

ORIGINAL ARTICLE

Anticipating data sharing for student-centred education: Governmental policy initiatives in Switzerland and Japan

Judith Hangartner¹  | Yuko Toyokawa²  |
María Guadalupe Ramírez³ 

¹Institute for Research, Development and Evaluation, Bern University of Teacher Education, Bern, Switzerland

²Academic Center for Computing and Media Studies, Kyoto University, Kyoto, Japan

³Institute of upper secondary education, Bern University of Teacher Education, Bern, Switzerland

Correspondence

Judith Hangartner, Institute for Research, Development and Evaluation, Bern University of Teacher Education, Bern, Switzerland.

Email: judith.hangartner@phbern.ch

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In the context of digital transformation and platformisation of education, policy concerns are shifting from infrastructure to data use. New governmental initiatives attempt to facilitate data sharing between schools, research and governing authorities to improve student learning. These attempts to create public data spaces anticipate new topologies of data-based governance that strengthen the data-based exchange between classrooms and system governance. However, educational research has paid little attention to these initiatives towards public data spaces. This article addresses this gap by examining such initiatives in Switzerland and Japan, exploring how policy documents envision data-driven educational futures. While both promote student-centred education through personalised and individualised learning, they reveal culturally specific ambivalences around this focus on individual learning. These cases point not only to the unresolved technical and regulatory challenges of the data sharing plans but also to controversies regarding what kind of education such data are meant to support.

KEYWORDS

data sharing, education policy, Japan, personalised and individualised learning, public data spaces, socio-technical imaginaries, Switzerland

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Practitioner notes

What is already known about this topic?

- Educational practices, including those in primary and secondary schools, are increasingly situated within commercial platform infrastructures that extract and capitalise data from teaching and learning activities.
- Platforms are promoted to improve education by providing personalised learning tailored to individual learners' needs.
- Proprietary data infrastructures in public education raise significant ethical concerns, including concerns about data protection, infringements of student privacy and the commodification of educational data.

What this paper adds?

- National governments develop policy initiatives to enable data sharing among schools, researchers, administrators and policymakers within trustworthy public data spaces.
- These initiatives are not only concerned with technical standards and questions of regulation that allow data sharing across institutional boundaries but also encompass guiding visions of future education.
- This paper analyses the emerging data-sharing governmental initiatives in Switzerland and Japan and examines the visions of future education they articulate.
- In both countries, the initiatives reproduce the commercial platforms' promises to improve education through personalisation and individualisation, while expressing culturally distinct and ambivalent understandings of these student-centred approaches.

Implications for practice and/or policy

- In the context of the increasing platformisation of education, digital data have become central to informing, guiding and governing educational practices at all levels.
- The proposed data spaces could provide mechanisms for creating public value from data generated in public education, which is currently predominantly monetised by commercial platforms in primary and secondary schools.
- While technical and governance challenges are crucial, policymakers should also consider the educational aims and pedagogical visions that data infrastructures should advance.

INTRODUCTION

Digital platforms increasingly serve as the primary infrastructure for school administration and educational practices in classrooms (Decuyper et al., 2021). These platforms constitute complex environments that mediate between people, integrating material resources and particular designs with social uses (Garcia & Nichols, 2021). They function as data infrastructures 'geared toward the systematic collection, algorithmic processing, circulation, and monetization of user data' (Van Dijk et al., 2018, p. 4). Educational data infrastructures are not only technological artefacts but constitute complex assemblages of technical components, social relations, policies, funding arrangements, expert knowledge and discourses

(Kitchin & Lauriault, 2014; Williamson, 2017b). The expansion of corporate platforms, such as Google Workspace for Education or Microsoft Teams, is accompanied by promises that data infrastructures can improve education through personalisation, tailoring learning to the needs of individual students (Williamson, 2017c). In contemporary political debates, educational platforms are often portrayed as a form of “technical magic” to enable the “opening up education” and enhance learners’ freedom, making education more accessible, personalized, transparent, and effective’ (Grimaldi & Ball, 2021, p. 115).

Alongside these promises of educational improvement, proprietary data infrastructures also bring significant ethical and political challenges. These include sufficient protection of children’s privacy, the surveillance of students through data-based tracking, discriminatory biases and, more broadly, the still-unknown effects of data infrastructures on educational practices (Lupton & Williamson, 2017; Selwyn & Gašević, 2020). The increasing reliance of schools on EdTech platforms, which produce sensitive data outside the oversight of public institutions, has raised public and scholarly concerns about the commercialisation of public education (Kerssens et al., 2023). Learners’ behavioural data become a valuable commodity—even when not directly used for marketing—as EdTech corporations extract data to improve algorithms, predict student behaviour and by doing so capture value from public education (Knox et al., 2020; Ozalp et al., 2022). Corporate monopolisation of user data also creates barriers to academic research (Greene et al., 2022). Beyond their economic power, EdTech companies are increasingly significant cultural and political stakeholders in shaping the future of education (Van Dijck et al., 2018).

In response to these concerns, researchers and policymakers increasingly recognise that educational data infrastructures should be democratically regulated and serve the public good (Holloway et al., 2023). National and supranational policy initiatives across various public sectors seek to reduce the monopoly of proprietary platforms and to mitigate their negative effects by developing data ecosystems and public data spaces (Beverungen et al., 2022). These policy initiatives are often inspired by private-sector models of data capitalisation and aim to generate digital value while defending public interests (Degen et al., 2025). The emergent initiatives in education follow attempts to enable data sharing by the development of data ecosystems and data spaces in other sectors, such as the European Data Governance Act (Ruohonen & Mickelsson, 2023), the European Health Data Space (Kari et al., 2024) and the Open Research Data trend (Redkina, 2019). The data-sharing initiatives in education pursue important goals: strengthening public values in data-driven education, promoting public access to and democratic control of data infrastructures and safeguarding data protection and privacy rights (Degen et al., 2025). Therewith, these efforts open up opportunities to define which values and visions of education should be supported by data infrastructures (Richter et al., 2025). Despite their significance, these educational initiatives have received limited attention in education research (but see Gulson & Sellar, 2019; Richter et al., 2025).

This paper examines governmental policy initiatives aimed at advancing data sharing in Switzerland and Japan. Such policies not only articulate goals concerning data sharing and data infrastructures but also convey socio-technical imaginaries of future education (Zakharova, 2025). The focus of our analysis is how these data-oriented policies in culturally distinct contexts anticipate visions of future education and how they relate to the predominant imaginary of personalised learning. The two countries provide compelling cases for exploring data-sharing policies, as they lack interoperable infrastructures and lie outside the focus of Anglo-American datafication research, while they offer a contrastive analysis of cultural conceptions of education. We begin by outlining the main concerns in the research regarding public data spaces, before summarising the prevailing concepts of education associated with data infrastructures.

ATTEMPTS TO ORCHESTRATE PUBLIC DATA SPACES

Governments are increasingly recognising the value of digital data and the importance of data sharing between education stakeholders (OECD, 2023a). Emerging policy initiatives across public sectors are shifting the focus from merely protecting data towards proactively creating and regulating public data spaces within broader data ecosystems (Schurig et al., 2024).¹ A *data space* is a public infrastructure jointly owned by a consortium of public and private actors, bound by data protection law and societal values. It is expected to address complex societal problems while ensuring fair distribution of profits (Beverungen et al., 2022). These initiatives aim to enable trustworthy data exchange and reuse based on shared values and standards, in compliance with overarching ethical and legal frameworks (Schurig et al., 2024). Within education, policy initiatives focus on facilitating data sharing among schools, research, local administrations, national governments; they also attempt to include data from commercial platform providers that extract the data produced from the activities of students and teachers (Vincent-Lancrin & González-Sancho, 2023).

The growing importance of data sharing is reflected in the OECD's recent focus on data ecosystems (OECD, 2023b). Some OECD countries document infrastructures for data sharing between national governments, local administrations and schools—for example, national student information systems that integrate school data directly (eg, Chile, Korea, Austria, Luxembourg)—or have implemented interoperability standards to facilitate data exchange (eg, Denmark) (OECD, 2023a). However, national accounts also reveal persistent technical challenges as well as data protection and privacy concerns that hinder data sharing across systems and between public institutions and commercial providers (OECD, 2023a). Establishing public data spaces that enable exchange between sovereign stakeholders is therefore highly complex, encompassing not only technical barriers but also critical governance issues such as infrastructure ownership, data control and access rights and negotiations over values, trust and beliefs (Schurig et al., 2024).

The German national policy initiative towards a public data space in education provides a rare example that has been studied in detail, highlighting the difficulties of such a complex project as well as the guiding educational visions (Gleiss et al., 2023; Hofhues & Schütz, 2025; Lucke et al., 2023; Richter et al., 2025).² Degen et al. (2025) identify three competing stakeholder perspectives that position the initiative between public and private value creation interests: (a) the public–private marketplace model, which acts as a broker between user demands and commercial providers and prioritises private value capture; (b) the interconnectivity infrastructure model, which emphasises interoperability and administrative services; and (c) the open education space model, which envisions a protected environment for educational collaboration that prioritises public values. At present, the initiative's development priorities are focused on intermediary services, without clear decisions about its future direction (Lucke, 2024). Similarly, Hartong (2024) identifies 'governance by intermediarisation' as the dominant mode through which Estonian education policies promote data infrastructure intermediaries to support interoperability, prioritising infrastructure connectivity. Both the German and the Estonian studies demonstrate that these data-oriented initiatives advance visions of future education, promising to personalise and individualise education (Bustorff et al., 2023; Hartong, 2024; Richter et al., 2025).

Aiming to facilitate data sharing between schools, research and governments, the envisioned public data spaces connect classroom practices with system governance and strengthen data-based educational governance (Gorur et al., 2019). Whereas conventional data-based governance relied on intermittent measurements of student performance, schools are now increasingly positioned as platforms that produce and extract student data in quasi-real time (Williamson, 2017a, pp. 9–10). These emerging public data space policies generate a new topology of data governance that amalgamates established and emergent

data-driven rationalities (Gulson et al., 2022). Thus, the initiatives attempt both to govern data and to strengthen governance through data.

SOCIO-TECHNICAL IMAGINARIES OF DATA-SUPPORTED PERSONALISATION AND INDIVIDUALISATION

Data infrastructures are not 'neutral' technologies but are complex assemblages that embody socio-technical imaginaries of cultural and social forms of education (Williamson, 2017a). Socio-technical imaginaries are 'collectively held, institutionally stabilised and publicly performed visions of desirable futures' supported by science and technology (Jasanoff, 2015, p. 4). Such imaginaries are included in the design of data infrastructures, promoted by EdTech companies, and embraced by educational policies and public discourses (Rahm & Rahm-Skågeby, 2023; Williamson, 2017a). A dominating techno-optimistic discourse promises that digital technologies have the potential to transform education from a one-size-fits-all model to an individualised and personalised approach adapting to each learner's unique needs, pace, and preferences, while providing teachers with unprecedented insights into learning processes (Holmes et al., 2018).

The focus on the individual learner is at the centre of the socio-technical imaginaries shaping data infrastructures. Rather than asserting an ontological distinction between individualisation and personalisation, we position these terms within different historical traditions to understand how they shape visions of educational futures. Present day EdTech discourses advocate personalised learning as an efficient, cost-effective, standardised and customisable product, which shifts decision-making from public school settings to commercial platform providers, fuelling the trend to corporate privatisation of education (Roberts-Mahoney et al., 2016). The concept of 'personalisation', however, is often only vaguely defined, encompassing technology-enabled customisation, individualisation understood as learner choice and data-based adaptation (Kucirkova et al., 2021; Van Schoors et al., 2021). Although now closely tied to technology-enhanced individual learning, 'personalisation' has its origins in digital marketing and was introduced into education during the UK's New Public Management reforms as a tool for improving learning outcomes (Mincu, 2012). The term was later promoted by the OECD (Miliband, 2006) and gained momentum with the spread of data infrastructures (Bulger, 2016). The promotion of personalisation and individualisation is situated within a broader transformation from 'education' to 'learning', driven by the instrumental rationality of performance-oriented reforms (Kerssens & de Haan, 2022). Whereas education has traditionally been associated with socialisation and discipline, but also with personal growth, emancipation and equality, the discourse of learning focuses on the individual acquisition of knowledge and competencies, abstracting learning from its social context (Biesta, 2015). Within this framing, institutions are reimagined as suppliers, teachers as facilitators of learning opportunities and students as consumers (Biesta, 2005).

Despite the current association between personalised learning and data infrastructures, student-centred reform discourses long predate the advent of digital technologies. As such, learner-centred educational approaches reflect the values of the Western liberal democratic and capitalist systems from which they emerged (Carter, 2010). In the early twentieth century, reform movements such as 'child-centred' or 'new education' in the United Kingdom, 'progressive education' in the United States, *éducation nouvelle* in France, or *Reformpädagogik* in Germany proposed individualised, child-centred approaches aimed at humanising rigid, lockstep schooling (Idel & Ullrich, 2017). These reforms emphasised the active child and its interests, pupil autonomy and self-government, more egalitarian teacher–pupil relationships and democratic values (Oelkers, 2010). Such ideas were revitalised during the emancipatory, anti-authoritarian climate of the 1970s, when child-centred approaches resurged

(Hartley, 2009). Alongside these humanist traditions, the twentieth century also witnessed experiments in automated individualisation through teaching machines and drill-based learning systems, rooted in cybernetic and behaviourist models (Watters, 2021). Today's approaches to algorithmic personalisation rely on the massive production of data and complex forms of analysis; however, this emphasis risks privileging data-evidence claims over the articulation of pedagogical theories (Hew et al., 2019; Khalil et al., 2023).

Current discourses on personalised learning, shaped by the growth of data infrastructures, are marked by conflicting epistemologies (Bartolomé et al., 2018). Socio-technical imaginaries simultaneously draw on the aims of child-centred reform traditions and amalgamate them with the neoliberal agendas of self-responsibilisation, 'choice and voice', and human capital production (Carter, 2010; Fielding, 2012). They amalgamate humanist ideas, constructivist pedagogies, with behaviourist models, self-determination theories and governmentality technologies that seek to govern conduct through self-direction (Perrotta, 2024). Within this framing, personalisation constructs the learner as a motivated, self-reflective, self-directed and self-governing subject (Simons & Masschelein, 2008). Recently, this subjectivation of the student as (self-)governing learner has been supplemented by calls for the development of social competencies that contribute to sustainability, well-being and happiness (Bryan, 2024; Kim, 2024). This produces an ideal learner who is post-political, responsible, resilient and empathetic—adaptable to socio-political conditions rather than positioned to contest them (Yliniva et al., 2024).

The socio-technical imaginaries of data-driven, individualised and personalised learning thus promote flexible epistemologies of student-centredness, drawing on humanist ideals of self-fulfilment, constructivist pedagogies and self-governing technologies. At the same time, they risk privileging algorithmic surveillance, machine behaviourism and control over learner agency, thereby anticipating ambiguous futures for data-driven education (Knox et al., 2020; Perrotta, 2024). Thus, while the imaginaries appeal to learners' individual needs, personalisation technologies in practice often deliver standardised tasks and reproduce the instrumental understanding of learning characteristic of mid-twentieth-century teaching machines (Macgilchrist, 2023; Watters, 2021).

ANALYSING DATA-RELATED EDUCATION POLICIES IN SWITZERLAND AND JAPAN

In the following, we analyse how data-sharing policy initiatives in Switzerland and Japan advance socio-technical imaginaries of educational futures, examining both the similarities and the cultural distinctions in the approaches to student-centred learning and conceptions of the self that these policies convey. Our reading of Swiss and Japanese policy documents integrates concerns related to data use, governance and educational visions (Hillman, 2023). The two countries are particularly well suited for a contrasting analysis: in both, responsibility for education is shared across governance levels, and neither has a centralised student information system or interoperable data infrastructure enabling comprehensive data sharing among stakeholders at different levels (OECD, 2023a, p. 193; SKBF, 2023; Takayama & Lingard, 2019). Additionally, proprietary platforms are widely used in schools in both countries today (OECD, 2023a, p. 194; SKBF, 2023). While quantitative research on platform use is limited, our ethnographic insights and co-design research with schools suggest that teachers in both countries use management and learning platforms to support diverse pedagogical approaches (Hangartner, Hürzeler, et al., 2024; Ogata et al., 2024).

While research on educational datafication is largely dominated by Anglo-American cases, examining Switzerland and Japan allows us to explore how countries on the margins of predominant policy landscapes (Carney, 2012) position themselves within the emerging

trend towards data sharing. Given both countries' reservations about adopting technologies for data-based governance, we are interested in how governmental and pedagogical agencies engage with the vision of creating public data spaces. Specifically, we ask How do local initiatives envision the forms of education to which data sharing contributes? How do these initiatives incorporate the dominant socio-technical imaginaries of personalisation and individualisation surrounding commercial data infrastructures and to what extent are these imaginaries adapted to local understandings of education?

Policies, as both texts and actions, constitute technologies of 'statecraft' that operationalise visions of the future (Uleanya & Prinsloo, 2024). Rather than serving as neutral instruments of innovation and improvement, digitalisation policies convey political and educational values (Høydal & Haldar, 2022). Policies are governing technologies that embody socio-technical imaginaries of future data-based education and function not only as 'statecraft' but also as 'futurecraft' (Uleanya & Prinsloo, 2024). To analyse socio-technical imaginaries, Rahm and Rahm-Skågeby (2023) suggest focusing on the problematisations, framed as problem-solution configurations, that policies produce. Such a post-structural analysis draws attention to the ways in which governments and other authorities are actively involved in the production of problems, by asking 'how the "problem" is *made to be* a particular kind of problem *within a specific policy*' (Bacchi & Goodwin, 2016, p. 17). The 'what's the problem represented to be?' (WPR) approach offers a heuristic to scrutinise how policies conceptualise and shape the problems they represent (Bacchi, 2009). Of the six questions posed by the WPR approach, our analysis concentrates on the following issues: what is the problem (concerning data use) represented; what assumptions (about future learning) are associated with the problem representations and what is left unproblematic or omitted (Germundsson, 2022).

We started by broadly collecting governmental and educational policy documents on digitalisation and screened them for relevance to data-related issues. Table 1 presents the subset of nine documents selected for in-depth analysis. The policy documents rendered in italics specifically address data sharing policies that include visions of future education. The remaining documents are more broadly concerned with education in the context of digital transformation and include an engagement with data use. We scrutinised how the selected policies framed the problem, how they defined goals, what instruments they propose, what understandings of future education they include and what they left undiscussed.

Switzerland

Schools in Switzerland are well equipped with digital infrastructure, including internet access, devices and cloud-based platform services, which are regularly used by students and teachers (Oggenfuss & Wolter, 2024).³ Even before the COVID-19 pandemic, the Swiss Conference of Cantonal Ministers of Education (EDK) launched a data-related policy for primary and secondary education (EDK, 2018). Within Switzerland's federal structure, in which the cantons are autonomously responsible for compulsory education, the EDK serves as an important political actor in harmonising education policies across cantons (Criblez, 2012).

The EDK has taken the lead in advancing the digital transformation of education, dedicating its latest digitalisation strategy specifically to data use and data sharing (EDK, 2018). The document anticipates that digitalisation will have a dynamic effect on education and recommends anticipating its potential and challenges to advance the pedagogical use of technologies (EDK, 2018). The overall goal of the EDK policy is 'to support all students equally and as well as possible on their way to becoming autonomous and responsible citizens in a digital world' (EDK, 2018, p. 1, our translation). The policy outlines broad strategic objectives, including data security and digital identity, data sharing between stakeholders, research

TABLE 1 Selected policy documents.

Country	Document	Focus/importance
Switzerland	EDK. (2018). <i>Digitalisierungsstrategie. Strategie der EDK vom 21.06.2018 für den Umgang mit Wandel durch Digitalisierung im Bildungswesen</i>	Political objectives for future data use and data sharing in education defined by the cantonal ministers of education
Switzerland	Educa. (2019). <i>Daten in der Bildung—Daten für die Bildung. Grundlagen und Ansätze zur Entwicklung einer Datennutzungspolitik für den Bildungsraum Schweiz</i>	Preparatory report by the intercantonal expert agency for the digitalisation of education (Educa), outlining the key elements of future data policy
Switzerland	Educa. (26.05.2025). <i>Datennutzungspolitik im Bildungsraum Schweiz. Entwicklungsansätze für eine kohärente Umsetzung</i>	Data use policy. Educa expert report showing directions and challenges that cantons could undertake towards a data policy
Switzerland	Swissuniversities. (02.12.2020). <i>Massnahmen zur Digitalisierungsstrategie der EDK im Bereich der Lehrerinnen- und Lehrerbildung. swissuniversities, Kammer Pädagogische Hochschulen</i>	Response of the umbrella organisation (Chamber) of teacher education universities to EDK digitalisation strategy
Switzerland	Swissuniversities. (09.03.2022). <i>Grundsätze und Leitvorstellungen für die Mitgestaltung von Schule und Lernen in einer Kultur der Digitalität</i>	Position paper by the Chamber of teacher education universities on education in the digital condition, which was informed by broad professional discourse
Japan	Digital Agency, Ministry of Internal Affairs and Communications, Ministry of Education, Culture, Sports, Science and Technology, & Ministry of Economy, Trade and Industry. (07.01.2022). <i>Roadmap on the Utilisation of Data in Education. Government of Japan</i>	Roadmap by governmental expert agencies for data use and data sharing in education
Japan	Digital Agency, Ministry of Internal Affairs and Communications, Ministry of Education, Culture, Sports, Science and Technology, & Ministry of Economy, Trade and Industry. (13.06.2025). <i>Outline of DX Roadmap. Government of Japan. Government of Japan</i>	Revised roadmap
Japan	Central Council of Education. (26.01.2021). <i>Towards the construction of “Japanese-style school education in the Reiwa era”: Realisation of individualised optimal learning and collaborative learning that draws out the potential of all children</i>	Outline on education in the context of digital transformation, issued by the educational council advising MEXT
Japan	MEXT. (16.06.2023). <i>Basic Plan for the Promotion of Education. Ministry of Education, Culture, Sports, Science and Technology (Cabinet Decision)</i>	Government strategic plan for promoting education over a five-year period, including data-based digital transformation

supporting data use, improvement of students' and teachers' digital literacy, and clarification of relationships with commercial infrastructure providers (EDK, 2018). According to the strategy, students and teachers should have access to the data they produce and receive transparency regarding how it is processed. Equity is framed in terms of individually adapted

learning pathways (p. 2). The document focuses on anticipated benefits of data use in education, largely neglecting technical, social and educational risks.

Educa, the intercantonal expert agency for the digitalisation of education, was tasked with developing a data use policy, beginning with a preparatory report followed by projects exploring data use (Educa, 2025).⁴ The foundational report highlights opportunities for data use and defines action fields for an education data space that facilitates standardised and controlled sharing of data across educational practices, school administration, governance, national monitoring, research and commercial providers. To achieve these goals, the report identifies technical standards to enable interoperability and data transfer, ethical and legal standards to ensure information security, the construction of a national data warehouse for educational data and governance processes (Educa, 2019, p. 7). The report also identifies widespread scepticism among education stakeholders as the main obstacle to building a data-informed education system, noting the need to improve data literacy to increase trust in data use (Educa, 2019, pp. 115–117).

The recently published *Data Use Policy* (Educa, 2025) outlines seven directions for future development to guide political decision-making at federal and cantonal levels: (1) Digital self-determination (*Selbstbestimmung*) and digital identity, (2) Development of data competency and a data culture, (3) Simplified application testing, (4) Integration of data use and data protection in technology procurement, (5) Promotion of secondary and multiple data use, (6) Legal and controlled utilisation of algorithmic systems and AI in education and (7) Active adoption of data-driven developments and promotion of innovation. The report prioritises digital autonomy and digital identity as central to enabling trustworthy data sharing within public data spaces while ensuring data protection (Educa, 2025, p. 14, 17). In the meantime, Educa has already developed a technical solution for digital identity for students and teachers, offered to primary and secondary schools.⁵

Drawing on a variety of studies and pilot projects, the report identifies interdependent challenges to establishing an education data space. These include institutional and legal uncertainties regarding how data may be shared between administrative bodies within cantons, between cantons and with external stakeholders such as researchers or commercial providers (p. 38, 43). Commercial providers have limited incentives to share application data, and legal uncertainties persist regarding the reuse of these data by schools, administrations and research institutions (p. 39, 46). The report emphasises the need to develop data competencies understood as the ‘critical-reflexive’ production, management and use of data by students, teachers and administrators. By explicitly advocating critical-reflexive data use, the policy acknowledges previously overlooked risks of data use. Furthermore, the report reveals the dependence on overarching developments, such as plans for a comprehensive national data ecosystem and a parliamentary initiative for a national framework law on secondary data use (Bundeskanzlei, 2024).⁶ The EDK approved the report as an ‘overview of the issues and problems surrounding data use in education’ (EDK, 2025; own translation) and decided to first seek qualified feedback from cantonal education directors before considering further action (EDK, 2025).

Teacher education and data use for student-centred education

The Chamber of the Universities of Teacher Education,⁷ another key policy actor, advocates a ‘critical-constructive’ approach to using digital technologies critically, effectively and efficiently to serve the interests of a democratic society (Swissuniversities, 2020, p. 5). The Chamber notes that teacher education is only beginning to address the opportunities and risks associated with data use and data analytics (Swissuniversities, 2020). To advance this discussion, teacher educators from all disciplines developed guiding principles for education

within the digital context (Stalder, 2018). The paper recognises both the opportunities and risks of tracking student data and recommends grounding its use in a reflexive approach within a legal framework that ensures privacy and property rights (Swissuniversities, 2022, p. 4). The position paper upholds traditional aims of democratic education while integrating constructivist approaches that emphasise the independent, reflective and collaborative acquisition of competencies, enabling students to participate in society in a self-determined, creative, critical and socially responsible manner (Swissuniversities, 2022, p. 3). However, the paper does not prioritise individualised learning, expressing a certain unease about a classroom organisation that isolates students working on their individual tasks.

Japan

With the recent Giga⁸ initiative, the Japanese government equipped primary and secondary schools nationwide with cloud-based infrastructures and personal devices for all students (Oyanagi, 2024). Building on this rapid infrastructure upgrade, the government initiated the plan to harvest data infrastructures in education.⁹ To advance this plan, the government proposes a data-driven model to acquire diverse data, convenes an expert conference on educational data use and established a data science centre as a hub for educational data analysis (Ogata et al., 2024). Published by an interministerial body, the *Roadmap on the Utilisations of Data in Education* (Digital Agency et al., 2022) outlines a vision for public data sharing within an interoperable data space, including a data warehouse for public educational data. The roadmap highlights the decentralised organisation of education in Japan and emphasises the importance of data standardisation and interoperability, while safeguarding privacy rights, rather than prioritising the partial optimisation of any single system. The plan envisages (anonymised) data circulating among students' homes, public schools, cram schools, universities, municipalities, local governments, education publishers and research institutions, while maintaining the sovereignty of the data owner. The roadmap explicitly states that the government does not intend to create a national database to control students' personal data.

The mission of the roadmap is to improve student-centred education, guided by the vision of 'a society, where anybody, at any time and place, can learn with anybody in his/her own way' (Digital Agency et al., 2022, p. 1). Data are intended to inform teaching and learning both in classrooms and at home, while aggregated school data are to be used for research and governance purposes (Kiryu, 2021). According to the Roadmap, data sharing supports sustainable learning, serves as an instrument for childcare, reduces teachers' administrative burden and enhances accountability in governing bodies (Digital Agency et al., 2022). The plan proposes an agile approach that starts small and improves continuously; in the long term, it aims to enable seamless sharing of data from pre-school to higher education and lifelong learning (Digital Agency et al., 2022). These initiatives are embedded in the government's broader vision of a 'super smart' Society 5.0, in which technologies are seen as central to economic recovery and sustainability (Ikeda, 2024).

The recently revised roadmap (Digital Agency et al., 2025) remains committed to these goals, while acknowledging further problems and seeking solutions for them, such as providing schools with digital learning applications, improving the data literacy of students and teachers and digitalising high school examinations. Furthermore, the roadmap promotes interoperability through the implementation and promotion of concrete data standards and interoperable systems in local administrations (Digital Agency et al., 2025). As a prerequisite for data use in the classroom, the roadmap prioritises the digitalisation of teachers' administrative work and communication with parents, which should reduce teachers' administrative burden and provide more time for individual student support.

How education policies anticipate data use for student-centred education

In the document *Japanese Style School Education in the Reiwa Era*,¹⁰ the Central Council for Education (2021), the advisory board to the Minister of Education, outlines how digitalisation should transform education and enhance its outcomes. The report situates the use of data within a broader analysis of the quality of Japanese school education. The Council identifies strengths in Japanese education in the high academic performance and a holistic approach that focuses on the whole person and fosters a sense of community. Weaknesses include widespread rote memorisation and drill learning for university examinations, which contribute to competition, peer pressure and deviant behaviour (Central Council of Education, 2021). The report advocates for a shift from a collectivist orientation to student-centred education, proposing 'individual optimal and collaborative learning that draws out the potential of all children' (Central Council of Education, 2021). The government's fourth basic plan of education (MEXT, 2023) integrates the objectives of the digital roadmap with the learner-centred approach articulated in the Reiwa report.

The Reiwa report proposes three approaches to individualise education (Horita & Nagahama, 2023): (1) Data-driven adaptation of learning to individual student needs ('individualisation of teaching'), (2) Students' self-direction of their learning process ('individual optimised learning') and (3) Provision of student autonomy to pursue their interests ('personalisation'). Student activity data, including information on mental health, is intended to inform individual learning and support teachers in the holistic guidance of students (Central Council of Education, 2021). The report recommends that digital technologies should not be used as an end in themselves or for drill learning, and classrooms should not become sites of isolated learning. Emphasis on the individual should be balanced with collaborative forms of learning. Data use is integrated into a vision of schools as attractive spaces of well-being that foster student motivation and develop the potential of all learners (Central Council of Education, 2021). In this vision, students engage in inquiry-based exercises and experimental group activities, learning to work with diverse peers to realise their potential as active contributors to a sustainable society (Central Council of Education, 2021).

The Reiwa report has faced criticism for failing to systematically link proposed data use with the pedagogical concepts it promotes and for relying on 'good practice' examples drawn from pre-digital student-centred reforms (Moriya, 2023). The author questions the introduction of new terms such as 'individual optimised learning' and the uncritical fusion of seemingly contradictory concepts of individual and collaborative learning. Drawing on Biesta's critique of 'learnification', Moriya (2023) argues that data-supported individual learning may encourage impoverished behaviourist drill exercises that diminish both teacher and student autonomy.

While current government policies emphasise student-centred education, it is important to note that efforts to individualise education are not new in Japan. In response to critiques of cramming-style, lockstep education, reforms promoting individualised teaching and active, independent or self-directed learning have been pursued since the 1980s (Cave, 2001, 2024; Yamanaka & Suzuki, 2020).

DISCUSSION

The data-sharing initiatives in Switzerland and Japan, although still at the stage of intentions, provide insights into the problematisations and assumptions underpinning governmental attempts to extract public value from data infrastructures. While both countries legitimise their policies through promises of educational improvement and efficiency gains, their legitimising strategies differ. In Japan, the roadmap for data sharing is justified by the promise that it

can help address serious educational, economic and social problems, echoing the legitimisation strategies of previous reforms (Takayama, 2013). In Switzerland, by contrast, data use is promoted without clearly defining educational or larger social problems; it is motivated primarily by the need to adapt to international trends in digitalisation, reflecting a 'fear of missing out' (Macgilchrist, 2023). In both countries, early political declarations of intent emphasised anticipated benefits, prioritising opportunities over risks and stressing that data security and privacy issues can be addressed through technical, ethical and legal standards (Gulson & Sellar, 2019). However, the recent data policy reports in both countries highlight numerous unresolved educational, ethical and technical challenges and risks posed by the intended data sharing. Similar to the German and Estonian policies (Hartong, 2024; Lucke, 2024), the initiatives in Switzerland and Japan prioritise the development of intermediary infrastructure services. Japan prioritises interoperability standards, while Switzerland currently focuses on technical solutions for digital identity. The documents include the use of data from commercial platforms and the establishment of a public data warehouse. However, except for the recent Swiss data policy (Educa, 2025), the policy documents do not explicitly address the relationship with commercial platforms or how their data will be integrated into public data spaces. Consequently, the initiatives remain vague regarding whether they aim to develop an open education model prioritising public values or favour a market model (Lucke, 2024).

In both contexts, policy initiatives connect data spaces to individual student learning through data-based personalisation, reproducing the socio-technical imaginaries that predominate in commercial platform infrastructures (Grimaldi & Ball, 2021). However, a close reading of policy documents reveals ambiguous positions regarding data-based individual learning, personalisation, learnification and the subjectivation of the self-directing learner (Simons & Masschelein, 2008). In Swiss policies, the focus on the individual student combines the traditional autonomy ideal rooted in *Aufklärung*, the humanist *Bildung* tradition, and democratic ideals, with constructivist learning approaches and the notion of the self-governing learner, which oscillates between democratic values and neoliberal imaginaries (Hangartner, Durler, et al., 2024; Perrotta, 2024). Here, the emphasis on digital self-determination transforms the traditional autonomy ideal into the competent and responsibilised individual, for whom control over personal data is a prerequisite for learning rather than a goal of the educational (*Bildungs*-)process (Richter et al., 2025). Notably, the contributions from teacher education reveal ambivalence towards the emphasis on individual learning, instead advocating for a diversity of educational approaches. This contrasts (and might be a response to) the prominence of self-organised learning in Swiss school-based reforms, which often focus on students' self-managed time allocation while working on standardised tasks (Hangartner, Durler, et al., 2024; Schmid et al., 2022).

Japanese policy documents, with their reference to 'anytime, everywhere, with anybody', emphasise lifelong learning independent of formal education institutions and they furthermore refer to the recent imagery of well-being put forward by international organisations (Kim, 2024). The associated approaches to individual learning enrich data-driven approaches to teaching and learning with student autonomy. This emphasis on the individual is moderated by a simultaneous focus on social learning. The Japanese policies adopt an ambiguous student-centred approach that combines non-competitive, child-centred education, the conservative language of morality, self-discipline and patriotism, with neoliberal language emphasising choice, deregulation and market mechanisms (Takayama, 2021). Japanese schools counterbalance the neoliberal focus on individualism by fostering learning communities that emphasise dialogue, social relationships and collaborative learning among students and teachers (Sato, 2011). This understanding of individual self-formation through public discussion within the community can be interpreted as a reactivation of relational concepts of the self, which historically shaped group learning in Japan (Rappleye & Komatsu, 2024; Tsuneyoshi, 1994). This emphasis on pedagogical relationships and holistic

education contrasts with data-driven adaptive learning models that rely on fixed, measurable cognitive frameworks (Ishii, 2022; Komatsu & Rappleye, 2017a). The learning community approach also helps to explain Japanese teachers' relative reluctance to adopt digital technologies and self-directed forms of learning (Komatsu & Rappleye, 2017b; Takayama & Lingard, 2019).

The data policies in both countries anticipate educators' scepticism towards data use and assign responsibility to teacher education for strengthening teachers' data literacy in order to advance data use in schools. While acknowledging potential benefits of data use in supporting teaching and learning, the policy documents from Swiss teacher education reveal a lack of knowledge and experience in data-driven learning. Similar to Japanese pedagogical policies, they highlight the priority of pedagogical and ethical concerns and emphasise the need for a legal framework that safeguards privacy and data ownership. In contrast to the data policies' suggestion of enhancing teachers' data literacy, Swiss teacher education places particular emphasis on a critical-reflexive approach to data use. This perspective aims to balance the recognition of opportunities with a critical examination of risks, framing critical-reflexive data literacy as an essential competency within a democratic society.

The transformation of education from a lockstep model to a student-centred approach with individualised learning is a long-held dream that is significantly reinforced by the socio-technical imaginaries embedded in EdTech discourses, data infrastructures and data-related policy frameworks. While the data-sharing policy initiatives in the two countries reference diverse student-centred approaches, they remain largely silent on how data can be integrated into pedagogical and didactic approaches to advance such varied facets of student-centred education (Bartolomé et al., 2018).

CONCLUSION

Digital education policies, having long focused on establishing infrastructure, are now directing their attention towards data. Emerging policy initiatives that aim to promote the sharing and reuse of educational data, such as those in Switzerland and Japan, reflect a significant public policy trend. The policies aim to increase the public value generated from digital data in education by making data available to schools, researchers and governing authorities. To advance these goals, the policies concentrate on intermediary services, whereby policy legitimacy becomes 'tied to connectiveness to data infrastructures, and to the capacity to contribute to infrastructural expansion' (Hartong, 2024, p. 105). Thereby, the policy initiatives contribute to a new topology of data governance that intensifies the relations between classroom practices and system governance.

However, these initiatives indicate that the anticipated data sharing in public data spaces raises many technical, ethical and regulatory challenges. Moreover, the initiatives give rise to open questions that may prompt further research: What are the effects of data sharing on educational practices when data produced from classroom activities, testing, administration, and research are merged, so that intimate insights into students' cognitive, behavioural and emotional learning become 'tied up to political action' (Williamson, 2019, p. 71)? A further important question concerns the relationship to the commercial platforms, particularly Big Tech corporate platforms. The policies remain vague about whether they opt for increasing data capitalisation and supporting commercial platforms or whether they attempt to challenge the data monopoly of EdTech platforms and to (re)gain public control over data that are produced by educational practices within public institutions.

These open challenges imply key pedagogical questions about how data should be used in education and to what ends. This represents a critical dimension of the data-related initiatives, making it crucial to debate what kinds of education data-sharing initiatives should

support. The data-oriented policies are legitimated by the promise of improving education by personalisation and individualisation. However, what is gained from public data spaces if they merely replicate the instrumental approaches to personalised learning promoted by commercial platforms? Teacher education should be encouraged to contribute to the debate on defining what forms of teaching and learning should be supported by data. Teacher education should aim to develop and enhance critical-reflexive data literacy, which reflects on the unintended effects of data use and seeks a diversity of pedagogically meaningful uses of data. Against the backdrop of 'cruel optimism' of placing technology in the service of instrumental conceptions of learning—often to the benefit of commercial EdTech companies—education policies and research are challenged to develop 'subversive' learning analytics concerned with power and equity in education (Cone, 2023; Wise, Sarmiento, et al., 2021). This requires a shift from preoccupation with technical possibilities towards a human-centred design that addresses educational problems and responds to the needs of students and teachers (Buckingham Shum et al., 2024; Wise, Knight, et al., 2021). Policymakers and pedagogues are urged to conceptualise data use in ways that accommodate diverse and sometimes conflicting ideas about education, including open-ended educational inquiries and learning environments that foster cooperation, collectivity and community (Richter et al., 2025).

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The authors declare no conflict of interest.

ETHICS STATEMENT

Ethical approval was not required for this study as it did not involve human participants or personal data.

DATA AVAILABILITY STATEMENT

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ORCID

Judith Hangartner  <https://orcid.org/0000-0002-3135-3808>

Yuko Toyokawa  <https://orcid.org/0000-0003-2386-3303>

María Guadalupe Ramírez  <https://orcid.org/0009-0005-7261-9288>

Endnotes

¹ While often used interchangeably, the term 'data space' is increasingly defined as a sector specific part of an broader 'data ecosystem' (Otto et al., 2022). As "ecosystem" also refers to intraoperable proprietary platforms, we use "public data space" for the initiatives in education.

² <https://www.meinbildungsraum.de> (20.08.2025).

- ³Prevalent platforms used in Swiss schools are Microsoft Teams and Google Workspace for Education (Hangartner, Hürzeler, et al., 2024).
- ⁴(<https://www.educa.ch/en/about-us/specialist-agency>; 27.08.2025).
- ⁵<https://www.edulog.ch/de> (22.08.2025).
- ⁶<https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaefte?AffairId=20223890> (22.08.2025).
- ⁷Umbrella organisation of teacher universities in Switzerland; <https://www.swissuniversities.ch/en/organisation/bodies/chamber-of-universities-of-teacher-education> (31.03.2025).
- ⁸<https://giga.global/> (21.08.2025).
- ⁹Platforms often used are the testing platform used by schools and governments (MEXCBT), learning platforms such as L-Gate and Manabi-Pocket, or the learning management system Loilo Note (OECD, 2023a, pp. 194–195).
- ¹⁰The Reiwa Era is the present, starting in 2019.

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