Student Perceptions of Generative Artificial Intelligence and Employability Skills: Evidence from Three Waves of a Global Student Survey

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Abstract: Generative artificial intelligence (AI), made widely accessible to students through the rapid rise of ChatGPT after its introduction in November 2022, has significantly influenced higher education. Its growing use highlights its potential to support learning, academic work, and employability skills development, including skills needed in digitally transformed public sector workplaces. As future public sector professionals are expected to operate in increasingly digital, data-driven, and uncertain environments, generative AI tools may help prepare students for emerging workplace demands. However, limited repeated cross-sectional research has examined students' perceptions of generative AI in relation to employability skills and public sector workforce readiness. This study addresses this gap by analysing social sciences students' usage patterns and perceptions of ChatGPT's potential for employability skills development across three academic years. Using descriptive statistics, including top-two-box scores, and inferential statistics, including ANOVA and post hoc comparisons, the study compares data from three waves of the Global ChatGPT Student Survey, including 9,356 social sciences students in 2023–2024, 9,575 in 2024–2025, and 9,250 in 2025–2026. Results show a clear increase in ChatGPT use across all analysed tasks, with the most common applications being summarising, brainstorming, study assistance, and research support. Students also increasingly perceived ChatGPT as useful for developing employability skills, particularly artificial intelligence literacy, digital communication, digital content creation, foreign language proficiency, and data analysis. At the same time, they viewed it as less effective for supporting interpersonal communication, decision-making, numeracy proficiency, and native language proficiency. These findings suggest that generative AI is becoming embedded in students' academic practices and may shape the digital, communication, analytical, and AI-related competencies expected of future public sector professionals.

Keywords: Generative artificial intelligence, ChatGPT, AI literacy, employability, public administration education, repeated cross-sectional survey

1 Introduction

The launch of the conversational generative AI tool ChatGPT in November 2022 represented a pivotal moment in the integration of artificial intelligence into higher education. Developed by OpenAI (San Francisco, CA), ChatGPT rapidly attracted global attention due to its advanced natural language processing capabilities, enabling smooth and intuitive communication between users and AI systems (Alessandri-Bonetti et al., 2024; Mohmad, 2023). Although initially designed to simulate human conversation, ChatGPT can support a wide range of academic and professional tasks, including writing assistance, summarizing, brainstorming, language learning, research support, and data analysis (Boubker, 2024; Das & Madhusudan, 2024). As one of the fastest-growing consumer-oriented AI technologies, ChatGPT has generated both optimism and concern within higher education institutions worldwide (Tlili et al., 2023; Twinomurinzi & Gumbo, 2023). Supporters emphasize its potential to provide personalized learning assistance, immediate feedback, accessibility, and improved learning efficiency, while critics highlight risks related to academic integrity, misinformation, biased outputs, plagiarism, and overreliance on AI-generated content, emphasizing the need for strong ethical frameworks and critical evaluation of AI-supported learning processes (Aristovnik et al., 2024; Michalon & Camacho-Zuñiga, 2023; Ravšelj et al., 2025a; Williams, 2024).

Previous studies have identified multiple ways in which ChatGPT and other generative AI tools can support higher education activities, particularly in relation to studying, writing, communication, problem-solving, and information processing (Boubker, 2024). As a result, these technologies are increasingly becoming integrated into students' everyday academic practices. At the same time, the rapid evolution of generative AI models, especially following the release of more advanced ChatGPT models with enhanced multimodal capabilities and broader accessibility, has substantially expanded their educational and professional potential (Dong et al., 2024). Beyond their immediate academic applications, generative AI tools are increasingly

discussed in relation to employability skills development, particularly as public sector organizations require employees who can work with digital technologies, process information critically, communicate effectively, and support evidence-based decision-making. Consequently, ChatGPT is increasingly recognized as a potentially valuable tool for supporting the development of competencies relevant to future employment, including within the public sector (AlAfnan et al., 2023; Aristovnik et al., 2024; Rahman & Watanobe, 2023; Rudolph et al., 2023).

These developments are particularly important for the future public sector workforce, as the public sector is increasingly shaped by digital transformation, data-driven governance, AI-supported services, and growing expectations for efficient, transparent, and citizen-oriented public services (Babšek et al., 2025). Ongoing digital transformation in the public sector increasingly requires employees to operate effectively in technology-supported environments characterized by large volumes of information, data-driven governance, and rapidly changing societal demands (Babšek et al., 2025). Future public sector professionals are therefore expected to possess strong digital competences, communication abilities, analytical skills, AI literacy, ethical awareness, and the capacity to critically assess technology-supported outputs in public sector and policy-making contexts (Krpálek et al., 2021; Hirsch et al., 2023; Tomaževič et al., 2023; OECD, 2026). Within this context, generative AI tools such as ChatGPT may significantly influence how future public sector employees acquire knowledge, develop employability skills, communicate, and perform public sector tasks. Recent OECD findings further emphasize that AI adoption in the public sector increasingly requires workforce upskilling, AI literacy, and continuous learning mechanisms (OECD, 2026). Understanding students' perceptions of generative AI and its potential contribution to employability skills development is therefore important not only from an educational perspective, but also for anticipating broader workforce transformations in the public sector.

Despite the growing body of literature on generative AI in higher education, important research gaps remain. Existing studies have mainly focused on general attitudes toward ChatGPT, ethical concerns, or specific educational applications, while less attention has been given to repeated cross-sectional evidence on changes over time in students' perceptions and usage patterns. Moreover, limited research has examined the relationship between generative AI use and employability skills development among students preparing for public sector careers. Accordingly, this study examines social sciences students' usage patterns and perceptions of ChatGPT's potential for employability skills development across three academic years, with particular attention to implications for the future public sector workforce. By focusing on social sciences students, the study also provides insights into future public sector professionals' preparedness to work in increasingly digitalized public sector and governance environments. The remainder of the paper is structured as follows: the next section presents the materials and methods, followed by the results section, while the final section provides the conclusion.

2 Materials and Methods

Data were gathered in three waves through the Global ChatGPT Student Survey, coordinated by the Faculty of Public Administration at the University of Ljubljana, Slovenia. This study uses a repeated cross-sectional survey design based on three waves of the Global ChatGPT Student Survey. Although the waves cover three consecutive academic years, they do not follow the same students over time. The first wave was conducted from October 2023 to February 2024 (Ravšelj et al., 2025b), the second from October 2024 to February 2025 (Aristovnik et al., 2025), and the third from October 2025 to February 2026. To support broad international participation, the questionnaire was offered in seven languages. In the first two waves, these included English, Italian, Spanish, Turkish, Japanese, Arabic, and Hebrew, while in the third wave Hebrew was replaced by Indonesian. Respondents were higher education students aged 18 years or older who were legally eligible to provide informed and voluntary consent to participate in the anonymous survey (Ravšelj et al., 2025a). A convenience sampling approach was employed, with the survey distributed through classroom activities and institutional communication channels. This approach reflects a common practice in educational research for reaching students who are accessible and willing to participate (Boubker, 2024; Sarstedt et al., 2018).

The online questionnaire consisted of several sections addressing issues directly and indirectly related to ChatGPT use. These sections covered socio-demographic characteristics, usage patterns, capabilities,

regulation and ethical concerns, satisfaction and attitudes, study-related issues and outcomes, skills development, labor market and skills mismatch, emotions, additional impacts and implications, study and personal information, and general reflections. Most constructs were measured using closed-ended items on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) (Ravšelj et al., 2025b). The questionnaire structure remained largely consistent across the three waves, with two exceptions. First, the item concerning the use of ChatGPT and other generative artificial intelligence tools was revised. In the first wave, students were asked exclusively about their use of ChatGPT. In the second and third waves, the question was expanded to include several tools, namely ChatGPT (OpenAI), Microsoft Copilot, Google Gemini (formerly Bard), Perplexity AI, Claude AI (Anthropic), and an open-ended "Other" option. This modification reflects the rapid expansion of the generative artificial intelligence ecosystem in higher education and acknowledges that students increasingly combine multiple AI tools depending on the academic task or learning objective. Second, a new section on additional impacts and implications was introduced in the third wave to capture emerging issues related to generative artificial intelligence use.

Although the survey included students from various countries and academic disciplines, this study focuses specifically on students enrolled in higher education social sciences programs. This focus is justified by the close connection between social sciences education and the future public sector workforce, as graduates from these fields often enter careers in the public sector, governance, policy analysis, public service delivery, and related sectors where digital, communication, analytical, and AI-related competences are becoming increasingly important (Aristovnik et al., 2024). While the broader survey examined multiple dimensions related to the use of ChatGPT, the present analysis concentrates specifically on students' usage patterns and the perceived development of employability skills. In particular, the study explores how social sciences students' perceptions of ChatGPT use and its role in fostering employability skills evolved across three consecutive academic years.

The survey included 9,356 social sciences students in the first wave, 9,575 in the second wave, and 9,250 in the third wave (see Table 1). The structure of the sample across the socio-demographic characteristics of the survey participants remained relatively consistent across the three waves. Female students represented the majority of respondents in all waves, with their share gradually increasing over time. Most participants were enrolled in first-level study programs, while smaller proportions were enrolled in second- and third-level programs. Regarding the mode of study, blended learning was the most common format in the second and third waves, whereas traditional learning predominated in the first wave. At the same time, the share of students engaged in online learning increased in the third wave.

Table 1: Socio-demographic characteristics of the survey respondents

Socio-demographic characteristics	First wave (2023-2024)		Second wave (2024-2025)		Third wave (2025-2026)	
	Number	Share (%)	Number	Share (%)	Number	Share (%)
Gender						
Male	3229	35.0	2999	31.7	2601	28.5
Female	5989	65.0	6449	68.3	6528	71.5
Level of study						
First	7751	83.2	7451	78.1	7521	81.6
Second	1306	14.0	1868	19.6	1548	16.8
Third	257	2.8	218	2.3	149	1.6
Mode of study						
Traditional learning	4461	47.8	4065	42.5	3614	39.2
Online learning	1018	10.9	764	8.0	1303	14.1
Blended learning	3854	41.3	4730	49.5	4306	46.7

Note: Due to missing values, some socio-demographic aspects do not match the number of the final sample.

Source: Own calculations based on the Global ChatGPT Student Survey.

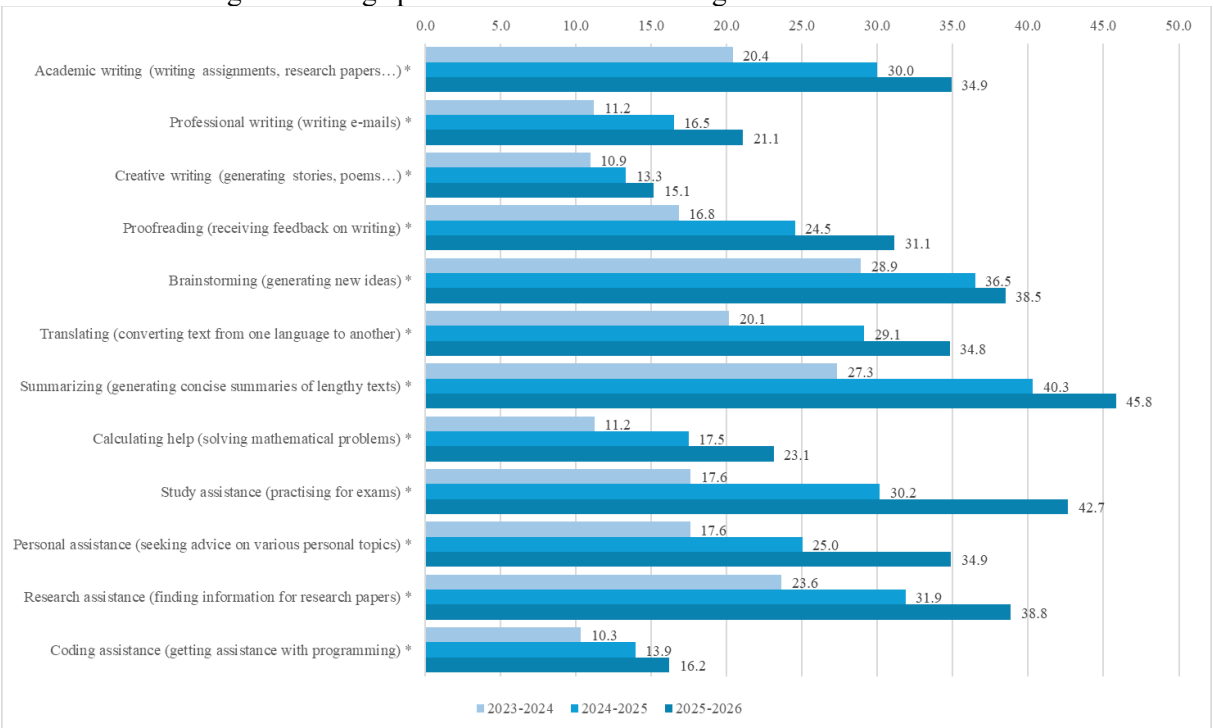
The data were analyzed using two main statistical techniques. First, descriptive analysis was performed by calculating top-two-box scores, representing the proportion of respondents who selected the two highest response categories ("agree" and "strongly agree") on the 5-point Likert scale. Second, one-way analysis of variance (ANOVA) was conducted to compare mean scores related to students' reported usage patterns and perceptions of employability skills across the three survey waves. When statistically significant differences

were identified, pairwise t-tests with appropriate adjustments for multiple comparisons were performed to examine differences between individual survey waves (Hair et al., 2010).

3 Results

Students' perceptions and patterns of ChatGPT use differed considerably depending on the type of task (see Figure 1). Across the three academic years, the highest levels of usage were consistently observed for summarizing, brainstorming, study assistance, and research assistance, indicating that students primarily used ChatGPT for activities closely related to learning support, information processing, idea development, and academic work. These findings suggest that students relied on ChatGPT to condense lengthy texts, generate ideas, prepare for examinations, search for information, and support study-related tasks. Such usage patterns are particularly relevant for the future public sector workforce because public employees increasingly need to summarize complex information, prepare evidence-based documents, generate policy ideas, support administrative communication, and use digital tools responsibly in everyday work. In contrast, the lowest levels of usage were reported for coding assistance, creative writing, professional writing, and calculating help, suggesting that ChatGPT was used less often for more technical, specialized, or less frequently required tasks. Overall, this pattern indicates that ChatGPT was most commonly integrated into students' everyday academic routines, reflecting the growing normalization of generative AI tools among future public sector professionals.

Figure 1: Usage patterns of ChatGPT among social sciences students



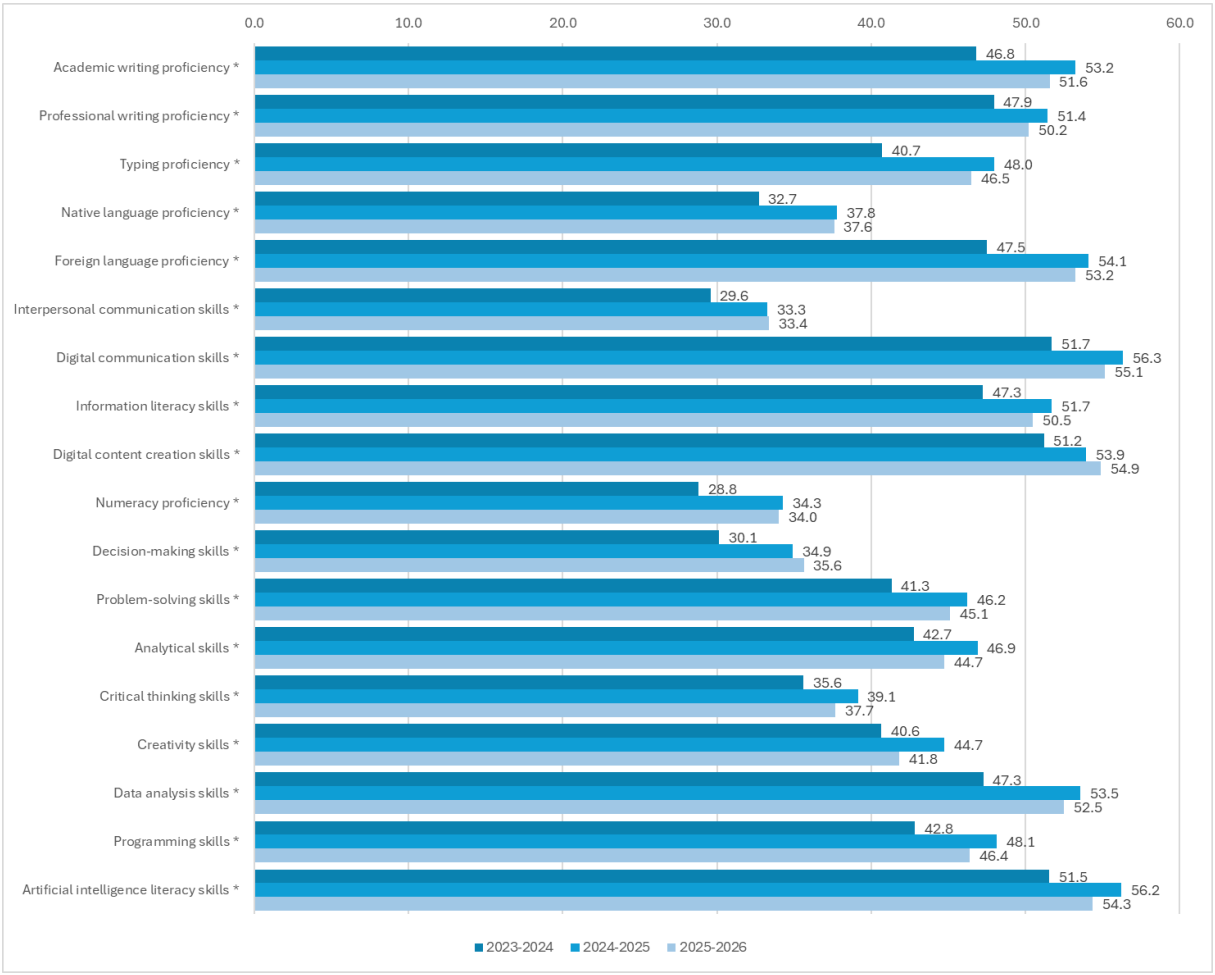
Note: An asterisk (*) indicates a statistically significant result of the ANOVA test ($p \leq 0.05$).
Source: Own calculations based on the Global ChatGPT Student Survey.

The results also show a clear upward trend in ChatGPT use across all analyzed tasks over time. ANOVA results revealed statistically significant differences across the three waves for all analyzed activities, while post hoc comparisons showed statistically significant differences between all pairs of waves for every analyzed task. Between the first and third waves, the largest increases were observed for study assistance (+25.1 percentage points) and summarizing (+18.5 percentage points), indicating particularly strong growth in the use of ChatGPT for learning support and text processing. In contrast, the smallest increases were recorded for creative writing (+4.2 percentage points) and coding assistance (+5.9 percentage points). Overall, these dynamics suggest that generative AI tools became increasingly embedded in students' academic practices, especially for studying, summarizing information, writing, and research support. From the perspective of the future public sector workforce, these findings indicate that upcoming generations of employees are likely to enter the public sector with greater familiarity and confidence in using generative

AI tools, potentially reshaping workflows, communication practices, evidence-based governance processes, and digital skill requirements in the public sector. Emerging evidence from public sector settings also suggests that generative AI may improve performance in document-related and knowledge-intensive tasks (Fitzpatrick et al., 2025).

Students' perceptions of ChatGPT's potential for employability skills development also differed considerably by skill domain (see Figure 2). Across the three academic years, the highest levels of agreement were consistently observed for artificial intelligence literacy skills, digital communication skills, digital content creation skills, foreign language proficiency, and data analysis skills. This indicates that students primarily associated ChatGPT with the development of digital, communication, language, and analytical competences. These findings suggest that students perceived ChatGPT as particularly useful for strengthening skills related to digital transformation, information processing, content creation, communication, and data-oriented work. Such perceptions are especially relevant for the future public sector workforce, where AI literacy, digital communication, digital content creation, foreign language proficiency, and data analysis are becoming central to public sector modernization, citizen communication, and evidence-informed governance. In contrast, the lowest levels of agreement were reported for numeracy proficiency, interpersonal communication skills, decision-making skills, and native language proficiency, suggesting that students perceived ChatGPT as less useful for skills requiring interpersonal interaction, contextual judgment, or more traditional forms of cognitive processing. Overall, this pattern indicates that ChatGPT was most commonly perceived as a tool for supporting digitally oriented and knowledge-based employability skills, reflecting the growing role of generative AI in shaping the competencies of future public sector professionals.

Figure 2: Perceptions of ChatGPT's potential for employability skills development among social sciences students



Note: An asterisk (*) indicates a statistically significant result of the ANOVA test ($p \leq 0.05$).
Source: Own calculations based on the Global ChatGPT Student Survey.

The results further show a generally positive trend in students' perceptions of ChatGPT's potential for employability skills development over time. ANOVA results revealed statistically significant differences across the three waves for all analyzed skills, while post hoc comparisons showed statistically significant differences between the first and third waves for almost every skill domain. Between the first and third waves, the largest increases were observed for foreign language proficiency (+11.5 percentage points) and data analysis skills (+9.3 percentage points), indicating particularly strong growth in students' recognition of ChatGPT's potential to support language development and analytical competences. In contrast, the smallest increases were recorded for analytical skills (+2.0 percentage points) and professional writing proficiency (+2.3 percentage points). Overall, these dynamics suggest that generative AI tools became increasingly recognized as relevant instruments for employability skills development, especially for digital, language, communication, and data-related competences. From the perspective of the future public sector workforce, these findings imply that upcoming generations of employees are likely to enter the public sector with stronger expectations and greater readiness to integrate generative AI tools into everyday professional tasks, including multilingual communication, information management, policy-related analysis, data processing, and digital content creation.

4 Conclusion

The introduction of ChatGPT in November 2022 marked a significant turning point in higher education, offering students advanced natural language processing capabilities and a versatile generative AI tool for a wide range of academic tasks. As one of the most sophisticated consumer-oriented generative AI applications, ChatGPT has been recognized for its potential to enhance learning through real-time feedback, personalized support, and improved accessibility. At the same time, it has also raised concerns regarding academic integrity, misinformation, algorithmic bias, and ethical issues related to the use of AI-generated content. In the context of social sciences education and the future public sector workforce, where digital competences, adaptability, communication abilities, and evidence-based decision-making are becoming increasingly important, ChatGPT demonstrates considerable potential for supporting employability skills development. Despite this potential, there remains a lack of repeated cross-sectional quantitative studies examining students' evolving perceptions and usage patterns related to generative AI tools. The present study addresses this gap by examining social sciences students' perceptions of ChatGPT's role in academic activities and employability skills development across three consecutive academic years.

The study reveals a substantial increase in ChatGPT use among social sciences students over the observed period. Students most frequently used ChatGPT for summarizing, brainstorming, study assistance, and research support, which consistently represented the dominant usage patterns. These findings indicate that students increasingly integrated generative AI tools into their everyday academic practices, particularly for learning support, information processing, and idea development. At the same time, students' perceptions of ChatGPT's contribution to employability skills development also evolved. While ChatGPT was initially perceived primarily as a tool for supporting language-related tasks and writing activities, students increasingly recognized its potential for strengthening digital communication skills, artificial intelligence literacy, digital content creation, foreign language proficiency, and data analysis competences. The release of more advanced ChatGPT models with enhanced multimodal capabilities and broader accessibility likely contributed to this shift by expanding the range of educational and professional applications available to students (Dong et al., 2024). Nevertheless, the findings also indicate that students continued to perceive ChatGPT as less useful for interpersonal communication, decision-making, and numeracy-related skills, suggesting that important limitations remain in relation to socio-emotional competences and complex human-centered cognitive processes (Bin-Hady et al., 2024).

The findings carry important implications for higher education and the future public sector workforce, particularly for public sector-oriented study programs that must prepare graduates to work in AI-supported, data-rich, and digitally mediated governance environments. They highlight the growing role of generative AI technologies in supporting the development of employability skills that are increasingly important in digitally transformed professional environments. In particular, ChatGPT appears to be especially relevant for strengthening digital literacy, communication competences, information management, and analytical skills that are becoming central to modern public sector and governance systems. The gradual shift in students' perceptions from language-oriented support toward broader digital and analytical capabilities

reflects the increasing normalization of generative AI tools within higher education and suggests that future public sector employees may enter the labor market with stronger expectations regarding the integration of generative AI into everyday workflows, communication practices, and evidence-based decision-making processes. These developments underscore the importance of integrating generative AI literacy, ethical AI use, critical assessment of AI-generated outputs, data interpretation, and responsible digital communication into public sector-oriented and social sciences curricula preparing students for public sector careers. The study also provides practical implications for educators and policymakers seeking to align educational practices with the demands of increasingly digitalized and technology-driven labor markets.

It is also important to acknowledge the limitations of the study. Although the survey included respondents from multiple countries and academic disciplines, the present analysis focused specifically on students enrolled in higher education social sciences programs due to their close connection to the future public sector workforce. Consequently, the findings may not be fully generalizable to students from other disciplinary or institutional contexts. In addition, the study relies on self-reported data, which may be influenced by recall bias and social desirability bias, potentially affecting the accuracy of students' responses (Aristovnik et al., 2024; Ravšelj et al., 2025a). Furthermore, the rapidly evolving nature of generative AI technologies means that students' perceptions and usage patterns are likely to continue changing over time. Despite these limitations, the study provides valuable multi-wave insights into students' evolving perceptions of generative AI and its role in employability skills development. The findings contribute to the broader discussion on the integration of generative AI into higher education and provide evidence on how students' evolving perceptions of AI-supported skill development may inform the preparation of future public sector professionals.

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