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Chapter 3 - I

A FRAMEWORK FOR THE ELSI (ETHICAL, LEGAL, AND SOCIAL ISSUES) OF EDTECH THAT UTILIZES EDUCATIONAL DATA

Kei Kano*, Nobutsugu Kanzaki, Atsuo Kishimoto,
Takayuki Goto, Hitoshi Sato, Takayuki Shiose,
Satoshi Takahashi, Yuko Fujimura, Goro Horiguchi,
Eri Mizumachi, Masayuki Murakami, Kaito Wakabayashi

1 Policies and recommendations for EdTech following the COVID-19 pandemic

This section introduces some of the trends in EdTech[1] that utilizes educational data generated in primary and secondary education. The nationwide closure of schools[2] due to the spread of COVID-19 and the promotion of the GIGA School Program[3] have been opportunities for EdTech to be adopted throughout Japan. Here, we will look at some policies and proposals that followed the pandemic.

In September 2020, at the peak of the COVID-19, the Working Group for the Use and Application of Medical Data, a joint effort between the Psychology/Education Committee and the Information Science Committee within the Science Council of Japan, published "Evidence-Based Learning—A Proposal for Utilizing Educational Data Through Digitization of the Classroom" (Science Council of Japan, 2020) as a policy recommendation for various government ministries such as Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Ministry of Economy, Trade and Industry (METI), and the Ministry of Internal Affairs and Communications. In its report, the working group noted the importance of designing systems, preparing the data environment, and training personnel for the collection, usage, and application of academic data.

In January 2021, the Central Council for Education released "Aiming to Build Japanese-Style School Education in Reiwa— Realization of Learning Environments Most Appropriate for Individuals and of Collaborative Learning Opportunities," in which it identified the progress thus far and emphasized the importance to figure out the best combination of ICT for improving the quality of formal education. Then, in

* **Kei KANO:** Corresponding author, Professor at the Faculty of Education, Shiga University, kkano@edu.shiga-u.ac.jp

January 2022, the government formulated a "Roadmap on the Utilization of Data in Education" (Digital Agency, MIC, MEXT, METI, 2022) around the vision of "applying digital technologies so that every individual can choose the services they want and live happy and fulfilling lives without being left behind." The plan stated that the use of educational data in EdTech will continue to advance and outlined various rules, policies, and timelines for that usage.

As evidenced by the involvement of so many different ministries, the policies for EdTech that utilizes educational data are complex and not limited to a particular government agency. In addition to these, in June 2022 the Cabinet Office's Integrated Science and Innovation Committee published a summary titled "Policy Package for Education and Training to Achieve Society 5.0" (Cabinet Office, 2022), reiterating its roadmaps for policy proposals aimed at the utilization of educational data and for developing curricula that promote digital-citizenship learning etc.

Viewed collectively, these various policies demonstrate the advancement of EdTech, the development of rules and regulations for utilizing and applying educational data, and the preparation of environments that allow such data to be used, as in the case of ICT and digital citizenship. One of the policies established after this was the "Notice Regarding the Use of Educational Data (1st Edition)" (MEXT, 2023) published in March 2023 by MEXT. This policy generally summarizes the main points that primary- and secondary-school teachers, board of education members, etc. should be aware of when handling the educational data of students, from the viewpoint of protecting personal information.

These developments are consistent with the statement by the Science Council of Japan (2020) that "there is a need to periodically reassess the usage of academic data so that it is done appropriately and not abused… to establish third-party organizations that can ethically review the design and implementation of systems that ensure that the human rights and dignity of students are not threatened…all while engaging in dialogue with citizens through the solicitation of public comments etc." On the other hand, a subsequent addition (2023) from the Science Council of Japan in September 2023 stated that: "As data is increasingly used and applied within society, there is a need for broader discussions beyond the framework of existing policies, guidelines and laws such as the Act on the Protection of Personal Information. Before considering new laws, policies, and guidelines, we must take note of the ethical, legal, and social issues (ELSI) that appear when implementing the results of research and development within society; the global situation regarding laws and regulations related to privacy protection; and problems involving the right to education and educational freedom. More specifically, we must first ensure that the process of collecting, storing, and managing educational data remains transparent. Progress is also needed in data literacy education for users of educational data so that they understand analyses and feedback based on that data as well as its original educational purpose of use."

As this statement makes clear, we still face the problems of how to formulate the rules and policies for using educational data and how to develop and implement ICT digital citizenship education.

2 Launching the R&D project related to the ethical, legal, and social issues (ELSI) of EdTech that utilizes educational data

The authors have established and conducted research and development project to identify the ELSI of EdTech and develop policies in response to them. This was done under the Research Institute of Science and Technology for Society (RISTEX)'s "Responsible Innovation with Conscience and Agility. After conducting a feasibility study titled "ELSI of Educational Technology using Student Learning Data" from October 2021 through March 2022, we launched the Practice on ELSI/RRI of Educational Technology Using Student Educational Data Project (the "Project") in October 2022. The Project is interdisciplinary featuring members from many different organizations and specialties. Some members even had prior experience with EdTech research and development, and we could capitalize on their expertise when identifying and developing solutions for the ELSI (Table 1). This article draws on part of the results of the Project.

Table 1: The interdisciplinary members of the research and development project

Group	Name	Affiliation	Specialty
ELSI practices Group (Proposes policies for responding to ELSI while conducting inclusive outreach and public engagement activities)	○ Kei Kano	Faculty of Education, Shiga University	EdTech development, public engagement
	Takayuki Shiose	Kyoto University Museum, Kyoto University	EdTech development, inclusive design
	Eri Mizumachi	Research Center on Ethical, Legal, and Social Issues, the University of Osaka	Science communication
	Masayuki Murakami	Center for Education in Liberal Arts and Science, the University of Osaka	Educational technology
	Kaito Wakabayashi	Research Center on Ethical, Legal, and Social Issues, the University of Osaka	EdTech development, ELSI research
ELSI Research Group (Identifies and analyzes ELSI while researching fundamental questions)	○ Atsuo Kishimoto	Research Center on Ethical, Legal, and Social Issues, the University of Osaka	ELSI, risk governance
	Nobutsugu Kanzaki	Faculty of Global Liberal Studies, Nanzan University	Ethics
	Takayuki Goto	Graduate School of Human Sciences, Osaka University	Social and educational psychology
	Goro Horiguchi	Graduate School of Law, Kobe University	Constitutional law
ELSI International Comparison Group (Compile cases while organizing and analyzing how they map to Japanese society)	○ Yuko Fujimura	Faculty of Education, Shiga University	Educational administration
	Hitoshi Sato	Faculty of Humanities, Fukuoka University	International comparative education
	Satoshi Takahashi	Graduate School of Human Sciences, the University of Osaka	Educational law

3 Submission of public comments

As part of the Project, we submitted opinions during the call for public comments in the planning stages of three policies: "Roadmap on the Utilization of Data in Education," "Policy Package for Education and Training to Achieve Society 5.0," and "Notice Regarding the Use of Educational Data (1st Edition)." These opinions, the responses to them, and the effects they had on the final versions are as follows.

First, we submitted the following comment on November 18, 2021, in response to the question "What do you think is important to keep in mind when using or applying educational data?" which was posed by the Digital Agency in relation to their Roadmap on the Utilization of Data in Education.

"Formulating a plan for detecting and responding to ethical, legal, and social issues (ELSI) in advance, from the time educational data is collected until the time it is utilized for any purpose of use, will be essential to promoting the usage and application of such data. Shouldn't the government establish rules and ethical guidelines? We hope that the government can develop a framework that considers all the diverse stakeholders, not only from a legal perspective but also in terms of ethics and society."

* This JST/RISTEX project "ELSI of Educational Technology using Student Learning Data" is a research endeavor that links EdTech developers and ELSI researchers to explore the societal implementation of EdTech. The project plans to propose rules and ethical guidelines for dealing with the ELSI within EdTech.

This comment received a total of 21 likes. Information about the citizen comments and the discussion with experts was published on January 7, 2022 (https://cio.go.jp/sites/default/files/uploads/documents/digital/20220107_news_education_02.pdf). In it, the comment above was mentioned as a main point, and it was reflected in the roadmap.

Next, we submitted the following comment on January 12, 2022, in response to the question posed on a survey conducted by the Council for Science, Technology, and Innovation regarding the "Midterm Summary of the Policy Package for Education and Training to Achieve Society 5.0.":

> "Formulating a plan for detecting and responding to ethical, legal, and social issues (ELSI) in advance, from the time educational data is collected until the time it is used for any purpose of use, will be essential for the conversion to educational DX and the advancement of personally optimized learning that capitalizes on digital technologies. These ELSI include questions like 'Do we have to provide our educational data to receive personally optimized learning?' 'Who decides which algorithm to use when there are multiple options available, and how do they make those decisions?' 'Is there a framework for correcting wrong evaluations caused by inaccurate profiling?'
>
> Shouldn't the government establish rules and ethical guidelines for these ELSI? We hope that the government can develop a framework that considers all the diverse stakeholders, not only from a legal perspective but also in terms of ethics and society."

* The JST/RISTEX project "ELSI of Educational Technology using Student Learning Data" (Representative: Kei Kano, Shiga University) is a research endeavor that links EdTech developers and ELSI researchers to explore the societal implementation of EdTech. The project plans to propose rules and ethical guidelines for dealing with the ELSI within EdTech.

Then, on February 9, 2022, an overview of the results for the midterm summary survey was published (https://www8.cao.go.jp/cstp/tyousakai/kyouikujinzai/6kai/siryo2.pdf). The above comment wasn't explicitly referenced, but there was a response stating: "The members of the working group and executive office will read each and every one of these comments and use that information when finalizing the policy package."

Finally, we submitted the following public comment for the "Notice Regarding the Use of Educational Data (1st Edition) (Draft)" and published it on the Web. Due to space constraints, we've provided this comment at the QR code below.

While the Project's comments weren't reflected in the Notice Regarding the Use of Educational Data (1st Edition), it was published in a Yomiuri Shimbun newspaper article (March 28, 2023) because one of the members of the expert panel had criticized the haphazard handling of the public-comment process.

The reactions to our series of public comments highlight the urgent need for a response to the ELSI of EdTech which utilizes educational data as well as the fact that there was practically no room for making changes based on any public comments. This is the phase where we must mount a rapid defense against the risks that are quickly becoming a reality due to the unflagging advance of technology. But at the same time, we must also respond to hidden risks as well as those that will appear over the medium and long terms.

4 Domestic and international cases

In the Project, we planned to identify the potential risks that could occur in Japan in the future. Therefore, we decided to focus on real-world ELSI cases from the United States, which has been a leader in EdTech and has already established certain policies in this area.[4]

In 2002, the Bush administration created the No Child Left Behind Act in the United States, one of the more advanced EdTech nations. Through the application of EdTech, educational data has been used to evaluate teachers and to analyze many aspects such as improvement in academic ability. Yet there have been some tangible instances of ELSI.

The following cases, for example, involve ELSI related to the fact that academic achievement test results were strongly tied to teacher evaluations:

- A teacher who was rated as "less effective than average" on a performance evaluation tied to academic testing committed suicide ("Teacher's death exposes tensions in Los Angeles," The New York Times, 2010)
- A veteran teacher who was rated as "ineffective" on a performance evaluation tied to academic testing filed a lawsuit that questioned the validity of such assessments (" 'Arbitrary and Capricious:' Sheri Lederman Wins Lawsuit in NY's State Supreme Court" The Washington Post, 2016)

As for the reactions to such ELSI instances, we know that there was a nationwide "opt-out" (boycott) movement among parents and students in the United States in response to the high-stakes application of state standardized testing ("Bush, Obama focus on standardized testing leads to 'opt-out' parent movement," The Washington Post, 2013). It was also pointed out that parents and teachers weren't sufficiently notified that there are rules granting people the right to opt-out from the provision of students' personal data ("Without Consent: An analysis of student directory information practices in U.S. schools, and impacts on privacy," World Privacy Forum, 2020), creating concerns over the improper acquisition of educational data.

Furthermore, the following ELSI cases involved the secondary usage of data:

- The results of a qualification test taken by high-schoolers for the purpose of joining the military were sent along with the personal data of students to military recruiters without the permission of parents and guardians ("High School Students' Test Results Are Being Sent to Military Recruiters Without Consent," Truth Out, 2016)
- A list of students with poor academic performance or behavioral problems was shared within a county sheriff's office to identify youth who are at risk for engaging in criminal activity ("Using Student Data to Identify Future Criminals: A Privacy Debacle," Education Week, 2020)

So, we can see that there have been cases where data from tests and surveys conducted by entities outside the school has been gathered and shared with other organizations without the consent of parents, as well as cases where academic achievements and behavior were used to profile for criminal risk.

5 Policies for responding to ELSI in the United States

So, what have been the responses to cases of ELSI in the United States? In the US, individual states have authority over matters related to education, so the systems differ by state. Each state also has its own regulations that cover the handling of data connected to students in primary and secondary schools. While this makes it difficult to discuss the country as a single entity, the state regulations presuppose the existence of various federal laws related to data protection (Connect Safely, Future of Privacy Forum, & PTA 2015). Therefore, we can examine the response to ELSI at the level of the federal government.

First is the Family Educational Rights and Privacy Act (FERPA), which applies to all educational institutions that receive financial assistance from the federal government. This law ensures that parents and guardians can access the educational data of their children and places restrictions on who can access and use the data of students in primary and secondary schools. It applies to schools and universities (most public institutions and a few private schools) that receive federal assistance. The Act grants certain rights to parents, including the right to view their own children's educational data, the right to demand correction or deletion of erroneous data, and the right to provide or deny consent for the disclosure of their children's data. And when a child turns 18 or enters university, these rights transfer from the parent or guardian to them. Regarding this law, a California student sued Google in 2014 claiming that the company had scanned several million emails that were sent and received by students.

Next is the Protection of Pupil Rights Amendment (PPRA), a law that requires schools to notify parents and guardians and obtain their consent in advance before conducting any investigations etc. that are supported by the federal government and that involve sensitive information about the students (such as mental-health issues, delinquency, promiscuous behavior, or domestic violence). This law allows parents to prevent their children from participating in investigations and to block the collection of their children's data for marketing purposes.

There is also the Children's Online Privacy Protection Act (COPPA), a federal law that establishes certain requirements for websites and online services intended for children under the age of 13. COPPA requires companies that operate websites or apps targeting children under 13 to notify parents in advance and obtain their consent when acquiring and using the personal data of their children. It also allows parents and guardians to access any of their children's data that has been collected and to request its deletion if necessary. The law does allow teachers and school administrators to provide consent in place of parents, but only for educational purposes. This law came up in a 2018 case involving Oath, Inc. (formerly AOL, currently Verizon Media). A COPPA compliance program discovered that the company was operating an online ad exchange which auctioned ad space on websites targeting children under the age of 13. Oath was eventually forced to pay a $4.95 million settlement.

Finally, there is the K-12 School Service Provider Pledge to Safeguard Student Privacy, a voluntary pledge through a third-party organization. The first edition was published in 2014 with the support of then-President Barack Obama, the National PTA, and the National Association of State Boards of Education. In 2020, the law was updated to reflect changes in technology, business practices, and regulations. The pledge has already been signed by 450 companies.

The K-12 School Service Provider Pledge to Safeguard Student Privacy is notable for being a bottom-up pledge of responsibility on the part of companies. It is a mechanism by which legal (L) issues that are not covered by laws as well as ethical (E) and social (S) issues can be addressed. Violators are subject to punishment by the Federal Trade Commission (FTC) and state attorneys-general (Figure 1).

6 Scope of EdTech that uses educational data

Now, let's keep these ELSI cases and responses from the United States in mind as we consider the ELSI perspective for EdTech that uses educational data in Japan. For this, we must first determine the scope of EdTech that uses educational data.

Regarding "educational data," the 12 types of data proposed in "Evidence-Based Learning—A Proposal for Utilizing Educational Data Through Digitization of the Classroom" published by the Science Council of Japan in 2020: (1) Usage history of learning support systems (access logs for digital teaching materials, usage logs for LMS etc., contents of digital notes), (2) Usage history of digital drill exercises (responses and scores), (3) Results of student questionnaires, (4) School register data, (5) Attendance data, (6) Teaching plans, (7) Test results (mini tests, summative tests, etc.), (8) Acknowledgements related to the academic record (report

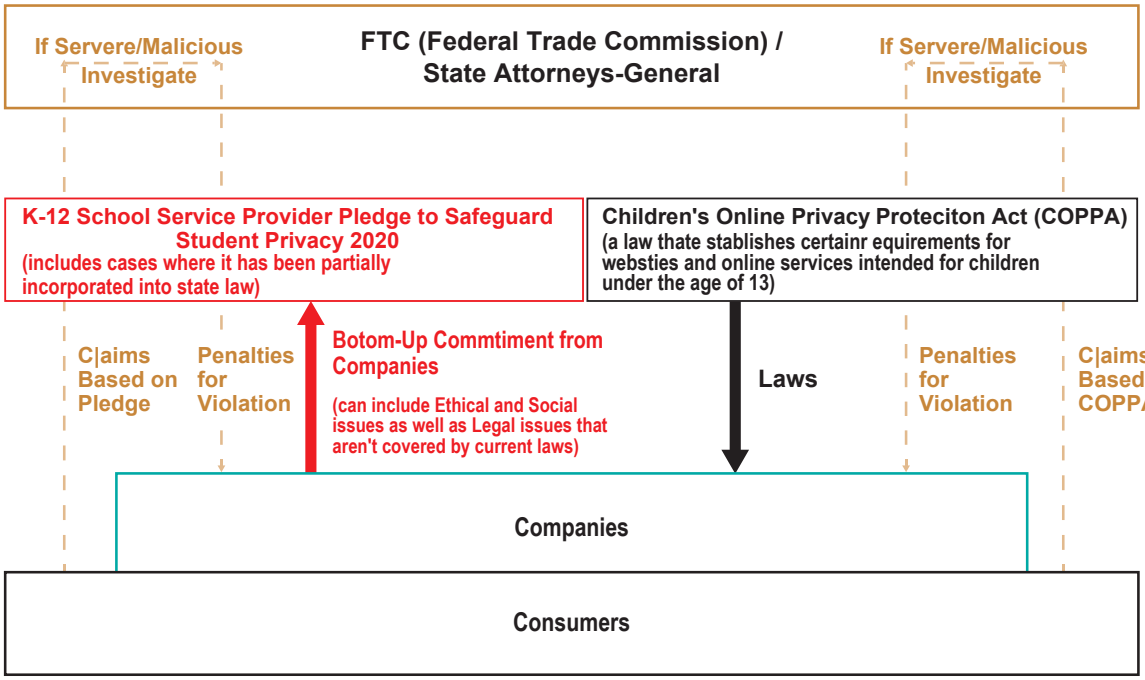

Figure 1: Comparison of COPPA and the K-12 School Service Provider Pledge to Safeguard Student Privacy

cards, pass/fail evaluations, etc.), (9) Results of teacher questionnaires, (10) Health observation data, (11) Daily notes, and (12) Usage of the school infirmary.

As for "EdTech," there is the definition provided by MEXT: "Any initiative that utilizes new technologies such as AI or big data in education." However, this scope is too broad. We therefore decided to treat the concept as four quadrants located around two axes: "Is the technology already feasible, or is it emerging?" and "Is the technology already being used, or is its usage emerging?" Since the quadrant of "The technology is emerging, but it is already being applied" doesn't make sense, we dropped it and were left with the three quadrants of 1 "The technology is feasible and its usage is emerging", 2 "The technology is feasible and is already being useed" and 3 "The technology and its usage are both emerging". The types and application of EdTech were 1 Edtech proficiency measurements, and their use in evaluations and entrance examinations, 2 Individual optimized learning and classification by EdTech that produces and presents individually optimized drill questions and video lessons, and 3 Confirmation of student attendance, measurement of emotions/concentration/distress/confusion, visualization of discussion content, etc., through EdTech's use of face and voice recognition (Figure 2).

7 A framework for uncovering the ELSI within EdTech that uses educational data

We decided to construct a framework that would allow us to discover the ELSI present within EdTech that uses educational data. First, we established 22 items representing the educational systems and mecha-

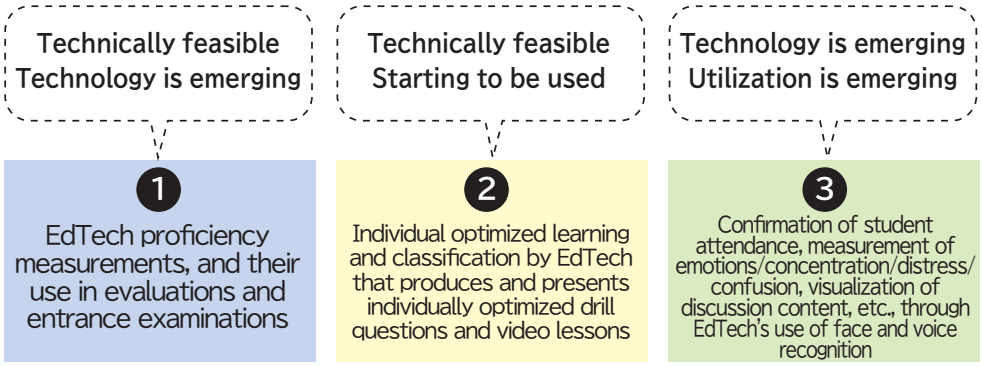

Figure 2: Types of EdTech and their applications

Figure 3: Three categories of suggested systems and mechanisms for Japanese public education (from "101 ELSI in EdTech")

nisms listed as "unique characteristics of the Japanese educational system" in *Reassessing Public Education in Japan* (Omomo and Seto, 2020) as well as the constitutions, laws, ordinances, and cultural elements that support them. We then categorized the laws and ordinances as either "Theory" or "Regulations." In other words, we organized the suggested systems and mechanisms for "Japanese public education" into three categories: A (Fundamental principle), B (Regulation), and C (Cultural background) (Figure 3). One of the features of the field of education is that the country's constitution and other laws form its foundational principles. Therefore, we put ethical (E), legal (L), and social (S) issues into category A "Fundamental principle," legal (L) and social (S) issues into category B "Regulation," and social (S) issues into category C "Cultural background" (Figure 3).

The specific educational systems and mechanisms that were included within these three categories are listed in Figure 4.

Legal norms **A Fundamental principle**

	Educational system/structure considered to be "Japanese-style public education"	Specific constitutional law, legislation, ministerial ordinance, etc.
1	Right to receive education	Constitution, Article 26, Paragraph 1: "All people shall have the right to receive an equal education correspondent to their ability"
2	Free public education	Constitution, Article 26, Paragraph 1: "Right to receive education" Paragraph 2: "Compulsory education shall be free"
3	Prohibition of improper controls	Basic Act on Education, Article 16: "Education must not be subject to improper controls"
4	Prohibition of public expenditure for private education (projects, schemes, etc.)	Constitution, Article 89: "Expenditures of public money, and limits on its usage (appropriation)"
5	Respect for individual character, protection of privacy rights	Constitution, Article 13: "Personal rights" and "Right to privacy"
6	Prohibition of discriminatory treatment in education	Constitution, Article 14: "Equality under the law" and "Prohibition of discrimination"
7	Guarantee of human-based education and personality development	Basic Act on Education, Article 1: "Education must be provided with the aim of fully developing the individual character"

Legal norms **B Regulation**

	Educational system/structure considered to be "Japanese-style public education"	Specific constitutional law, legislation, ministerial ordinance, etc.
8	Compulsory school-attendance system	School Education Act, Article 1: "In this Act, schools shall be kindergartens, elementary schools, junior high schools, compulsory education schools, high schools, secondary schools, special needs schools, universities, and colleges of technology"
9	Limitations on parties that can establish schools	School Education Act, Article 2: "Schools shall be established only by the national government [. . .], local governments [. . .], and school corporations specified by Article 3 of the Private Schools Act [. . .]"
10	Specific age/grade principle for compulsory education (Course promotion principle)	School Education Act, Article 17: "Guardians have obligations to have their children attend elementary school [. . .] for six years starting from the day after their children reach the age of six years and ending when the children reach the age of 12," and "to have them attend junior high school until the end of the school year during which the children reach the age of 15"
11	"Seat-time" (class attendance) promotion principle in compulsory education (Credit-based promotion principle)	School Education Act, Enforcement Regulations, Article 57: "In elementary schools, approving the completion of courses for each school year and graduation must be determined by evaluating the past grades of school children."
12	Appropriate teacher's license principle	Education Personnel License Act, Article 3: "Education personnel must be persons who have received the appropriate license certification as stipulated by this Act."
13	Law-based employment terms and conditions and guarantee of status for public servants	Every Article and item (paragraph) of the Local Public Service Actstipulated by this Act."
14	Protection of personal information of children attending school	Act on the Protection of Personal Information
15	Mass purchase of private industry educational materials	Characteristics of Japanese-style public education not necessarily grounded in law
16	Legal nature of the course of study (curriculum)	Characteristics of Japanese-style public education not necessarily grounded in law
17	Strictness of textbook screening system	Characteristics of Japanese-style public education not necessarily grounded in law

C Cultural background

	Educational system/structure considered to be "Japanese-style public education"
18	Unequal power relationship between teachers and children/students
19	Equity rather than equality
20	Emphasis on the five basic subjects/Emphasis on subjects required for entrance examinations
21	Emphasis on life guidance
22	Emphasis on academic background in society

Figure 4: Suggested systems and mechanisms for Japanese public education for each category (from "101 ELSI in EdTech")

Finally, we created a framework for discovering ELSI in EdTech by constructing a 3x3 matrix featuring the three EdTech types and applications as well as the three categories of Japanese public-education systems and mechanisms that we came up with.

8 "101 of the ELSI in EdTech" and its implications

Using the framework described above, we identified 101 ELSI in EdTech that utilizes educational data. We also recognized the need to organize the issues according to factors such as whether they occurred during data acquisition or during usage, whether they were related to algorithms, whether they existed prior to or after the introduction of EdTech, etc., so we simultaneously organized these issues. We ultimately published the booklet "101 ELSI in EdTech" which introduces the issues we had discovered using this framework. We reluctantly omit listing them all here due to space constraints, but they include some responses to the ELSI cases in the United States mentioned earlier. For example, "Don't we need to create rules for cases where

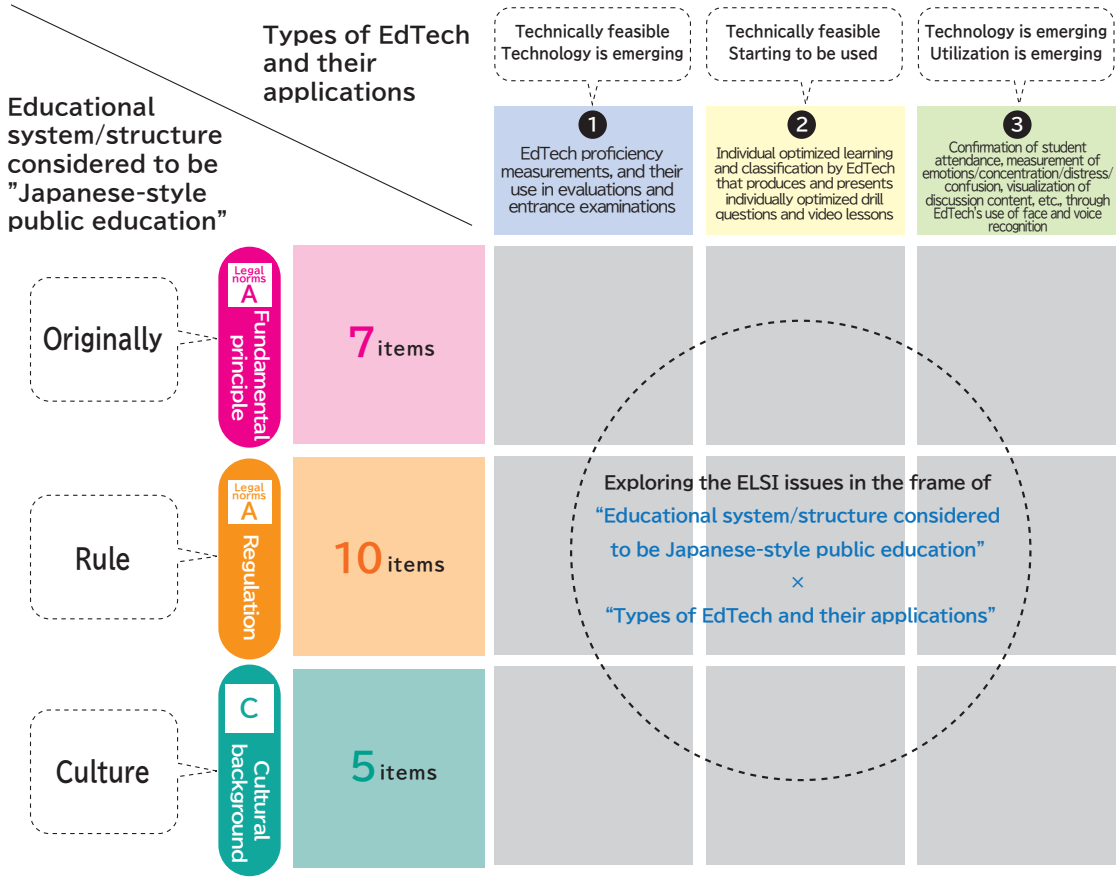

Figure 5: Framework for uncovering the ELSI within EdTech that uses educational data (from "101 ELSI in EdTech")

teacher evaluations and school rankings are directly linked to the academic performance of students?" "Have the criteria for teacher evaluations been restricted to things that are measurable?"

Regarding several of the issues, a study was conducted to explore public reception via the panel members of an Internet survey company (Goto and Kano, 2023). While the results showed that people are more receptive to personalizing and optimizing learning with EdTech, they are not very receptive to the idea of implementing EdTech in a way that dramatically alters the roles of teachers, schools, and educational systems. This suggests that critical discussion is needed when implementing EdTech so that the technology is not introduced in a haphazard way without ample consideration of laws and regulations. We can also infer that students, teachers, and schools want the ability to choose whether or not to use EdTech, even after it is introduced. Any of the 101 issues could appear in Japan as well, so we will ideally continue to study and respond to them.

"101 ELSI in EdTech" was referenced within the "Notice Regarding the Use of Educational Data (1st Edition)" as well as the additional comments (2023) of the Science Council of Japan, and policy recommendations are starting to recognize that this is an area requiring further study.

In addition to discovering and studying the issues, we may also need to develop specific responses to them. Perhaps we need a law similar to the one enacted by the US federal government. But at the same time,

we must cover the areas that laws are too slow to catch up with due to the rapid advance of technology.

Moving forward, it may be prudent to consider multiple avenues for responding to these areas as they come up, including the possibility of requiring companies in EdTech to sign a pledge or establishing guidelines for schools and boards of education.

Postscript

A portion of this research was conducted by the "ELSI of Educational Technology using Student Learning Data,"feasibility study project (JPMJRX21J8), as well as the Practice on ELSI/RRI of Educational Technology Using Student Educational Data Project, supported by JST-RISTEX Responsible Innovation with Conscience and Agility Program.

Some of the information in this article is based on the final report titled "ELSI of Educational Technology using Student Learning Data"; a contribution to the *Peta-gogy* publication of the Information Processing Society of Japan titled "Expectations and ELSI (Ethical, Legal, and Social Issues) of EdTech Utilizing Educational Data" (Kei Kano, 2023, *Information Processing Vol 67 No.4*, pp. 332–336); the FY 2022 report for the Practice on ELSI/RRI of Educational Technology Using Student Educational Data Project; and preliminary drafts that the authors of this article presented at the annual conference of the Japan Society for Science Education (JSSE) in 2022, the national conference of the Japan Society for Educational Technology (JSET) in the fall of 2023, and the Japanese Society for Artificial Intelligence (JSAI) in 2023.

Notes

1. A portmanteau of the words *education* and *technology*. One definition is "any initiative that utilizes new technologies such as AI or big data in education" (MEXT, 2018).
2. Conducted from March 2, 2020, until the start of spring break. However, it continued until the end of May 2020 in areas with high infection rates.
3. GIGA is short for Global and Innovation Gateway for All. Under the jurisdiction of the MEXT, this project aims to "continually achieve fair and personally optimized learning that leaves none of our diverse children behind at every place of learning in Japan by giving each student a device along with seamless access to large, high-speed communication networks while simultaneously promoting the use of cloud-based services, building systems for the procurement and maintenance of ICT devices, popularizing excellent use cases, and fully adhering to the PDCA cycle with regard to utilization." Due to the pandemic, the original schedule was accelerated.
4. ELSI cases can be found not only in the United States but in Europe and Japan as well. Issues other than the ones presented in this article can also be found, such as those involving behavioral data, facial images, and search histories. For more information, refer to Wakabayashi and Kishimoto (2023).
5. Can be downloaded from the following URL: https://doi.org/10.6084/m9.figshare.25866901.v2 (Last accessed on September 29, 2024)

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