solutions to academic challenges. Students found AI particularly useful for providing quick, practical responses, which facilitated their coursework. AI was also praised for providing detailed information, contributing to rapid improvements in learning processes, and making information easy to access. Students also reported that AI's ability to guide them to the correct answer and synthesize complex information enhanced their academic research. AI tools were also recognized for their role in demonstrating research methodology by helping students understand and apply structured approaches in their studies. These features highlight how AI not only accelerates academic tasks but also deepens students' understanding of research practices.

Despite the numerous benefits of AI, students highlighted several areas where it falls short of their expectations. One major issue is AI's inability to answer every question correctly, often attributed to the inaccurate information on the internet that it may rely on. Additionally, students expressed concerns about the cost of premium versions of AI tools, which limit access for some users. The feedback also highlighted the robotic language often used by AI, which makes interactions feel less natural and engaging. Students found that AI sometimes works monotonously, repeating tasks without adapting to new contexts. Other challenges include failing to provide detailed information and a tendency to offer superficial answers, which can be frustrating for users seeking in-depth explanations. These limitations underscore the need for enhancements in AI's accuracy, personalization, and ability to deliver more meaningful insights.

Using AI in Assignments and Presentations: In response to the question about how students used AI in their coursework, it became clear that AI tools played diverse roles. Students reported using AI for various academic tasks, including idea generation, text translation, outline preparation, and title creation. AI was also employed for tasks such as text redaction, preliminary research, literature review, summarizing articles, and simplifying data. Notably, AI was useful for providing different perspectives and helping students narrow down their assignment topics. However, some students expressed concerns about AI's limitations. These concerns included a fear of plagiarism, a lack of clarity in AI-generated content, and the absence of specific or detailed results. This demonstrates the dual nature of AI use in academic settings—while it offers significant opportunities to enhance productivity and streamline tasks, students are also cautious of its potential downsides.

In the Environmental Economics course, students were asked whether they used AI tools in creating presentations. Some students reported using AI tools to enhance their presentations, taking advantage of AI-generated suggestions, designs, or data

visualizations to streamline the creation process. On the other hand, a group of students opted for more traditional tools, preferring to use platforms like Canva, Word, or PowerPoint without AI assistance. This illustrates a range of approaches to how students incorporate—or opt not to include—AI into their academic tasks, varying according to their level of familiarity and comfort with the technology.

Use of AI in Other Academic Studies: AI has proven valuable in a range of tasks, including analyzing numerical data, conducting literature reviews, simplifying complex subjects, and assisting with exam preparation. Students also reported using AI to generate ideas, create titles, interpret data, and even visualize complex information. These uses showcase the versatility of AI in supporting academic research and coursework. However, it is important to note that while AI tools can significantly enhance efficiency in these areas, students must be cautious about relying too heavily on them, ensuring that they complement critical thinking and personal effort.

Students' Expressions Related to AI: Students have provided various positive feedback regarding their experiences with artificial intelligence. Accordingly; "phrases such as 'very impressive', 'facilitating', and 'open to improvement' indicate that students see AI as a powerful tool that enhances their academic and personal tasks. "Phrases such as 'efficient,' 'detailed,' and 'practical' reflect how AI facilitates complex processes, making them accessible and versatile. Moreover, the presence of terms such as 'thought-provoking' and 'engaging' suggests that AI fosters creativity and encourages students to explore new perspectives. Overall, this visualization highlights the significant value that students derive from using AI tools in various contexts.

Students also provided negative feedback regarding their experiences with artificial intelligence. According to this; "words such as 'robotic,' 'monotonous,' and 'superficial' indicate that students sometimes found AI responses lacking depth and felt too mechanical. "Terms such as 'not clear,' 'not specific,' and 'generalized' point to problems with AI providing vague or overly broad information, making it difficult to rely on for precise academic needs. Additionally, the word 'paid' raises concerns about the costs associated with accessing certain AI tools, which may limit their use for students. These statements highlight the challenges AI poses and underscore the need to improve its accuracy and usability.

Challenges Caused by AI: Students identified several challenges posed by the development and use of AI. Among the most concerning issues is the potential harm to humanity, including fears that AI will cause a loss of control or autonomy. Another major concern is the difficulty distinguishing between correct and incorrect information, which can lead to misinformation or confusion. AI has also been criticized for excessive digitalization and for restricting freedom, suggesting that its pervasive use might limit personal and social flexibility.

Other notable challenges include the fact that many premium features require payment, creating a gap in access based on financial status and contributing to

inequality of opportunity. Furthermore, students mentioned that AI often provides general information rather than specific details, which can hinder its effectiveness. Lastly, some felt that AI might be killing the investigative spirit by making it too easy to find answers, thus reducing curiosity and critical thinking in social and academic contexts.

Use of AI in Everyday Life: Students reported numerous practical applications of AI in their daily lives, demonstrating its versatility beyond academic use. For example, AI is used in resume preparation, creating video content, and preparing for interviews, all of which help streamline professional tasks. Additionally, AI has helped respond to siblings' questions or solve workplace problems, showcasing its role in both personal and professional problem-solving. Interestingly, AI is also used to generate suggestions while cooking or shopping for clothes, reflecting its growing presence in everyday decision-making. Students also mentioned using AI for finding Excel formulas and even for medical diagnostics, emphasizing its usefulness in technical and health-related tasks. This wide range of applications demonstrates how AI is becoming an integral part of daily life, offering quick, effective solutions to a range of needs.

Future of AI and Views on the Future of AI: In discussions about the future of AI, students identified both positive and negative aspects. On the positive side, AI is expected to increase efficiency across various sectors, but its correct use needs to be learned for it to reach its full potential. Students also emphasized the need for students and teachers to collaborate in integrating AI into education, predicting a significant transformation in the education system. AI could also lead to the reorganization of labor and social life, create new job opportunities, and increase living standards. However, discussions have arisen about the need to establish global laws governing AI and even guaranteeing the rights of robots as AI continues to advance. On the negative side, students noted challenges, such as technological adaptation difficulties, particularly in regions like Türkiye, where adapting to AI may be slower. Concerns about income inequality and unemployment were also raised, as AI could displace jobs, posing economic challenges for certain populations. These reflections highlight both the promise and the risks of AI, suggesting that while it has the potential to revolutionize society, it must be carefully managed to avoid negative consequences.

Students expressed a variety of perspectives on the future of AI. On the one hand, there is a sense of optimism and excitement about the revolutionary potential of AI, with the belief that it could lead to harmonious integration into society and improve various aspects of life. On the other hand, students also expressed significant concerns, with some envisioning a potentially dystopian future, reflecting fears of negative consequences such as job displacement, privacy issues, and ethical dilemmas. The rapid development of AI is characterized by terms such as 'rapid,' while some remain cautious about the negative consequences it could bring if not

appropriately managed. These mixed feelings highlight the complex, multifaceted nature of the debate over the future of AI.

4. Discussion

The findings of this study provide a comprehensive understanding of how students interact with AI technologies in their academic and daily lives, highlighting both the benefits and challenges associated with these tools. The rapid adoption of AI in education, particularly after 2022, reflects a broader trend in the increasing use of digital tools driven by the pandemic. As noted by Zawacki-Richter *et al*. (2020) and Luckin *et al*. (2016), the integration of AI technologies into education has been facilitated by their ability to provide fast access to information, personalized learning experiences, and efficiency in academic tasks. This aligns with the findings of this study, which showed that students reported using AI to enhance productivity, optimize their learning processes, and address specific academic needs.

AI technologies are increasingly present in students' daily and academic lives, and various factors influence their introduction. Students' introduction to AI was significantly influenced by social and digital environments, including social media, peer recommendations, and academic tools. This aligns with Selwyn (2019) and Bucher (2012), who emphasize the role of social influences and digital platforms in shaping technology adoption. Our findings further suggest that students primarily encounter AI through social circles and digital media rather than through formal instruction, echoing evidence from Romanian economics students, where awareness and familiarity are central drivers of perceived utility and positive attitudes toward AI (Sova et al., 2024). Yet, unlike contexts where formal training helps convert awareness into frequent and effective use, our participants largely relied on self-directed learning, highlighting a clear opportunity for institutions to formalize AI integration and reduce the risks associated with unstructured adoption. Social media, in particular, has emerged as a crucial space where students encounter AI, exchange user experiences, and learn about its applications. These channels not only raise awareness but also reinforce the importance of integrating AI literacy into educational contexts to prepare students for the challenges posed by these technologies.

AI tools such as ChatGPT and translation applications have demonstrated flexibility and adaptability, providing support across various academic and personal contexts. The accessibility of these tools across multiple devices, including smartphones and computers, enables students to integrate them seamlessly into their routines, making them indispensable for tasks such as writing, research, and language translation. These findings align with those of Holmes et al. (2019) and Luckin et al. (2016), who emphasize the versatility of AI in addressing diverse student needs while enhancing efficiency and convenience.

However, the study also highlighted significant challenges associated with the use of AI. Students frequently criticized the robotic, generic nature of AI-generated

responses, echoing concerns raised by Shneiderman (2020) and Jarrahi (2018). The lack of depth and specificity in AI outputs limits its effectiveness in addressing nuanced academic tasks, and this perceived superficiality suggests that economics education should move beyond using AI for basic information retrieval and instead equip students to collaborate with AI for complex tasks such as economic modeling and data analysis. In this respect, advanced "AI literacy" training may be necessary to unlock AI's potential as a sophisticated tutor or analyst (Wan et al., 2025). Moreover, the economic disparity in AI access remains a pressing challenge, as students with financial constraints may lack exposure to advanced AI features that require paid subscriptions, as highlighted by Eubanks (2018) and Benkler (2019). García-López et al. (2025) warn that such disparities risk exacerbating existing educational inequalities and call for policy interventions to ensure equitable access to AI. These findings underscore the need for more inclusive, user-friendly AI tools, alongside targeted AI literacy support, to ensure equitable access and meaningful use for all students.

Another critical concern is the potential impact of AI on students' critical thinking skills. While AI tools offer significant advantages in speed and efficiency, over-reliance on these technologies may hinder the development of independent analytical abilities. This aligns with the warnings of Williamson (2018) and Baker and Smith (2019), who emphasize the importance of balancing the use of AI with the cultivation of critical and reflective thinking skills. Additionally, Niloy et al. (2024) provide empirical evidence that the use of AI chatbots is strongly linked to a decline in academic integrity, as students may prioritize convenience over ethical considerations. Their findings suggest that excessive reliance on AI-generated content can discourage in-depth engagement with learning materials, underscoring the need for structured AI literacy programs. Educational institutions must address these challenges by incorporating digital literacy training into their curricula, enabling students to use AI responsibly and effectively while maintaining academic integrity.

Participants' concerns about future unemployment resonate with the 'job-substitution' risks modeled by Katsamakas et al. (2024), in which AI automation may reduce demand for traditional labor. To counter this risk, higher education institutions must pivot toward teaching 'AI-complementary skills'—such as complex problem-solving, management, and critical thinking—that distinguish human labor from machine learning outputs. As Wan et al. (2025) suggest, integrating interdisciplinary projects and practical data skills into the economics curriculum is essential to preparing graduates who can leverage AI rather than compete against it.

Beyond academic contexts, the findings highlight the integration of AI into students' everyday lives, where it is used for tasks ranging from preparing resumes to addressing health-related queries and making daily decisions. This reflects broader trends observed by Dwivedi *et al*. (2021) and Makridakis (2017), who note that AI has become a key support tool in both professional and personal domains. However, concerns about misinformation and ethical considerations, as pointed out by Bostrom

(2014) and Floridi (2020), remain significant barriers to the broader adoption of AI technologies.

5. Conclusion

This study offers important implications for the role of AI in education by examining the impact of AI use in higher education on students and the opportunities and challenges it presents. The findings reveal that students perceive AI technologies as time-saving and productivity-enhancing tools, particularly in processes such as idea generation, text translation, data analysis, and literature review. For example, students tend to perceive AI support for academic tasks, such as creating headings, summarizing, and simplifying complex topics, in a positive light. This enables students to view AI as a guide and utilize it to enhance their academic productivity.

However, students are also aware of some limitations of using AI. First of all, concerns about the accuracy and reliability of AI-generated content require students to evaluate AI from a questioning perspective. The study's findings show that students need to critically assess information produced by AI rather than simply trust it. In particular, some students drew attention to a "robotic" language and to forms of expression that lacked sufficient depth in the content produced by AI. This situation reveals that while students benefit from AI in terms of speed of access to information, they need more contribution in terms of elaboration and customization of the content.

In addition, ethical concerns regarding the use of AI are among the study's important findings. The capacity of AI to produce original content in certain academic tasks is limited, raising questions about originality and the ethical use of AI among students. At this point, while students welcomed the conveniences brought by AI, they emphasized the need for greater care in addressing ethical issues, such as originality and content accuracy. In particular, students need guidance on how to use AI without violating academic ethics rules and to ensure information reliability.

Digital inequality is also an important issue in the use of AI. According to the study's findings, the fact that some AI tools are paid for leads to inequality of opportunity among students and shows that these technologies cannot be used by everyone on equal terms. Especially, students who lack access to premium features cannot fully benefit from the opportunities offered by AI. This situation raises questions about the impact of digital technologies on educational access and limits the role of AI in providing equal educational opportunities. Therefore, economic access challenges need to be taken into consideration when integrating AI into educational processes.

This study reveals that AI in higher education can contribute to academic achievement, but some ethical and technical limitations must be carefully addressed. It is essential for students to use AI tools not only as a source of quick information access but also as an educational tool that fosters critical thinking, ethical evaluation, and digital literacy. In this context, educational institutions need to develop programs that raise students' awareness of the responsible and ethical use of AI technologies

and support their critical thinking skills. In addition, supporting digital literacy education for more effective and equitable use of AI in education will enable students to interact with these technologies more consciously and reliably.

More broadly, the findings suggest that integrating AI into economics pedagogy requires a strategic shift from passive adoption to active educational innovation. While students use AI to enhance productivity, recurring concerns about accuracy and "robotic" outputs point to the need to cultivate "AI maturity"—the ability to work with these tools critically and reflectively rather than treating them as a substitute for independent thought. To achieve this, institutions should move beyond simple prohibitions and instead implement structured AI literacy support that explicitly addresses ethical use and digital inequality. As AI increasingly automates routine knowledge tasks, economics education should also pivot toward developing "AI-complementary skills" such as complex problem-solving, strategic planning, and sound judgment—capabilities that remain distinctly human and are essential for effective human–AI collaboration. Finally, effective integration depends on institutional backing through training, guidance, and adequate infrastructure, enabling students to engage with AI consistently and responsibly. In this sense, AI should be positioned as a collaborative partner in learning, helping prepare students for a workforce where human–AI synergy is increasingly the norm.

Based on these findings, AI's role in the higher education environment extends beyond supporting academic tasks to also developing students' digital skills and critical thinking approaches. The effective and responsible integration of AI into educational processes will improve students' academic performance and strengthen their digital literacy, ethical sensitivity, and trust in information.

While this study primarily captures students' experiences with AI in an economics course, the findings also hold practical implications for instructors. To support responsible and effective AI integration in teaching, instructors are encouraged to develop transparent classroom policies that clearly define acceptable AI usage and address issues such as plagiarism. Promoting digital literacy is essential, particularly by guiding students to critically evaluate AI-generated content and cross-check information for accuracy and relevance. Instructors may also consider embedding low-stakes assignments or in-class activities that foster critical and reflective exploration of AI. Furthermore, ensuring equitable access—by recommending freely available tools or providing institutional support—can help reduce digital divides among students.

This study has certain limitations. The study was conducted with a limited sample of students from a single course, which may limit the generalizability of the findings. Additionally, the focus group method, while insightful, may not fully represent the diversity of student experiences. Nevertheless, the findings offer potential implications for other economics courses—particularly those involving critical analysis and academic writing—as well as for broader social science contexts.

Additionally, the ethical and accessibility concerns raised by students in this study may resonate with those in similar educational environments beyond Türkiye. Given the rapid evolution of AI technologies, future research should include larger and more diverse samples, longitudinal studies to track changes over time, and comparative investigations across countries and institutional contexts. Such research could further explore strategies for integrating AI into higher education that promote critical thinking, ethical awareness, and equitable access.

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Özcan Garan conducted the qualitative analysis and organized the focus group interview. Billur Engin Balin was responsible for the study's conceptualization and conducted the literature review. Both authors contributed equally to interpreting the findings and writing the manuscript. All authors read and approved the final manuscript.