DOI 10.51558/2490-3647.2025.10.2.937

UDK 004.89:378

Primljeno: 29. 07. 2025.

Izvorni naučni rad
Original scientific paper

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THE ROLE OF CHATGPT IN THE EDUCATIONAL PROCESS: THE PERSPECTIVE OF SOCIOLOGY STUDENTS

This paper examines the role of ChatGPT within higher education by integrating two theoretical frameworks: the Technology Acceptance Model (TAM) and Actor-Network Theory (ANT). Through a quantitative survey conducted among 155 sociology students across five Croatian universities, the study explores perceptions of ChatGPT's usefulness, ease of use, trustworthiness, and adoption intentions. TAM provides a quantitative foundation for understanding students' attitudes toward ChatGPT, while ANT enables the interpretation of ChatGPT as an active participant within educational networks. The results indicate that although students recognize ChatGPT's potential to enhance learning efficiency (79% agreed that ChatGPT speeds up academic task completion – 49.4% strongly; 29.6% somewhat), concerns about trust (mean trust in the reliability of supporting technologies = 2.91 on a 1–5 scale), cognitive load, and limited social influence moderate its adoption.Findings highlight the importance of AI literacy, the need for institutional guidelines on ethical AI use, and the role of educational institutions in supporting responsible integration of AI technologies into academic practice. The study concludes by offering recommendations for strengthening AI adoption strategies in higher education and outlines directions for future research.

Key words: ChatGPT; higher education; Technology Acceptance Model (TAM); Actor-Network Theory (ANT); artificial intelligence in education

1. INTRODUCTION

Advanced digital technologies, particularly artificial intelligence (AI), have significantly transformed educational processes within higher education. As Luckin et al. (2016) emphasize, AI enables the personalization of educational content, methods, and emotional support, adapting to the individual needs of students. This fosters the development of competencies aligned with labor market demands and contributes to the creation of a more effective educational environment.

Zawacki-Richter et al. (2019) point out that AI tools not only facilitate personalized learning and support writing and research activities but also relieve educators of certain routine tasks. Such contributions enhance the overall quality of teaching, positioning artificial intelligence not merely as an auxiliary tool, but as an integral component of the educational process. A systematic review of 57 studies published in 2023 and 2024 confirms these trends in the use of ChatGPT in higher education and analyzes the benefits and risks for teaching and learning (Baig and Yadegaridehkordi 2024).

Klačmer (2020) highlights that the acceptance of technology in education is significantly influenced by digital literacy and prior experience, a conclusion further supported by the Technology Acceptance Model (TAM). Moreover, the TAM2 model underscores the importance of combining cognitive and social factors in shaping the intention to use technology, with prior experience playing a crucial role in this process (Venkatesh and Davis 2000).

Within this framework, ChatGPT is perceived not solely as a tool, but as an active participant in higher education. The aim of this paper is to examine how sociology students perceive the role of ChatGPT in their educational process and to identify key factors that influence its successful integration into the academic environment.

2. THEORETICAL FRAMEWORK

2.1. Origin and Development of the TAM Model

The Technology Acceptance Model (TAM) was developed by Fred Davis in 1989, building on the Theory of Reasoned Action proposed by Fishbein and Ajzen (1977). TAM aims to explain user acceptance of technology through two key constructs: perceived usefulness and perceived ease of use. As Davis (1989) pointed out, individuals are more likely to adopt a technology if they believe it will facilitate their tasks, while

the perception of ease of use further strengthens their positive attitude towards its adoption.

Over time, TAM has been widely applied in various fields, especially in education, where its relevance to pedagogical processes has been firmly established. A meta-analysis (Legris, Ingham and Collerette 2003) showed that the model explains approximately 40% of user behavior. Seeking to expand the original model, Venkatesh and Davis (2000) introduced TAM2, incorporating social influences such as subjective norms and result demonstrability. Building on this foundation, Venkatesh and colleagues (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT), which combines elements from eight earlier models and introduces predictors like performance expectancy and facilitating conditions.

These theoretical developments have proven particularly applicable in the field of education, where the acceptance of tools such as ChatGPT is also shaped by social and organizational factors. Nevertheless, TAM has not been without its critics. Scholars such as Bagozzi (2007) stressed the importance of including emotional and cultural factors, while Sørebø et al. (2009) emphasized the role of intrinsic motivation. Similarly, Orlikowski and Iacono (2001) argued that technology should not be seen as a neutral tool, but rather as a socially constructed phenomenon.

In light of these critiques, alternative models have emerged, aiming to offer a more comprehensive understanding of the complex interplay between humans and technology.

2.2. Actor-Network Theory (ANT)

Actor-Network Theory (ANT), developed by Latour (2005), is based on the premise that social reality emerges through continuous interactions among a variety of actors, both human and non-human, such as technologies, laws, and institutions. Rather than viewing society as a stable structure, ANT conceptualizes it as a dynamic network of relationships in constant flux.

A key tenet of this approach is the understanding that non-human entities, such as technologies, also possess agency and actively participate in shaping social processes. Callon (1984) and Law (1992) further elaborate that the identities and goals of actors are defined through processes of "translation" within the networks that connect them. According to this perspective, social order cannot be understood independently of material factors.

Latour (1996) emphasizes that ANT blurs the boundary between the technical and the social, treating technologies not merely as supportive tools but as actors that ac-

tively shape social practices, power relations, and structures of knowledge. In this way, ANT offers a framework for analyzing social phenomena as simultaneously technical, symbolic, and materially conditioned, thereby providing deeper insights into their interdependence in everyday life.

2.2.1. ChatGPT as an Actor within the Educational Ecosystem

Although ChatGPT did not exist at the time of their writing, Castañeda and Selwyn (2018) offer a theoretical framework that allows for its conceptualization as an active actor within the digitalized educational environment. Rather than perceiving digital technologies merely as passive tools, their role in shaping users' values, attitudes, and behaviors positions them as co-creators of knowledge and pedagogical relationships, in line with the Actor-Network Theory (ANT) perspective.

Knox (2020) further emphasizes that artificial intelligence serves not only as a means of information transmission but also redefines the ways in which knowledge is produced, valued, and by whom it is authorized to be shaped. He particularly draws attention to the influence of commercial interests in determining educational content and evaluation practices.

Similarly, Selwyn (2022) highlights that AI in education redirects functions such as assessment and feedback provision from teachers to algorithms, thereby reshaping power relations and traditional notions of authority. Consequently, AI must be understood as a politically and market-driven process, one that has the potential to influence existing inequalities and redefine the conventional roles of teaching and learning.

2.2.2. Applications of ANT in Educational Research

Fenwick and Edwards (2010) emphasize that ANT approaches enable the analysis of digital technologies in education by viewing them not as passive tools, but as actors that actively shape educational relationships and practices. ANT thus provides a framework for understanding the interactions between humans and technology and their influence on everyday pedagogical processes.

Kumar and Tissenbaum (2022) apply ANT to map the relationships between students, teachers, and technology, illustrating how tools such as Connected Spaces shape classroom dynamics and the distribution of knowledge. In this perspective, technology is not merely regarded as a medium, but as an active participant within educational settings.

A similar emphasis is found in the works of Sørensen (2009) and Fenwick, Edwards and Sawchuk (2011), who highlight the role of materiality, space, and infrastructure in the construction of knowledge and the shaping of educational practices. Within this framework, education is conceptualized as a network in which humans, technologies, and spatial elements continuously interact.

3. INTEGRATING TAM AND ANT IN THIS STUDY

This study integrates two theoretical frameworks – the Technology Acceptance Model (TAM) and Actor-Network Theory (ANT) – to provide a more comprehensive understanding of the acceptance and role of tools such as ChatGPT in higher education. TAM (Davis 1989) offers a quantitative framework for analyzing individual user attitudes, focusing on perceived usefulness and perceived ease of use, thereby examining students' readiness to adopt technology.

In contrast, ANT conceptualizes technology as an active social actor embedded within a network of relationships involving students, educators, and educational policies (Latour 2005). By combining TAM and ANT, a broader perspective is achieved: while TAM quantifies user attitudes, ANT uncovers the dynamics of relationships within educational practices.

For instance, Castañeda and Selwyn (2018) emphasize that technologies shape users' values and behaviors, while Venkatesh et al. (2003) demonstrate that user intentions can be reliably modeled through TAM and UTAUT. Such an integration allows for a deeper understanding of ChatGPT – not merely as a technological tool but as an actor that transforms power relations and knowledge structures within education (Selwyn, 2010; Knox, 2020), which is consistent with the most recent systematic reviews of ChatGPT in higher education that map benefits, limitations, and research gaps (Abdallah et al. 2025). Moreover, Watson, Brezovec and Romic (2025) highlight the necessity of linking individual and systemic aspects of AI tool usage, recognizing that ChatGPT operates as a co-actor within a complex scientific network.

4. METHODOLOGY

This study explored how sociology students in Croatia perceive the use of artificial intelligence, particularly ChatGPT, in education. The research was based on the Technology Acceptance Model (TAM), incorporating constructs such as perceived usefulness, perceived ease of use, trust in the Internet, attitude toward behavior,

subjective norm, perceived behavioral control, and intention to use (Davis 1989; Klačmer 2020). A total of 155 undergraduate and graduate sociology students from five Croatian universities participated in the study.The analyses reported in this paper were conducted exclusively on the subsample of 81 participants who had used ChatGPT.

Research Design

Data were collected through an online survey administered via Google Forms due to its accessibility and efficiency. The questionnaire included TAM-based items and showed strong reliability across constructs (Cronbach's $\alpha > 0.9$), as shown in Table 1, providing a solid basis for analyzing AI adoption in the academic context.

Table 1. Reliability of the TAM Model Scale

Construct	Number of Items	Cronbach's Alpha
Expected Usefulness	6	,949
Expected Ease of Use	6	,907
Trust in the Internet	5	,923
Attitude Toward Behavior	4	,927
Subjective Norm	4	,945
Perceived Behavioral Control	4	,905
Intention to Use	3	,911

Sample of Respondents

The study was conducted on a non-probabilistic sample of 155 undergraduate and graduate sociology students from five Croatian universities. Among them, 81 students had prior experience using ChatGPT. All analyses reported here were conducted on this subsample of 81 ChatGPT users. Participants came from institutions including the Faculty of Croatian Studies (University of Zagreb), the Catholic University of Croatia, and the Faculties of Humanities and Social Sciences in Zagreb, Osijek, Zadar, and Split.The sample of 81 students consists mostly of female students (88.9%), which corresponds to the general gender trends in sociology studies in Croatia.

Data Analysis Method

Data from the survey were analyzed using quantitative methods, with descriptive statistics to present the distribution of attitudes and response frequencies. The findings offer preliminary insights into the acceptance of ChatGPT for educational purposes and potential adoption barriers among sociology students. In addition to reliability

(Cronbach's $\alpha > .90$), the validity of the measurement model was assessed using confirmatory factor analysis (CFA). All indicators loaded strongly and significantly on their intended constructs (all $p < .001$), confirming convergent validity. Global fit was modest ($\chi^2(413) = 796$; $\chi^2/df = 1.93$; CFI = .861; TLI = .844; RMSEA = .107), indicating scope for refinement in future studies.

Ethical Aspects of the Research

The study adhered to ethical guidelines, ensuring anonymity and voluntary participation. Participants were informed about the research objectives and could withdraw at any time without consequences. Data were used solely for academic purposes.

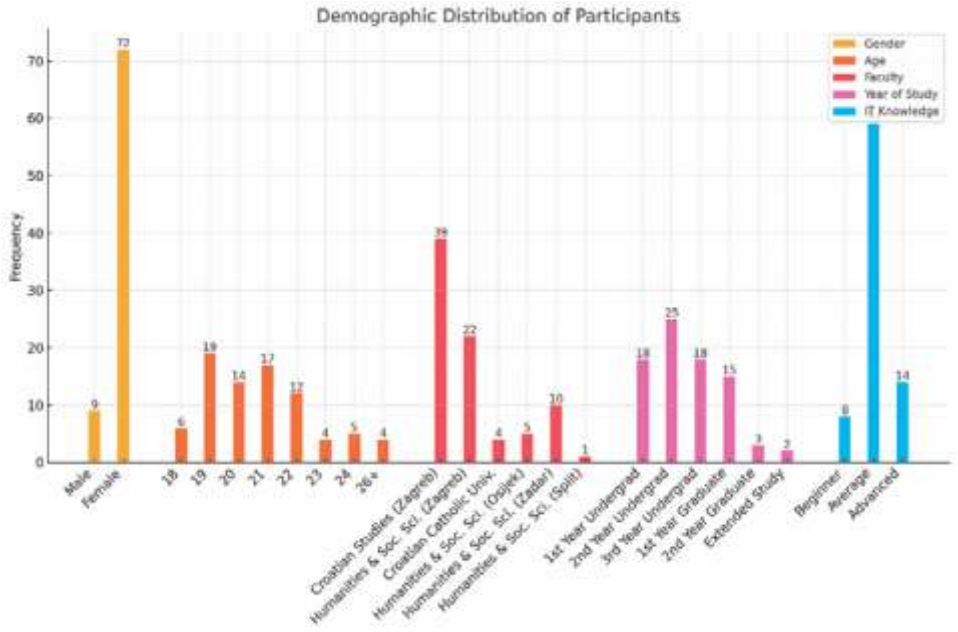
5. RESULTS

Of the 81 respondents, 88.9% are women, and most are between 19 and 21 years old. The largest groups are from the Faculty of Croatian Studies in Zagreb (48.1%) and the Faculty of Humanities and Social Sciences in Zagreb (27.2%). Second-year undergraduates make up the majority (30.9%), and most students rate their IT knowledge as average (72.8%). This indicates a need for further technological education (see Graph 1). The sample is predominantly female (88.9%), which corresponds to general gender trends in sociology studies in Croatia.

Table 2. Mean values of the main constructs by gender

		Expected Usefulness	Expected Ease of Use	Trust in the Internet	Attitude Toward Behavior	Subjective Norm	Perceived Behavioral Control	Intention to Use
Mean	Male	24,30	23,89	13,47	14,09	10,80	16,22	10,74
	Female	22,34	22,66	15,10	13,91	10,81	15,82	10,22
Std. Deviation	Male	6,862	6,333	4,528	4,526	5,442	4,738	4,474
	Female	6,674	6,220	4,859	4,508	4,716	4,387	3,611

Graph 1. Demographic Distribution of Participant



An elimination question assessed ChatGPT usage for educational purposes across mobile phones, tablets, and computers. Results show a near-equal split: 52.26% use ChatGPT monthly, while 47.74% do not use it regularly. This suggests that while more than half of the participants integrate the tool into their academic activities, a significant portion either does not need it or uses it infrequently. The results offer insights into TAM constructs related to ChatGPT usage in education. In Table 3, the Pearson correlation matrix of the applied constructs is presented, indicating strong intercorrelations, whereas Table 4 outlines the key descriptive statistics.

Table 3. Correlation matrix of the main constructs

		Expected Usefulness	Expected Ease of Use	Trust in the Internet	Attitude Toward Behavior	Subjective Norm	Perceived Behavioral Control	Intention to Use
Expected Usefulness	Pearson Correlation	1	,763**	,426**	,708**	,398**	,722**	,773**
	Sig. (2-tailed)		,000	,000	,000	,000	,000	,000
	N	81	81	81	81	81	81	81
Expected Ease of Use	Pearson Correlation	,763**	1	,418**	,608**	,301**	,816**	,686**
	Sig. (2-tailed)	,000		,000	,000	,006	,000	,000
	N	81	81	81	81	81	81	81
Trust in the Internet	Pearson Correlation	,426**	,418**	1	,667**	,547**	,400**	,563**
	Sig. (2-tailed)	,000	,000		,000	,000	,000	,000
	N	81	81	81	81	81	81	81
Attitude Toward Behavior	Pearson Correlation	,708**	,608**	,667**	1	,608**	,579**	,854**
	Sig. (2-tailed)	,000	,000	,000		,000	,000	,000
	N	81	81	81	81	81	81	81
Subjective Norm	Pearson Correlation	,398**	,301**	,547**	,608**	1	,294**	,580**
	Sig. (2-tailed)	,000	,006	,000	,000		,008	,000
	N	81	81	81	81	81	81	81
Perceived Behavioral Control	Pearson Correlation	,722**	,816**	,400**	,579**	,294**	1	,673**
	Sig. (2-tailed)	,000	,000	,000	,000	,008		,000
	N	81	81	81	81	81	81	81
Intention to Use	Pearson Correlation	,773**	,686**	,563**	,854**	,580**	,673**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	
	N	81	81	81	81	81	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4. Descriptive statistics of the main constructs

Expected Usefulness	Mean		22.56
	95% Confidence Interval for Mean	Lower Bound	21.08
		Upper Bound	24.04
	Std. Deviation		6.680
Expected Ease of Use	Mean		22.80
	95% Confidence Interval for Mean	Lower Bound	21.43
		Upper Bound	24.17
	Std. Deviation		6.205
Trust in the Internet	Mean		14.92
	95% Confidence Interval for Mean	Lower Bound	13.85
		Upper Bound	15.98
	Std. Deviation		4.824
Attitude Toward Behavior	Mean		13.93
	95% Confidence Interval for Mean	Lower Bound	12.94
		Upper Bound	14.92
	Std. Deviation		4.482
Subjective Norm	Mean		10.81
	95% Confidence Interval for Mean	Lower Bound	9.76
		Upper Bound	11.87
	Std. Deviation		4.764
Perceived Behavioral Control	Mean		15.87
	95% Confidence Interval for Mean	Lower Bound	14.89
		Upper Bound	16.84
	Std. Deviation		4.398
Intention to Use	Mean		10.27
	95% Confidence Interval for Mean	Lower Bound	9.46
		Upper Bound	11.09
	Std. Deviation		3.688

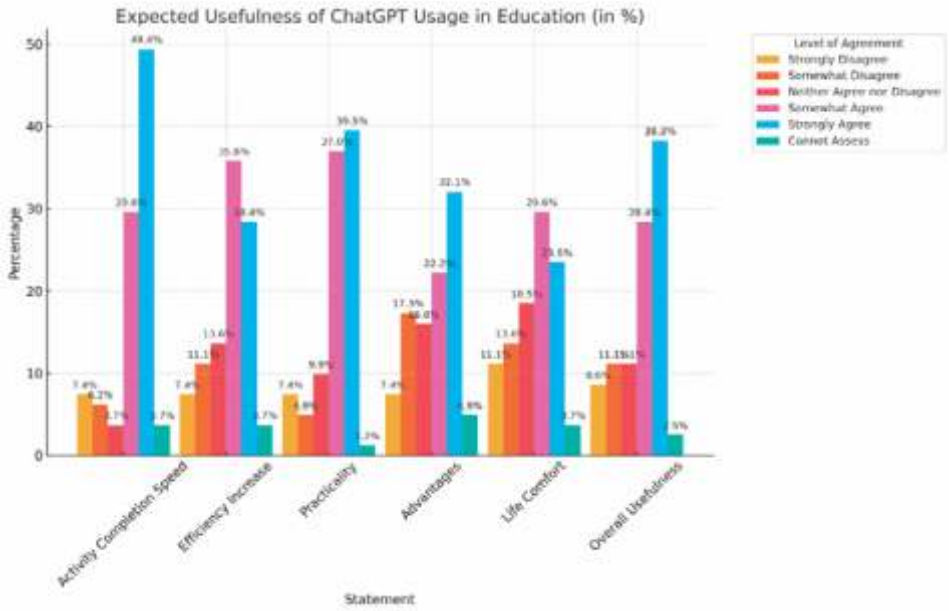
CFA supported convergent validity across all constructs, although global fit indices (CFI = .861; TLI = .844; RMSEA = .107) fell below conventional cutoffs.

Expected Usefulness – Perceived Benefits vs. Practicality

Students recognize ChatGPT's utility in increasing academic efficiency, with an average rating of 4.19 for task completion speed. While its effectiveness is acknowledged, the lower rating for „making life more comfortable" (3.52) suggests it does not significantly reduce cognitive or emotional workload. This implies students view

it more as a functional tool than a transformative experience. The high variance (1.578–1.966) indicates differing user experiences, likely influenced by digital literacy and preferences for human vs. AI support. To fully integrate ChatGPT, institutions may need to tailor its use across disciplines and offer structured guidance. Survey results show that "Activity Completion Speed" (49.4% Strongly Agree, 29.6% Somewhat Agree) is the most positively rated aspect, with respondents recognizing ChatGPT's ability to speed up academic tasks (see Graph 2).

Graph 2. Expected Usefulness of ChatGPT Usage in Education (in %)

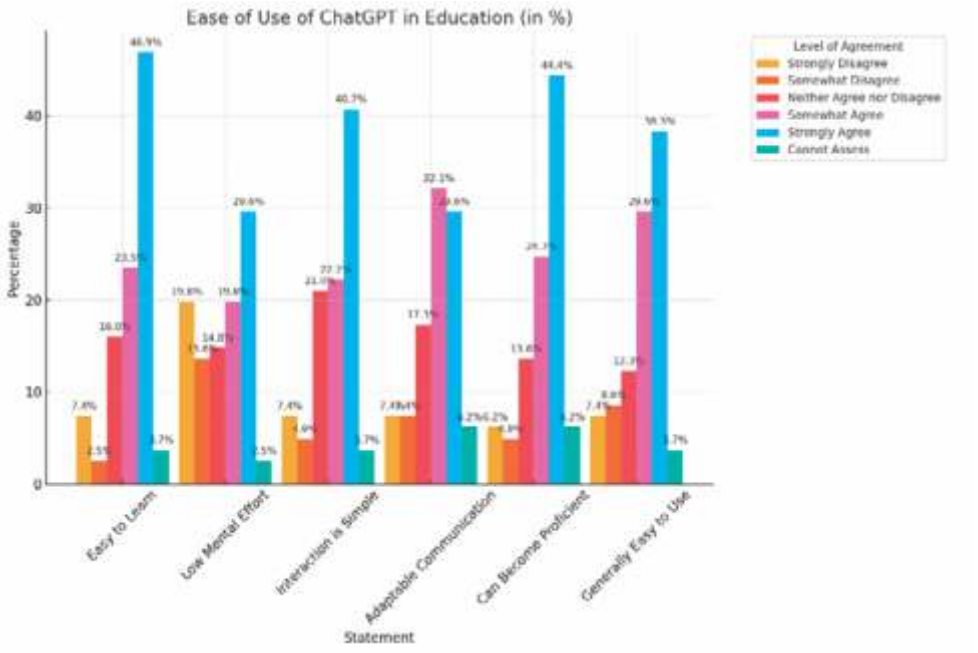


Practicality (37.0% Strongly Agree, 39.5% Somewhat Agree) also receives high acceptance, indicating its practical value in education. Overall, ChatGPT's usefulness and efficiency (35.8% Strongly Agree, 28.4% Somewhat Agree) are widely recognized, though "Life Comfort" (29.6% Strongly Agree, 28.5% Somewhat Agree) has slightly lower agreement, suggesting limited impact on comfort (see Graph 2). Disagreement is low across all aspects, with few finding ChatGPT unhelpful, while many agree on its benefits, especially in task completion speed.

Expected Ease of Use – Accessibility vs. Cognitive Load

Ease of use is crucial for adoption, with findings showing mixed perceptions. The mean ratings indicate ease in learning ChatGPT (4.15) and adaptability (3.88), but lower ratings for mental effort (3.33) suggest cognitive strain. This could stem from challenges in prompt formulation, verifying AI-generated content, or lack of AI literacy. Universities should integrate AI literacy into curricula to help students use ChatGPT effectively with minimal cognitive load. Graph 3 shows that most respondents find ChatGPT easy to use in education. "Easy to Learn" (46.9% Strongly Agree) and "Can Become Proficient" (44.4% Strongly Agree) are the highest-rated categories, indicating users find it intuitive and easy to master.

Graph 3. Ease of Use of ChatGPT in Education (in %)

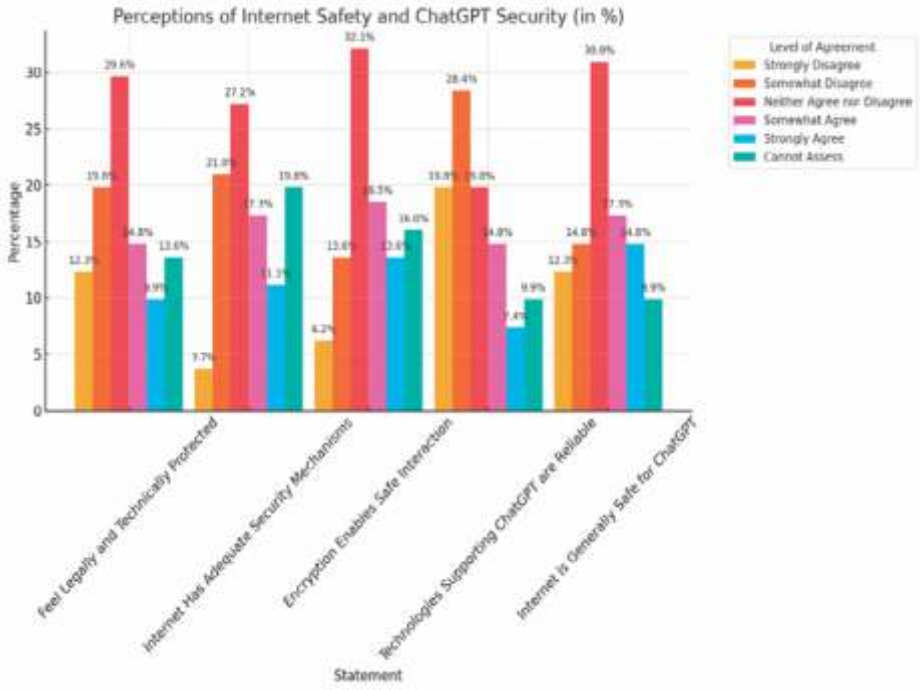


"Interaction is Simple" (40.7% Strongly Agree) and "Generally Easy to Use" (38.3% Strongly Agree) reinforce that it's user-friendly. However, "Low Mental Effort" (29.6% Strongly Agree) shows some users find it cognitively demanding, with a small subset indicating higher cognitive effort. Overall, ChatGPT is widely perceived as intuitive and easy to use.

Trust in the Internet – The Psychological Barrier to AI Adoption

Despite its growing adoption, students demonstrate only moderate trust in using AI online (mean = 3.31–3.70). A key concern is trust in the technology itself (mean = 2.91), reflecting skepticism regarding the reliability of AI-generated content, data privacy, and risks of academic dishonesty. The relatively high standard deviation (1.50–1.56) indicates heterogeneous levels of trust, shaped by prior exposure to online security issues and concerns about AI replacing educators. To address these challenges, institutions should develop clear policies and establish ethical guidelines for AI use in education. Graph 4 presents survey responses on internet safety and ChatGPT security, showing that many respondents expressed skepticism about encryption, with 32.1% somewhat disagreeing and 13.6% strongly disagreeing.

Graph 4. Perceptions of Internet Safety and ChatGPT Security (in %)

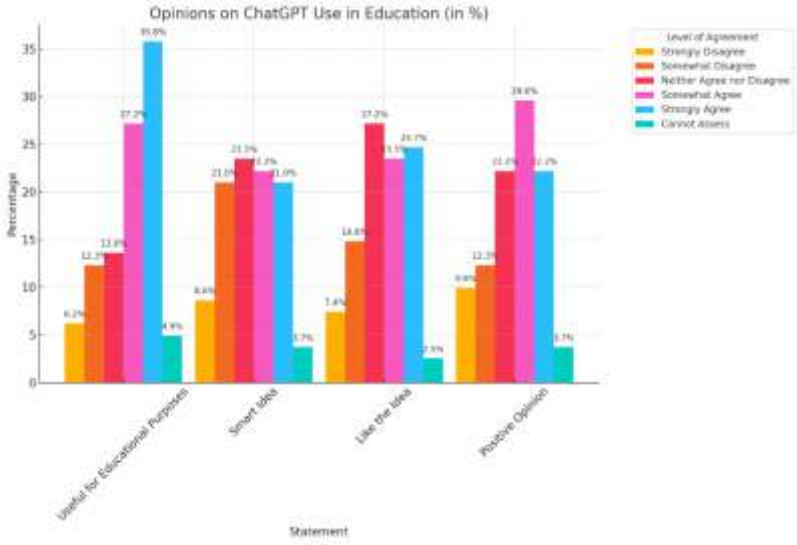


Similarly, 28.4% disagreed with "Technologies Supporting ChatGPT are Reliable," and 27.2% disagreed with "Internet Has Adequate Security Mechanisms." Most respondents (30.9%) felt the internet was unsafe for ChatGPT-related activities, and 29.6% disagreed with the statement "Feel Legally and Technically Protected". The results indicate widespread mistrust in internet security, encryption, and ChatGPT's supporting technologies, as well as a lack of confidence in security mechanisms. A portion of respondents were unsure about security, likely due to limited technical knowledge. These findings point to the need for clearer security measures and better education on encryption and cybersecurity.

Attitude Toward Behavior – Perceived Value vs. Skepticism

Students generally have a positive attitude toward ChatGPT (mean = 3.89 for usefulness), but a lower score for „liking the idea" (3.51) suggests hesitation. This may stem from concerns about AI dependency, skepticism about inaccuracies, or uncertainty about ChatGPT's fit with academic expectations. The mode of 5 for usefulness, but 3 for other factors, shows a divide – some embrace AI, while others remain skeptical, possibly due to unclear academic policies. To increase acceptance, institutions should provide clear guidelines and position AI as a complement to traditional learning. Graph 5 shows that most respondents support ChatGPT's educational benefits, with the highest agreement on its usefulness for educational purposes (35.8% Strongly Agree, 27.2% Somewhat Agree).

Graph 5. Opinions on ChatGPT Use in Education (in %)

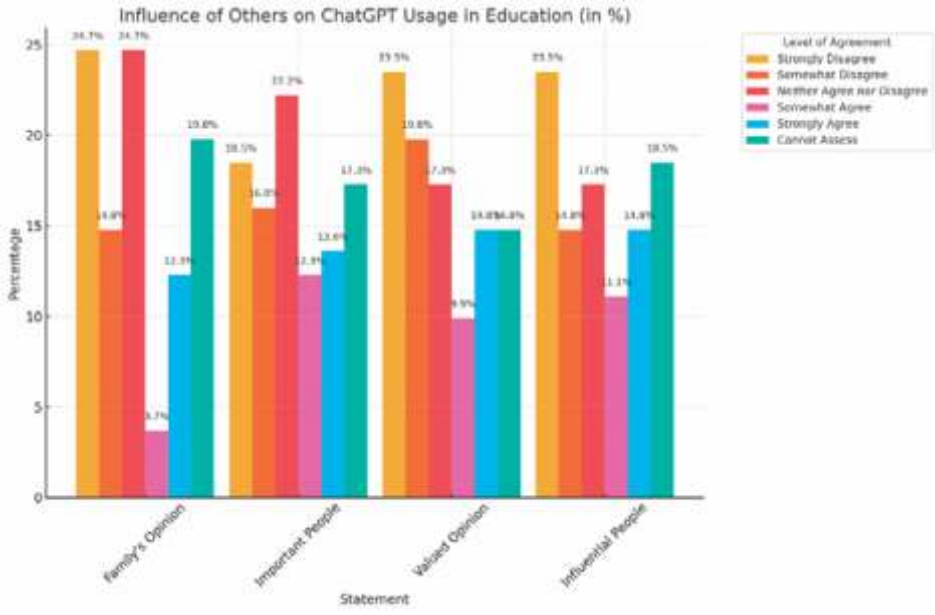


Positive opinions and enthusiasm for its concept are also evident, though some remain undecided (21.0%–24.7%). Minimal opposition exists, especially regarding its usefulness (6.2% Strongly Disagree, 12.3% Somewhat Disagree). While support outweighs skepticism, some respondents are neutral or skeptical, likely due to lack of experience. Clear guidelines for ethical use could help engage these individuals.

Subjective Norm – The Lack of Social Influence

Unlike other digital tools, ChatGPT usage is largely an individual choice (mean = 3.17–3.38), with some students feeling no external pressure to use AI tools. This could be due to a lack of awareness among peers, limited faculty endorsement, or preference for traditional learning methods. Educational institutions could foster peer discussions and workshops on AI, increasing its social acceptance. Graph 6 shows that most respondents do not consider external opinions, such as family or influential figures, in their decision to use ChatGPT.

Graph 6. Influence of Others on ChatGPT Usage in Education (in %)



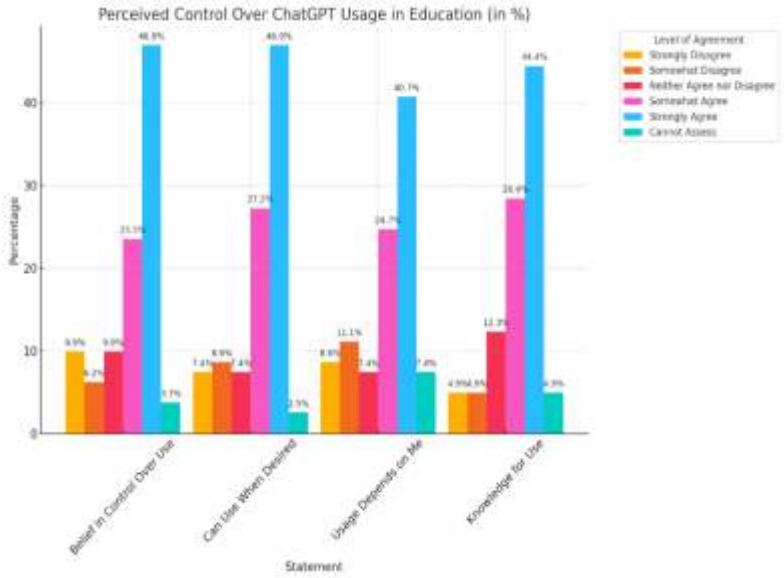
The highest influence comes from "Influential People," though responses remain mixed. This suggests that personal choice plays a significant role in adopting ChatGPT, with limited impact from peer influence or institutional recommendations.

Perceived Behavioral Control – Self-Efficacy in AI Adoption

Most students feel confident in using ChatGPT (mean 4.00–4.17), with the highest rating for knowledge (4.17). However, there is variability in confidence, likely due to prior AI experience or concerns about academic integrity.Institutions should provide equal access to AI training to address this gap. Most respondents feel they have control over ChatGPT usage (46.9% Strongly Agree, 23.5% Somewhat Agree). The majority believe they can use it freely (46.9% Strongly Agree), are confident in their knowledge (44.4% Strongly Agree), and see usage as a personal decision (40.7% Strongly Agree). Disagreement is minimal (below 12%), suggesting that students are empowered and confident in using ChatGPT without needing additional access measures (see Graph 7).

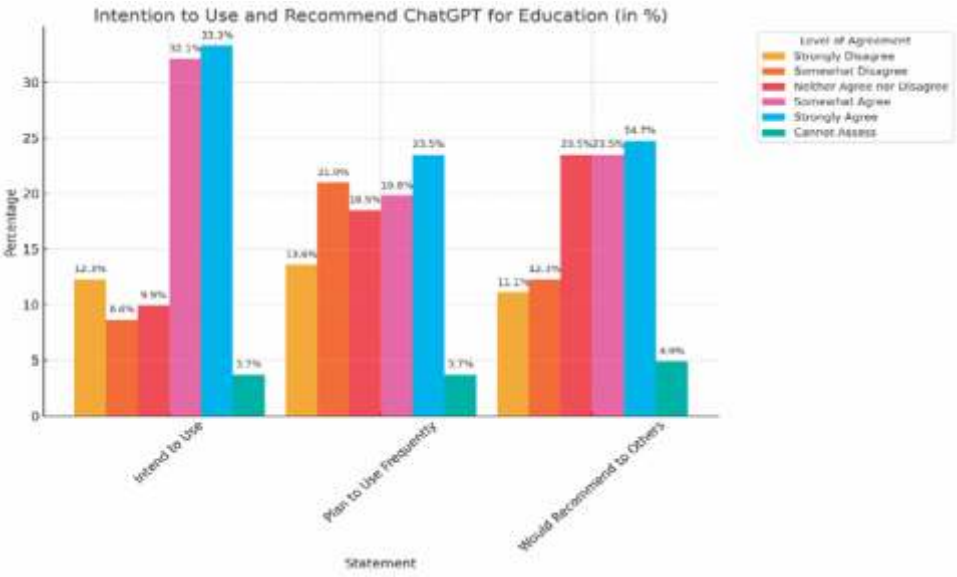
Graph 7. Perceived Control Over ChatGPT Usage in Education (in %)

Intention to Use – The Gap Between Potential and Actual Adoption



While students recognize ChatGPT's usefulness, their intention to use it is moderate (mean = 3.30–3.77), with high variability. Some are highly motivated, while others see it as optional. This gap may stem from unclear academic policies, personal learning preferences, or concerns about over-reliance on AI. Institutions should promote responsible usage and clarify expectations to encourage greater AI adoption. Graph 8 shows that most respondents intend to use ChatGPT for education (33.3% strongly agree), and many would recommend it to others (24.7% strongly agree).

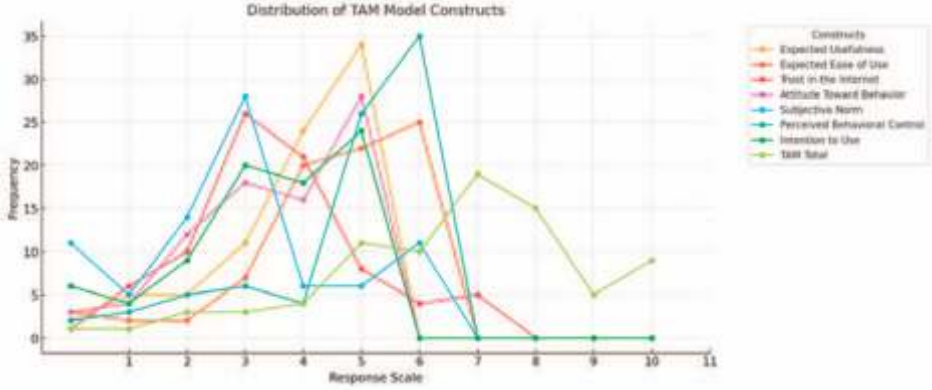
Graph 8. Intention to Use and Recommend ChatGPT for Education (in %)



However, fewer plan to use it frequently (19.8% strongly agree), with some unsure about its regular use. Disagreement is low overall, but there is some resistance to frequent use and recommending it, indicating that some students remain undecided. Institutions may need to emphasize recurring uses and demonstrate benefits to boost long-term adoption.

Graph 9 shows that most TAM constructs are rated between 3-5, indicating moderate perceptions of usability and usefulness.

Graph 9. Frequency Distribution of Technology Acceptance Model (TAM) constructs



Some constructs, like Perceived Behavioral Control and TAM Total, show higher ratings (5-7), while Trust in the Internet and Attitude Toward Behavior have more varied responses. Few respondents rated at the extremes (1-2 or 9-10), suggesting general acceptance but with balanced views. Constructs like Subjective Norm and Perceived Behavioral Control show more varied responses, indicating different external influences on decision-making.

ChatGPT is generally seen as useful and easy to use, though some reservations exist. Trust and security concerns moderate adoption, indicating a need for clearer guidelines on ethical use. Social influence is weak, making adoption more individual than peer-driven. Behavioral control is strong, but confidence varies, suggesting a need for equal access to AI training. While most students feel they have control over usage, adoption is driven by perceived benefits rather than accessibility. The intention to use ChatGPT is present but not overwhelming, with some students cautious. To better integrate ChatGPT, universities should offer AI literacy programs, clear guidelines, and awareness campaigns addressing its benefits and ethical issues. Key recommendations include increasing awareness and training, addressing security concerns, encouraging social influence, and exploring reasons for varying adoption rates.

6. DISCUSSION AND CONCLUSION

According to Actor-Network Theory (ANT) by Bruno Latour (1989), technology adoption is not solely determined by human actors but emerges from the interactions between various elements in a socio-technical network. In the context of this study, ChatGPT exists within a network of students, university policies, professors, institutional expectations, and broader digital literacy trends. The relatively high percentage of students with average IT knowledge (72.8%) suggests that digital tools are an integral but not dominant component of their learning process. From an ANT perspective, ChatGPT is not simply an external tool but an actor that influences and is influenced by the behaviors and expectations of students. For instance, the finding that 52.26% of respondents use ChatGPT for educational purposes at least once a month indicates that this AI tool is becoming embedded in academic routines. However, the remaining 47.74% who do not use it regularly suggest that structural elements, such as institutional norms and individual digital confidence, still mediate its integration. The unequal distribution of IT proficiency levels further supports the notion that ChatGPT's role in education depends on the interactions within the educational ecosystem rather than on the tool itself.

Another limitation is the lack of national statistics on the gender structure of sociology students, but internal faculty data and general higher education trends indicate the sample is partially representative.

The Technology Acceptance Model (TAM) by Fred Davis (1989) provides an explanatory framework for understanding the extent to which students adopt and integrate ChatGPT into their academic activities. Two primary constructs of TAM – Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) – help explain the findings. The survey results indicate that students recognize the usefulness of ChatGPT, particularly in terms of efficiency and task completion speed. The highest-rated aspect was „Activity Completion Speed" (49.4% strongly agree, 29.6% somewhat agree), indicating that a significant proportion of students believe that ChatGPT enhances their productivity. This is consistent with Davis (1989), who identified perceived usefulness as a primary predictor of user acceptance.

Similar conclusions were drawn by Venkatesh et al. (2003), who confirmed that when a technology improves performance, intention to use increases accordingly. This aligns with TAM's argument that users adopt technology when they perceive it as beneficial for their performance. However, the lower agreement level regarding whether ChatGPT „makes life more comfortable" (M=3.52) suggests that while the tool is useful, it is not necessarily perceived as transformative. This distinction highlights the role of external factors (such as digital literacy and institutional support) in shaping how users experience the benefits of AI-driven learning. Despite recognizing ChatGPT's usefulness, students exhibit mixed perceptions regarding its ease of use. The mean rating for „Learning to use ChatGPT is easy" was 4.15, indicating relative ease of adoption. However, the mean score for „Communicating with ChatGPT doesn't require much mental effort" was lower (M=3.33), suggesting that some students find the cognitive load associated with ChatGPT interaction to be a challenge. According to Davis, Bagozzi and Warshaw (1989), perceived ease of use affects not only user comfort but also shapes perceived usefulness, suggesting that cognitive strain can indirectly lower adoption rates. This finding is consistent with TAM's prediction that perceived ease of use influences adoption rates. Similar factors—namely cognitive load and competencies in prompt formulation—were also identified in a quantitative study with a sample of 328 students (Yu, Yan, and Cai 2024). Students who struggle with prompt formulation or assessing AI-generated information may experience higher cognitive strain, leading to lower engagement.

A crucial factor influencing ChatGPT adoption is the limited role of social influence, as reflected in the „Subjective Norm" construct. Unlike social media platforms,

where peer influence is a strong determinant of adoption, ChatGPT usage appears to be an individual decision. The relatively low mean scores for statements like „People who influence my behavior think I should use ChatGPT“ (M=3.35) suggest that external encouragement from professors or peers is not a strong factor in students' decision to use AI tools. This reflects the TAM2 model (Venkatesh & Davis 2000), which emphasizes that subjective norms have limited influence in voluntary usage settings, such as student-driven AI adoption, but gain importance in more structured environments. Recent student trend data from 2025 likewise indicate high but diverse use of GenAI tools and divided attitudes toward AI-based assessment and examinations, underscoring the weak role of social influence and the importance of clear institutional rules (HEPI 2025). This contrasts with traditional educational technologies, where instructor recommendations often drive adoption. From an ANT perspective, this indicates that ChatGPT has not yet fully integrated into academic norms and remains in a transitional stage. The limited institutional promotion or structured training programs on AI literacy may explain why some students remain hesitant to use it frequently. If universities aim to enhance AI adoption, they must actively position ChatGPT within the educational network by providing guidelines, training sessions, and ethical discussions on AI integration.

Another important factor influencing technology acceptance is trust in digital environments. The study results indicate moderate levels of trust in the security and reliability of ChatGPT. The lowest-rated statement in this category was „I trust that the technologies supporting ChatGPT are reliable at all times“ (M=2.91), suggesting that a significant number of respondents remain skeptical about AI's consistency and security. This skepticism aligns with broader concerns about data privacy, misinformation, and the ethical implications of AI-generated content. A recent study (Ardito 2025) evaluates the limitations of GenAI detection tools, emphasizing the need to redesign assessments rather than relying on detection as the primary mechanism. Similar concerns are raised in an analysis by The Guardian (2025), which warns of increasing AI-related academic misconduct and calls for reform of assessment systems. In line with these concerns, Turnitin's 2024 operational guidelines introduce a 20% threshold for displaying the proportion of AI-generated text and caution against false positives, further relativizing reliance on detection (Turnitin 2024/2025). These findings are consistent with recent calls for institutions to address security concerns through clear policies and ethical guidelines for AI use in education (Bittle and El-Gayar 2025). From a TAM perspective, concerns about security and reliability act as barriers to adoption by negatively impacting „Perceived Behavioral Control“, a con-

struct related to the belief that one has the ability to use a technology effectively. If students feel uncertain about the credibility of AI-generated content, they may hesitate to rely on ChatGPT for academic tasks. Klačmer (2020) points out that digital literacy and previous exposure to technology play a crucial role in shaping users' perceived behavioral control, which can significantly influence readiness to use AI tools like ChatGPT. This highlights the need for digital literacy initiatives that teach students how to critically evaluate AI outputs and navigate ethical concerns associated with AI in education. The findings of this study, when analyzed through the lenses of ANT and TAM, illustrate that ChatGPT adoption is shaped by a complex network of factors, including digital literacy, institutional norms, and perceived ease of use. While students recognize the tool's usefulness, barriers such as cognitive load, lack of social influence, and trust issues limit full integration into academic routines.

Research Limitations

This study has some limitations that should be considered when interpreting the results – sample size and structure and quantitative methodology. A limitation of this study is the modest global fit of the CFA model, suggesting that future research should consider respecification and testing on larger samples. The study was conducted on a sample of 81 respondents, the majority of whom were female students from social sciences and humanities faculties. This sample composition may affect the generalizability of the results, as students from technical and natural sciences fields may have different approaches to using AI technologies. Secondly, the research relied on a survey, which provides a broad overview of attitudes but does not offer deeper insights into the reasons behind individual responses. Qualitative interviews or focus groups could provide a more comprehensive understanding of students' perceptions and experiences.

Practical Implications

The findings suggest several practical steps that universities and educators can take to enhance AI adoption in education. First, AI literacy training is essential: universities should provide structured programs to help students develop the skills needed to effectively use AI tools such as ChatGPT (EDUCAUSE 2024). Second, the integration of AI into curricula is recommended, as educators can incorporate AI-driven learning strategies into coursework to enable students to engage with technology in meaningful ways. UNESCO guidelines provide a framework for curricular integration and the development of both teacher and student capacities (UNESCO 2023/2025). Third, insti-

tutions should establish clear ethical AI use guidelines. Transparent and responsible policies can help students navigate concerns about academic integrity and the role of AI in education (An, Yu and James 2025), while also fostering greater trust and confidence in the adoption of generative AI tools. UNESCO further emphasizes that clear policies, transparency, and human capacity building are prerequisites for the responsible use of GenAI (UNESCO 2023/2025). Finally, encouraging peer discussions—through student-led workshops and debates on AI applications—can enhance familiarity with ChatGPT and similar tools, while also reducing hesitation in their use. By embedding AI literacy into curricula and fostering a supportive network for AI adoption, institutions can better integrate ChatGPT into higher education, thereby enhancing students' learning experiences while addressing the challenges identified in this study.

Recommendations for Future Research

Given the limitations of this study, future research should expand the sample population (including students from technical and natural sciences disciplines could provide a broader perspective on AI adoption trends), use mixed-methods approaches (combining quantitative surveys with qualitative interviews or focus groups could offer deeper insights into student experiences and attitudes), explore ethical and security concerns in more depth (investigating issues such as plagiarism, data privacy, and AI's role in academic integrity would provide a more comprehensive understanding of student concerns) and assess longitudinal adoption trends (tracking changes in ChatGPT usage over time could reveal patterns in acceptance, skepticism, and evolving educational needs). By embedding AI literacy into academic curricula and fostering a supportive network for AI adoption, institutions can better integrate ChatGPT into higher education, enhancing students' learning experiences while addressing the challenges identified in this study.

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ULOGA CHATGPT-a U OBRAZOVNOM PROCESU: PERSPEKTIVA STUDENATA SOCIOLOGIJE

Sažetak

Ovaj rad analizira ulogu ChatGPT-a u visokom obrazovanju integracijom dvaju teorijskih okvira: Tehnološkog modela prihvaćanja (TAM) i Teorije akter-mreža (ANT). Kroz kvantitativno istraživanje, provedeno među 155 studenata sociologije na pet hrvatskih sveučilišta, istražuju se percepcije korisnosti, jednostavnosti uporabe, povjerenja i namjere korištenja ChatGPT-a. TAM pruža kvantitativni okvir za razumijevanje stavova studenata prema ChatGPT-u, dok ANT omogućuje njegovo tumačenje kao aktivnog sudionika u obrazovnim mrežama. Rezultati ukazuju na to da, iako studenti prepoznaju potencijal ChatGPT-a za povećanje učinkovitosti učenja, zabrinutosti vezane uz povjerenje, kognitivno opterećenje i ograničen društveni utjecaj umanjuju njegovo prihvaćanje. Nalazi ističu važnost razvoja digitalne pismenosti, potrebu za institucionalnim smjernicama o etičkoj uporabi umjetne inteligencije te ulogu obrazovnih institucija u poticanju odgovorne integracije AI tehnologija u akademsku praksu. Rad završava preporukama za jačanje strategija prihvaćanja umjetne inteligencije u visokom obrazovanju i usmjerava buduća istraživanja.

Ključne riječi: ChatGPT; visoko obrazovanje; Tehnološki model prihvaćanja (TAM); Teorija akter-mreža (ANT); umjetna inteligencija u obrazovanju

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