What Does It Mean to Coexist with Generative AI? ～Thinking the Future of Informatics Education through AI Literacy Materials for High School Students～

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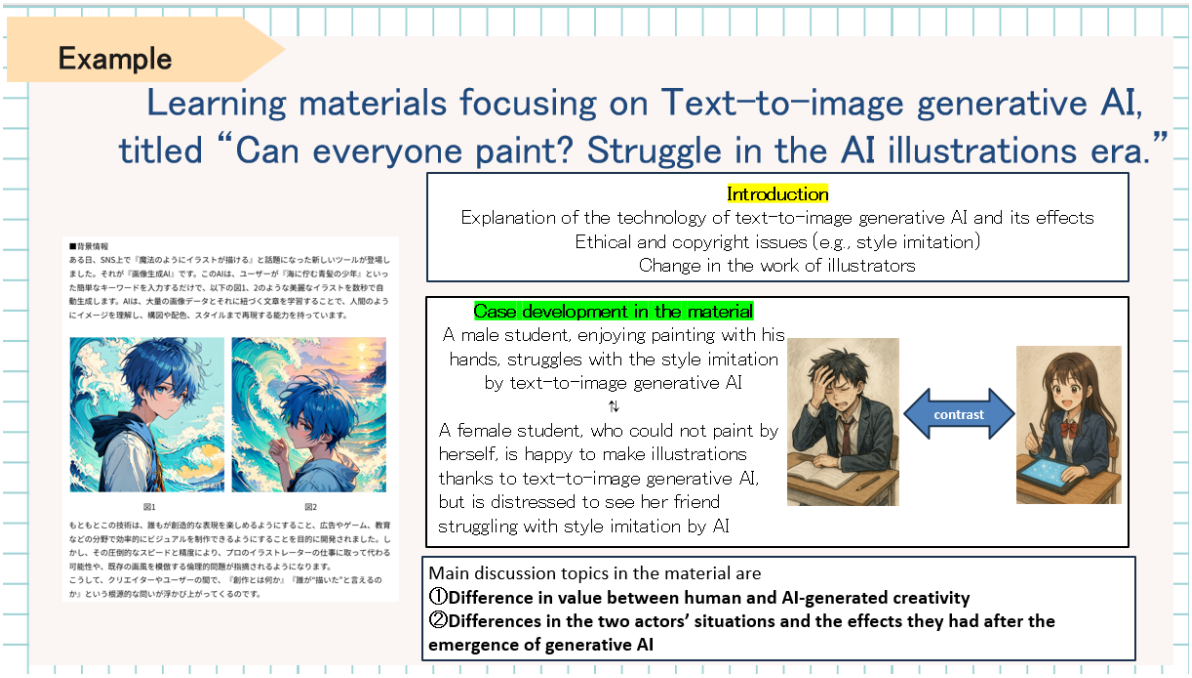
I have been conducting research to improve materials for teaching AI literacy to high school students in Associate Prof. Ema's Laboratory at Tokyo College, the University of Tokyo. The materials I am now improving are fundamentally based on materials created in her class in the spring semester of 2025, in which 24 graduate students, including myself, participated. In this class, we developed the materials through group discussions about "What are the essential questions we want high school students living in the AI era to consider?[1]" Based on that, I have been improving the materials for practical use in high schools[2].



Generative AI was used to design this image and thumbnail

Coexistence with AI?

The main motivation for this research is my suspicion about the form of coexistence with AI. In particular, losing opportunities to hear my friends' genuine opinions after the spread of AI and the imitation of Studio

[1] With regard to the editing and use of the teaching materials, Associate Professor Ema obtained permission from all students who participated in developing the materials in the class.

[2] Details of the materials are available in the introductory video (English subtitles available) prepared for the "Informatics Practical Case Report Meeting 2025" , or in an article published on the TOSHO E-Net website (Japanese only).

Ghibli's animation style by AI was shocking to me. When asking my classmates questions, they first ask generative AI instead of answering on their own, which always makes me feel sad and think, "I am here to hear your own opinion…" Additionally, beyond the argument that style imitation does not violate copyright law, I cannot stop thinking about ethical questions of whether AI users imagine how original painters would think and feel about their style being imitated. Based on these experiences, I learned the importance of considering the coexistence with AI, thinking backward from the kind of society and individuals we want to realize and become. Furthermore, I came to think I want students living in the AI era to envision their way of coexisting with AI, analyzing the effects and ethical issues brought by the use of AI.

Challenges in Teaching Literacy Amid Rapid Technological Evolution

The thing I placed importance on in the process of improving the materials was interviewing educational practitioners. I got advice from government officials, teachers of informatics and morals, and staff working at several textbook companies.

Through my research activities, I have keenly realized the challenges of integrating content on AI, which continues to evolve rapidly, into the strictly defined curriculum based on the Course of Study (national curriculum guidelines issued by the Ministry of Education). Contrary to my expectations, the first problem I faced was "how to demonstrate the content of the materials and their usage explicitly and concisely, in alignment with the current textbooks."

This problem stems from two points peculiar to the Japanese educational field: the long revision cycle for changing Japan's Course of Study and teachers' heavy workload. In Japan, textbooks are developed based on the Course of Study; however, the current informatics Course of Study includes very little about AI, and the implementation of the revised curriculum is scheduled for 2032[3]. Therefore, I needed to demonstrate how and in which textbook units the materials could be used, aligned with textbooks edited in accordance with the 2022 Course of Study. Furthermore, given teachers' heavy workloads, it was necessary to provide the materials in a user-friendly format that would minimize their burden as much as possible.

I felt the frustration and limitations of the framework for learning AI literacy aligned with the current textbook. I recommended using the materials in the relevant units when materials contain similar content to the textbook, such as AI use in assignments, and copyright issues caused by AI. However, their essential questions differ from those addressed in textbook units: "How can we maintain autonomy when using AI for school assignments?" and "What is the difference in value provided by humans and AI?" On the other hand, teaching materials that address AI-specific issues, such as bias and accountability, have no corresponding content in current textbooks, so I could only demonstrate their use in class as content independent of the textbook units.

[3] As of March 2026, the next revision of the Course of Study for high school informatics is currently under discussion within the working group established by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

I argue that continuing informatics education without sufficient flexibility to update the curriculum in response to technological change may increase reliance on individual teachers. When teachers are unable to adequately respond to such changes, this could lead to a deficiency in the learning content that students should have acquired. Although I fully understand that directly reflecting technologies and their issues in materials could cause the obsolescence of learning content, using this as an excuse to leave the gap between the speed of technological implementation in society and the informatics curriculum unaddressed could threaten the essential role that informatics education should play.

What is the Significance of Making AI Literacy Education Mandatory?

Through the process of improving the teaching materials, I came to believe that the use of information technology should be taught together with its literacy and ethical issues, and that all high school students should learn them as a single integrated subject. Discussions on the next Course of Study are currently underway, but at the time of writing, it remains unclear to what extent AI literacy and related ethical issues will be included in the compulsory subject Informatics I.

Whether AI literacy and ethical issues will be mandatory would depend on whether they are recognized as essential to acquiring information utilization skills in informatics, which the informatics subject primarily aims to teach. In March 2026, observing the discussion of the allocation of learning content between Informatics I (mandatory) and Ⅱ (selective) in the next informatics Course of Study, utilization of technology, including AI, was allocated as the main topic as mandatory, and literacy and ethics were situated as advanced content. However, given the rapid pace of AI development and its growing impact, the Informatics curriculum should be designed not only for students as users of AI systems, but also with the perspective that they may in the future be involved in developing AI systems or integrating AI into society. In this situation, based on my experiences touched on in the first part, I argue that information utilization skills are not acquired only by learning the methodology of using technologies, but the combination with learning AI literacy for using technology with responsibility and autonomy, and considering the impact on others, so as not to foster unfairness and bias existing in society.

I strongly hope that informatics education will realize peaceful coexistence with technology, rather than leaning towards over-reliance on technology or ethical problems. In parallel with improving materials, I believe it would be my small but important role for future students to ask the relevant actors about the importance of curriculum flexibility and teaching AI literacy.