Generative AI and the value changes and conflicts in its integration in Japanese educational system

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Abstract

This paper critically examines Japan's approach toward the adoption of Generative AI such as ChatGPT in education via studying media discourse and guidelines at both the national as well as local levels. It highlights the lack of consideration for socio-cultural characteristics inherent in the Japanese educational systems, such as the notion of self, teachers' work ethics, community-centric activities for the successful adoption of the technology. We reveal ChatGPT's infusion is likely to further accelerate the shift away from traditional notion of self, which has been ongoing during past educational reforms, towards active and self-directed learning. The current discourse on Generative AI's infusion in education is driven by neoliberal agendas aimed at increasing employability and individualism. Moreover, the introduction of ChatGPT in the context of Japan's educator culture offers potential solutions to address issues of overwork but also necessitates considerations regarding increased responsibilities for teachers and the preservation of their central role in student education. Finally, the irreplicable social growth fostered by community-centric activities in the Japanese educational system highlights the limitations of ChatGPT in replicating dynamic social interactions, emphasizing the importance of holistic approaches to education beyond technological integration.

Key words: Generative AI; values; conflicts; education; Japan

1. Introduction

Released in November 2022, OpenAI's ChatGPT continues changing the world. ChatGPT is an artificial intelligence (AI) chatbot built on the foundation of Large Language Models (LLMs) that allows machines to converse like humans. Built from 170 trillion parameters, GPT-4, the latest version of ChatGPT, is capable of predicting the subsequent word based on the context of

preceding words. This upheaval fuels people's fear of mass technological unemployment, academic inaccuracy, and plagiarism.

In April 2023, only five months after the release of ChatGPT, OpenAI Chief Executive Sam Altman came to Japan as the first foreign destination after the prominence of ChatGPT. After a meeting with Japan's Prime Minister, Altman said he aimed to open an office and expand services in Japan. In response, Japan's Chief Cabinet Secretary Hiroku Matsuno said the Japanese government will consider government adoption of AI technology such as ChatGPT once privacy and cybersecurity issues are resolved. Japan released its National AI Strategy in 2019, building its national AI narrative as human-centric, versatile to reality's demands, and oriented towards the common good (Paltieli, 2021).

Japan showed an optimistic response towards the adoption of ChatGPT and simultaneously joined the hectic technical competition of this advanced technology, yet is currently lagging behind the US, China, and Europe. The International Institute for Management Development (IMD) of Switzerland released its global digital competitiveness ranking in 2023 and Japan only ranked 32th out of 64 countries, lowering 3 positions compared to the previous year and continuously dropping 11 positions compared to 2019. The Liberal Democratic Party, in its White Paper (May 2023), acknowledged that Japan is lagging behind the US, China, and Europe in international AI publications and AI adoptions in companies. The project team also suggested that the non-regulatory and non-binding framework for AIs formulated in 2019 is no longer suitable for the unexpected speed of AI development and Japan needs a New National Strategy for AI in the New AI Era. For example, a Japanese LLM using the Japanese supercomputer Fugaku and being trained in the Japanese language is being developed by the Tokyo Institute of Technology, Tohoku University, Fujistsu, and the state-funded RIKEN research centers group. The model is expected to have at least 30 billion parameters. Another project funded by Japan's Ministry of Education, Culture, Sports, Science, and Technology that learns published research and generates scientific hypotheses, started with 100 billion parameters. These Japanese models are trained in a significantly smaller data size of ChatGPT with 175 billion parameters of GPT-3 and speculated 100 trillion parameters of GPT-4.

The education sector in Japan responded to the national strategy promptly with innovative AI-powered projects in schools, guidelines for teachers and students, and the springing-up of AI education start-up companies. Educators are increasingly recognizing the potential of these AI models, particularly ChatGPT, not only as a learning tool for students but also as a resource for teachers in various educational aspects. This paper examines the integration of Generative AI in education while maintaining a stance of healthy skepticism. Cần phát triển thêm phần intro about education in Japan.

The study focuses on two critical elements in questioning the adoption of Generative AI: the inherent nature of the technology and the context of its implementation. Firstly, an in-depth look into the underlying technology of LLMs, specifically ChatGPT, sheds light on the potential

risks in the educational sector. Secondly, considering Japan's educational system and the country's cultural values, the implementation of Generative AI might burden already overworked teachers and could potentially misalign with certain educational values in Japan.

Overall, using the most up-to-date media discourse and implementation guidelines of Japan, the paper delves into these potential concerns to find a balanced approach to integrating Generative AI into the Japanese educational landscape. It also discusses the future trajectories of AI in education in Japan within the country's national strategy.

2. What are LLMs?

LLM is a type of artificial intelligence model designed to generate human language based on the auto-complete function when given a prompt. They operate by processing vast amounts of textual data and are fine-tuned on specific datasets to capture statistical properties and semantic relationships within language. Despite their ability to generate human-like text, these models lack genuine comprehension and must be used with caution in situations where factual accuracy and understanding are essential. In the interpretation of Ted Chiang in The New Yorker, LLMs like ChatGPT can be likened to blurry JPEG algorithms for text on the web (Chiang, 2023). They retain a significant amount of information from their extensive training data, but upon closer examination, the details start to blur, resulting in an acceptable level of information preservation. While these models excel in producing natural and persuasive responses, they are not experts in any specific domain and rely on patterns learned from their training data, making their understanding limited to surface-level correlations. As a result, the output we gain from those models can be completely fabricated. This issue is often referred to as "hallucination."

Assessing the reliability of LLMs behind ChatGPT has proven to be a complex endeavor. Testing GPT-4, the most advanced iteration of the LLM behind ChatGPT yielded mixed results. Although it performed well in various academic and professional tests, even minor rephrasing of questions led to inaccuracies in the model's responses, underscoring its unreliability in real-world scenarios (Nature Editorial, 2023). In 2019, Chollet introduced a novel test for the AI model, the Abstraction and Reasoning Corpus (ARC). This evaluation involves participants observing visual presentations where a grid of squares transforms into different patterns. Their task is to reason the rules behind these transformations and predict subsequent changes. Chollet highlighted that this test evaluates the capacity to adapt to novel situations, which he considered a core feature of intelligence. GPT-4 also struggled with this task, indicating the model's current inability to reason effectively.

Overall, ChatGPT doesn't commit to the truth. As a language model, its limitations in comprehension and understanding must be acknowledged. This point is well addressed in the guideline for the limited use of Generative AI at elementary and secondary education, which will be discussed in section 5.

3. The Japanese Visions of Artificial Intelligence

Japan is a strong proponent of the adoption of advanced technology in society to address socio-cultural issues, and this effort is recognized globally. Since then, Japan's AI regulatory policy has followed a "risk-based and soft law" approach. This digital governance approach uses non-binding goal-based guidelines and articles instead of rule-based hard law to guide and support companies in implementing their AI strategies (Hiroki, 2023). According to the AI Governance in Japan Ver1.1 report published by the Ministry of Economy, Trade, and Industry (METI) in July 2021, the Japanese government avoids using one-size-fits-all guidelines so companies with different capacities and AI experience can both benefit. This "agile governance" (Hiroki, 2023, p.3) aligns with Japan's National AI Strategy published earlier that year aiming to build trust for the citizens and leverage the democratic government (Palteli, 2021). Calling for public comments on the report by METI and emphasizing the involvement of multi-stakeholders in the discussion, regulation, and implementation of AI are examples of how the Japanese government practices its "AI for Everyone" strategy. Responding to AI proliferation with agile governance, Japan is building its "Good AI Society" (Linde & Peter, 2018), avoiding the criticism of liberal democracy as being old-fashioned and unresponsive to citizens' demands.

Since the 5th Science and Technology Basic Plan or "Society 5.0", science, technology, and innovation have been placed as the driving force to sustainably address the economic and social challenges of Japan (Cabinet Office, 2015). The Plan also states that Artificial Intelligence (AI), besides robots, the Internet of Things (IoT), and big data, is expected to coexist with humans, creating a superintelligent/supersmart society that provides differentiated customized services that meet human needs (Cabinet Office, 2015).

Realizing this plan, in 2019, the Japanese government launched the Social Principles of Human-Centric AI with three fundamental philosophies: Human Dignity, Diversity and Inclusion, and Sustainability. Japan aims to maximize the use of AI, tackle associated risks, and develop its own AI technology (Japanese Business Federation, 2019). Since then, Japan's AI regulatory policy has followed a "risk-based and soft law" approach in which the authorities have non-binding goal-based guidelines and articles instead of rule-based hard law to guide and support companies in implementing their AI strategies (Hiroki, 2023). Furthering this approach, during the G7 Summit 2023, Japan emphasizes the goal of maximizing the positive impacts of AI rather than suppressing its use (Hiroki, 2023).

We will later discuss how there is a disconnection between this Society 5.0 vision and the guideline on Generative AI in education.

4. Characteristics of the Japanese Education System

In Japan, schools play a vital role in not only educating children but also instilling discipline and moral standards (Saito, 2011). With respect to student enrollment in compulsory education

(age 4-16 years old), Japan is one of the highest among the OCED countries (OECD, 2023). Interestingly, the number of instruction days in Japan ranked number one among the OECD countries with 201 days in a year, including Saturday (OECD, 2021). The vitality of schooling in the education system of Japan prompted us to investigate the application of ChatGPT at the school level, expecting to shed light on the informative perspectives about this phenomenon.

In this paper, we employ the three significant characteristics of the Japanese educational system including the notion of self in the educational setting, the deeply entrenched notion of devoted teachers, and the community-centric school environment. How we select these characteristics is based on the review of literature of prominent Japanese and non-Japanese educational researchers (Shogo, 1991; Saito, 2011; Gordon, 2022). More importantly, these characteristics are heightened by the Japanese social and cultural values which are especially important in understanding the application of technology in education (Vuong, 2022; Vuong & Ho, 2024). We will first briefly present each characteristic and subsequently analyze how these contextual aspects inform the deployment of AI in education in Japan.

Firstly, there is a distinction between the Japanese and the Western notion of self, and its manifestation in education is noteworthy. As opposed to the Western perception of self as individualism, the Japanese one holistically involves three dimensions: interpersonalism, self-discipline, and role perfectionism (Befu, 1986 as cited in Sato, 2004). These dimensions of self emphasize the importance of interdependence, utmost self-exertion (“*isshokemmei*”), and the commitment to one's roles despite all odds (Befu, 1986, p24 as cited in Sato, 2004). This relational perspective of self in Japan is heightened in various school contexts such as “*keigo*” (honorifics), “*senpai-kouhai*” (vertical seniority), and “*kenkyo*” (modesty, humility) in which students are expected to adjust their behaviors and attitudes in the collective life of schools. The subsequent self-effacement of this cultural value in students is considered complementary. Good students in Japan are described as “*sunaona iiko*”, meaning they quietly listen to what the teachers say without asking any questions (Davies & Ikeno, 2002).

Secondly, the Japanese educational system is characterized by extensive class hours and a strong emphasis on academic achievements (Saito, 2011). While there are ongoing reforms in curriculum, school evaluation systems, teacher training, and admission procedures to shift towards student-centered learning rather than standardized rote learning (Gordon, 2010; Yamanaka & Suzuki, 2020), the focus on academic performance remains integral, ensuring that schools continue to play a crucial role in students' lives. Consequently, this places a significant workload on teachers, resulting in long working hours. The role of teachers within the Japanese school system is incredibly comprehensive. They not only perform typical teaching duties but also engage in planning extra-curricular activities and guiding students' decisions for higher education and career paths. This is partly explained by one important characteristic of teacher culture in Japan – “the image of the devoted teacher” (Kenshin-teki kyōshi-zō) (Hisatomi, 2012; Hasegawa, 2021). Coined by Hisatomi (1998) and preceded by similar terms like the "self-sacrificing teacher image" (Hisatomi, 1995 as cited in Hasegawa, 2021), this concept reflects the inherent busyness and sense

of duty ingrained in Japanese teachers. Despite expressing discontent with their workload, teachers have historically viewed their relentless commitment to their profession as essential to their identity (Hisatomi, 1988). Unfortunately, this has led to a culture of overwork, a topic extensively covered in both the media (Fukazu, 2023; Osaki, 2022) and the literature (Hojo, 2021; Matsushita & Yamamura, 2022). These sources illustrate the extent of overwork among teachers, linking it to prolonged working hours, overtime commitments, and the stress stemming from heavy workloads.

Finally, while academic achievement holds significant importance within the educational system, the cultivation of peer relationship and community value stands as another important educational aim, manifested through school events and club activities (Sato, 2004; Gordon, 2010). School events include ritual ceremony, cultural festival, sport festival, field trip, and community volunteering (Ministry of Education, Culture, Sports, Science and Technology, 2009), whereas club activities are divided into two main types: sport clubs and cultural clubs (Okada, 2009). These activities are not considered as 'extra' (Sato, 2004) but an integral part of the educational system. For school events, it is the norm for all students, regardless of their competency, to participate and share the organization responsibility, fostering a sense of inclusivity and community participation (Sato, 2004; Hirose et al., 2010). As a result, the students experience personal growth through interpersonal relationships (Taruki, 2005; Hirose et al., 2010; Kawamoto, 2014) and internalization of critical values such as sense of achievement, resilience, and perseverance (Hirose et al., 2010). For club activities, sport clubs are ubiquitous around all schools in Japan (Nakazawa, 2014). Research on club activities in Japan also indicates other positive influences, notably stress relief (Kadoya and Muto, 2001), psychosocial adaptation (Okada, 2009), and overall well-being (Imajuku et al., 2019). Ultimately, these positive influences underscore the significance of a community-centric environment in individual development, and support the Japanese approach to the inclusion of school events and club activities in the curriculum.

5. Japanese Responses Toward Generative AI Deployment

State & Institutional responses

National level guidelines

Multiple prefectural governments provide guidelines for using Generative AI and promote its use within office tasks (NHK Iwate, 2023). When it comes to the education sector, many refer to the national proposed guideline on generative AI in primary and secondary education level by the Ministry of Education, Culture, Sports, Science, and Technology (2023). Its principles align with guiding principles in the Hiroshima AI Process, an international convention organized by G7 countries on the regulation and governance of advanced AI technologies. It also notes that the form discussed in the guideline is text-based generative AI and specifically mentions three key providers for generative AI: ChatGPT, Bing Chat, and Bard. Overall, it considers the understanding of the nature, merits, and demerits of generative AI, and how its implementation impacts the developmental stages of the students. Outside of educational scope, there are also various

considerations regarding (1) privacy and handling of personal information, (2) legal consideration, and (3) copyright protection, all of which are universal concerns regarding the use of generative AI.

In addition, in July 2023, the Ministry of Education, Culture, Sports, Science, and Technology in Japan published a guideline for the limited use of Generative AI, specifically ChatGPT at elementary and secondary education (Mainichi Japan, 2023). The guidance highlights the concerns in which using ChatGPT affects students' critical thinking and other academic skills. On the technological side, it highlights the risks of personal data leaks and copyright infringements. Overall, the guidance advocates for careful implementation of ChatGPT, and reflects a balanced and nuanced viewpoint on the use of Generative AI for educational purposes. The guidance is provisional and will be revised based on this period's evaluation results.

The guideline shows a trial-and-error approach to the implementation of generative AI. It acknowledges the complexity and potential risks from universal adoption of generative AI in the education sector and thus includes both temporal guiding principles and a revision plan based on the results of piloting implementation projects. The pilot initiatives include four steps: (1) Learning about generative AI (Understanding the mechanism, conveniences, risks, and essential considerations for generative AI), (2) Learning how to use generative AI (Prompt and dialogue skills, methods for fact-checking), (3) Actively utilizing generative AI in various subjects (4) Using generative AI similar to a search engine. It notes that such pilot initiatives are more suited for middle school students and above, with primary school students only focusing on knowing generative AI as a concept.

At the core of the guideline lies the goals for enhancing "information utilization competence" (Jōhō katsuyō nōryoku). This has been a goal for educational policy in Japan, one of which is the GIGA (Global and Innovation Gateway for All) school project - which provides access to digital learning devices for students on a 1-to-1 basis. With generative AI as both the tools for discussion and practice, the students are expected to learn the impact of using and distributing information, to be aware of information rights, and to see the dangers of misinformation.

(In addition, this is well-aligned with the role of education in a neoliberal capitalist system (Jones, 2019). As education is directly affected by the changing occupational and social structure, the demand for highly skilled ICT workers in a digital age requires the incorporation of digital literacy in the compulsory education sector. It's worth noting that educational technology has frequently been crafted not primarily for educational purposes, but rather, as exemplified by generative AI, it demonstrates its significant capability in gathering information and data, revealing its substantial potential for educational uses.)

There are three levels of stakeholders in the guideline: students, teachers, and institutions. For students, careful deployment of generative AI so as not to negatively affect students' cultivation of skills and critical thinking is emphasized. In the example against the use of generative AI, there are cautions against plagiarism, and using generative AI for creative writing

and references. In these cases, students' sense of problem-solving and critical thinking is undoubtedly put to the test. On the other hand, three roles of Generative AI are recommended, namely language acquisition, text-based material proofreading, and programming. Whereas AI literacy is critical for both students and teachers, it is a heavy requirement for the teachers. Being the evaluator of generative AI use in the curriculum and classroom, teachers need a certain level of AI literacy to facilitate generative AI usage properly. In addition, the guideline recommends teacher training for AI literacy as part of the pilot initiatives. Secondly, there are tasks where the teacher's role is irreplaceable, such as critical feedback on the students' work and educational guidance. While the guideline suggests generative AI to be used to support teachers with menial tasks, such as answering students' questions and preparing classroom material, these tasks are with regard to the fundamental ethics of teachers as educators. Finally, Generative AI is regarded as a good starting point for managing tasks relating to school affairs at the institution level. These tasks include classroom teaching materials, school events and club activities' planning, administrative management, and external communications with parents.

Local levels

Acknowledging and following the national guideline, Toda City in Saitama Prefecture, a leading municipality in ICT education that equipped all its primary and middle schools with an ICT environment in 2016, published its "Guidelines for the Use of AI in Education in Toda City" in September 2023 (Tei, 2023). A distinguishing feature is the introduction of AI use into two phases: Phase 1: primarily for administrative tasks; and Phase 2: usage for both administrative tasks and learning. The initial phase involves staff utilizing AI for administrative purposes, aiming to understand its pros and cons before contemplating its effective use in learning scenarios. Once Phase 1 initiatives have sufficiently integrated, the plan is to transition to Phase 2, utilizing AI for both administrative and learning purposes. In comparison to the national guideline, Toda City's guideline is more detailed with examples of generative AI's appropriate use, prompts to use with Bard, and instructions for long essay-based homework. It further addresses parental monitoring when students are out of campus and age limitations for different generative AI platforms.

Except for the case of Sophia University, which banned all forms of Generative AI to be detected in students' works (Yomiuri Newspaper, 2023), the majority of higher education institutions in Japan provided their own guidance toward the use of ChatGPT and other generative chatbots for students in doing assignments and essays. Takeda (2023) analyzed approximately 200 AI guidelines collected from university websites to provide an overview of how Japanese universities understand and formulate their policies regarding generative AI. As a result, there is no university that completely prohibits Generative AI usage in publicly disclosed policies. Even Sophia University, which cites the use of AI-generated sentences as "completely prohibited" in the evaluation of ChatGPT, allows its use within the scope permitted by instructors. While using AI-generated content as the final product is prohibited, many universities permit its use within the discretion of course instructors to enhance educational effectiveness. Thus, professors' perceptions

of Generative AI will dictate how its usage develops among universities' students. This clearly raises the importance of AI literacy programs for universities' faculty.

Educators' Perception of Generative AI in Education

Some scholars, including Prof. Tatsuya Horita from the Tohoku Graduate School and Tokyo Humanities Graduate School, advocate for a cautious approach towards adopting Generative AI in educational settings. Horita stresses the importance of careful implementation and patient instruction (Eguchi, 2023), particularly for individuals hesitant about these technological advancements. However, he remains optimistic, likening the integration of Generative AI into school curricula to the gradual acceptance of Internet search engines (Generative AI and Educational Environment Project, 2023b).

Prof. Noyuri of Future University Hakodate proposes an Ethical, Legal, and Social Issues (ELSI) project-based learning approach to AI literacy. Drawing parallels to genome analysis projects, Noyuri highlights the necessity for students to critically examine the ethical and societal implications of AI products and usage (Generative AI and Educational Environment Project, 2023b).

On the other hand, some educators view Generative AI solely as a supportive tool. Prof. Yoshida from the Graduate School of Tokyo describes it as a "co-pilot", emphasizing the primacy of user knowledge, reasoning, and decision-making. He maintains that Generative AI lacks independence and will always function as an auxiliary to human intellect (Generative AI and Educational Environment Project, 2023a).

Similarly, Prof. Ikejiri of the University of Tokyo emphasizes the irreplaceable role of community participation in education, suggesting that Generative AI can only support cognitive learning improvement rather than substitute for human interaction (Generative AI and Educational Environment Project, 2023a).

Prof. Miyajima from Gakushuin Graduate School brings attention to the impact of Generative AI on programming education. While Generative AI can effortlessly generate code based on user requests, Miyajima highlights the importance of users' creative input in shaping programming tasks and outcomes. Whereas Generative AI alone is enough for code generation, it is the user creativity that Generative AI cannot replace. Ideas and visions for programming and its application are what will drive programming education in the era of Generative AI (Generative AI and Educational Environment Project, 2023a).

6. Discussion

Thus far, we have examined Japan's approach to regulating Generative AI in the education sector and the perceptions of educators. However, it's evident that this approach primarily focuses on assessing the technology's risks and benefits, often overlooking the socio-cultural

characteristics inherent in the Japanese educational system. Considering these characteristics is crucial for the successful adoption of advanced technologies. A parallel comparison can be drawn with the Care Robot Project, as investigated by Dr. James Wright from the Alan Turing Institute (Wright, 2023). While the Japanese government advocates for the adoption of advanced care robots to address various socio-economic issues, Dr. Wright observed disruptions caused by their integration into Japanese nursing homes. The concept of "nagare," meaning flow and the ethics of care play a pivotal role in this context. Caregivers, accustomed to a fluid workflow centered around residents' routines, faced challenges when introducing care robots, as it necessitated time allocation and disrupted their established practices. Moreover, the personalized care ethos, which addresses residents' physical, social, emotional, and ethical needs individually, encountered displacement. This led to a scenario where "caring for robots displaces caring for people" (Wright, 2023). Given these insights, it's imperative to consider the trajectory of ChatGPT deployment in the Japanese educational system within the framework of its current socio-cultural characteristics.

The Notion of Self During Educational Reform

It appears that the role of ChatGPT in education is emphasized to increase the support to students' active and self-directed learning (Lo, 2023) which is aligned with the movement towards active learning in Japan and its recent education reform. Since the 1990s, the radical educational reform in Japan has taken a constructivist approach in which teaching and learning shifted from the rote of information transmission through memorization and repetition towards child-centered participatory learning (Gordon, 2010). Active learning, a specific pedagogical method aligning with this renewed direction, started to gain policy-led traction in Japan around the time of 2010 (Ito and Chan, 2017; Mizokami, 2014 as cited in Isemonger, 2020). Notable reports from the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) including Towards a Qualitative Transformation of University Education (2012) and Improving Higher Education for Industrial Needs (2018) are considered significant to mark the rise in interest of active learning (Isemonger, 2020). However, how this reform impacts the performance of students is still unknown due to the scarcity of research on this topic (Gordon, 2010; Isemonger, 2020). The most recent educational reform taking place in 2020 which accentuated the vitality of students' communication skills in English prompted the proposed private English test system for the university entrance exam and the increasing inclusion of educational technologies in teaching English (U.S Department of Commerce, 2020).

Both these movements are aligned with the neoliberal discourse, placing the role of education as increasing employability for students. Here, ChatGPT might become a driving force to push the Japanese educational system further from its deep-rooted cultural values. The technology, similar to the active learning reform orientation, is providing students more chances to attain more self-assertiveness and self-reliance, making the entire education landscape lean more towards egalitarianism and individualism. Consequently, the Japanese relational perspective of self, derived from interpersonalism, will prevail, and other cultural values such as "*keigo*"

(honorifics)*, "senpai-kouhai*" (vertical seniority), and "*kenkyo*" (modesty, humility) will also be impeded.

This neoliberal agenda might nudge the unique Japanese notion of self away from construction in accordance with the group to individualism - the Western notion of self. Post-war Japan in the path of economic reform changes some of its cultural characteristics to resemble more Western-oriented individualism values. Educational reforms fuel this transition.

According to Nomura Research Institute's estimate, Japan is likely to have the highest percentage of occupations likely to be replaced by AI and robots 49% of the current employment), in comparison to the US (47%) and UK (35%) in the next 20 years, Japan faces a critical decision in how to adopt AI into education (Nomura Research Institute, 2015)). It is noteworthy that professions that require skills in interpersonal collaboration, negotiation, and understanding of others are more difficult to be replaced by AI (Masami, 2021). This way of life of always considering other people in society has long been practiced by Japanese people, however, faces the possibility of being transformed into individualism oriented (Mantello et al., 2021).

Generative AI and student-teacher relationship in Japan

Next, we consider potential impacts of ChatGPT's adoption in Japanese education systems. We focus on how the technology might further overload already burdened teachers, and how the use of AI might undermine some important aspects of Japanese traditional culture such as ambiguity, respects for vertical These observations imply for the implementation process must consider the initial increase in workload for teachers and make appropriate adjustments.

Teachers' work ethics

The introduction of ChatGPT in the context of Japan's educator culture offers a potential solution to address the prevalent issue of overworking. By streamlining menial tasks such as class material preparation and administrative duties, ChatGPT promises to alleviate the burdens placed on teachers. However, it's essential to recognize that this technology could also compound the responsibilities of already overburdened educators.

For example, in the 3rd International Symposium of the Institute of AI and Beyond, Prof. Noriko used ChatGPT to answer a history assignment at Tokyo University, demonstrating that ChatGPT's outputs, despite looking comprehensive, included several pieces of information that can not be found in common textbooks (Noriko, 2023). This raised the question of whether the information is fabricated or yielded from unpopular materials, and it is a hard one to answer.

In light of this context, the introduction of Generative AI necessitates a careful examination of its potential impact. It is imperative to consider that this technology could potentially add to the responsibilities of already burdened teachers. For instance, teachers would need to undergo new training to effectively use ChatGPT and instruct students themselves on interacting with ChatGPT. Tasks like evaluating students' work and handling additional paperwork, associated with these new

technologies, would undoubtedly add to their existing workload. Given this scenario, the question arises: Will the integration of technology ultimately alleviate the hardships faced by teachers, or will it inadvertently contribute to their burdens? Balancing the potential benefits of Generative AI with the practical challenges of implementation within an already stretched educational system is a critical consideration.

Teacher-student communication

Japan's traditional ethos of "the devoted teacher" underscores the importance of maintaining the central role of educators in guiding and nurturing students' learning journeys. It's crucial to ensure that ChatGPT complements rather than replaces teachers' roles. Yet, nowhere to be found in the guidelines is how teachers and students should behave beyond the use of generative AI for the search for the correct answer.

Moreover, a core element of communication in Japanese society, *ambiguity (aimai)*, is not taken into consideration in these guidelines. The classic text on contemporary Japanese culture, *The Japanese mind*, opened with the concept of Aimai (曖昧), or Ambiguity defined as "a state in which there is more than one intended meaning, resulting in obscurity, indistinctness, and uncertainty" (Osamu, 2002, p. 9). How Japanese people encode and decode meaning can be very different from other cultures, especially from the Western custom of clarity. Therefore, to mindlessly adopt a technology developed in Western countries and trained mainly by English-speaking data in Japan without highlighting the differences is to neglect the inherent aspect of cultural differences. This crucial misalignment shall disrupt the relationships in the educational realm such as between teacher and students and how students perceive learning and creativity. The teacher-and-student relationship in Japan is not only about teaching and learning but it reflects the respects for values such as social hierarchy or team spirits. These traditional values should be taken into consideration in any technological adoption process (Ho et al., 2023; Vuong & Ho, 2024).

Irreplicable: Social growth through community-centric activities

The significance of peer relationships and community values for comprehensive mental growth in students cannot be overstated. As discussed earlier, the Japanese educational system places a strong emphasis on school events and club activities, which play pivotal roles in nurturing these values among students. These community-centric activities foster essential social growth and instill values such as teamwork, leadership, and communication, which are integral to children's development. ChatGPT, while beneficial for customized learning and individual interaction, falls short in replicating the dynamic and social nature of these extracurricular activities. This is similar to the point raised by Prof. Ikejiri who emphasizes the irreplaceable role of community participation (Generative AI and Educational Environment Project, 2023a).

Policy Implications

Since existing AI-related guidelines in Japan are taking a trial-and-error approach, coupled with an agile regulatory framework, a broad consensus on the use of AI in education remains ambiguous. These guidelines are still in the rudimentary phase of trial-and-error, delineating the potentials as well as associated risks of AI usage, yet lacked action-oriented instructions to multilayered stakeholders. Moreover, these guidelines pose a disconnection with the Society 5.0 owing to the non-mentioning nor implementaiton of the core principles.

Conclusion

The early adoption of Chat-GPT and the open-mindeness about its future in Japan is a continuation of the Japanese worldview of technology. It was not an accidental or emergent response of Japan to the rise of technology. On the contrary, Japan has been establishing sociotechnical imageries, using the future vision of technology to shape social and political orders. However, the reality of implementing AI in Japan will face a lot of challenges. The nagare that accounts for the socio-cultural identity of Japanese people and Japanese institutions will come into conflict with the displacement by AI technology (Ho & Vuong, 2024). In the education sector, the social and emotional ethical needs that are essential for students cannot be replaced by AI.

Promoting the use of AI in education without a sufficient understanding of the underlying mechanism and the subsequent impacts will be counterproductive. Machine-enabled technologies such as ChatGPT, leaderboard, and recommendation systems are by no means "benign, neutral, and objective" (Noble 2008, p1) but are constructed and reconstruct sociocultural dispositions, via the founders (Airoldi, 2022). A set of acceptable behaviors, actions, and qualities are pre-defined in those technologies and when used in education, will nudge and reinforce learners to those pre-determined modes of performance and conduct (Knox, 2020). The rising emphasis on individualization and self-directedness in learning, empowered by these technologies, is regulating learners to a neoliberalist model of education where learning needs exist and the educator's responsibility is to supply and meet the demand (Biesta, 2005).

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