

Data in Education – Data for Education

Principles and approaches towards the development of a data use policy for the Swiss education area



Acknowledgements

Data in Education - Data for Education. Principles and approaches towards the development of a data use policy for the Swiss education area. educa.ch, commissioned by the coordination committee for digitization in education (KoA Digi)

With contributions by:

Florent Thouvenin, Alfred Früh, Aurelia Tamò-Larrieux (Centre for Information Technology, Society, and Law (ITSL), University of Zurich)

Hannes Lubich (Institute for mobile and distributed systems, FHNW), Martin Leuthold (SWITCH)

Andreas Kellerhals (formerly representative for open government data, OGD)

Matthias Stürmer (Department of research into digital sustainability, University of Bern)

Project team educa.ch:

Nelly Buchser-Heer

Manuela Gloor

Simon Graber

Michael Jeitziner

Benjamin Volland

Markus Willi

Karl Wimmer

Irene Ziörjen

Cover illustration educa.ch/Marion Bernet

CC BY-NC-ND (creativecommons.org)

Bern, May 2019

Suggested source citation:

educa.ch (2019): Data in Education – Data for Education. Principles and approaches towards the development of a data use policy for the Swiss education area. Bern.

Original title of the German version:

educa.ch (2019): Daten in der Bildung – Daten für die Bildung. Grundlagen und Ansätze zur Entwicklung einer Datennutzungspolitik für den Bildungsraum Schweiz. Bern.

Management Summary

On behalf of the SBFI (State Secretariat for Education, Research and Innovation) and the EDK (cantons), educa.ch has compiled a report entitled “Data in Education - Data for Education”, containing principles and approaches towards the development of a data use policy for the Swiss education area. The report does not suggest a direct policy for data use but outlines the scope for action within which such a data use policy could be formulated. It provides the thematic overview required for this undertaking and thus helps further the debate on the use of educational data within the structures of the state education system. It addresses issues such as the legal foundations, the security aspects, interoperability and the possibilities of open data. Finally, the report formulates approaches towards the development of a practicable, nationwide framework for the use of educational data in Switzerland.

Assignment

As part of their cooperation on education, the state (Federal Department for Economics, Education and Research) and cantons (Swiss Conference of Cantonal Ministers of Education) discuss questions relating to digitization. As part of their joint Digitization coordination committee, they commissioned the agency educa.ch to draw up a set of principles governing a future policy for data use in education. The present report “Data in Education – Data for Education” is the result of that assignment.

The report was compiled between May 2018 and May 2019. It was drafted in close collaboration with the Swiss Conference of Cantonal Ministers of Education and the State Secretariat for Education, Research and Innovation. The work involved various specialists, who contributed articles on specific themes covering aspects of data use in the education sector relevant to the report. There was wide-ranging consensus that that the report should focus primarily on the potential benefits of data use for the education sector. This agreement was based on the unanimously shared conviction that the methods and results of data use will figure increasingly in development of the education system, schools and teaching of the future. Furthermore, individuals in the education system will need access to data relevant for their purposes and to be sufficiently qualified to put it to use for these purposes. The use of data in the education sector, then, should be structured to comply with the individual legal requirements of data protection and, at systemic level, must be able to integrate the strategic goals of educational policy and control by the authorities responsible.

The educational data ecosystem

In its descriptive sections, the report contains explanations of key terms, including a definition of “educational data” that describes it as “data generated as part of the education system that enables us to make statements or draw conclusions about the latter” (cf. Chap. 2). A potential taxonomy of “educational data” is likewise provided. It goes on to describe the contexts in which educational data are used and the stakeholders concerned by this usage. Stakeholders are categorized as:

- **Educational policy and control**, whose entities use the data in the planning, monitoring and control of the education system;
- **Educational administration and school organization**, where data is used to organize and manage the day-to-day functioning of institutes of education;
- **Educational research**, in which data are used as a means of examining and explaining events in actual educational scenarios;
- **Education market**, whose participants (suppliers and clients) use data for commercial purposes and
- **Teaching and learning**, whereby data relating to teachers and students is used as part of everyday teaching and learning practice.

The potential use of educational data is summarized using selected examples of good practice. Here, a notable feature is the potential for using data as part of educational monitoring. Largely well-advanced examples from Luxembourg, Estonia and Denmark demonstrate how data is already being collected and processed in national education systems. Subjecting them to differentiating analysis helps various protagonists use evidence-based decision-making processes to implement both local, as well as regional and national projects. These systemically organized possibilities for the use of educational data contrast starkly with those that ultimately target a more marked individualization of teaching and learning, such as teaching situations or the compilation of teaching content. Although educational research suggests that they have enormous potential, their use is restricted to individual projects and they are still not implemented on a large scale.

At the core of the report is the development of a simple model of an “Educational data ecosystem”, which describes how data from various sources in the education system can be standardized and then, in accordance with personal, organizational and common expectations, released in a controlled way for use as open data, shared data or closed data. Finally, contributions from specialists on issues relevant to the legal foundations, information security, the open data principle and the possibilities for standardization or the interoperability of educational data, shed light on the parameters relevant to the education system that need to be taken into account when constructing the ecosystem or which identify possible gaps.

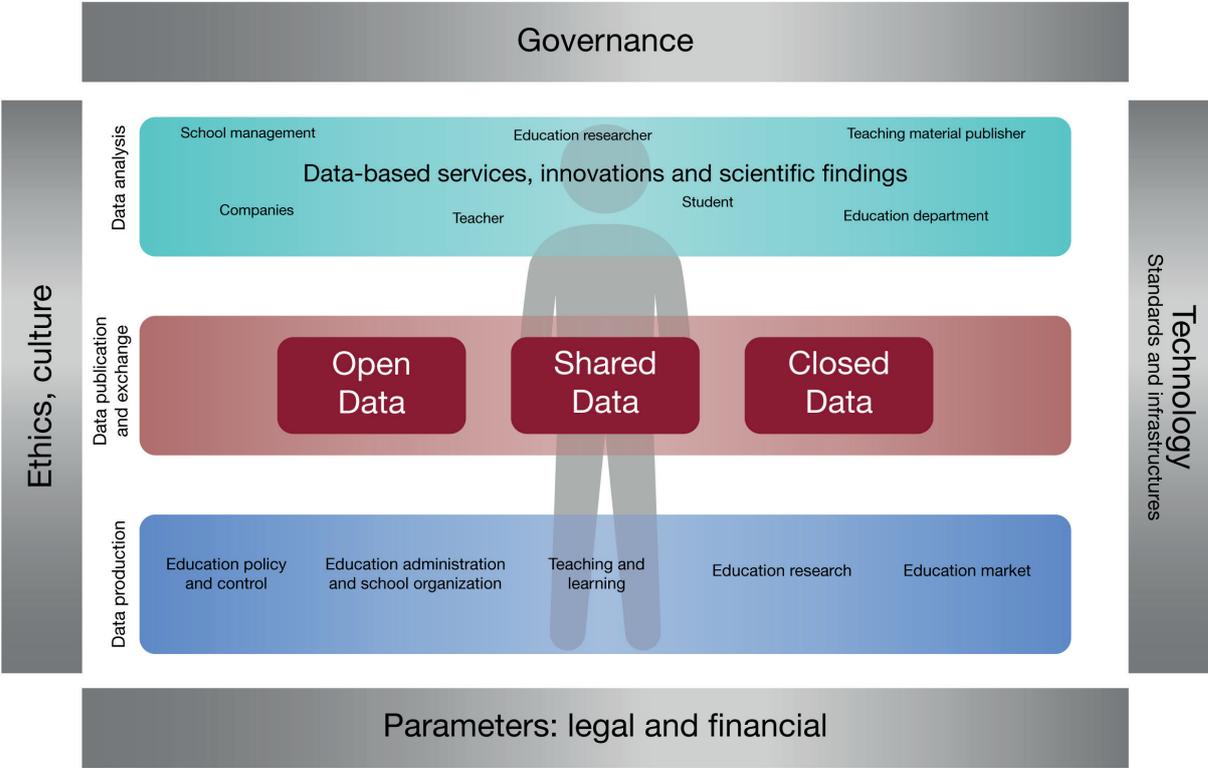


Fig. 1: Educational data ecosystem (according to Golliez, 2018)

Challenges

At the moment, the potential for the use of educational data is handicapped by low-level acceptance and scepticism regarding the actual use of digital data. The interviews included in the report show that these sentiments are widespread among players in the education system. They justify them in particular by pointing to the fact that many of the legal and procedural aspects of the protection and availability of data in the education sector remain unclarified. Moreover, they criticize shortcomings in the basic technical facilities and a general lack of expertise in data use.

For the full potential of educational data use to unfold, there is primarily a lack of practicable regulations that guarantee the individual's right to information security and data minimization while at the same time catering to the social need for the use of this data to improve the education system and learning success. The regulations need to be conflated into an operational framework that highlights the potential of educational data. The following points should be taken into account:

- The framework is valid for the whole of Switzerland: Isolated solutions make no sense in a digitized society. They hinder efficiency and create inequalities (e.g. for schools in different cantons or by imposing different data protection requirements on service suppliers). The state, cantons and municipalities must work together to ensure that freedom of choice, even beyond the education sector, is guaranteed.
- The framework will be established using a comprehensive, integrative approach: The aim is not to find individual solutions but to establish a regulatory system for all data use. In the process, the aim should be to make all the parameters of the educational data ecosystem part of the solution.
- The framework is agile and flexible: To make it easier to react appropriately to future challenges, solutions are needed that permit a continuous reassessment of the situation and provide for the regular integration of amendments all the way through to fundamental revisions.
- The framework will be jointly developed: It cannot be implemented alone by the currently relevant authorities and institutions in the education system but will require the involvement of all stakeholders. Their interests must be weighed up against each other and integrated into a consensual solution. This is not only because of the financial aspects but also, above all, because specialist expertise will be required.

The challenges regarding the use of educational data are a high priority and need to be tackled immediately. Private (and also state-run) suppliers of digital teaching aids and other services are already collecting extensive data on the learning behaviour and success of schoolchildren. As a result of existing agreements about their use, this data is available exclusively to the provider. As a general rule, this data is not accessible at all to data-generating institutions and only to a limited extent to data-generating individuals (because of their legal right to know about data relevant to them, for instance). Moreover, it is by no means certain that institutions and individuals are fully aware of the amount and type of data held by service providers. It is also doubtful whether most institutions today would be able to use this data for profit, even if they did have access to it.

Areas for action

On the assumption that the report would draw up the principles for a future data use policy, the themes for specific areas for action were identified with the help of the specialists who had been involved. On the one hand, these areas for action help to ensure that data can be used in the first place. On the other hand, they guarantee that this usage takes place within a regulated framework.

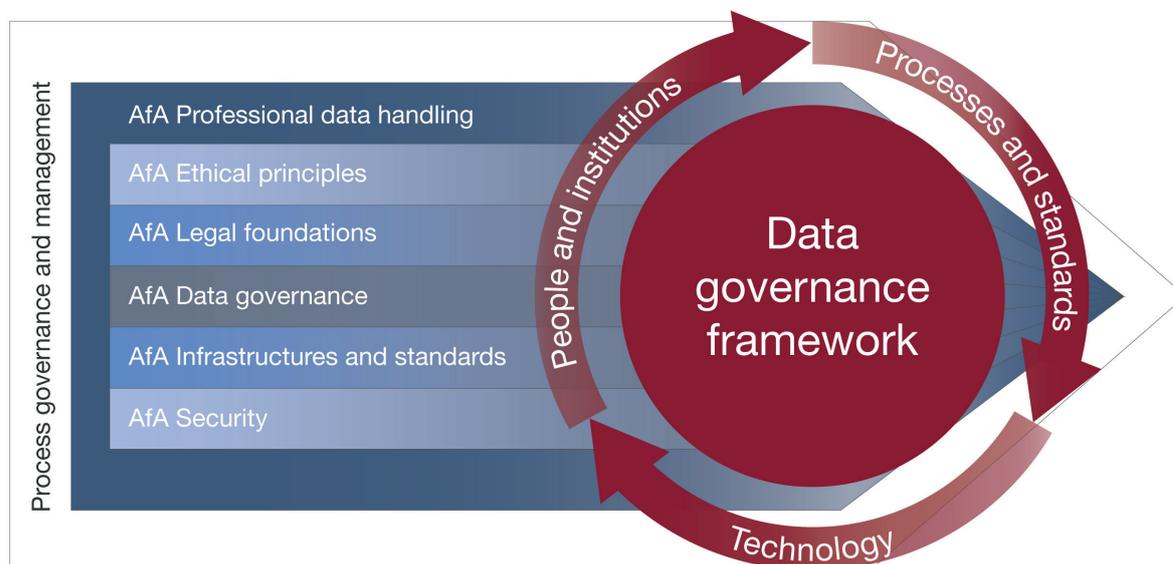


Fig. 2: Areas for action (AfA)

The basis for any use of data is a area for action known as “Professional handling of data”, which aims to ensure that all players in the education system have expertise in keeping with their respective roles in the handling of data. Two more areas for action, “Ethical principles” and “Security”, likewise constitute an objective. The future use of data in the education system must be secure and governed by suitable ethical principles. The areas for action “Legal foundations” and “Infrastructures and standards” are both regulatory instruments, but function at different levels. The area “Data governance” aims to implement the results achieved in the individual areas for action (who is responsible, how should the processes advance, etc.). Finally, “Process governance and management” is the “interface” for coordinating the individual areas for action and is thus the starting point for the establishment of a coherent framework.

Development approaches

A regulated use of educational data will neither develop by itself nor simply “occur” as the result of increasing practice. On the contrary, educational data should be seen as an important infrastructure within the education system: it requires investment and maintenance, and its use must be regulated.

The concluding section of this report on “Data in Education - Data for Education” contains concrete approaches aimed at individual areas for action that will contribute overall towards the development of a comprehensive data use policy for the Swiss education area.

Development approaches specific to areas for action

AfA 1: Professional data handling

Promotion of understanding for the digital transformation in general and for the role of the data use specifically, particularly among decision-making bodies. This includes raising data awareness and data literacy within the education system.

AfA 2: Legal foundations

The coordinated and continuing development of the right to information under data protection at the national level as a means of guaranteeing data portability in the Swiss education area.

Examination of a nationwide right to access privately held educational data.

Examination of an enhanced privilege of research that would be standardized throughout the country and guarantee adequate access to educational data for education research, education evaluation and education planning purposes.

AfA 3: Security

Definition and implementation of minimal protective measures to achieve information security in all Swiss educational institutions.

AfA 4: Ethical principles

Formulation of an initial proposal for basic ethical principles to be complied with when using educational data.

AfA 5: Infrastructures and standards

Implementation of a uniform educational data standard throughout Switzerland.

Establishment of a national warehouse for educational data.

Exploitation of the potential of open data in forming the basis for new and creative approaches to solving problems, for opening up new knowledge and increasing efficiency within the administration.

AfA 6: Data governance

Definition of suitable data governance structures and processes in coordination with measures to be addressed in other areas for action.

AfA 7: Process governance and management

Ensuring coordination of all measures to be implemented.

Implementation proposals

Competence centre for data use

Establishment of a competence network for data use in the education sector. It will comprise the relevant specialist expertise in the data use sector as described above in the individual areas for action and serve everyone in the education sector as a central point of contact for all related questions.

To expedite its implementation, a first step would be to focus on issues specific to education. At a later point in time, it might well be sensible to institutionalize the network and transform it into a general competence centre for data use that would incorporate a department for education (cf. Frey, Rogg, Savolainen, Schmid and Wandeler, 2018).

Targeted promotion of pilot projects towards the establishment of an adequate framework

Support of pilot projects, which would use concrete examples of applications to illuminate the “Educational data ecosystem” framework in reality, specify the aims of data use and test various solutions as required by the various stakeholders. Tried-and-tested solutions must be implemented immediately.

This approach will facilitate simultaneous activation of the system: urgency and/or the need for action in specific areas will become evident while the potential and challenges that occur in real educational everyday life can be observed and experienced. It will also provide details of the action needed and further the development of appropriate, practicable solutions (including the definition of roles and responsibilities).