

# Comparative Overview report – 1<sup>st</sup> version

AGILE EDU MINISTRY OF EDUCATION SURVEY

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## Introduction

The effective, inclusive and safe digitisation of student learning requires a digital education ecosystem in which teachers, students, the school leadership, local, regional and national authorities, educational technology providers and parents can work together efficiently with clear roles, responsibilities and appropriate channels for communication and cooperation. The Agile EDU project recognizes that education is at a critical moment in time when it needs to reflect on and agree quality criteria and success factors to ensure that decisions taken will impact positively on the future of education and training, thereby increasing the cooperation between the public and private sectors to support trusted and successful digital education ecosystems as envisioned by the EC Digital Education Action Plan 2021-2027 (DEAP).

The core of the Agile EDU project is the utilisation of data for learning, and questions such as the following are addressed: To what ends are data collected, and do they actually serve those ends? Which data are necessary for action? (a pedagogical concern); What measures are necessary to ensure data security? How do you prevent plagiarism and deception on student assignments and exams? (issue of confidence and data security).

Who possesses the data, how is it stored, and who has access to the data? (issue of data ownership). Should educators and parents have access to everything a student does online? Which regulations should regulate the use of artificial intelligence in educational institutions? (a question of data ethics).

The project uses agile transformation methodology involving cycles of feedback and improvement of tasks to maximize the quality, usability and sustainability of project outputs and results. The spiral of agile transformation in the project includes several iterations of a survey of ministries of education and national agencies to investigate their views on the topic (vision, enablers, obstacles, main players and their relationships) as well as relevant practice examples.

Prior to the start of the Agile EDU project, the preliminary collection of information was organised as a way of setting the scene and enabling efficient project start. The first cycle of agile information capture was organized as one of the first project activity and two more cycles of agile information collection will follow in 2024 and 2025, during the project implementation as a part of project agile development strategy.

In the preliminary collection of information, from May to June 2022 we collected information about data regulation, governance, management, and use from fourteen member countries: Belgium-FR, Belgium-NL, Croatia, Cyprus, Finland, France, Greece, Hungary, Ireland, Portugal, Serbia, Slovakia, Slovenia and Spain.

During the first cycle of agile collection of information, in February-March 2023 thirteen countries participated: Belgium-NL, Croatia, Finland, France, Malta, Norway, Portugal, Serbia, Slovakia, Slovenia, Spain, Switzerland and Turkey

Information was collected through a questionnaire, which the participating countries answered with the support of different country experts. In the preliminary collection of information their answers enabled us to identify the legislation, organisation, and data governance that were present in spring 2022. In the first cycle of agile information collection, information about legislation, organisation, and data governance are collected from four more countries: Switzerland, Malta, Norway and Turkey. In that agile cycle additional information regarding examples of data use in education, teachers' professional development in data literacy area, plans and processes as well as obstacles and enablers perceived by participating countries in their context was gathered.

**Table 1. Data collection overview (17 countries)**

Data collect overview	BEfr	BEnl	CH	CY	EL	ES	FI	FR	HR	HU	IE	MT	NO	PT	RS	SK	SL	TR
Preliminary collection 2022	x	x	In 2023	x	x	x	x	x	x	x	x	In 2023	In 2023	x	x	x	x	In 2023
First cycle Agile EDU collection 2023		x	x			x	x	x	x			x	x	x	x	x	x	x

Preliminary collection in 2022 focuses on legislation, organisation, and governance. The first cycle of Agile EDU collection focuses on data uses examples, data literacy teacher professional development, enablers and obstacles; also covering topics of preliminary collection for CH, MT, NO, and TR.

## Legislation and governance

Two main law documents govern the collection and use of education data in most of the participating countries. These are the Education Law and the Data Protection Law or Act which is usually based on the General Data Protection Regulation of the European Union. What student data is collected is usually stated in the Education Law (as in the case of [Hungary](#)) or in accompanying regulatory documents (as in the case of [Croatia](#)). However, in these statutes, the purpose of student data use is mentioned just in general terms.

Data sharing protocols (e.g., protocols on sharing of data between schools, the Ministry and service or technology providers) exist in Belgium, Spain, Slovenia, Finland, France, Greece and Norway. Finland, France, Hungary, Greece and Norway also have information sensitivity classifications.

Hungary mentioned National Data Protection Office with regulatory, audit functions and institutional-level policies.

Data governance and legislation in K-12 education has a strong federal component in **Switzerland**. While there is a national data protection law, the interpretation of this law is subject to cantonal data protection officers. Moreover, on 1<sup>st</sup> September 2023, a new [national data protection law](#) modelled closely on the EU's GDPR, will take effect. Education laws are in their vast majority part of the cantonal jurisdiction. Correspondingly there are 26 cantonal laws on K-12 education that cover with more or less detail the use of data for various purposes, for example [Canton Zürich](#).

Although **Norway** like Switzerland is not a member of the European Union, the GDPR was incorporated into the EEA agreement, so Norway is thus bound by the GDPR in the same manner as EU Member States.

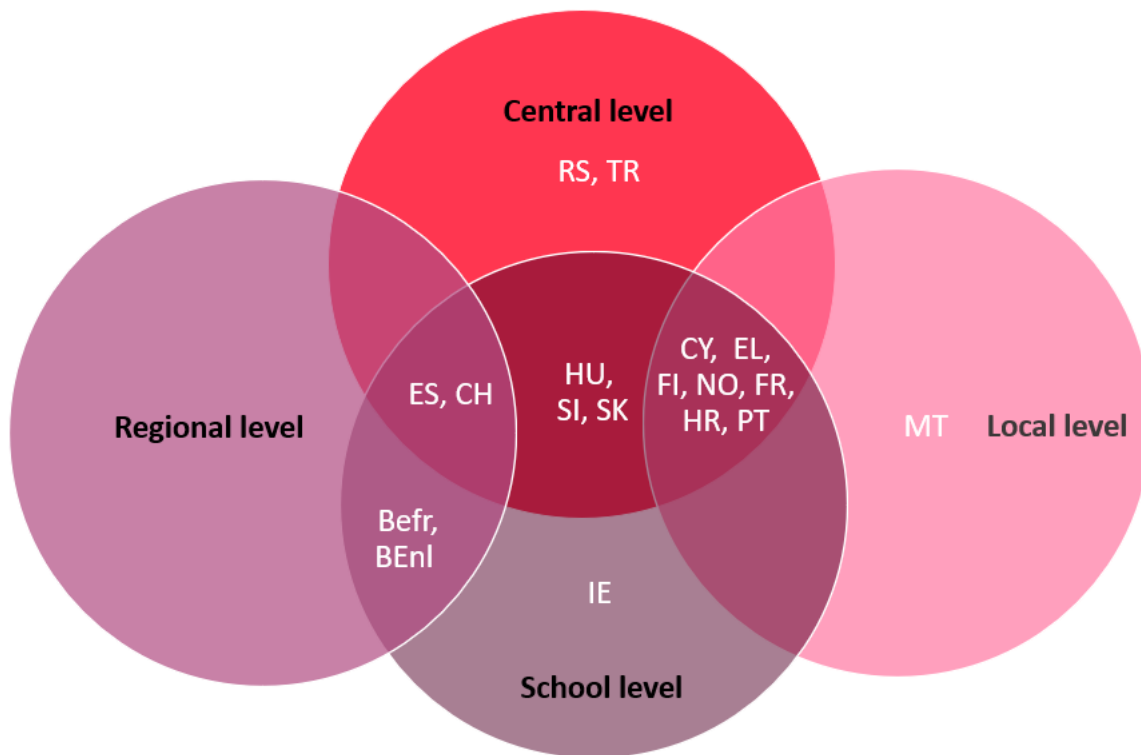
Some of the more specific regulatory documents mentioned are:

- Croatia: Ordinance on the Joint Electronic Register of School Institutions – “e-Matica”;
- Finland: The Data Protection Guide (or Privacy Guide);
- France: Digital Services and Trust Framework;
- Ireland: Social Welfare Consolidation - Sharing of Information;
- Norway: Guidance and legislation on implementation of digitalisation
- Serbia: The Bylaw on the Unified Information System of Education;
- Slovenia: Organisation and Financing of Education Act;
- Spain: Contracts for Specific Tools and Services with Technology Providers.

## Data management

Data management in education refers to the process of collecting, organizing, storing, maintaining, and utilizing various types of data related to educational activities. It typically involves the use of specialized software and databases to store and manage educational data, as well as the development of policies and procedures to ensure data quality, security, and privacy.

In almost all participating countries, education data is managed at several levels: Central government level (14), Regional government level (4), Local government level (8), and School level (15). The regional government level is represented by Autonomous Communities in Spain, Flemish and French Communities in Belgium and Cantons in Switzerland. The local government level is represented by municipalities in Nordic countries, counties or districts in other countries.



**Figure 1. Level of data management**

Management of data only at **school level** is mentioned by **Ireland** where individual primary schools collect and enter their enrolment data on the Primary Online Database. This enrolment data is then collated and checked by the Department. The Department engages with schools individually and collectively, when necessary, to improve or correct enrolment data. The same process happens in post-primary schools.

Management of data only at **central level** is reported by Serbia and Turkey. **Serbia** uses the unified education information system established and managed by the Ministry. The Ministry ensures the safety and security of the technical equipment and the software. It also provides the necessary resources for the operation of the information system. The school is responsible for entering and updating the data required in the registers. In **Turkey** data management is also provided centrally, relying on the data processing services of the Ministry of National Education.

Management of data at the **school and local or regional level** is characteristic of Belgium's Flemish and French communities. The **Belgium-Flemish** community has a centralised database platform called "[Discimus](#)" which enables the collection and exchange of data between schools, education centres and The Agency for Educational Services. Their web application "Dataloep" provides figures and statistics from schools or school boards and allows comparison between institutions and metrics. [Demo version](#).

In the **Belgium-French** community, some data is managed at school level for organizational and pedagogical purposes, and at regional authorities level (communities) for other purposes. Schools

and/or groupings of organizing authorities are allowed to develop their own digital solutions for data collection and use ([Décret du25/04/2019](#)).

Management of data at **school and central levels** is present in Hungary, Slovakia, and Slovenia. In **Hungary**, data is collected and processed in two ways: Schools record and manage student personal data, school-student legal relationship data and academic progress related data, while The Educational Authority maintains a national centralised personal register of students and various statistical education data.

Similar methods of data collection and use are present in **Slovakia** where schools are collecting and storing all kinds of data about students. Most of the data, apart from grades, is sent to a centralized electronic register managed by the Ministry. A third kind of data is the results of national testing. This data is collected and stored by an organization under the hat of the Ministry and is used to monitor the performance of schools and the educational system as a whole.

In **Slovenia**, schools collect, process, store, transmit and use data from databases kept in accordance with the regulations on personal data protection. The Ministry of Education creates, manages, maintains, and controls an IT database for the purposes of uniform data management, and for the purposes of monitoring education work, planning policy initiatives, and conducting analytical and statistical research.

In nine countries, Croatia, Cyprus, Finland, France, Greece, Norway, Portugal, Spain and Switzerland, the data management model covers all three levels: **school, regional or local and central level**. **Cyprus** and **Portugal** reported the following data management model:

1. Schools – local access and control which is restricted to each school's own data; each school is responsible for its own management systems;
2. Municipal and district education offices– regional access and control which is restricted to each district's data;
3. Country level under the responsibility of the Ministry of Education – global access and control to all the data, central management system.

Various types of platforms and computer systems are used to navigate between the three levels of data management, some centrally developed by the Ministry, others outsourced at each levels.

**Croatia** uses "e-Matica", a centralized system created by the Ministry of Science and Education where the most important data on students and staff of primary and secondary schools is recorded. Data is automatically synchronized with other education [institutions](#) such as NISpVU (National Information System for Higher Education Registration), "e-Class" register, NISPI (National High School Enrolment and Enrolment Information System).

**Finland** also mentioned all three levels of data management, however, the approach there is different. In Finland, education providers (local authorities, the municipality) negotiate education data use with technology providers. At school level, students and teachers most often use the same data management systems, applications, digital learning materials and environments as the rest of



the municipality. At country level, Finland has only some [statistical analyses](#) and [archived](#) data on completed education levels and degrees.

The [French Roadmap](#) of the Ministry of National Education and Youth on Data Policy, Algorithms and Source Codes prescribes the principles of data governance, evaluation and sharing. Educational institutions and private providers have access to data that is not considered to be of general interest, and which is not shared with Academies and the Ministry. The Ministry is working on harmonisation and the establishment of common nomenclatures and interoperability to enable use of the data at country level.

In **Greece**, data management is organized at central level by the Ministry of Education, at regional level by the Regional Education Directorates, and at local level by Directorates of Primary and Secondary Education and Schools. The information system "[Myschool](#)" of the Ministry of Education and Religious Affairs registers the data from the daily operations of the schools.

Municipalities are responsible for **Norway's** primary and lower secondary schools, which means they are responsible for and have the authority to decide how this education is provided within the constraints of the law. Legally, the municipalities are then also the "data controller" for the processing of the pupils' personal data. The school owner is responsible for following up in close dialogue with schools and training companies/training offices. At the national level, the responsibilities are shared among the State Administrator, the Directorate of Education and Training and the Ministry of Education.

The Ministry of education in **Malta** has a number of portals for managing education data. They are networked between the Ministry and state schools. The Ministry has its own Information Management Unit and Information Management System.

In **Spain**, schools collect and record student academic data. All academic data and records are kept on official platforms provided by the Autonomous Communities (local authorities) for all publicly funded schools. The Autonomous Communities are responsible for data maintenance and security, and have complete oversight (the Ministry of Education has to go through the Autonomous Communities to coordinate international cooperation (Consejeros de Educación), for example, Conferencia Sectorial de Educación).

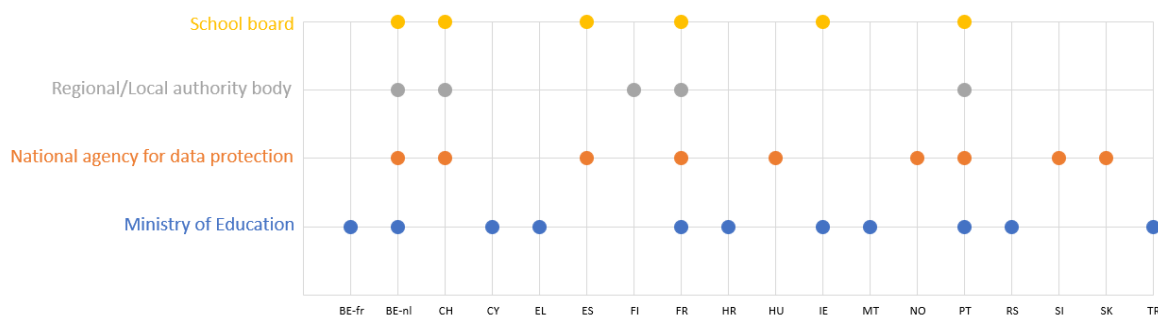
Besides country, local and school levels of data management **Switzerland** also mentions cantonal authorities and technology providers. Depending on context, canton, municipality and provider a vast array of different management solutions exists in Switzerland. Different entities can be involved in managing different types of data for different purposes and with a variety of ends. For instance, at the national level the Office of Federal Statistics manages and combines data from national registers and large-scale assessments or other survey data. Cantonal authorities use data for planning and monitoring. Local authorities may use data from quality control or individual support. Service providers may use data for a variety of reasons. Amongst others, for improving their products. The degree of cooperation and the definition of responsibilities also vary considerably across entities.

## Who monitors data management in education?

Data monitoring in context of this reports refers to the measures taken to ensure that educational data is collected, stored, processed, and used in a manner that protects the privacy, confidentiality, and security of individuals' personal information. Effective data monitoring and protection measures in education include policies and procedures to ensure compliance with relevant laws and regulations, secure data storage and transmission practices, access controls, and user authentication mechanisms.

In all participating countries, the levels of data monitoring are very similar to the levels of data management. The main stakeholders in data monitoring are the Ministry of Education (BE-NL, BE-FL, CY, EL, FR, HR, IE, MT, PT, RS, TR) and the National Agency for Data Protection (BE-NL, CH, ES, FR, HU, PT, SI, SK). In BE-NL, FI, FR and PT, the local authorities are also monitoring data management in education. In BE-NL, CH, ES, FR, IE and PT, this is done together with the school boards. Some specific instances are mentioned by four countries:

- ES: Regional Educational Administrations;
- CH: Cantonal offices of data protection, Cantonal authorities
- CY: Ministry of Education; School Admin Teams, District Education Offices;
- SI: Inspectorate of the Republic of Slovenia for Education and Sport;
- HU: At institutional level - the head of the school, the system administrator; At central level - the Educational Authority.



**Figure 2. Monitoring of data management**

The **Ministry of Education** is the only monitoring body in the Belgium-French community, Croatia, Cyprus, Greece, Malta, Serbia and Turkey.

In **Finland** and **Norway**, municipalities (**local authorities**) are responsible for data monitoring. In Switzerland cantons monitors data, which similar with the Finnish and Swedish approach in which education providers are organized at the municipalities level (cantonal in Switzerland). In **Switzerland** responsibilities of roles and roles of stakeholders in data monitoring can change from

one canton to another, and even from one school to another within the cantons. Responsibilities are commonly defined in either law (education and data protection) or contractual arrangements (including job descriptions). Switzerland doesn't have Ministry of Education organized on the country level.

The **National Agency for Data Protection** is involved in data monitoring in almost all countries, especially in Hungary, Slovenia, and Slovakia where it is the main data monitoring entity.

In **France**, many actors oversee data management. A Ministerial Steering Committee for Data has existed since 2015. It is supported by a network of correspondents. There is one correspondent in each department of the Ministry, and they report to the Secretary General. An Ethics Committee for Education Data comprised of parliamentarians, researchers, academics, and association leaders has been in place since 2019, and in 2020, a Strategic Committee for Data was established to support the Steering Committee.

In **Norway** specific data protection roles and responsibilities varies in accordance with the task at hand e.g., the Directorate of Education and Training is data controller for national exams, while municipalities are data controllers for locally given exams. However, the same systems are used for both types of exams, meaning that the directorate acts as a data processor with regards to local exams.

## Organization and implementation

### What kind of student data is collected?

In all participating countries, Education Law and Data Protection Law define what kind of data is collected in the field of education, as mentioned in the beginning of this report.

All participating countries collect data about: name, age, gender, parents'/caretakers' names, addresses, attendance, grades, special needs, and students' assessment data. Frequently collected data includes also information about: exam performance (15 countries), social benefits (14), behaviour reports (12) and students' progress (12). Additionally, **Croatia** mentioned collecting unified education numbers for every student. Hungary mentioned collecting student data on foreign study visits and trips and on school-student legal relationship data. **Switzerland** mentions collecting student health data (e. g. results from school medical and dental examinations, matching information (e. g. which class, school, specialisation and/or performance tier a pupil attends) and religious affiliation. In Switzerland cantonal education laws define what data is collected so not all cantons collect same data.

In **Norway** if school owners decide to use devices or apps that allow to track the child's performance and engagement, they are obliged to have done the necessary risk assessments under data protection law, e.g., Data protection impact assessment (DPIA) and risk assessment, as well as evaluated privacy by design and as a standard for the device/app. Some school owners also gather

information about who has parental rights and who provide daily care for the child, information about pupils that are under protection by some sort of restraining order or living on a secret address, and information about some pupils' health data when they are needed for adapting the education properly.

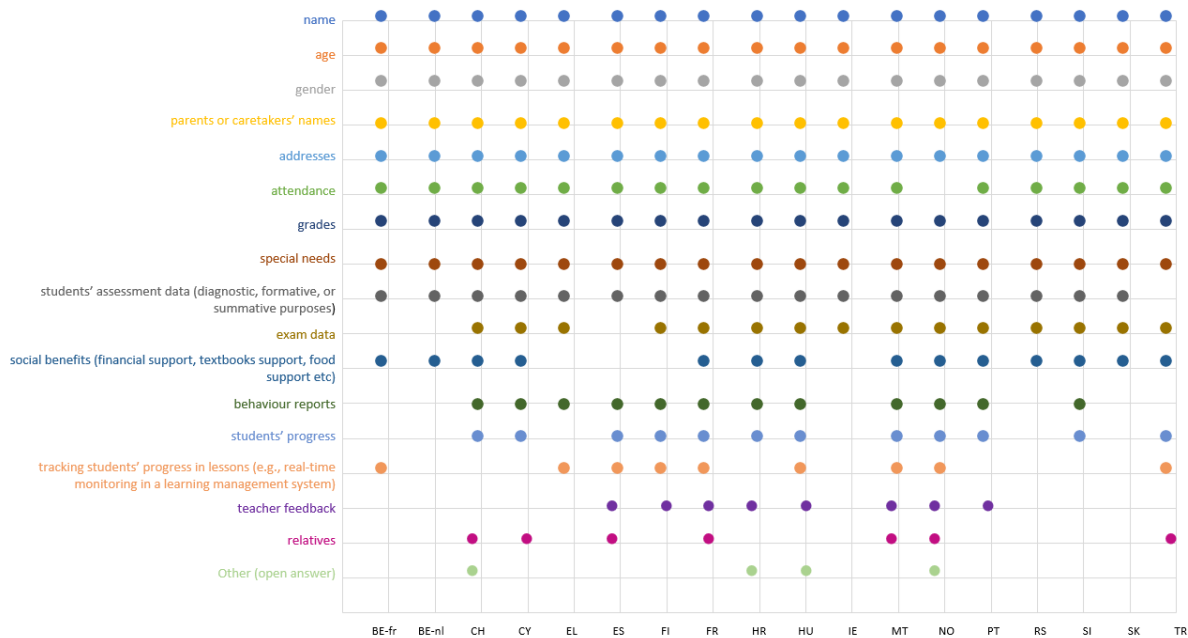


Figure 3. What kind of data about students is collected

### What processes are used to collect, exchange, and protect student data?

The legislation and procedural steps are different but similar examples of data exchange are present in all participating countries.

In all participating countries, the **collection** of student data is based on the Education Law and the Data Protection Law. Consent forms signed by parents or by students are used only in cases that are not covered by the Education Law.

In some instances, additional consent from parents or students is required e.g., in the case of collecting data for research purposes. In such cases, research approval and signed consent forms are needed. Additional consent forms may be needed when a school or a teacher would like to use some digital tool outside of the pre-agreed set of tools.

**Norwegian Personal Data Act** contains some privacy principles that all businesses, including schools, must follow. One of the principles is accountability which means that the business must have a full overview of its processing of personal data and implement technical and organizational

measures to ensure that the law is followed. This means that each individual business must make many important assessments on their own - before they collect, store, and use personal data.

The **exchange** of data among different stakeholders is covered by a special legislation or by protocols specifically signed by the different entities involved in the data sharing processes. **Switzerland** mentions that obtaining data from private providers of tools is a major challenge for administration. This is partially because such access was not foreseen at the time of deployment and usually require explicit consent by pupils or their parents.

Education data, which is already collected in some of the education databases and archives, may be used for **research or statistical reports, designing pilot projects, and monitoring purposes**. In such cases, access is given according to the purposes pursued (in accordance with GDPR), data is aggregated, anonymized or pseudonymized and securely transferred.

There is also a legitimate data exchange for specific **administrative purposes** to institutions, which have a legal basis for data acquisition and further processing. In such cases, data is not anonymized, but access is secured and complies with the legislation in place.

Student data is also **shared among schools** of the same level – in the case of a student transferring schools, the student's previous school can share his/her data with the student's new school. What data exactly can be shared is prescribed by government policy. If a student is transferring schools during the school year, the shared set of data is larger and includes all grades, results, attendance records, etc. If a student is transferring schools at the end of the school year, only the standard diploma is shared.

When students **graduate some level of education** (e.g., when students move from primary to secondary/middle school, or from there to high school) their data is shared with the next level of education. Usually, higher education institutions have a different database, and some data from the pre-tertiary education database is shared, for example, the exam results with which a student has graduated. The Educational Authority can connect data from different databases using unique student identifying numbers. **Belgium Flanders and Norway** mentioned students are often given the chance to start over when moving from one school to another, students or parents (dependent on age) may choose whether to share information with the new school or not.

### For how long is student data stored (archived)?

The regulations regarding the storage time for student data depends on the type of data and vary in all participating countries. Some of the data about students' progress, results and accomplishments is stored only during the ongoing school year.

The duration of data keeping is defined in the Education Law. Respondents from all participating countries reported archiving student data in centralised records databases.

All personal data is processed until the purpose of processing is achieved in accordance with legal and other regulations. Afterwards, the personal data is no longer used, but is stored in accordance with the regulations on the preservation of documentary and archival material.

Respondents from **Slovakia** mentioned that they store attendance data for 7 years. End-of-year grades/results are stored for 60 or 80 years or indefinitely. In **Ireland**, pupil data will be retained on Primary Online Database for administrative, identification and analysis purposes until the pupil's 19<sup>th</sup> birthday. After this point, the sensitive data will be anonymised in line with national and international best practices (and in keeping with the National Archives Act from 1986) and used only for statistical and longitudinal analyses. At post-primary school level, the retention period is age 25, subject to review thereafter. Data could be retained longer to enable the auditing of the public funds' expenditure.

In **Norway** the amount of data that is archived varies between different municipalities. The information recorded is mostly administrative, and not related to how pupils adapt to the school environment or how they perform. Information about daily learning is mostly held within teacher's private files or within cloud service of providers systems. There are two levels of archiving in accordance with archive legislation: municipal level (for municipal authorities) and national level. Each actor must ensure their own compliance with legal obligations. It is prohibited to store personal data longer than is necessary for the purpose for which it was collected. When the data no longer is needed for the purposes it was collected, it is either deleted or stored in a restrained manner until it is delivered to national or communal archives.

The duration of storage of personal data from pupils in **Switzerland** is determined by legal requirements concerning opposition and objection to decisions (e. g. decisions about promotions or grades), as well as general regulation concerning the retention of official documents. These durations can vary from canton to canton. Some cantons set general rules independent of the type of pupil data. For instance, by determining that the administration cannot keep unused records for longer than 10 years, and that after this period records need to be destroyed or handed over to public archives. Other cantons provide more specific guidelines that differentiate between different types of information. For instance, by setting storage duration of pupil health data to 10 years of grades and behavioural information to 15 years, of learning assessments, parent interview records, self-assessments, teacher observations, etc. to the moment until the decision based on these documents becomes legally binding and can no longer be contested.

### What measures are in place to prevent data misuse?

All participating countries have strict legislation and policies on education data use. When data exchange involves a third party, protocols are put in place and parties are responsible for complying with them. All parties must comply with the provisions of the General Data Protection Regulation. The Data Protection Officer's duties include responding to requests, management of data breach incidents and management of dedicated channels for reporting unlawful practices.

In all participating countries, there are technical and security measures in place against unauthorised or unlawful data processing and against accidental loss, destruction, damage, alteration or disclosure of data. These include: strong firewalls, use of own servers, passwords, tracing, logging, operating security, clamp-down on malicious software, enhanced security of computer channels/networks, website security, backups. Additionally, the deployed platforms/systems/databases are installed on intranets which allow local storage of the collected data and prohibit access to any external users.

In **Belgium-FR**, all data exchange tools are created and technically managed by ETNIC, a public benefit organization. Specific permissions are required for authorized users to access (some of the) tools, databases and warehouses.

**Belgium-NL** has a Declaration of Intent for [Privacy in Digital Educational Resources](#) jointly developed with the Federation Centers for Basic Education and a number of suppliers of digital educational resources.

In **Norway** the awareness and use of data processor agreements are growing. However, the school owners and pupil's abilities to control their own data is often limited. The Directorate of Education and Training has taken on a proactive role in guiding and raising awareness and competence within data protection in the education sector. There are also several initiatives involving other national regulatory authorities, consumer organisations and agencies that all contribute with guidance and resources the schools can use as part of their learning plan or to improve their own competence and compliance. Most popular digital resources used in education make use of the voluntary common single sign-on solution for authentication and authorisation purposes for all public schools and most private schools, with API's for exchanging data about the pupils such as municipality, school, level, class and teaching groups.

Cantons and schools in **Switzerland** use a variety of approaches towards prevention of data misuse, including but not limited to awareness raising campaigns among different actors, guidelines on data protection and security, further education offers or contractual arrangements with service providers. One way in which the education system is currently trying to improve data security is via the introduction of the single sign-on service [Edulog](#). Edulog provides an intermediary layer between service providers and educational identity management systems. It limits the amount of information a service provider can obtain about pupils, teachers or other staff using their services, while guaranteeing that these individuals have access rights. Moreover, users are informed about all characteristics that educational identity management systems pass on to service providers via Edulog. Therefore they are better informed and retain more control over their digital identities and data.

## Data use

### For what purposes is education data collected?

Collecting data at the **system monitoring level** (monitoring dropout levels and education systems and providing general statistical analysis) as well as at the **individual level** (student academic and non-academic monitoring, measuring student performance) is frequent among participating countries and is present in almost all of them.

Collecting data for **measuring school performance** is present in Belgium-FR, France, Hungary, Malta, Norway, Portugal, Serbia Switzerland and Turkey. Data is collected for **measuring system performance** in Belgium-NL, Cyprus, France, Hungary, Ireland, Malta, Portugal, Serbia, Slovenia Switzerland and Turkey.

**Regarding the teachers**, Finland, France, Hungary, Malta and Portugal collect data for teacher self-assessment. Cyprus, France, Hungary, Malta, Serbia and Turkey collect data to measure teacher performance. For example, in Cyprus, [The Law on Public Educational Service](#) prescribes what teacher data is collected and how it can be used for teacher recruitment.

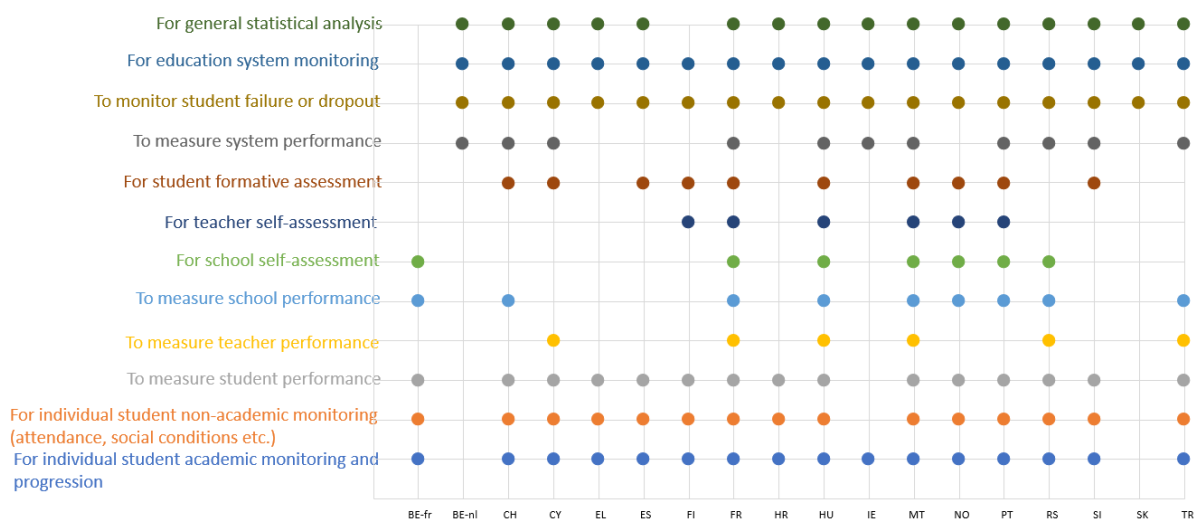


Figure 4. Purpose for collecting student data.

In **France, Hungary and Malta**, student data is collected for all the listed purposes, from the system monitoring level to the school and individual one, including for self-assessment purposes. To conduct this comprehensive data collection, all mentioned countries have created national platforms managed by the ministries of education. In Hungary, most of the data collection and use is regulated by the [Act CXC of 2011 on National Public Education](#).



The [French Roadmap](#) on Data Policy, Algorithms, and Source Codes, which describes activities for the 2021 – 2023 period, ensures interoperability between all applications used by the institutions to consolidate and manage education data, regardless of the IT solutions chosen locally, following the “Tell us once” principle.

By contrast, **Slovakia** focuses only on system monitoring level purposes (general statistics, dropout rates, education system monitoring). Despite the fact that the country has a [central register](#) with different kinds of student data, we could conclude that such a register is insufficient to capture all student data.

**Greece, Spain and Croatia** collect data at individual level (student academic and non-academic monitoring, measurement of student performance) as well as at system monitoring level (monitoring dropout rates and education system, and providing general statistical analysis). Central databases with student data are available in Greece ([MySchool](#)) and in Croatia ([e-Matica](#)). In addition to the already mentioned purposes, the Spanish authorities also collect data for student formative assessment.

**Cyprus, Slovenia, Switzerland and Portugal** collect data at individual level (student academic and non-academic monitoring, measurement of student performance) as well as at system monitoring level (monitoring dropout rates, the education system and providing general statistical analysis). Additionally, they also collect data to measure system performance. Furthermore, Cyprus and Slovenia collect data for student formative assessment, while Portugal collects data to measure school performance.

### What are the most used forms of data use for learning?

In the section on the purposes of education data collection we talked about monitoring at system and at individual levels as well as collecting data for measuring school and system performance. Here we focus on the more specific use of student data for learning by students, teachers, schools and the education system.

While regulatory frameworks prescribe what data can be collected, they do not offer specifics on the forms of data use. The survey participants (usually acting at central level) reported that according to them collected data is mostly used for the following purposes: adaptation of teaching materials and methodologies (13 countries), teaching staff management (11), academic orientation (10). They reported that they use the data least for: curriculum planning (4), stakeholder accountability (3) and district accountability (0).

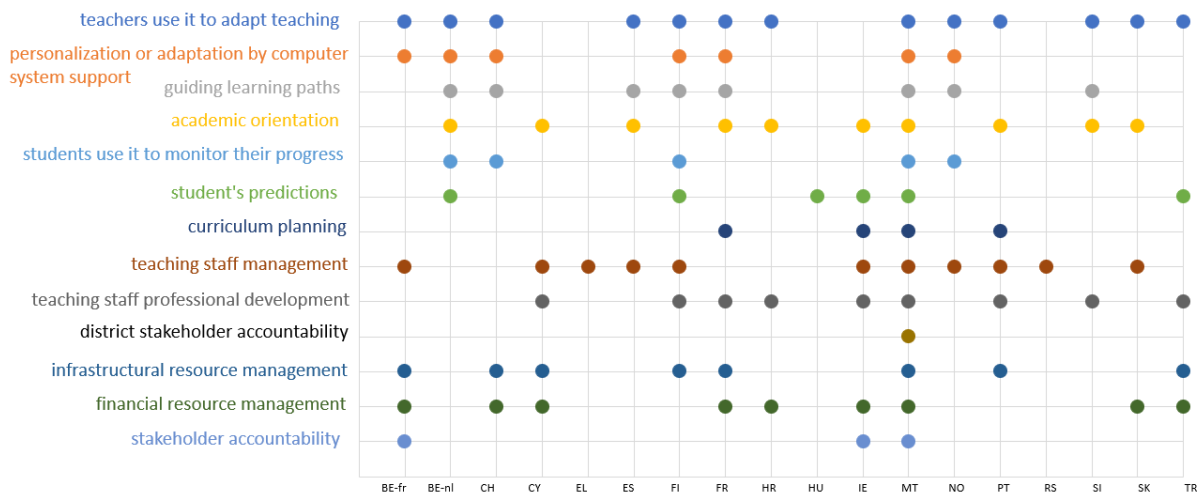


Figure 1. Mostly used forms of data use for learning

Regarding the use at **system level**, all three forms of data use (infrastructural resource management, financial resource management and stakeholder accountability) are present in **Belgium-FR and Malta**; two of them, infrastructural and financial resource management in **Cyprus, France, Switzerland and Turkey**; financial resource management and stakeholder accountability in **Ireland**; one of them, infrastructural resources management in **Finland and Portugal**, financial resource management in **Croatia and Slovakia**.

If we look at the **individual level** of data use by students and teachers, participating countries' responses show that use of data by **students to monitor their progress** (e.g., to monitor their own achievements and compare their results with averages) is still very rare. Only **Belgium-NL and Finland, Malta, Norway and Switzerland** reported this practice. Meanwhile, teachers in thirteen out of the eighteen studied countries reported using the data **to adapt their teaching methods**.

**Using data for predictions** (e.g., for the choice of next subject, next level of education, a different strand of education; achievement predictions; dropout predictions) is also relatively rare – it was mentioned by **Belgium-NL, Finland, Hungary, Ireland and Malta**. Furthermore, only four countries, **France, Ireland, Malta and Portugal**, mentioned using the data for **curriculum planning**.

**Belgium-NL, Finland, France, Malta, Norway, Slovenia, Spain and Switzerland** reported using the data for **adaptation and personalization** of the learning process:

- teachers use it to adapt teaching (e.g., consult a dashboard to check students' quiz answers and make decisions accordingly);
- computer-supported personalization or adaptation (e.g., automated adaptation of difficulty of activities based on student's answers) (not ES);
- guiding learning paths (e.g., suggesting topics, subjects or complexity levels) to progress;
- academic orientation (e.g., where to continue education) (not FI).

**Croatia and Slovakia** have organized educational data use around:

- teachers use it to adapt teaching (e.g., consult a dashboard to check students' quiz answers and make decisions accordingly);
- academic orientation (e.g., where to continue education);
- financial resource management;
- teachers follow-up - teaching staff professional development in Croatia, and teaching staff management in Slovakia.

Participants from **Greece and Serbia** reported using the data only for teaching staff management.

**Cyprus, Finland, Ireland, Malta and Portugal** reported using the education data they have for **teaching staff management and teaching staff professional development**.

**Belgium-FR, Croatia, France, Greece, Norway, Serbia, Slovenia, Spain and Turkey** reported using the data for either teaching staff management or teaching staff professional development, but not both.

If we look at the numbers of the kinds of different data that is used to make decisions, **Malta** is implementing a very comprehensive use of the data (13), followed by **France** and **Finland** (8), while other countries' use of the data is less diversified (6 or less).

### Examples of data use - overview

In the category "**Teachers use data to adapt teaching**" France and Portugal mentions that teachers can use results and platforms for national assessments and exams, France Switzerland, Slovakia, Finland, Belgium-Flanders and Norway mentions different commercial publishers or EdTech platforms and applications and school management systems. Open digital resources and open assessment tools were present in Portugal, Slovenia, Spain and Croatia and national education database and open data were mentioned by Belgium-Flanders and Croatia.

EdTech, commercial publishers' platforms and applications were also mentioned regarding the "**Personalization or adaptation by computer system support**" in France, Switzerland, Slovakia, Finland, Belgium-Flanders and Norway. While Finland and Spain mention resources created on the national level by the Ministry, Agency or Directorate.

In France, Switzerland, Slovakia, Finland, Belgium-Flanders and Norway commercial platforms and applications are also leading for the "**Guiding learning paths for students**", while in Finland, Spain, Slovenia and France resources created on the national level by the Ministry, Agency or Directorate are also present. Portugal and Serbia mention that school or class councils are guiding students to follow appropriate learning path.

When we talk about "**Academic orientation for students**" most of the participating countries are inclined to personal, human support then to the technological solutions. Almost all participating countries mentioned school psychology and guidance service, also frequently available are

information portals. Results from national testing and data in students' management platforms are mentioned by Portugal, Croatia and France. Belgium-Flanders mentioned Kr8cht! tool which is dedicated to help students in their school or study choice.

School management platform or application are examples of digital technology use by **students for monitoring their progress or organize** their daily school activities in France, Portugal, Switzerland, Norway, Belgium-Flanders, Spain and Croatia.

Solutions for **use of data for predictions** (e.g., for the choice of next subject, next level of education, a different strand of education; achievement predictions; dropout predictions) are still not very present in participating countries. Some specific examples and platforms were mentioned by France (SIECLE dropout prevention), Portugal (statistics & forecasts), Finland (Wilma platform) and Belgium-Flanders (Datawijzer platform).

**Assessment of students' work and the competences** required in the curriculum are usually done by teachers with or without some specific technology and with national assessment exams (FR, PT, CH, SK). Similar approach is visible for **curriculum planning**, it is mostly done by teachers or multidisciplinary school teams, with some digital platform as a support. Only Finland mentions a digital solution dedicated to curriculum planning – ePerusteet.

There are different approaches and digital solutions for **teaching staff management and professional development**, either databases and catalogues on regional or national level, school management systems, self-assessment tools and projects.

**For monitoring and forward planning of resources** countries typically use statistical services and analysis which create reports on several education segments and themes. Software for financial accounting on school level is usual solution for **financial resource management** in all participating countries.

More information about the examples mentioned by some of the participating countries you may find in final chapter.

## Teachers' professional development

In the 2022 preliminary collection of information four main areas are recognized by the participating countries as most important for future development and research: data literacy, efficient data use, standardization and interoperability, and artificial intelligence implementations. Although data literacy was among them, the first agile cycle of information collection showed that topic of education data literacy is still very rarely present in teachers' professional development.

**Data literacy of teachers and school leaders** refers to the responsible use of data, safe data use, data protection, raising awareness among learners and/or guardians about data collection, management, and use, developing knowledge of applicable regulations, developing compliance audit methodologies on data processing..

Teachers' needs for professional development in the area of digitally processed data use for learning are in some countries diagnosed using **platforms for assessing digital competences**, for example Pix in France, National Framework in Portugal, Self-assessment tools in Finland (Opeka/Ropeka, MENTEP, SELFIE, ICT-taitotesti) and Belgium-Flanders (Digisnap, ICT-monitor MICTIVO).

In Croatia, Slovenia and Serbia priorities for teachers' professional development are defined on the national level and published in yearly **catalogues**.

National or international **projects** as a source for teachers' professional development are mentioned in almost all participating countries.

In several countries (Switzerland, Malta, Norway, Belgium-Flanders) decisions about teachers' professional development are part of the **school autonomy**. For example, in **Switzerland** substantial cantonal/regional differences exist in the structure and form of teacher education and teacher further education. In most cantons different forms are mixed to varying degrees, with some cantons placing more emphasis on school-level peer-to-peer exchange and development, while others put more weight on educational offers by teacher training institutions. In **Norway** it is the school owner's responsibility to assess teachers' competence and needs, and if they need additional support in answering those needs, they can get it from National Directorate.

In **Portugal** in the scope of a National Plan for Digital Transition, the General-Directorate for Education has created a National Framework to develop digital competences among all teachers and, consequently, among their students. Once the needs have been ascertained the Schools' Principals contact the [Association Training Centres](#) to manage the specific training that they need. Each centre has to manage the needs from all schools that are associated with them to decide which training courses are required and how are they going to implement their training Plan. [Database of Digital Training of Schools](#) is publicly available.

## Forms and frequency

Teachers' professional development for any topic, in participating countries, is more often organized on school and national level. On national level in the form of Online course with or without mentors, Online lecture, or webinar and Face-to-to face conference. On school level the most frequent forms are Online and Face-to-face workshop, which are less frequent on the national level.

**Table 2. Forms of professional development (darker shade means more frequent option)**

	school level	local level	regional level	national level
Online course with mentors	ES, FI, HR, MT, RS	ES, FI, HR	ES, FI, FR, HR, SI	ES, FI, FR, HR, MT, NO, RS, SI,
Online course without mentors	ES, FI, HR, MT, PT	ES, FI, HR, PT	ES, FI, FR, HR	ES, FI, FR, HR, MT, NO, PT
Online workshop	FI, FR, HR, MT, PT, RS, SI	FI, FR, HR, PT	FI, FR, HR, PT, SI	FI, FR, HR, MT, RS, SI
Online lecture or webinar	ES, FI, HR, MT, RS	ES, FI, HR	ES, FI, HR, PT	ES, FI, HR, MT, PT, RS, SI
Online or hybrid conference	ES, FI, MT, PT, SI	PT, FI, ES	ES, FI, PT	ES, FI, MT, PT, RS, SI
Face-to-face conference	ES, FI, HR, MT, PT, SI	ES, FI, HR, PT	ES, FI, HR, PT	ES, FI, HR, MT, PT, RS, SI
Face-to-face workshop	FI, FR, HR, MT, PT, RS, SI	FI, FR, HR, PT	FI, FR, HR, PT	FI, HR, MT, PT, RS, SI

The most frequent form of teacher professional development in participating countries is Online course with mentors on national level. It is followed by professional development on the national level in form of Online course without mentors and Face-to-face conference. The least frequent are professional development on local level in forms of Online course with mentors, Online lecture or webinar, and Online or hybrid conference on local and regional level.

Teachers' professional development could be organized in different forms and with different length. Trainings are organized by the Ministry, National agencies, municipalities, local authorities and commercial providers. No specific guidelines regarding professional development for the area of digitally processed data use for learning are available.

## Topics and experts

In most of the participating countries Teachers' professional development is available for different topics aiming to raise digital competences, like digital citizenship, digital identity and security, digital inclusion, data, algorithms and source codes, the use of management tools etc.

In **Belgium-Flanders**, since January 2023 the pedagogical advisory services receive additional funding (1.500.000 yearly for two years) to professionalize school teams in the field of data literacy.

**Spain** has several online resources connected with education data, for example: MOOC [Learning Analytics en Educación \(1<sup>st</sup> edition\)](#), MOOC [Design your School's Digital Plan \(4<sup>th</sup> Edition\)](#), SPOOC [Terms of use, BigData and network economics](#), NOOC [Quality of Digital Educational Resources: Accessibility \(1<sup>st</sup> edition\)](#).

Experts for teachers' trainings for any topic are usually university professors, schoolteachers, inspectors, textbook authors, researchers, pedagogical advisors.

Spain mentioned that all tutors must have completed a training course on online tutoring to provide adequate support to attendees. In Serbia, law defines who can be trainers for teachers' professional development courses. Finland has tutors and mentors who are most often full- or part-time teachers and are tutoring colleagues for a few hours per week.

## Enabling and challenging elements

### Enablers

The effective use of digital data in education depends on various **enablers** recognized by participating countries, such as human capital, technological solutions, innovations, legislations, funding, and autonomy. Two countries mentioned developing **national strategies and legislation** to support the integration of technology in education. **Finland** has developed a reference framework for the digitization of early childhood education, pre-primary and basic education, and liberal arts work. Similarly, **Portugal** has implemented a Digital Transition Action Plan to promote the use of digital technologies in education.

Three countries mentioned investments in **projects, EdTech, and innovations to pilot and research digital solutions** in education. **France** has established a Partnership for Artificial Intelligence (P2IA) to explore the potential of AI in education. **Switzerland** has developed a national innovation system to foster innovation in education. **Finland** has also taken steps to promote innovative learning environments in schools.

**Platforms for self-assessment of digital competences, national assessments were mentioned by France** (Pix platform) and **Portugal** (National assessments individual results database (RIPA) and a global result, school groupings/ungrouped schools (REPA).

**Funding** as an enabler is recognized in **Finland** and **Switzerland**, who also mentioned **autonomy of schools** as important factor; while **equipment and connectivity** are in focus of **Portugal** and **Spain**.

To enable the effective use of digitally processed data in education, countries have recognized the importance of having a **national identification system, a single sign-on, systems for data exchange, and publicly available data**. **Finland** has implemented MPASSid, a national identification brokering service that allows users to access multiple digital services using a single set of credentials. **Norway** mentioned that common standards and joint solutions enable data exchange across the education system. **Serbia** has developed the Unified Education Information

System to consolidate student data. **Croatia** has set up the Ministry of Education website with publicly available data.

**Professional development programs** and the availability of **experts** are also crucial as enablers for digitally processed data use in education. **France** has implemented TNE trainings for teachers and parents to support the integration of digital technologies in education. **Portugal** has launched Schools Digital Development and Open Interactive Resources- REDs repository and Pilot Project for Digital textbooks to facilitate the use of digital resources in classrooms. **Spain** has experts who provide support and mentoring to teachers on the use of data in education. **Croatia** has developed instructions for data users by CARNET to guide educators.

## Obstacles

Different obstacles and barriers, or challenges for data use for learning are existing on different education system levels in all participating countries.

Many stakeholders in education still **lack a thorough understanding** of digital transformation in general and the role of data utilization in particular. Consequently, it is not always clear what is needed or useful. Concerns and fears regarding the possible effects of using technology in educational settings might also result from these. (CH, SK)

There are **concerns about the sharing and joint use of data** in administration and education politics, as this data might be seen as ranking or being behind other schools or institutions, leading to reputational issues and the need for justification. (CH, BE-FL, NO, SI, MT)

Outdated **legislation**, limitations by legislation, misunderstanding of general data protection regulation or ethical considerations, lack of open datasets could also be barriers for efficient use of data in education. **Data collection that is incomplete** or does not reflect the diversity of the education system can result in the perpetuation of societal biases, poor practises, and prejudice by learning analytic and artificial intelligence algorithms. (FR, BE-FL, PT, CH, FI, NO, SI)

The increased value of using data for learning is still, for the most part, **not supported by strong evidence or practice**. This ignorance (together with the significant investments that are frequently required to implement data-based solutions) leads to a certain amount of restraint on the part of education policy. Educational data is a **comparatively new topic**, and it remains to be determined what the most pressing needs in the field of education are, in order to determine how the data could be utilized. (FI, CH)

Most of the participating countries are **missing universal standards** for data governance, data exchange, or interoperability. This makes it impossible to transmit data effectively across administrative boundaries. Additionally, the **complexity of the education system** may pose a challenge. It may be difficult to establish a standardised approach when all parties involved have significant autonomy. (CH, BE-FL, NO)



There are numerous regulations regarding information security, privacy, and accessibility, making it difficult for new service providers to enter the market. Due to the expense of assessments, it is also difficult for smaller school proprietors to offer a variety of services to their students. There is also the difficulty that teaching aids that would assist one group of students are not permitted because they do not provide the same service to all students regardless of their abilities. It is essential to pursue **equality** and ensure that everyone has the same opportunities, without **limiting the diversity of services** in a way that creates distinctions. If every service must comply with accessibility requirements, the ability of service providers to specialise is constrained by accessibility requirements. (NO, FI)

The restrictions on **child profiling** make it difficult to develop effective learning analytics solutions. Traditional schoolbook publishers have historically established a positive reputation on the market. They have been challenged by new, innovative small enterprises as part of digital transformations. The aforementioned requirements and learning analytics drive the market towards a limited number of **large service providers**, which may **inhibit innovation** in the long run. Establishing a common set of principles for collaboration, standards, and collaborative services that facilitate the exchange of activity data and other profile data to enable effective learning analytics across vendors is challenging. (NO, FI)

**Resources**, human and financial are also an obstacle. There may not be enough developers or funds to construct national, regional, or local systems that make extensive use of educational data. **Lack of professional development trainings** for data use in education is another obstacle. The **limited time** available to teachers for in-service training hinders the development of data literacy skills. Occasionally, **participation** in in-service training is minimal (due to a lack of incentives, time, etc.). **Teacher shortage** and perceived planning **workload** and administrative burden may also have an effect. (FI, FR, HR, SK, ES, BE-FL, SI, RS)

### Overcoming challenges

In the preliminary collection of information three areas were identified as potential enablers of digitally processed data use in education.

**More efficient use of data** implies the use of data for assessment, for adapting teaching methods, for personalization or adaptation by computer system support, for guiding learning paths and for use by students to monitor their progress (CY, HR, IE).

**Standardization of education data** encompasses the national models for managing education data, interoperability and data sharing, data retention periods, management of some specific databases (such as early school leaving prevention databases), learning analytics at country level (FI, HU, SI, PT).

**Artificial intelligence implementation** includes the use of data to personalize students' learning processes and also to facilitate the teachers' pedagogical and administrative tasks, to enable predictions, to alert teachers of possible difficulties, to guide students, and to deepen understanding of how machine learning and AI can enhance data assessment (ES, FR, IE).

Additionally in the first cycle of agile information collection participating countries mentioned several solutions that may help in overcoming existing obstacles: **centrally available solutions, interoperability, standardization** (CH, FI, FR, NO), **clear and shared vision on the use of data, availability of data for research** (BE-NL, FI, FR), **raising awareness about data use in education, teacher training and clear guidelines for specific areas of data use in education** (PT, SK, HR), more regular monitoring, evaluation and forecasting (MT).

Participating countries lay high hopes in new development, which is planned for coming years, for example implementation of Education data hub in France, project Digitrajen učitelj in Slovenia or development of Data usage policy for whole education area in Switzerland.

## Country examples of data use

### Belgium Flemish Community

The Belgium-Flemish community has a centralised database platform called "[Discimus](#)" which enables the collection and exchange of data between schools, education centres and The Agency for Educational Services. "[Dataloep](#)" is a web application ([Demo version](#)) with statistics from schools or school boards that allows extraction of specific figures and comparison with other institutions. [Dataloep](#) offers citizens, researchers, any interested user the ability to access about: Enrolments, student characteristics, mobility and attractiveness, repeat grade, academic progress, early school leaving, study certificates and orientation certificates in compulsory education; Enrolments, student characteristics and diplomas obtained in HBO5 Nursing and higher education, Enrolments in part-time art education and adult education.

**Data Bundle** contains data from schools as provided to the policy domain, enriched with data about the municipality, the school community, the educational zone or Flemish education, depending on the level of education. The following reports are currently available: Student numbers, Student characteristics, Staff numbers, Attestations, Study certificates, School progress and grade retention, Student flows IN, Student flows OUT, Secondary education (for primary schools), Higher education (for secondary schools), Early school leaving (for secondary schools).

In Flanders the several tools can be used in education for adaptation by computer system support. Some examples of **Adaptive platform for exercises**: Bingel, DiaBe, Diddit, Duolingo, Kabas – Kai, Microsoft Math Solver, Quizizz, Prowise Learn – Rekenluin, Prowise Learn -Taalzee, Prowise Learn -Words&Birds, Snappet. Some **Adaptive educational games**: Ava & Trix, Ko de Kraker, Kr8cht, Lezergame, Monkey Tales, Rekenkoning Junior, Taalheld, TypeTopia.

[Kr8cht!](#) Is a tool which helps students in their **academic orientation** from primary to secondary education. [Columbus](#) is a toolbox which guides students in their academic orientation from primary to higher education.

Most Secondary schools in Flanders make use of [Smartschool](#). This digital schooling platform gives **students insight in their progress or organize their daily school activities** (daily school activities, learning analytics to monitor achievements, compare with averages, prepare for assessments, prepare for events...). Other similar platforms are also available.

At school level, schools can use data from Datawijzer: [Primary schools](#), [Secondary schools](#). A data platform created by the Flemish Inspectorate, to monitor the quality of their education. In Datawijzer, schools get data about the level of education of their students, dropout **predictions**, how students are doing in the next level of education, school delay... etc.).

The Flemish Inspectorate uses [VOI.CE](#) as an **additional data gathering** tool for thematic use.

### Belgium French Community

The Belgium-French community created and shared various publications on the pedagogical platform “e-classe” aimed at raising awareness among teachers, headmasters, schools and stakeholders on data practices, including the course “[Comment développer des sites web et des applications conformes au RGPD ?](#)”.

### Croatia

Croatia is currently implementing the project “[e-Upisi](#)” (Informatizacija procesa i uspostava cjelovite elektroničke usluge upisa u odgojne i obrazovne ustanove) which will create a system at national level that will digitalise the processes of application and enrolment in all education institutions. It will be the ecosystem in which data is managed responsibly and efficiently, integrating different public registers, data collection and exchange via the Government Service Bus. Croatian Academic and Research Network has created the instructions for data users.

[EMA-Education management application](#) is a central place for registration of all users from the primary and secondary school system for professional training. The purpose of the application is to enable all professional development participants from the primary and secondary school system to search, apply for and download professional training certificates.

### Cyprus

Cyprus is using graded access to ensure appropriate data processing (e.g., at school level, by district education offices and by the Ministry of Education). It provides access only to authorized officials and is strengthened by a set of technical/organizational measures.

## Finland

Basic education in Finland is organized by more than 400 education providers (300 of them are municipalities) who follow the national core curriculum. Education providers have great autonomy when comes to planning of education and resourcing it. Even though a lot of resources are from the government, education provider has a great autonomy on how to allocate the resources within the local educational and cultural services.

Finland funded several projects at municipality level related to education data. Some of these projects are building an open ecosystem where all actors working in the field of education can join together to build a national service platform for education.

Almost all the education providers and schools use learning materials and platforms of **commercial publishers** (for example: [Sanoma](#), [Otava](#), [Studeo](#)) which often include data-tools. Quiz-tools (Kahoot!, Forms, Quizlet) are widely known and used, as well as Finnish alternatives such as [ViLLE](#) and [Oridi](#). Almost all the education providers have also Google, Microsoft or Apple ecosystem in place. Finland also has strong **EdTech start-ups** community which are developing new applications for education.

The Finnish National Agency for Education is **creating materials for the groups for whom commercial publishers do not produce material**, for example: [Learning material for adults in basic education](#). Some skilled **teachers** are also making their own adaptative learning paths for students with open or commercial solutions.

At [Studyinfo.fi](#) you can find information on different degrees and qualifications and learn about studies in educational institutions in Finland. The service can be used to find different study options and apply for the studies online.

[Wilma](#) is Finland's **teaching and learning platform**, which creates a digital learning path from kindergarten to secondary schools. Wilma supports student administration in organization, evaluation, and communication between home and school.

[Abitti](#) is an **exam system** published by the University Examination Board which gives future matriculation examinees and upper secondary schools organizing exams the opportunity to familiarize themselves with the matriculation examination system. With Abit, the board also gets valuable information for the development of the exam system and support for exam days.

[Edulyzer](#) is a **survey and analysis application** for processing data collected in the school community. Students, parents, teachers and school leaders could use Edulyzer to get a comprehensive view of strengths, learning and well-being, utilize data in interaction and guidance with learners, monitors the activities of schools at the municipal level, allocates resources and measures based on the information collected, etc.

For **curriculum planning** and organizing national service called [ePerusteet](#) is available. The ePeruseet service contains all the basics of curricula, degrees, and trainings from early childhood

education to second grade. Teaching and training organizers also publish local curricula and degree implementation plans in the service.

Different self-assessment tools for measuring **teachers' competences** are in use, like [Opeka/Ropeka](#), [MENTEP](#), [SELFIE](#), [ICT-taitotesti](#)

**National education statistics** are available on those pages: [Ylioppilastutkintolautakunta](#) and [Vipunen](#).

## France

France is launching the "[Education Data Hub](#)", a data platform intended for researchers, edtech players and national education stakeholders. The ambition of the project is to enable researchers, the entire educational community, and its partners to create a coherent ecosystem, guided by common ethical standards around a shared data catalogue and an open algorithms library. This ecosystem aims to take shape within a strong legal framework that respects the protection of personal data. It also aims to support the national AI strategy with the creation of sovereign data warehouses on which to train AI. The "Education Data Hub" will mainly take the form of a platform designed to collect, consolidate, and host the data made available by all the players in the education ecosystem. The EDH will also be able to provide support to data managers to facilitate data collection, to accompany the reprocessing of data and to promote the definition of common norms and standards to develop data interoperability. It is a project to extend the opening, sharing and exploitation of education data to all actors in the educational ecosystem (companies, researchers, national education managers, etc.). It is also a project that supports the national AI strategy. Within the framework of the new national AI strategy, the creation of sovereign data warehouses to train AI is favoured.

Teachers have access to data collected at the **national assessments** at the beginning of elementary school, at the beginning of middle school and at the beginning of high school. These assessments may help them adapt their teaching to the individual needs of their students in mathematics and French. These data make it possible to develop teaching practices: class exchanges, individualized support, implementation of workshops. On a case-by-case basis, teachers use applications that provide student monitoring.

All secondary schools and some primary schools have a **virtual learning environment**, an integrated set of digital services selected and made available to all actors. The three services most used by teachers in these spaces are "communicating with parents," "getting students to collaborate with each other" and "personalizing student support". Data are collected and used in a secure environment.

Within the framework of an innovation partnership (P2IA), the Ed-tech companies developed an **AI assistant** for learning French and Math in primary schools which enables adaptive and personalized learning as well as learning analytics. Some of the technology enhanced learning tools in use, are: [Lalilo](#), [Kwyk](#), [Kaligo](#), [Adaptiv'Math](#), [Smart Enseigno](#).

A support system for the **production of digital resources** for schools has been set up ([Edu-Up](#)). These are contents and associated services, or digital tools-services designed for teaching and learning activities, directly linked to the acquisition of knowledge and skills by students. When the companies submit their applications, special attention is requested regarding inclusion and gender equality.

At the secondary school level, the SIECLE school life application is a tool dedicated to this **prevention of dropout**. Schools have an overview of the student's schooling, which allows them to identify students at risk of dropping out, in order to offer them assistance: tutoring, support, counselling, etc.

The use of data is connected to the **assessment** through national evaluation of French and Maths, at the beginning of primary school, at the beginning of middle school, and at the beginning of high school. This allows the Ministry to follow progress and long-term difficulties. At the local level, the authority can add dedicated hours to students' needs.

Four digital tools are dedicated to the **management of teaching staff**: a tool for managing replacements, a personal tool for monitoring teachers' careers, a tool for collective and individual recording of career elements (positions held, training courses....) and a last tool which is gradually taking over from the others in order to centralize information and make it more accessible to agents and managers.

A School Evaluation Council was launched in 2020. Its priority was to settle the **school's evaluation** by defining methodology and indicators. These indicators are mostly data produced by the school. A national campaign of school evaluation has been implemented at secondary level in 2020, and at primary level in September 2022. A school evaluation is divided into two parts: a self-evaluation by teachers, parents, students, and non-teaching staff. And an external evaluation by inspectors, academic staff, and management personnel. The report provides strategic directions, as well as an action and training plan. The digital components are used for two purposes: the creation of reliable data and indicators of the school's evolution, and analyses that allow for the development of individualized proposals.

Regarding **forward planning of resources** In France several applications are in use. Arena for projections of human resources needs and enrolment. EPI application, dedicated to monitor use of school buildings. School management software suites are available for secondary schools. The Ministry of National Education and Youth is currently updating the financial management tools of educational institutions.

## Greece

In Greece, data management is organized at central level by the Ministry of Education, at regional level by the regional education directorates, and at local level by directorates of primary and secondary education and school units. The information system "[Myschool](#)" of the Ministry of Education and Religious Affairs contains information about the daily operation of the schools.

## Hungary

Hungary established protocols and procedures on how to follow data related to national competency measurements across grades 6, 8 and 10 in an anonymized way.

The Educational Authority maintains a national centralised personal register of pupils. The institutions record and manage the personal and school-student legal relationship data in the national centralised register of pupils. The student personal data is partially provided by the pupils (parents, guardians) and partially obtained from a centralised database (the address data). The Educational Authority also maintains various statistical data services (public education statistics, early school leaving prevention system, etc.). Schools provide inputs for this. Parents also have a “parent module” in the school's local data system where they can track their child's academic progress and provide feedback on the data.

## Ireland

Individual primary schools collect and enter their enrolment data on the Primary Online Database. This enrolment data is then collected and checked by the Department. The Department engages with schools individually and collectively, when necessary, to improve or correct enrolment data. The same process takes place in post-primary schools. As described in Data Sharing Agreements, the Department shares the data in compliance with a mutually agreed confidential secure data transfer protocol. These files, encrypted and password-protected, are delivered via secure electronic portals. The personal data is pseudonymised. For security reasons, the access to the data is limited to the nominated professional staff (Statisticians) as per Data Sharing Agreements.

## Malta

The Ministry has a Data Warehouse Unit to monitor data available to schools.

## Norway

Municipalities are "School owners", responsible for Norway's primary and lower secondary school. This means they are responsible for and have the authority to decide how education is provided within the constraints of the law.

For advancements to upper secondary education data such as attendance, grades etc. are stored and shared with the [Vigo IKS](#) (inter-municipal company). Vigo looks after the **development and management of the county municipalities' joint IT systems** within secondary education, transport, and shared services. The company is owned by the county councils and governed by a board of representatives with one member from each county council and one from Oslo municipality, as well as a board. These are the main tasks of VIGO:

- Procurement and management of joint IT solutions
- Management and further development of VIGO Central Base
- Development and management of a new school administrative system, [Visma InSchool](#)
- Quality assurance of student and apprentice data
- Information work for the county municipalities via vilbli.no
- Development of a solution for archiving documents from the subject systems to archives.

There may be municipalities who have taken into use devices or apps that allow to track the child's performance and engagement, however this is for each school or municipality to decide. In such a case, the school owner is obliged to have done the necessary risk assessments under data protection law and risk assessment, as well as evaluated privacy by design.

Norwegian Directorate for Education and Training has made available a tool for **mapping of students' Norwegian language abilities** to determine whether they are entitled to receive adapted learning to increase their Norwegian skills level. The Directorate also has a **learning project online**, where students who qualify may apply to have classes in levels more advanced than their own in Math, as well as have bilingual teaching in some specific languages.

## Portugal

At school level, the use of data to adapt teaching is connected to the use of open digital resources and the ones that are provided by the editors in several textbooks' platforms.

These **digital textbook platforms** (owned by the Editors of each digital coursebook) provide several quizzes, activities, etc. that can be used in the classroom, by each student/class. From the results obtained by each student, teachers can adapt teaching methodologies and approaches according to the results (e.g., the difficulties that each student have, comparing results between students). These results are connected to the outputs of each platform that are provided to teachers.

The use of several **open digital assessment tools** (quiz, self-assessment by check list) is also to be considered as a pedagogical tool for formative and summative assessment.

**The MAIA Project - Monitoring, Follow up and Research in Pedagogical Evaluation** - is a multidimensional project within the scope of which curricular and pedagogical issues, theoretical and practical issues of teaching, learning and evaluation are discussed, as well as issues of continuous training and professional development of teachers, including the digital dimension of the formative assessment (Project MAIA [Folha 9\\_Avaliação Formativa Digital.pdf \(mec.pt\)](#)).



At the level of primary school and second cycle (2<sup>nd</sup>, 5<sup>th</sup> and 8<sup>th</sup> grades), schools have the results of the **national assessment tests** which provide specific results at an **individual base (RIPA)** and a **global result to school groupings/ungrouped schools (REPA)**. Schools, within the scope of their autonomy, decide how to use RIPA and REPA, how they manage data and how they involve teachers in the mobilisation of that information. Besides these reports, schools also have access to the results of national final Tests, at the end of the third cycle (grade 9), and the results of the final exams at the secondary level (grades 11-12). More information in: <https://iave.pt>.

Within the framework of their autonomy, schools and their teachers can provide different learning paths, as well as develop different measures regarding the school success of all students ([Decree-Law no. 55/2018](#), [Decree-Law no. 54/2018](#)). The class council, based on the available data, plans the activities for each class/student regarding their performance and specific characteristics.

Each school has its own **School management Platform** (E360, INOVAR, among others). In these platforms, among other things, all the grades, courses, students' progress are registered. Both parents and students have access to these platforms in a restricted and individual area.

**Teaching staff characterization** in terms of numbers, age, qualifications and teaching area; non-teaching staff characterization in terms of numbers, age, qualifications; school locations and characteristics are available in [Dashboard Educação em Números](#) – (non-tertiary education).

General-Directorate for Education and Science Statistics (DGEEC) produces **official statistics and several statistical analysis and studies** that can provide information for guiding learning for students.

Statistics:

- Education Statistics

(<https://estatisticas-educacao.dgeec.medu.pt/eef/2021/inicio.asp> ]

- Foreign Study Programmes <https://www.dgeec.mec.pt/np4/96/>
- Individual and domestic teaching  
([https://www.dgeec.mec.pt/np4/96/%7B\\$clientServletPath%7D/?newsId=145&fileName=EE2021\\_EnsIndividual\\_EnsDomestico.pdf](https://www.dgeec.mec.pt/np4/96/%7B$clientServletPath%7D/?newsId=145&fileName=EE2021_EnsIndividual_EnsDomestico.pdf))
- Regions in numbers  
(<https://estatisticas-educacao.dgeec.medu.pt/dse/regioesemnumeros/inicio.asp>)
- Student profile and School Profile of Gipsy Communities  
(<https://www.dgeec.mec.pt/np4/97/> );
- Teacher profile (<https://www.dgeec.mec.pt/np4/98/>);
- Inclusive Education (<https://www.dgeec.mec.pt/np4/527/>)
- Special Educational Needs (<https://www.dgeec.mec.pt/np4/224/>)

- Special Education Needs in Higher Education (<https://www.dgeec.mec.pt/np4/428/>)
- Curricular Enrichment Activities (<https://www.dgeec.mec.pt/np4/99/>)
- School Technological Resources (<https://www.dgeec.mec.pt/np4/100/>)

Statistical analysis and studies:

- [Infoescolas - Estatísticas do Ensino Básico e Secundário](#) – (non-tertiary education): school success and retention rates.
- [Dados e Estatísticas de Cursos Superiores \(infocursos.pt\)](#) – (tertiary education): tertiary course's access grades; tertiary course's success rates; tertiary course's employability rates.
- [Dashboard Educação em Números](#) – (non-tertiary education): NUTS I, II and III and municipality success and retention rates.
- Situation after 3 years of students entering the 3<sup>rd</sup> cycle of basic education (<https://www.dgeec.mec.pt/np4/540/>).
- Monitoring of the 21/23 School+ Plan (<https://www.dgeec.mec.pt/np4/529/>)
- Psychological Health and Well-Being | School Observatory (<https://www.dgeec.mec.pt/np4/513/>)
- School Results - Equity Indicator | Elementary and Secondary Education (<https://www.dgeec.mec.pt/np4/490/>)
- Main school result indicators by discipline - 2<sup>nd</sup> cycle and 3<sup>rd</sup> Cycle.
- Sports Habits of the Portuguese School Population
- Situation after 3 years of students in scientific-humanistic courses (<https://www.dgeec.mec.pt/np4/434/>).
- Situation after 3 years of students in professional courses (<https://www.dgeec.mec.pt/np4/429/>).
- Observatory of the Paths of Secondary School Students, a project that has been collecting data since 2007, allows tracking students throughout their secondary school and post-secondary paths. It has three moments of data collection: at entry into secondary school, at exit from secondary school and young people in post-secondary (about 14 months after leaving secondary school) (<https://www.dgeec.mec.pt/np4/47/>).
- National Final Exams and Examinations - Main Indicators (since 2017) (<https://www.dgeec.mec.pt/np4/441/>)
- Pursuit of studies among graduates of Professional Higher Technical Courses (since 2016/17).

- Pursuit of studies among degree graduates (since 2016/17).
- Pathways in higher education: situation after 4 years for students enrolled in 3-year degrees.

## Serbia

The Ministry has established a unified education information system. It provides conditions for the safety and security of the technical equipment and software as well as the necessary resources for the functioning of the information system. The institution (school) is obliged to ensure the entry and update of data in the required registries.

Teachers and school specialists keep the data on students' individual development (abilities, skills, interests, motivation, achievement etc.) and they can adapt teaching and learning process according to the data. Also, they can suggest topics of school projects, workshops, optional activities etc. but also integrate some specific examples to the regular teaching process.

## Slovakia

Most of the data, apart from grades, is sent to a centralised electronic register under the Ministry of Education. There, it is stored and analysed for different purposes - usually statistics.

**National testing** data is collected and stored by an entity under the Ministry of Education. The data is used to monitor the performance of schools and the educational system as a whole. [Electronic platform](#) is in use for performing national test.

Use of data to adapt teaching, for personalization or adaptation is widely used, and many tools are present on the market, for example [SmartBooks](#), [Vieme to](#).

**School management system** is used in almost every school, for example [Edupage](#) which has many functionalities, including automatic marking, dashboards, staff management etc.

[Kam na strednú](#) is an official portal aimed at students' **academic orientation**. For curriculum planning [Digiškola](#) application is available.

## Slovenia

Schools collect, process, store, transmit and use data managed in accordance with the regulations on personal data protection. The Ministry responsible for education establishes, manages, maintains, and controls an IT database for the purposes of uniform data management and for the purposes of monitoring and planning educational work, policy planning, conducting research and statistical analyses.

For **adapting teaching, personalization or adaptation** most of the teachers and pupils have used Moodle (with plugins; [Skupnosti SIO](#)), MS Teams (some apps in Teams), [E-school System](#) (developed in pandemic time as part of Administration System for schools), Google Classrooms.

There is the plan for 2023 – 2029 to develop an comprehensive virtual space for each student and teacher.

From 2012 – 2015, Ministry developed 43 **e-textbooks**, for example [E-um učna gradiva](#) for Mathematics. In 2022 – 2023 E-school bag project provided an editor to develop or upgrade multimedia and interactive education e-materials and to upgrade e-textbooks and some e-materials [KAM in KAKO](#) (Where and How) is a tool for exploring, developing, and fulfilling career options. It offers young people (pupils, students) and also adults the information they need when making decisions about their **future profession**: which education and training to choose in order to achieve their career goal. Based on the individual's interests, Kam and how helps to choose a suitable profession. Also, with the help of the program, they can check which educational programs lead them to the desired profession.

For measuring **school or system performance** there is a portal with School Path [Digital Schools Awards European Programme | Build Digital Schools & Education in Europe](#).

In 2023 starts a national project Digitrajen učitelj (DigiSustain Teacher) where the digital (11 day), sustainable competence (1 day) and financial literacy) will be developed and assessed (expect 20.000 teachers).

## Spain

Spanish schools collect and record data from the students for the academic records. All the academic data and records are kept on official platforms provided by the Autonomous Communities (local authorities) for all publicly funded schools, and they are responsible for data maintenance and security. Autonomous Communities in Spain have full oversight in education, even the Ministry of Education has to coordinate international cooperation and actions through different committees from Autonomous Communities Ministers (Consejeros de Educación), for example, Conferencia Sectorial de Educación.

Spain ensured that platforms used by the schools to store and manage data belong to the educational administrations and are located on their own servers thereby making data safer.

Schools often use Moodle which has some features that allow learning to be automatically adapted to the characteristics of the learner, although this will depend on the specific course configuration and tools used, for example, Moodle has **adaptive learning tools** that use data analysis to automatically adjust the difficulty and pace of the course based on the learner's progress. These tools can include adapting assignments, activities and assessments based on the learner's proficiency level. In addition, Moodle also has a tool called "Activity Recommendations" that uses **data analytics** to suggest relevant activities and resources to students based on their progress and the resources they have previously used. These recommendations can help students discover new materials and resources that are interesting and relevant to their learning.

Guide and description of **School Digital Plan** has been published by Moe-INTEF ([English version](#)) where use of SELFIE is recommended in order to establish the plan for school development.

Here are some of the project examples which can **illustrate the use of data for learning** in Spain: [Toxiria Minichefs](#), [Moodle is and its educational uses](#), [Journey to Mars](#), [Ayúdame y te habré ayudado](#), [Hackathon de ideas contra la Covid19](#), [Del laboratorio al aula virtual](#), [Terraforming gamification](#), [Use of video for teaching purposes](#), [5<sup>th</sup> Centenary of the First Round the World Race](#), [The Bamak Quest](#), [Historias embotelladas](#),

## Switzerland

Data governance and legislation in K-12 education has a strong federal component in Switzerland. The Swiss K-12 education system is federally organised with almost all decisions being made at a local and cantonal level. Depending on context, canton, municipality, and provider a vast array of different management solutions exists in Switzerland. Different entities can be involved in managing different types of data for different purposes and with a variety of ends.

Several **adaptive learning tools** are employed throughout Swiss schools. Most of these technologies provide feedback to teachers (in the form of dashboards) allowing them to

- track their pupils' progress in various domains,
- identify individual's learning gaps,
- identify knowledge gaps of the entire pupil body in a class,
- determine the effectiveness of support measures,
- adapt teaching and evaluation (formative and summative)

Several technologies for **personalization or adaptation, guiding learning paths** are employed in K-12 education in Switzerland. To give just two examples:

- [Mindsteps](#): an adaptive learning tool for mathematics, German, French and English from grade 5 to grade 11. It is adaptive in the sense that it estimates what knowledge and skills pupils have based on solved tasks in a virtual environment and adapts learning paths and task difficulty based on these estimations. It provides feedback to both pupils and teachers, and therefore can be used for teaching and independent practice. Its task pool is based on the Swiss-German curriculum. It is employed in K-11 education in 4 German-speaking cantons in North-Western Switzerland.
- [Lernnavi](#): an adaptive learning tool for German and mathematics and is currently in use in schools in upper secondary education (academic track) in some cantons in Northern and North-Eastern Switzerland. It adapts both task difficulty and learning paths to estimated pupil competences.

Most cantons (25 of 26) **use cantonal standardised testing** to evaluate pupils' competences relative to attainment goals set in regional curricula. In some cantons these tests are administered by public bodies. In others they are carried out as a service by private companies. How these data are used, and to whom results are provided depends on canton (and at times on the providers). In some cantons results are provided with **varying levels of detail and anonymity to the varying levels of the administrative hierarchy** (e. g. pupils obtain their results, usually also relative to all other pupils in a canton, teachers obtain the information from their pupils, and additional information on population performance or population performance adjusted for class composition, school principals get information on average school or class performance, as well as information on population performance or population performance adjusted for class/school composition, while cantonal administration obtain only average performance information), while in other cantons the administration may obtain information on the performance of each individual pupil.

There is a wide variety of monitoring efforts on **school and education system performance** in Switzerland. On a national level the most prominent tool for evaluating the education system's performance is the "Swiss Education Report" compiled every four years by a specialised monitoring agency. However, in particular larger cantons also tend to have their own monitoring divisions within the cantonal education departments. School evaluations are likewise common. However, the form and nature (obligatory vs facultative) of these evaluations can differ between cantons.

Data is used in wide variety of ways for forward planning of resources in Swiss K-12 education. A simple example is the use of scenarios (based on age structure and migration) to **predict the evolution of the number of pupils** in the coming years in order to evaluate and plan future resource requirements (schools, teachers, ...). The best-known predictions are produced annually by the Federal Statistical Office for a forecast period of 10 years.

## | Conclusion

There are many similarities, but also significant disparities, between the data governance, organisation, and monitoring practises of the participating countries. Some challenges are universal (such as ethical questions or raising competences), while others are country-specific (such as centralised versus decentralised models of data governance). All compiled examples of data use in education will help us understand the potential and possible enhancements for supporting the efficient and meaningful use of data in education.

Over the next few years, additional developments in the use of digitally processed data for learning will occur in various countries, and we hope to be able to document them in our subsequent iterations of agile data collection.



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