

Challenges to the Use of Generative AI in Teaching and Learning Among Students and Faculty

Nagayuki Saito, Sendai University, Japan
Chiaki Hashimoto, Sendai University, Japan
Yasumasa Yamaguchi, Sendai University, Japan
Hidetaka Uchino, Sendai University, Japan

The Southeast Asian Conference on Education 2025
Official Conference Proceedings

Abstract

Today, generative AI is creating disruptions in education, urging schools and universities to reconsider their lesson designs. If generative AI has the potential to reshape education and learning, swift action is required to prepare for this transformation. This study examines the impacts of generative AI on students and teachers, its potential future influence, and the educational challenges it poses. A web-based survey collected responses from 8,769 participants, including 5,942 students and 2,827 teachers from Japanese high schools and universities. After excluding invalid responses, 6,939 valid responses were analyzed (4,323 from students and 2,616 from teachers). As of March 2024, 30.3% of students had used generative AI, leaving about 70% yet to adopt it. Among teachers, the usage rate was 19.3%, 11 percentage points lower than that of students. Notably, 27.8% of students who used generative AI admitted copying AI-generated outputs into their assignments. Furthermore, 50% of high school students using generative AI reported uncertainty about what constitutes academic misconduct. These findings highlight the urgent need for ethics education aligned with institutional guidelines to prevent academic misconduct. Such education should address risks like dishonesty while fostering proper use and citation of generative AI. Additionally, it is crucial to introduce positive applications of generative AI in education. For teachers, specialized training programs should cover the basics of generative AI, strategies for integrating it into teaching, and approaches to revising assessment methods. These measures are essential for effectively addressing the challenges posed by generative AI in education.

iafor

The International Academic Forum
www.iafor.org

Introduction

Towards Evidence-Based Utilization and Support of Generative AI in Education

Today, generative AI is causing disruptions in educational settings. It may necessitate a reconsideration of instructional design in schools and universities. If generative AI has the potential to transform the future of teaching and learning, it is needed that we take proactive measures to prepare for this shift. In response to the increasing societal adoption of generative AI, Japan's Ministry of Education, Culture, Sports, Science and Technology (2023) issued a notice in July 2023 titled "Guidelines for the Use of Generated AI at the Elementary and Secondary Education Level (Tentative Version)." This notice emphasizes the importance of considering the actual educational practices in each school when formulating responses to generative AI in academic institutions.

Accordingly, the notice calls for institutions to provide appropriate guidance for students and faculty while also ensuring that policies and approaches are periodically reviewed in light of technological advancements and the evolving implementation of such guidelines. In alignment with this policy initiative by MEXT, universities and other educational institutions have been developing operational policies and usage rules for generative AI.

When looking at the international landscape, UNESCO (2023) has identified a "human-centered approach" as a key pillar in the future direction of education policies concerning the use of generative AI in the education sector. This approach emphasizes the need to provide opportunities for students to develop the necessary competencies for the appropriate use of generative AI in education while ensuring that they can benefit from its use. It also highlights the importance of implementing continuous education policies that take into account the long-term impact of generative AI on teaching and learning.

To effectively address the opportunities and challenges posed by generative AI in educational settings, it is essential to refer to prior research that has examined institutional policies, student behavior, and pedagogical implications. These previous studies offer valuable insights into how generative AI is integrated into teaching and learning, highlighting ethical concerns, technical limitations, and instructional possibilities. By synthesizing the findings from these research efforts, a more comprehensive understanding of the current landscape can be established. The following section reviews key studies to provide a contextual foundation for the subsequent examination.

Previous Researches

Policies and Challenges of Generative AI in Education

The emergence of generative AI has introduced challenges in both education. In the field of education, it necessitates a re-examination of lesson design and is expected to bring significant transformations in the future. In response, numerous educational institutions have started developing policies to guide the use of generative AI in academic settings.

For example, Boston University's Center for Computing & Data Sciences mandates that any use of generative AI must be acknowledged, requiring students to include an appendix detailing their interactions with the AI and the rationale behind its use (Welker, 2023). Monash University, on the other hand, has implemented policies that ensure students are

informed about the ethical and responsible application of generative AI in academic work while enforcing strict measures against academic misconduct (Monash University, 2023). Meanwhile, the University of Southern California encourages exploratory engagement with AI, provided that research ethics considerations are thoroughly addressed in accordance with university guidelines (University of Southern California, 2023).

In Japan, the Ministry of Education, Culture, Sports, Science and Technology has begun compiling reference materials to support schools in managing the use of generative AI in educational settings (Ministry of Education, Culture, Sports, Science and Technology, Special Committee on Digital Learning Infrastructure, 2024).

Exploring the Impact and Challenges of Generative AI in Education

In this section, previous studies on the impacts and challenges of generative AI in education are reviewed to provide a foundation for understanding its role in academic settings. Klarin et al. (2024) examined the relationship between generative AI usage in schools, students' executive functioning, and academic performance. Their study found that students with executive function challenges were more likely to perceive generative AI as a valuable tool for problem-solving. Generative AI was commonly utilized for task completion, information retrieval, and learning support in various educational activities. However, the study did not establish a clear correlation between AI usage and academic performance.

Lee and Low (2024) emphasized that while generative AI holds great potential in education, fostering critical thinking remains essential. They cautioned that educators should not treat generative AI merely as an information-providing tool but rather as a means to cultivate students' critical thinking, creativity, and ethical awareness. Moreover, the risk of bias in AI-generated outputs was highlighted, as biases present in training data can influence the AI's responses (Angwin et al., 2016). Therefore, developing students' ability to critically assess AI-generated content is crucial in mitigating these biases.

Further reinforcing this perspective, Dilling and Herrmann (2024) investigated university students training to become elementary and middle school mathematics teachers. Their research underscored the importance of equipping future educators with the skills to critically evaluate the outputs of large language models (LLMs) and recognize their limitations.

Additionally, Fatahi et al. (2024) analyzed responses from ChatGPT and human users, utilizing sentiment analysis tools to quantify emotional expression. Their findings revealed that while ChatGPT can effectively generate objective responses, it struggles to match the natural and emotionally expressive qualities of human communication.

Drawing on these previous studies, this study explores the challenges of integrating generative AI into educational settings by examining its usage and perceptions among students and educators.

Survey Concept

In light of the increasing accessibility and societal integration of generative AI, determining how this technology should be used in educational contexts has become a matter of growing importance. To examine this issue, a large-scale web-based survey was conducted to investigate how generative AI is currently being utilized by both students and educators, as

well as to identify their perceptions of its benefits, risks, and related educational challenges. The study targeted individuals on both sides of the learning environment—students as learners and teachers as facilitators of instruction—across various educational levels.

The survey gathered responses from a total of 8,769 participants, comprising 5,942 students and 2,827 teachers. After excluding invalid responses, a total of 6,939 valid responses were analyzed, with 4,323 from students and 2,616 from educators. Participants included high school students aged 15 and above, as well as teachers from elementary, junior high, and high schools, vocational schools, universities, and graduate schools. The survey was administered online between March 21 and March 25, 2024, by the AI Education and Research Team at Sendai University.

The aim of this survey was to provide an evidence-based foundation for understanding the actual conditions and challenges surrounding the use of generative AI in educational settings. By capturing a broad spectrum of experiences and perspectives, the survey seeks to inform the development of appropriate guidelines, instructional strategies, and support systems for integrating generative AI into education in a responsible and effective manner.

Table 1: Overview of the Survey

Item	Details
Objective	Given the current situation where generative AI is easily accessible, the question of whether and how it should be utilized in education and learning has become a pressing issue. In response to changes in the educational environment, this survey aims to clarify how students, as learners, and teachers, as providers of education, are utilizing generative AI, what perceptions they hold, and what educational challenges need to be addressed.
Targets	Students: Aged 15 and above (equivalent to high school students)
	Teachers: Elementary, junior high, and high school teachers, as well as educators from specialized training colleges, vocational schools, universities, and graduate schools.
Method	Web-based questionnaire
Respondents	8,769 participants (Valid responses: 6,939) Students (n = 4,323) Teachers (n = 2,616)
Period	March 21, 2024 – March 25, 2024
Conducted by	AI Education and Research Team, Sendai University

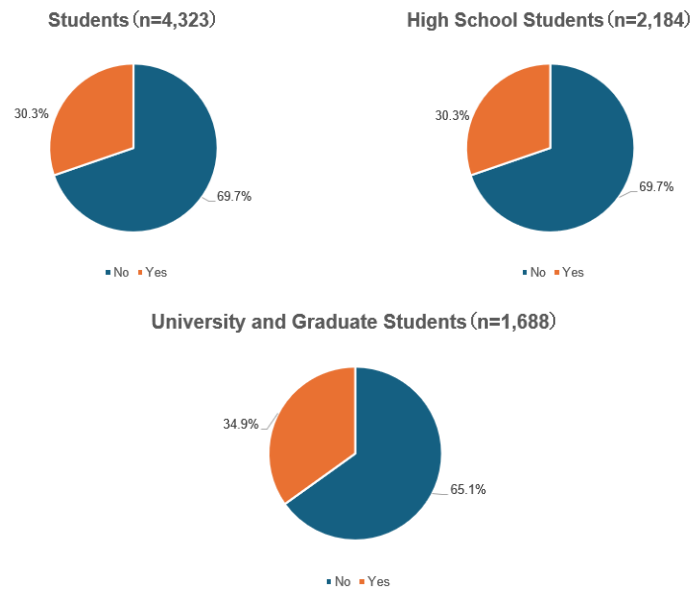
Analysis Results

Usage of Generative AI by Students and Educators

Students' Usage of Generative AI. As of March 2024, 30.3% of high school students and 34.9% of university and graduate students reported using generative AI. Despite the widespread societal presence of generative AI tools, approximately 70% of students had not yet utilized them at the time of the survey. This indicates that a significant proportion of students had not incorporated generative AI into their learning practices.

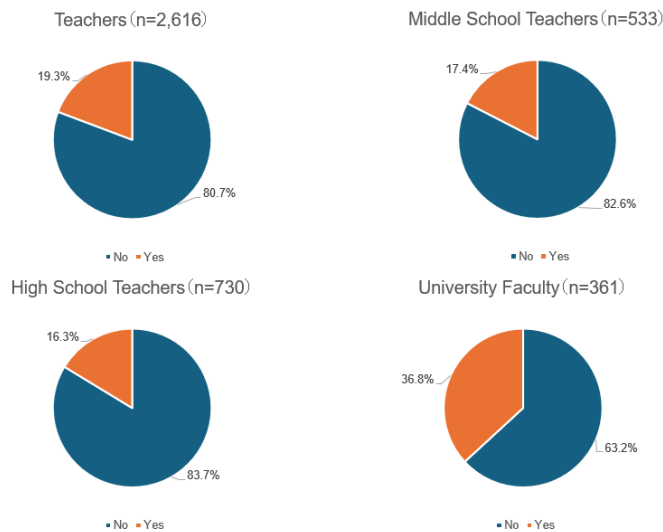
The data also show a difference in usage rates between educational levels, with a higher percentage of university and graduate students reporting use compared to high school students.

Figure 1: Generative AI Usage Rates Among Students



Teacher’s Usage of Generative AI. Focusing on educators, 19.3% reported using generative AI. This proportion is approximately 11 percentage points lower than the usage rate reported by students. When broken down by type of educational institution, faculty members at universities and graduate schools reported the highest usage rate at 36.8%, while educators at elementary, junior high, and high schools showed lower adoption rates. The data indicate clear differences in the use of generative AI among educators depending on the educational level at which they teach. This higher usage rate among university and graduate school faculty may be attributed to their utilization of generative AI not only for educational purposes but also for research activities.

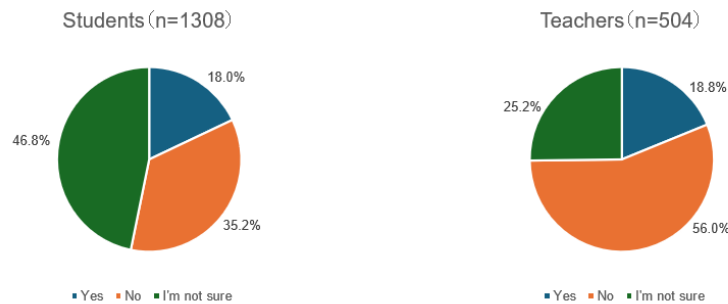
Figure 2: Generative AI Usage Rates Among Teachers



Experience With Opt-Out Settings. Regarding experience with opt-out settings, 18.0% of students and 18.8% of educators responded that they had used such settings to prevent their input data from being utilized by generative AI systems. These figures indicate that only a minority of both groups had actively taken measures to manage how their data are handled by AI tools.

In contrast, a substantial proportion of respondents indicated a lack of understanding about opt-out settings. Among students, 46.8% reported that they do not fully understand the function or purpose of these settings. Among educators, 25.2% expressed the same uncertainty. These results suggest that awareness and comprehension of opt-out settings remain limited across both groups.

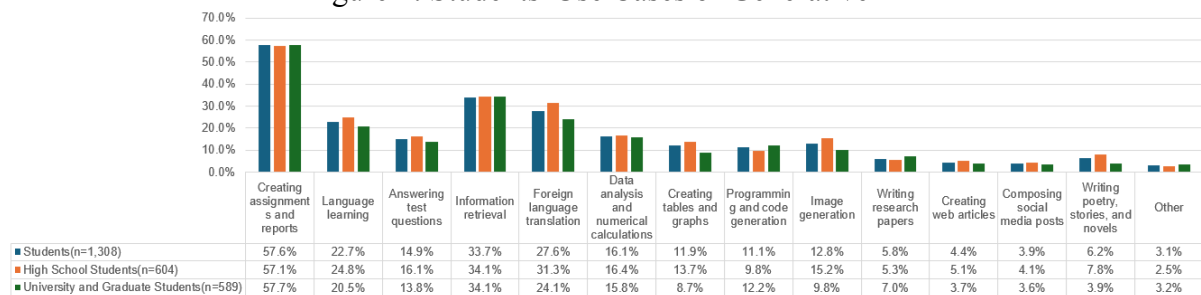
Figure 3: Experience With Opt-Out Settings for Generative AI Input Data



The findings highlight a need for improved information dissemination and educational efforts regarding data control features in generative AI tools. Ensuring that users are informed about such options may support more responsible and informed use of AI technologies in educational contexts.

Students' Use Cases of Generative AI. Students who use generative AI were asked about the purposes for which they utilize the technology. The most common use case among both high school and university/graduate students was "creating assignments and reports," with nearly 60% of students indicating experience in this area. The second most frequently cited purpose was "information retrieval," reported by approximately 35% of students. "Foreign language learning" also emerged as a notable use case, with 31.3% of high school students and 24.1% of university/graduate students indicating usage for this purpose. In relation to "answering test questions," 16.1% of high school students and 13.8% of university/graduate students reported using generative AI in this context.

Figure 4: Students' Use Cases of Generative AI



Educational Challenges of Generative AI for Teachers

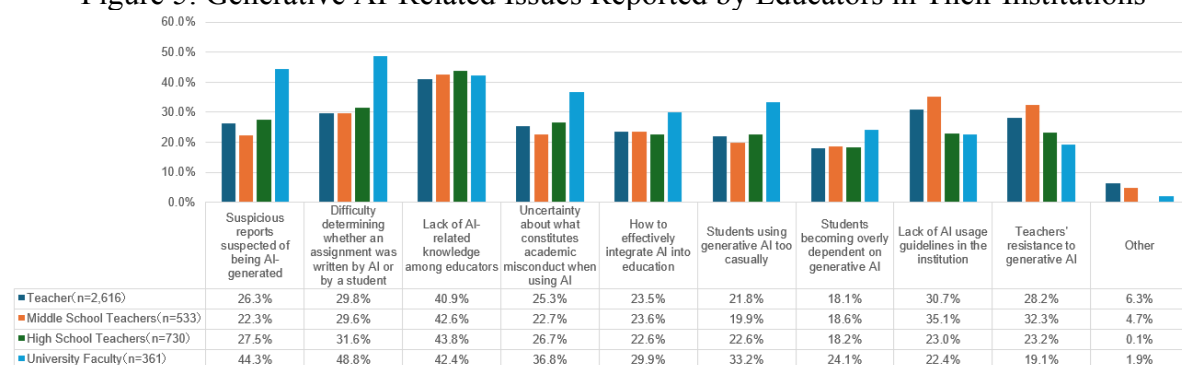
Generative AI-Related Issues in Schools and Universities Where Educators Work. Among the educators surveyed, those working at universities and graduate schools reported a higher frequency of generative AI-related issues compared to those at elementary, junior high, and high schools. The most frequently cited concern was the difficulty in determining whether submitted assignments had been authored by students or generated using AI tools. This was

particularly prominent in higher education institutions, where written reports and essays are common forms of assessment.

In contrast, educators at the elementary and secondary levels more frequently identified a lack of knowledge about generative AI and the absence of institutional guidelines as key challenges. These responses suggest that generative AI is creating distinct types of issues depending on the educational context. While higher education institutions face concerns related to academic integrity and evaluation, primary and secondary schools are encountering foundational challenges related to awareness and policy development.

These findings indicate that generative AI is impacting schools and universities in varied ways, with differences emerging not only in usage rates but also in the types of institutional issues reported by educators across educational levels.

Figure 5: Generative AI-Related Issues Reported by Educators in Their Institutions



Problematic Behaviors and Challenges in Learning With Generative AI Among Students

Students' Assignment Creation Using Generative AI and Copy-Pasting. Students who use generative AI were asked whether they had ever used it to create assignments or reports. Among them, 60.1% of high school students and 65.9% of university and graduate students indicated that they had done so. Additionally, respondents were asked whether they had copied and pasted AI-generated content directly into their assignments or reports for submission. Overall, 27.8% of students acknowledged engaging in this behavior. When examined by educational level, 28.1% of high school students and 25.8% of university and graduate students reported submitting assignments that contained copied content generated by AI tools.

Figure 6: Students' Use of Generative AI for Creating Assignments and Reports

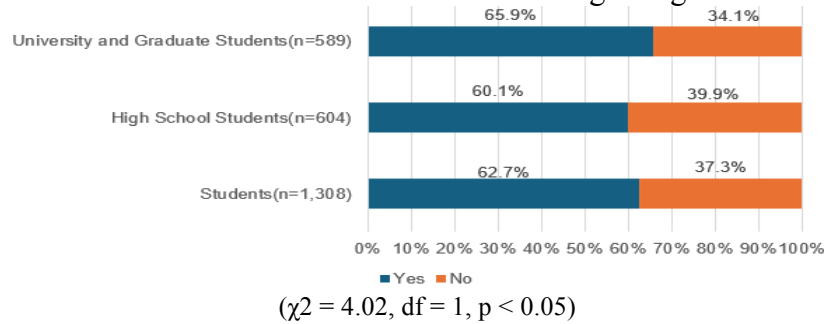
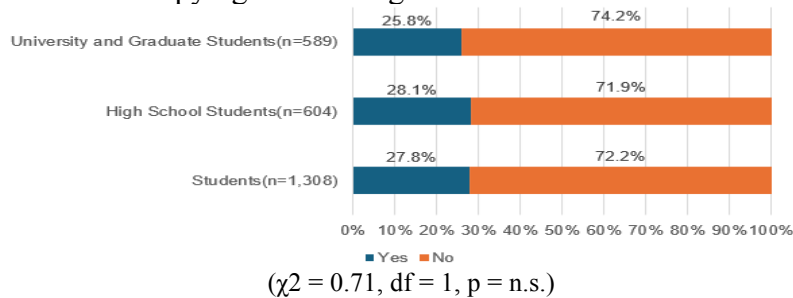


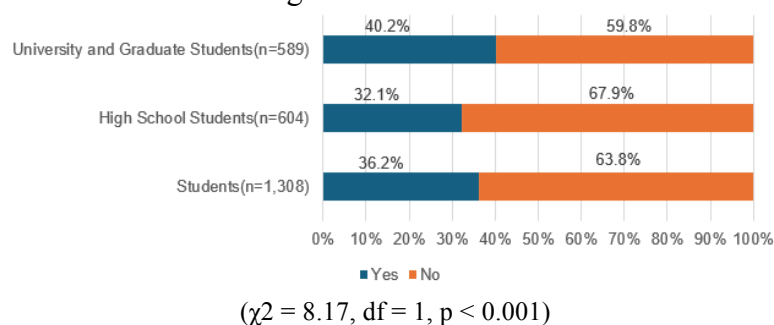
Figure 7: Students' Copying and Pasting of AI-Generated Content in Assignments



Students' Knowledge of Fact-Checking. Regarding knowledge of fact-checking, 63.8% of students who use generative AI indicated that they do not know how to verify the accuracy of AI-generated content. A breakdown by educational level shows that 67.9% of high school students and 59.8% of university and graduate students reported a lack of fact-checking knowledge. These figures suggest that a majority of student users are engaging with generative AI without the skills necessary to critically assess the reliability of the output.

The relatively higher percentage of high school students lacking fact-checking skills points to a potential gap in information literacy education at the secondary level. In both high school and university settings, the findings underscore the need for targeted instructional efforts aimed at equipping students with competencies for evaluating AI-generated information. Without such skills, students may rely on content that is inaccurate or biased, which could hinder the development of sound academic judgment.

Figure 8: Awareness of Fact-Checking Methods for AI-Generated Content Among Students



Discussion

Based on these findings, it is essential to consider specific measures that support both educators and students in adapting to the educational challenges and opportunities brought

about by generative AI. This section discusses recommended support for each group, beginning with support for teachers.

Support for Teachers

The survey revealed that 19.3% of educators reported using generative AI, a figure approximately 11 percentage points lower than that of students. University and graduate school faculty demonstrated higher usage (36.8%) compared to educators at elementary, junior high, and high schools. Additionally, 25.2% of educators indicated a lack of understanding regarding opt-out settings, and some cited challenges related to the absence of institutional guidelines.

These findings highlight the need to strengthen support for educators through comprehensive professional development. Rather than merely restricting the use of generative AI, it is important for educators to acquire the instructional skills necessary to guide students in leveraging AI as a tool for deepening and expanding learning, while also preventing academic misconduct. Effective support should include training programs that address fundamental knowledge of generative AI, its pedagogical applications, and strategies for revising assessment practices.

In parallel, educational institutions should establish clear operational policies for the use of generative AI and provide technical assistance, particularly for educators less familiar with ICT. Such institutional measures would not only mitigate risks related to academic integrity but also contribute to the constructive and responsible integration of generative AI into teaching and learning.

Support for Students

Among students, 30.3% of high school students and 34.9% of university and graduate students reported using generative AI. The most common purpose was creating assignments and reports, followed by information retrieval and foreign language learning. At the same time, 27.8% of student users acknowledged copying and pasting AI-generated content into assignments. Furthermore, 63.8% of student users indicated they did not know how to fact-check AI-generated outputs, with the lack of fact-checking literacy more prominent among high school students (67.9%).

These findings point to the necessity of targeted student support focusing on academic integrity, fact-checking skills, and ethical AI usage. Educational institutions should provide guidance that clearly defines academic misconduct in the context of AI use, alongside instruction on proper citation practices and data privacy controls, such as opt-out settings. Particular attention should be given to high school students, where understanding of both technical and ethical dimensions of AI remains limited.

Establishing Educational Readiness for the Integration of Generative AI

The integration of generative AI into education is already underway and is producing observable impacts on both teaching and learning practices. Survey results show variability in AI usage across educational levels, gaps in ethical understanding, and limited awareness of technical features like opt-out settings.

In anticipation of broader adoption, it is essential that educational institutions proactively establish comprehensive guidelines and implement them systematically. These guidelines should address not only usage policies but also pedagogical strategies, digital literacy development, and ethical considerations. Preparing both educators and students to engage with generative AI critically and constructively will be crucial for realizing its potential to enhance educational outcomes.

Acknowledgements

This research was supported by a grant from the "Creative Education and Research Plan" of Sendai University (project title: Advancement of Sendai University's Education and Research Activities in the AI Age and Construction of a Social Collaboration Infrastructure).

While this manuscript incorporates certain elements from a previously published project report, those sections have been substantially revised and recontextualized to develop a more in-depth academic discussion. Moreover, the paper includes significant additions of original findings and interpretations. Accordingly, the content constitutes a distinct and expanded contribution and does not duplicate the prior report.

References

- Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016). Machine bias: There's software used across the country to predict future criminals. And it's biased against blacks. <https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing>
- Dilling, F., & Herrmann, M. (2024). Using large language models to support pre-service teachers' mathematical reasoning—an exploratory study on ChatGPT as an instrument for creating mathematical proofs in geometry, *AI for Human Learning and Behavior Change*, 1-14.
- Fatahi, S., Vassileva, J., & Roy, C. K. (2024). Comparing emotions in ChatGPT answers and human answers to the coding questions on stack overflow. *Frontiers in Artificial Intelligence*, 7, 1-11. <https://doi.org/10.3389/frai.2024.1393903>
- Klarin, J., Hoff, E., Larsson, A., & Daukantaitė, D. (2024). Adolescents' use and perceived usefulness of generative AI for schoolwork: exploring their relationships with executive functioning and academic achievement. *Frontiers in Artificial Intelligence*, 7, 1-13. <https://doi.org/10.3389/frai.2024.1415782>
- Lee, C. C., & Low, M. Y. H. (2024). Using Generative AI in education: the case for critical thinking. *Frontiers in Artificial Intelligence*, 7, 1-3. <https://doi.org/10.3389/frai.2024.1452131>
- Ministry of Education, Culture, Sports, Science and Technology. (2023). Guidelines for the Use of Generated AI at the Elementary and Secondary Education Level (Tentative Version). https://www.mext.go.jp/content/20230718-mtx_syoto02-000031167_011.pdf
- Ministry of Education, Culture, Sports, Science and Technology. (2024). Guidelines for the Use of Generated AI at the Elementary and Secondary Education Level. https://www.mext.go.jp/content/20241226-mxt_shuukyo02-000030823_001.pdf
- Monash University. (2023). AI statements, Learning and Teaching: Teach HQ. <https://www.monash.edu/learning-teaching/TeachHQ/Teaching-practices/artificial-intelligence/policy-and-practice-guidance-around-acceptable-and-responsible-use-of-ai-technologies>
- University of Southern California. (2023). Instructor guidelines for student use of generative artificial intelligence for academic work. <https://academicsenate.usc.edu/wp-content/uploads/sites/6/2023/02/CIS-Generative-AI-Guidelines-20230214.pdf>
- Welker, G. (2023). BBJ: Academic unit at BU adopts guidelines for use of generative AI. Boston University Faculty of Computing & Data Sciences, <https://www.bu.edu/cds-faculty/2023/03/28/academic-unit-at-bu-adopts-guidelines-for-use-of-generative-ai>