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Students' concerns about using AI in their studies

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Abstract

Research objectives (aims) and problem(s): The research concepts were developed based on Ulrich Beck's theory of risk, Pierre Bourdieu's concept of cultural capital, and Paulo Freire's concept of critical pedagogy. The research problem is formulated as follows: What concerns do students at Kraków universities have about using artificial intelligence while studying? It was assumed that they are related, in part, to dependence on technology, algorithmic flaws, and the potential replacement of humans by AI.

Research methods: The study was conducted between 20 January and 20 March 2025, using the diagnostic survey method (CAWI) on a quota sample of 1,529 students, via the Google Forms platform. Frequency analyses and descriptive statistics were applied.

Process of argumentation: The empirical findings were interpreted in relation to broader social and educational processes associated with technological risk, digital inequalities, and critical approaches to AI in education.

Research findings and their impact on the development of educational sciences: Respondents rated their concerns using a five-point Likert scale. The strongest concerns were related to the possibility of AI replacing humans in professions such as teaching or translation (30.1% selected level 5, the highest level of concern; 13.7% reported no concern at all). High levels of concern were also recorded regarding errors and imperfections in algorithms (level 4 – 24.6%, level 5 – 23.2%). The results indicate a growing sense of social anxiety associated with the increasing use of technology, particularly concerns related to the loss of control over technological systems and the potential for technological dependency.

Keywords:

AI,
AI tools,
AI use,
concerns,
AI in studies

Conclusions and/or recommendations: Literature analyses indicate a shortage of empirical studies on students' concerns regarding AI use in higher education and highlight the need to promote informed, responsible AI use in academic environments. The study contributes to the emerging debate on AI-related risk perception among university students and expands research on technological inequalities in higher education.

Introduction

Contemporary life increasingly revolves around artificial intelligence, which is entering all areas of human activity. Higher education institutions are thus becoming places not only for gaining knowledge but also for managing technological risk. Despite the growing body of international research on AI in higher education, limited attention has been paid to students' concerns regarding the social and educational consequences of AI use in the context of Central and Eastern Europe.

International research demonstrates that artificial intelligence is transforming higher education. AI-based tools, including generative systems such as ChatGPT, are becoming increasingly integrated into students' everyday academic practices, particularly in areas such as information retrieval, text generation, language support, and personalised learning (Holmes et al., 2022; Tlili et al., 2023). Researchers emphasise that AI technologies may enhance educational accessibility and effectiveness while simultaneously generating ethical, social, and pedagogical challenges. These challenges include issues related to academic integrity, the weakening of independent and critical thinking, increasing dependence on digital technologies, and the reproduction of educational inequalities (Kasneci et al., 2023; Selwyn, 2019).

AI-related anxiety among university students has become an increasingly important area of contemporary educational research. Concerns associated with artificial intelligence include excessive dependence on technology, reduced independent thinking, algorithmic bias, automation of cognitive processes, and the possible replacement of human labour in selected professions (Cotton et al., 2023; Rudolph et al., 2023).

Researchers also point out that the growing presence of AI in academic environments may weaken the development of critical reflexivity and promote reproductive rather than analytical models of learning (Luckin, 2018; Selwyn, 2019). Although representatives of this generation are often described as “digital natives,” recent studies indicate that high technological exposure does not necessarily translate into critical digital competencies or informed AI literacy (Prensky, 2001; Zawacki-Richter et al., 2019).

Artificial intelligence, despite its growing presence in academic and public debate, poses serious theoretical and practical challenges in the Polish context due to the lack of local research relating to its application among young people. This study focuses on young adults aged 18–29 and analyses selected dimensions of AI-related concerns in higher education, including fears related to labour market automation, algorithmic imperfections, technological dependence, and loss of control over technology.

The rapid development of AI technologies in higher education may also be interpreted through broader sociological theories concerning risk, inequality, and access to resources. The growing importance of AI-related competencies increasingly differentiates students in terms of technological skills, educational opportunities, and access to digital resources. Consequently, artificial intelligence functions as an integral component of educational processes. At the same time, the expanding presence of AI technologies generates significant ethical, educational, and social concerns related to critical thinking, technological dependency, and the reproduction of social and educational inequalities.

This study's theoretical framework is based on Ulrich Beck's theory of risk, Pierre Bourdieu's concept of cultural capital, and Paulo Freire's critical pedagogy approach applied in the context of education. Combining these theoretical perspectives enables a critical understanding of the challenges that AI poses to schools, universities, and broader educational policy.

Conceptualisation of the research problem

Artificial intelligence refers to computational systems capable of performing tasks that typically require human cognitive abilities, including learning, reasoning, decision-making, and natural language processing (Russell & Norvig, 2021). The concept of artificial intelligence is commonly associated with John McCarthy, who introduced the term in 1956, while important contributions to the development of AI theory were also made by Alan Turing and Marvin Minsky (Minsky, 1986).

Bourdieu's concept of cultural capital focuses on the level of cultural knowledge that allows access to and effective use of modern technologies, through access to and familiarity with technological tools in educational environments. The accumulation of high cultural capital in education leads to educational inequalities, such as disparities in the ability to use AI tools, familiarity with their functionality, awareness of their consequences, and understanding of underlying mechanisms and manipulation risks. Technological capital may thus become a new form of cultural capital, where AI literacy becomes key to success and the further development (conversion) of competencies among students and between academic institutions. According to Bourdieu, capital should be understood in dichotomous terms: as barriers to social mobility on the one hand and as opportunities arising from social networks and the multiplication of competencies (capabilities) offered by one's environment on the other. Bourdieu argued that educational systems contribute to the reproduction of existing social inequalities by legitimising class-based differences through educational practices and cultural norms (Bourdieu, 2006; Bourdieu & Passeron, 2012). This perspective can be understood within Bourdieu's broader theory of social fields, where institutions operate according to specific structures, rules, and forms of capital that shape individuals' positions and opportunities (Bourdieu & Wacquant, 2006). According to Turner (2012), Bourdieu linked habitus with class culture, suggesting that individuals occupying similar social positions tend to develop comparable dispositions, perceptions, and patterns of behaviour (Bourdieu, 2008, as cited in Turner, 2012). This perspective is particularly

relevant to the analysis of AI in higher education, as students' ability to use AI consciously and critically may depend on their previous educational experiences, social background, and access to technological resources.

Beck's theory emphasises the continuous risks produced by technology, within which modern societies must function. These risks are generated by the very system of modernity, which, in the age of the "risk society," begins to threaten itself. They are, in his view, oversized side effects of scientific and technological progress – invisible, hard to control, and often global in nature. They are uncontrollable due to the absence of institutions that can effectively oversee or prevent them (Beck, 2002, pp. 72–84; Stankiewicz, 2008). The author identifies three characteristics of risk: delocalisation, incalculability and non-compensability (Beck, 2002; Beck, 2012). Life in a risk society is associated with chronic anxiety and a general sense of uncertainty, which is often pushed into the subconscious but not always effectively (Hryniewicz, 2014, p. 14). AI in higher education introduces risks related to algorithmic errors, privacy loss, technological dependency, automated assessment, and the potential replacement of human labour in selected professional and educational roles, such as teachers, translators, and tutors. Consequently, artificial intelligence may be understood not only as a technological innovation but also as a source of broader social and educational risks.

The integration of Beck's theory of the risk society and Bourdieu's concept of cultural capital suggests that modern education should prepare students to use AI technologies consciously and critically by fostering an understanding of both the opportunities and risks they entail. This preparation remains closely linked to unequal levels of cultural and technological capital, as access to digital competencies and the ability to use AI effectively are not equally distributed among students. An additional perspective complementing this theoretical framework is Freire's concept of critical pedagogy (1970). In line with this concept, AI technologies in educational contexts should not replace independent thinking and reflective inquiry but foster the development of critical consciousness, analytical competencies, and responsible participation in contemporary digital society.

Method

This study examined the concerns students at Kraków universities expressed about the use of artificial intelligence in the learning process. It was assumed that students' concerns may be associated with technological dependency, reduced control over cognitive and decision-making processes, algorithmic errors, and the potential replacement of human labour by AI systems. Additionally, the study aimed to identify broader social and educational dimensions of AI-related risk perception among university students and to formulate recommendations for responsible AI use in higher education.

The main dependent variable in the study was students' concerns regarding the use of artificial intelligence in the learning process. The variable was operationalised through four dimensions of AI-related risk perception: concerns about the replacement of human labour by AI systems, concerns related to algorithmic errors and imperfections, concerns regarding technological dependency, and concerns associated with reduced control over cognitive and decision-making processes.

Concerns about the replacement of human labour referred to fears that AI may replace humans in certain professions and educational roles, such as teachers or translators. Concerns related to algorithmic imperfections referred to fears of errors, inaccuracies, and limitations in AI systems used in education. Technological dependency referred to concerns about excessive reliance on AI tools in the learning process. Reduced control over cognitive and decision-making processes referred to concerns that extensive reliance on AI may weaken independent thinking and critical reflection.

All variables were measured using a five-point Likert scale, where 1 indicated no concern and 5 indicated a very high level of concern. The grouping variables used in the analysis comprised gender, year of study, and place of residence. Gender was analysed using three categories (woman, man, and no response). Year of study was divided into seven categories corresponding to the respondents' educational stage. Place of residence included five categories reflecting the size and type of locality. The collected data were analysed using Statistica 13.3 and Microsoft Excel.

Frequency analyses and descriptive statistics, including mean, median, and standard deviation, were applied. The analysis also included Pearson's chi-square test and Cramér's V coefficient. The study was conducted between 20 January and 20 March 2025, using a computer-assisted web interviewing (CAWI) survey administered via the Google Forms platform.

A quota sampling method was used. Based on the total number of students at Kraków universities, obtained from the Public Information Bulletins (BIP) of individual institutions, the overall number of students in Kraków's academic centres was estimated at approximately 135,000. The population was divided into specific groups to determine quotas, and 1.5% of students from each university were subsequently selected for the study. After verifying their responses, 1,529 questionnaires qualified for final analysis – each with a completion rate of around 95%. Due to limitations of space, only the number of qualifying participants from each Kraków university is listed below:

- Jagiellonian University – 458
- AGH University of Science and Technology – 230
- University of the Commission of National Education in Kraków – 230
- Hugo Kołłątaj University of Agriculture in Kraków – 78
- Tadeusz Kościuszko Cracow University of Technology – 139
- Andrzej Frycz Modrzewski Krakow University – 108
- Cracow University of Economics – 185
- Jan Matejko Academy of Fine Arts in Kraków – 16
- Pontifical University of John Paul II in Kraków – 40
- Ignatianum Academy in Kraków – 45

Quotas were established based on respondents' gender, year of study, and place of residence. Respondents were recruited through institutional communication channels, academic networks, and online student communities. Due to the sampling procedure, which included only students from Kraków universities, the findings cannot be generalised to the entire population of students in Poland. Nevertheless, the study makes it possible to identify significant relationships and trends.

Analysis of collected data: Student concerns

The analysis focused on four main dimensions of AI-related risk perception among university students: concerns about labour market automation, algorithmic imperfections, technological dependency, and loss of control over technology.

Table 1. Students' concerns regarding the replacement of human labour by AI systems

Response	N	%
1	209	13.67%
2	231	15.11%
3	324	21.19%
4	289	18.90%
5	460	30.09%
No answer	16	1.05%
Total	1529	100.00%

Table 1 presents the distribution of students' concerns regarding the replacement of human labour by AI systems in selected professions and educational roles, such as teachers, translators, and language instructors. A relatively high proportion of respondents expressed elevated levels of concern in this area. The largest group of surveyed students selected the highest level of concern (30.1%), while only 13.7% declared no concern. The average level of concern was moderate ($M = 3.37$; $Me = 3.00$; $SD = 1.41$), suggesting that fears related to labour market automation constitute an important dimension of AI-related risk perception among students at Kraków universities.

Table 2. Relationships between socio-demographic variables and concerns regarding the replacement of human labour by AI systems

Variable	χ^2	p-value	Cramér's V
Gender	53.39	$p < .001$	0.13
Year of study	151.50	$p < .001$	0.14
Place of residence	46.58	$p < .001$	0.09

χ^2 = Pearson's chi-square test; Cramér's V = effect size coefficient.

The analysis revealed statistically significant relationships between concerns regarding labour market automation and all analysed socio-demographic variables ($p < .001$) (Table 2). The strongest association was observed for year of study (Cramér's V = 0.14), suggesting that educational experience may influence students' perceptions of AI-related labour market risks. Higher levels of concern were more frequently observed among students in advanced stages of education and among respondents from smaller towns and rural areas.

From the perspective of Beck's theory of the risk society, these findings can be interpreted as broader anxieties associated with technological transformation and the growing automation of social and professional life. Differences associated with place of residence may indicate unequal access to technological and educational resources, corresponding with Bourdieu's concept of the reproduction of social inequalities through cultural capital, while also influencing the critical use of AI technologies in the learning process.

Concerns related to errors and imperfections in AI algorithms constituted another important dimension of students' technological anxiety in educational settings.

Table 3. Students' concerns regarding errors and imperfections in AI algorithms

Response	N	%
1	165	10.8%
2	259	16.9%
3	351	23.0%
4	376	24.6%
5	355	23.2%
No answer	23	1.5%
Total	1529	100.0%

As shown in Table 3, responses were concentrated primarily in the higher categories of the scale, with 24.6% selecting level 4 and 23.2% selecting level 5. The average level of concern remained moderate ($M = 3.33$; $Me = 3.00$; $SD = 1.30$), suggesting that the reliability of AI-based systems is perceived as a significant challenge in higher education.

Table 4. Relationships between socio-demographic variables and concerns regarding errors and imperfections in AI algorithms

Variable	χ^2	p-value	Cramér's V
Gender	32.35	$p < .001$	0.10
Year of study	102.96	$p < .001$	0.12
Place of residence	86.73	$p < .001$	0.12

χ^2 = Pearson's chi-square test; Cramér's V = effect size coefficient.

The statistical analysis demonstrated significant relationships between the analysed variable and all socio-demographic characteristics included in the study (Table 4). Although the effect sizes measured by Cramér's V were weak, the results indicate that perceptions of risks related to algorithmic imperfections differ depending on students' educational

experiences and social backgrounds. Higher levels of concern were particularly evident among students in more advanced years of study and among respondents from smaller towns and rural areas. These findings may be interpreted through the lens of Beck's risk society theory, according to which technological modernisation generates new forms of uncertainty and anxiety associated with automation and algorithmic decision-making.

Another important dimension of AI-related risk perception concerned fears associated with excessive dependence on technology in educational and everyday functioning.

Table 5. Students' concerns regarding technology dependence associated with AI use

Response	N	%
1	290	19.0%
2	258	16.9%
3	278	18.2%
4	261	17.1%
5	424	27.7%
No answer	18	1.2%
Total	1529	100.0%

The data analysis indicates that the largest proportion of respondents reported the highest level of concern (27.7%) (Table 5). The average level of concern remained moderate ($M = 3.18$; $Me = 3.00$; $SD = 1.48$), suggesting that technological dependency constitutes an important dimension of AI-related risk perception among the surveyed students.

Table 6. Relationships between socio-demographic variables and concerns regarding technology dependence associated with AI use

Variable	χ^2	p-value	Cramér's V
Gender	55.85	p < .001	0.14
Year of study	151.50	p < .001	0.14
Place of residence	83.52	p < .001	0.12

χ^2 = Pearson's chi-square test; Cramér's V = effect size coefficient.

The data presented in Table 6 indicate statistically significant relationships between concerns regarding technological dependency and all analysed socio-demographic variables (p < .001). Although the effect sizes measured by Cramér's V remained weak, higher levels of concern were more frequently observed among students in advanced stages of education and among respondents from smaller towns and rural areas.

From the perspective of Beck's theory of the risk society, these findings may reflect broader concerns associated with increasing dependence on technological systems and the diminishing autonomy of individuals in highly technologised digital environments. The results also correspond with critical approaches to educational technologies, which emphasise that excessive reliance on digital tools may weaken students' autonomy and reduce their engagement in reflective learning processes (Selwyn, 2019).

Concerns regarding the loss of control over technology reflected broader anxieties associated with the growing autonomy of AI systems and their increasing role in educational and everyday decision-making processes.

Table 7. Students' concerns regarding loss of control over technology associated with AI use

Response	N	%
1	203	13.3%
2	301	19.7%
3	381	24.9%
4	299	19.6%
5	338	22.1%
No answer	7	0.5%
Total	1529	100.0%

The respondents' answers were concentrated primarily around the middle and higher levels of the scale. Nearly one quarter of respondents (24.9%) indicated a moderate level of concern, while 22.1% reported the highest level of anxiety. These findings suggest that the surveyed students perceive the growing autonomy of technological systems as a significant social and educational challenge.

Table 8. Relationships between socio-demographic variables and concerns regarding loss of control over technology associated with AI use

Variable	χ^2	p-value	Cramér's V
Gender	27.54	$p < .001$	0.09
Year of study	202.62	$p < .001$	0.16
Place of residence	58.46	$p < .001$	0.10

χ^2 = Pearson's chi-square test; Cramér's V = effect size coefficient.

Consistent with the previous analyses, statistically significant relationships were identified between the analysed variable and all socio-demographic characteristics ($p < .001$). The strongest association was observed for year of study (Cramér's V = 0.16), which may suggest, similarly

to the preceding findings, that academic experience and the extent of prior engagement with digital technologies influence students' perceptions of technological control and autonomy.

These findings may reflect broader socio-pedagogical tensions associated with the growing autonomy of AI systems and the changing role of human agency in educational environments. In line with critical approaches to educational technologies, concerns regarding loss of control may indicate fears related to reduced autonomy and increasing dependence on automated systems in learning processes.-

Conclusions

The analysis of data concerning the concerns of students at Kraków universities indicates that perceptions of artificial intelligence extend beyond purely technological issues and reflect broader social and educational transformations associated with the growing presence of AI in higher education. The analysed dimensions of concern suggest that artificial intelligence is perceived by respondents as a source of both opportunity and uncertainty.

The findings revealed statistically significant relationships between AI-related concerns and socio-demographic variables, particularly year of study and place of residence. Higher levels of concern among students from smaller towns and rural areas may indicate inequalities in access to digital competencies and technological resources. Simultaneously, students in more advanced stages of education demonstrated greater awareness of the potential social and educational consequences of artificial intelligence.

The results may be interpreted through Beck's theory of the risk society, according to which technological modernisation generates new forms of uncertainty shaping contemporary social life. At the same time, the observed differences correspond with Bourdieu's concept of cultural capital, suggesting that the ability to critically engage with AI technologies is becoming an increasingly important educational and social

resource. From the perspective of Freire's critical pedagogy, the findings highlight the growing importance of critical digital literacy, reflective thinking, and responsible participation in digital environments. Artificial intelligence may support educational processes; however, its implementation should reinforce rather than replace students' autonomy, critical thinking, and independent intellectual engagement, thereby promoting reflective learning instead of the passive reproduction of content generated by AI systems.

The observed differences in perceptions of AI among the surveyed students may reflect broader social tensions concerning the relationship between individual autonomy and increasing dependence on digital technologies, as well as between individual agency and the systemic influence of automated technological solutions. The findings suggest that gender, place of residence, and level of education constitute significant factors differentiating the ways in which artificial intelligence is interpreted and evaluated.

Educational implications and best practices

The findings suggest that artificial intelligence is emerging not only as a tool supporting educational processes but also as a significant factor shaping the functioning of contemporary higher education and influencing perceptions of technological risk. It creates both opportunities and challenges, particularly in relation to equal access to education, critical thinking, and digital competencies. The integration of AI into education should therefore be based on the principles of transparency, responsibility, and equal opportunity.

Drawing on Bourdieu's theory, Monika Adamczyk (2015, p. 14) emphasises that the educational system plays a crucial role in the reproduction of social inequalities through symbolic practices, authority, and pedagogical work. In this context, the implementation of AI technologies requires reflection on their potential influence on social structures, educational inequalities, and access to cultural and technological capital.

However, in light of Freire's concept of critical pedagogy (1970), AI should not replace human intellectual activity but rather support the development of analytical, interpretative, and reflective competencies necessary for responsible functioning within contemporary digital societies. From the perspective of critical pedagogy, education should strengthen individual autonomy, foster critical thinking about technology, and promote reflective engagement in learning processes.

The findings indicate that place of residence, particularly smaller towns and rural areas, may influence perceptions of AI, its role in education, and concerns associated with technological transformation. These differences may reflect unequal access to digital competencies and technological resources. These findings remain consistent with Bourdieu's concept of cultural capital and with studies emphasising that AI may reinforce existing educational inequalities rather than reduce them (Bulathwela et al., 2024; Zawacki-Richter et al., 2019). Consequently, students should be prepared not only for the technical use of AI tools but also for their critical, ethical, and responsible application. Although artificial intelligence may support learning processes through content personalisation, progress monitoring, and learning-support systems, excessive dependence on automated technologies may simultaneously weaken students' autonomy and limit the relational dimension of education.

With regard to critical thinking, the findings align with studies indicating that the growing presence of AI in education may weaken the development of critical thinking and reflective learning, particularly when reliance on generative tools is excessive (Kasneci et al., 2023; Selwyn, 2019). Similar conclusions concerning the weakening of independent and reflective learning have also been presented by Luckin (2018), who emphasised that the development of AI in education requires the simultaneous strengthening of critical thinking competencies and students' conscious engagement in learning processes. From the perspective of Freire's critical pedagogy, education should strengthen students' autonomy and their capacity to critically evaluate content generated by AI systems.

The students' concerns regarding labour market automation, loss of control over technology, and dependence on AI may be interpreted

in light of Beck's theory of the risk society. Similar tendencies have also been identified in studies on AI anxiety and perceptions of risks associated with the automation of educational and professional processes (Cotton et al., 2023). Fears related to the replacement of humans by AI systems in certain professions, such as teachers, translators, and tutors, remain consistent with earlier research indicating a growing sense of uncertainty associated with the automation of work based on cognitive and linguistic competencies (Łukasik, 2024). At the same time, researchers emphasise that AI more often leads to the transformation and redefinition of professional roles than to the complete elimination of human labour (Chan & Tsi, 2023).

Artificial intelligence is both an opportunity and a potential threat to contemporary education, a finding confirmed by this study. The surveyed students perceive AI simultaneously as a tool supporting the learning process and as a source of potential educational and social risks. Similar conclusions were formulated by Kasneci et al. (2023), who indicated that AI may enhance the effectiveness of education while simultaneously raising questions concerning cognitive autonomy, responsibility, and the quality of the educational process. Future education requires a balanced approach that combines technological innovation with the preservation of the relational, humanistic, and social values that underpin education. The observed tendencies also indicate a growing need for broader public debate concerning the impact of artificial intelligence on education, employment, and the professional identities of younger generations.

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