

Comparative Overview report – 3rd version

AGILE EDU MINISTRY OF EDUCATION SURVEY

AUTHOR: LIDIJA KRALJ, EUROPEAN SCHOOLNET

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Executive summary

The Comparative overview report of the Agile EDU project investigates how Ministries of Education across Europe manage and utilise educational data. Information was collected from 20 European Union member states in period 2022 till 2025 in three cycles.

Most participating countries regulate education data through two key legal frameworks: the Education Law and the Data Protection Law, typically aligned with the EU's General Data Protection Regulation (GDPR). While these laws define what data is collected, they often lack specificity regarding its intended use. Several countries, including Belgium, Finland, France, and Norway, have established protocols for data sharing and sensitivity classifications. Switzerland's federal structure results in diverse interpretations of national laws across its cantons.

Data management occurs at multiple levels—school, local/regional, and national. Countries like Croatia, Finland, and Portugal employ integrated systems that span all three levels. Centralised systems such as Croatia's "e-Matica" and Greece's "Myschool" facilitate data collection and synchronisation. Monitoring responsibilities are shared among Ministries of Education, national data protection agencies, and local authorities.

All countries collect basic student data (e.g., name, age, grades, attendance), with some also gathering behavioural, health, and socio-economic information. Data collection is legally mandated, with additional consent required for research or non-standard digital tools. Data exchange protocols govern transfers between schools and education levels, ensuring compliance with privacy laws. Storage durations vary, with some countries retaining academic records for decades, while others anonymise data after specific age thresholds.

Education data is primarily used for system monitoring, performance evaluation, and individual student tracking. Countries like France, Hungary, and Malta utilise data comprehensively, including for teacher self-assessment and academic orientation. However, predictive analytics and student-led data use remain limited. Teachers in most countries use data to adapt instruction, though curriculum planning and stakeholder accountability are fewer common applications.

Data literacy is increasingly recognised as essential for educators, though its integration into professional development varies. Countries such as Finland, Portugal, and Spain have launched national frameworks and training programmes. Teachers' needs include skills in data analysis, ethical awareness, and digital decision-making. Despite growing awareness, gaps persist in training availability and recognition.

Key enablers include national strategies, funding, digital infrastructure, and professional development. Finland and Portugal have implemented comprehensive digitalisation frameworks, while France and Switzerland invest in innovation and AI partnerships. Challenges include fragmented governance, lack of interoperability, outdated legislation, and limited teacher training. Concerns about data misuse, privacy, and equity also hinder progress.

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 recognises 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 an 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 an efficient project start. The first cycle of agile information capture was organised as one of the first project activities, with a second one in 2024 and the third one in 2025, during the project implementation as a part of the 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, Switzerland and Turkey.

Information was collected through a questionnaire, which the public authorities from 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 have been 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.

During the second cycle of agile collection of information, in February-April 2024 thirteen countries participated: Belgium-NL, Croatia, Cyprus, Finland, Hungary, Lithuania, Norway, Portugal, Serbia, Slovenia, Spain and Sweden. In that agile cycle, new information was congregated regarding data use legislation, teachers' professional development, data literacy competences and implementation examples as well as obstacles and enablers perceived by participating countries in their context.

Third cycle of agile collection of information was organised in spring 2025 with eleven countries participated: Belgium-NL, Croatia, Czech Republic, Finland, France, Greece, Norway, Portugal, Serbia, Slovakia, Slovenia, Spain and Sweden. In that agile cycle, previously collected information were checked and corrected if needed. New information regarding country initiatives for data use in education were collected.

In total information was collected from **20 EU members states in period 2022 – 2025.**

Table 1. Data collection overview (20 countries)

Data collect overview	BEfr	BEnl	CH	CY	CZ	EL	ES	FI	FR	HR	HU	IE	LT	MT	NO	PT	RS	SK	SI	SE	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		in 2024		X	X	X	X				X	X	X	X	X	X	In 2024	X
Second cycle Agile EDU collection 2024		X			X	X	X	X	X	X					X	X	X	X	X	X	
Third cycle Agile EDU collection 2025		X		X			X	X		X	X		x		X	X	X		X	X	

Preliminary collection in 2022 focused on legislation, organisation, and governance. The first cycle of Agile EDU collection in 2023 focuses on data use examples, data literacy teacher professional development, enablers and obstacles; also covering topics of preliminary collection for CH, MT, NO, and TR. The second cycle of Agile EDU collection in 2024 focuses on data literacy

competences also covering topics of the first cycle collection for the Czech Republic and Sweden. While the third cycle contributed to the report with collection of new initiatives and overview of strategic developments which happened in past few years.

Strategic developments 2023 - 2025

We asked participating countries to compare information we collected back in 2023 with new developments in their countries. Over half of the countries that took part in the study provided a description of some of the strategic developments that have recently taken place in their respective country.

In mentioned period the **Flemish government** (Belgium) introduced LeerID, the single sign on solution for Flemish compulsory education. LeerID is in a growth process where it tries to respond to the needs of the education landscape. The importance of transparency on data sharing is increasing step by step. A cybersecurity action plan is also set up, in which the whole GDPR legislation has an important place, highlighting the importance of privacy and how to deal with it.

During this period **Finland** focused on consolidating digital strategies through national frameworks and ecosystems (e.g., DigiOne, MPASSid); strengthening interoperability and defining roles for stakeholders in data ecosystems; launching national projects to support digitalization in early childhood, basic, and adult education. Updated guidelines and resources have been published to support data protection and ethical use, e.g. [National guidelines for the use of AI in Education](#), published in March 2025.

Hungary's [National Strategic Plan for Achieving the Objectives of the Digital Decade Policy Programme 2030](#), as outlined in Decision (EU) 2022/2481 of the European Parliament and of the Council (14 December 2022) was published at end of 2023. The system for teacher professional development in Hungary is being reformed starting from the 2025/2026 academic year, with the entry into force of a new government decree (419/2024. (XII. 23.)), which took effect on January 1, 2025, replacing the previous regulation that had been in force since 1997. Detailed information about the new system is continuously provided on the [Educational Authority's website](#).

Currently in **Lithuania**, more and more attention is paid to data-based decision-making. It is increasingly emphasized that the educational process, school management and even education policy must be based on data. Scientific research is receiving an increasing amount of attention through the [Lithuanian Science Council](#), as well as through the [National Education Agency's](#) structural project aimed at studying the factors of student achievement.

The **Norwegian** Directorate for Education and Training is assigned to considering the consequences of removing digital skills as one of the five basic skills for the youngest students.

In **Portugal** new indicators were added to data monitoring portals to better assess the contribution of each school or tertiary education institution to improving the quality and equity of Portugal's

education and training system, as well as the satisfaction of its students' educational needs. Also, longitudinal database was created enabling access to anonymised data to researchers.

Serbia continues implementation of the Strategy for Education 2030, where digitalisation is one of the main priorities of the education system—particularly in strengthening IT capacities at both the institutional and teacher levels, improving IT infrastructure in schools, and developing digital services for data management. These include systems such as JISP (Unified Information System of Education), ES Dnevnik (Electronic Grade Book), and similar platforms, as well as the use of digital textbooks. Over the years, these systems have been established and become fully operational. Since 2023, they have been enhanced with new features—primarily aimed at parents (timely access to information) and teachers (reducing administrative burden). One notable recent development in the system is the availability of aggregated data from ES Dnevnik to the Ministry of Education. This data has the potential to complement existing mechanisms (e.g. JISP) and to contribute to more informed decision-making at the system level.

From 2023 to 2025, **Spain** has experienced several strategic developments and significant changes in the use of student data for learning. As a result of the educational digitalisation plans financed by the European Next Generation funds, the use of digital learning management platforms was consolidated. Virtual platforms in the different educational territories centralise and collect data on academic performance, attendance, and participation, though their use very much depend on the decision made by the school, the didactic departments and the teachers. In addition, the digital training plans for teachers include competencies in educational data analysis, which empowered teachers to make informed decisions. The funds from the Recovery and Resilience Mechanism are being key to implementing technology in classrooms, including the ethical use of data. The application of the General Data Protection Regulation was strengthened, requiring impact assessment for the use of digital platforms with sensitive data of minors. This led to a critical review of the use of big tech platforms in some territories. Some schools are abandoning the use of the Big Techs' solutions due to ethical and privacy concerns. Initiatives such as the Democratic Digitalisation Plan in Barcelona, promoted the development of sovereign digital infrastructures with local control of educational data. These platforms try to ensure that data is used only for pedagogical purposes, avoiding commercial exploitation. They represent a pioneering model of education data sovereignty and participatory governance that has been watched with interest in other regions. Some autonomous communities (such as the Valencian Community or Andalusia) have begun to integrate socioeconomic data, migrant origin and special educational needs to design early intervention policies and personalized support.

In **Sweden** many school organisations are exploring possibilities in small-scale pilot projects., but there have been no national policy changes.

New initiatives regarding data use in education

LeerID in Belgium Flanders

LeerID, the single sign on solution for compulsory education, was launched in Belgium Flanders in 2022. Pupils get a LeerID account that they take with them throughout compulsory education. This account contains a unique identifier. In addition to authentication, adding an API that allows schools to share certain pupil data with educational applications after the school's agreement, is planned in short term. This way, the applications will get advance notice of which pupils to expect, and pupils can then log in very easily using their LeerID username and password. This way, all connected applications are treated equally and have access to the same pupil data subject to the school's agreement.

School e-Mine (Školski e-Rudnik) in Croatia

On the website of the Croatian Ministry of Science and Education is available various data that is used for policy making at different levels or to do scientific research. CARNET's Department of Research on Digital Technologies in Education uses publicly available data on schools, employees and students published in the [School e-Mine](#) during the design and implementation of the research. It also collects data on the subjects of the educational process as well as on the educational process itself through its research. It is important to emphasize that all ethical guidelines and norms as well as GDPR rules are respected during the research.

eΔEA System (Electronic Administration of Education) in Cyprus

The [eΔEA System](#) (Electronic Administration of Education), is a comprehensive digital platform developed by the Ministry of Education, Sports and Youth of Cyprus. It was launched with the aim to facilitate the management of educational processes and student data across all levels of public education. The system collects a wide range of student-related data, including personal information. During the current phase of implementation, it is used to manage the student enrolment and transfer procedures through electronic application submissions, document uploads, and tracking of application progress. It will gradually expand to manage student academic records (grades, attendance, assessments, and promotions), administrative planning (timetables, exam scheduling, and academic calendar) and more.

Data initiatives in Finland

Three data related initiatives are currently in progress in Finland. [MPASSid](#) (Single Sign-On System) is a national authentication solution for education, developed by the Finnish Ministry of Education and the Finnish National Agency for Education. [Digital Service Package for Continuous Learning](#), a national initiative to support individuals in making educational and career choices and

to promote lifelong learning through digital services. [Framework for Digitalisation in Education](#) is a national strategy to promote equitable digital learning, define common rules, and develop interoperable data foundations across all levels of education.

Public Education information systems in Hungary

The [Public Education Information System](#) (KIR) is operated by the Educational Authority (Oktatási Hivatal). KIR is a nationwide electronic registration and data provision system built upon data supplied by those involved in public education tasks.

The [Higher Education Information System](#) (FIR) is a central registry that consolidates the institutional and personal data of higher education into a single IT system, making it centrally accessible in one place. FIR contains personal data as defined by Act LXXXIX of 2018 on Educational Registration, as well as non-personal data specified in Government Decree 87/2015 (IV. 9.) on the implementation of certain provisions of Act CCIV of 2011 on National Higher Education. The student and higher education staff personal registries are based on institutional data provision, which means a one-time upload of necessary data and continuous updating of the uploaded information. Higher education institutions can submit data to FIR through their academic systems. The reliability of the data is ensured by FIR accepting only data authenticated with a digital signature.

Development of EMIS in Lithuania

The [Education Management Information System](#) (EMIS) in Lithuania is a key tool for systematically collecting, analysing, and systematizing education data related to the operation and development of the education system. It serves as a centralized data repository, allowing for monitoring and assessing the state of education at the national level. The initial vision in 2006 was formulated as a single, stable, reliable, secure, and easy-to-use centralized application and set of integrated databases and applications housed in the Ministry of Education and Science (MES) and accessed via the Internet.

EMIS collects data that includes information about students (demographics, attendance, achievements such as exam results, etc.), teachers, schools, curricula, textbooks, SEK, family data from social databases, social insurance, and others. All data are integrated per person ID but can only be used anonymously.

The system is accessible to all schools, municipalities, county and ministry providers, and users, with permissions appropriate to their level of responsibility within the system. The data (covering about a 20-year period) from EMIS is used differentially by various groups:

- Non-registered users: Access to municipalities and school profiles, and all levels of indicators.
- Registered users: Additional access to data by level, years, and place.

- Specific registered users (e.g., research groups, policy analysis groups, Statistical Department): Access to raw data tables.

Today, EMIS data is quite comprehensive and consolidates data from the entire Lithuanian education system, combining it with data from other systems per person, helping to base management decisions on data using various indicator systems. The information provided is public (anonymised). EMIS is continuously updating its software and data. One of the plans for the next update is to use AI for analysing data.

New indicators and longitudinal database in Portugal

New indicators have been included in the '[InfoEscolas](#)' and '[InfoCursos](#)' portals to better assess the contribution of each school or tertiary education institution to improving the quality and equity of Portugal's education and training system, as well as the satisfaction of its students' educational needs. For instance, indicators have been defined to evaluate the academic performance of student groups in relation to their socio-economic characteristics in general secondary education courses, the difference is considered between the average marks actually achieved and the 'expected' marks (taking into account schools with similar proportions of students benefiting from school social support and/or similar levels of parental education). The availability of regional data also enables school principals and other members of the educational community to compare and interpret their school's results in light of the results observed in the regional where their institution is located.

The longitudinal database (DataDGEEC) is a system that collects and stores information about individuals involved in formal education processes, such as students, teachers, non-teaching staff, and schools. This information is protected and anonymised, and a unique identifier is assigned to each individual. This identifier allows individuals to be monitored throughout their education and training process, at different levels of education, and possibly even in their future roles within the education and training system, whether as a student or as a member of the workforce (teacher or non-teacher). Since the data is anonymised, not only does it allow General-Directorate for Education and Science Statistics technicians to conduct longitudinal information analysis processes more efficiently but also allows this information to be used by different user profiles – Academia, individual researchers, etc. in a safe centre environment.

The electronic grade book in Serbia

The electronic grade book (Serbian: ES Dnevnik) is a software solution that has replaced the traditional paper-based grade book in schools across Serbia. It enables teachers to record students' grades, absences, homework, and disciplinary measures, while reducing administrative workload. Parents are given direct insight into their child's progress through a dedicated portal, where they can monitor grades and absences, receive notifications, and communicate with the school (e.g., by scheduling consultations with teachers during available time slots). Parents and other legal

guardians can only view their own child's records, and students also have access to the platform. Teachers, on the other hand, can only view and edit grades for the subjects they teach. Their administrative tasks are further simplified by the ability to directly generate and print required reports.

The platform has seen some recent changes. One of the recent enhancements that has been announced includes enabling the Ministry of Education to access aggregated statistical reports on key educational indicators in real time – without access to any personal data of students, parents, or teachers. Direct links to the portals are as follows: [for schools](#), and [for students and parents](#).

Unified digital platforms and ecosystems in Spain

There are varied examples of SSO systems and Unified digital platforms and ecosystems across the different Spanish educational administrations. Not all of them use the explicit term "Single Sign-On" to refer to their integrated authentication systems. They may use terms such as "single account," "integrated access," "educational digital identity," etc. These systems are constantly evolving, with new integrations and features being added over time and the information about the architecture and internal workings of these systems is not public for security and privacy reasons. Here are some of the examples of such systems.

[EducamosCLM](#) is the educational environment of the region of Castilla-La Mancha, that provides tools for schools, teachers, families, and students, accessible with a single sign-on. The educational community can access communication, planning and monitoring tools, a virtual secretary for online procedures and academic records, the official LMS integrated, a collaborative teaching environment (Microsoft Teams tools, cloud services, etc), educational management tools for schools (Delphos), among others.

[EducaMadrid](#) is the educational platform that provides a digital environment for teaching, learning in the region of Madrid. EducaMadrid integrates varied services and tools: Virtual Classrooms, media library, cloud, email, educational portal (user management, websites and collaborative spaces for centres, teachers and students), MAX (Madrid-linux: free operating system based on GNU/Linux). The Virtual Classroom is also accessible through a mobile app for the consultation of materials, the delivery of assignments and communication through messaging and push notifications. Moreover, [EMPieza](#) is a part of EducaMadrid educational environment that facilitates students, teachers and families to access a wide range of educational services with a single login: Virtual classrooms, media library, e-mail or Cloud services.

[SÉNECA](#) (Andalucía): Comprehensive management platform that collects data on attendance, evaluation, communication with families and academic monitoring. Although it is not explicitly referred to as a single "SSO system" with a specific, publicly known name, the Andalusian Regional Government has made progress in integrating credentials for accessing various educational services such as the Moodle for schools, educational email (@educacion.junta-andalucia.es), and other management applications. A single account is used to access these resources, which functionally resembles an SSO. The Séneca Portal, the comprehensive education management

system in Andalusia, requires a single authentication to access its various modules and services for teachers, students, and families.

[Educarm](#) (Region of Murcia): Academic management system that allows schools and families to access school data, evaluation and communication. EduCARM is the educational portal of the Autonomous Community of the Region of Murcia. Its main objective is to integrate information and communication technologies (ICT) into the educational field of the region, offering various services and resources to the educational community: students, teachers, families, and schools. The Basque Department of Education has developed authentication systems for integrated access to platforms such as [Ikasgunea](#) (its virtual learning space) and other educational services. The goal is to ensure that users can access different resources with the same credentials.

These are only some examples, and other autonomous communities are also using or developing systems that functionally act as SSOs, integrating access to their educational platforms and digital services. This may include the integration of credentials for accessing EVAs, academic management platforms, email, and other digital resources.

The Ministry of Education offers a statistical yearbook that compiles relevant data on education in Spain, facilitating access to crucial information for decision-making and research. Link: [Anuario estadístico. Las cifras de la educación en España | Ministerio de Educación, Formación Profesional y Deportes](#)

Research and development programs in Sweden

In [Education - AI4edu](#) project, consortium of six organizations from four EU member states including Luleå University of Technology, Sweden is working together to investigate, develop, implement and evaluate next generation intelligent educational assistants, powered by leading edge AI and language technologies, designed to conversationally interact with students and to support teachers and students in fulfilling their teaching and learning goals, in a way that makes them acceptable as engaging, flexible, effective, reliable and helpful partners.

[Datadriven skolförbättring | ifous.se](#) are research and design programs implemented in 2020-2024 aimed at teachers, principals and administrative leaders who, together with researchers, wanted to test their experience and contribute to the creation of new scientific knowledge around data-driven school improvement at the classroom, school and principal level.

Case studies and Learning stories of Agile EDU project

Additional information regarding different initiatives for the data use in education from Denmark, Finland, France, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, and Switzerland you may find in [9 case studies](#) and [18 learning stories](#) created as part of the Agile EDU project .

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, Czech Republic, Spain, Slovenia, Sweden, Finland, France, Greece and Norway. Finland, France, Hungary, Greece, Sweden and Norway also have information sensitivity classifications. Hungary mentioned the National Data Protection Office with regulatory, audit functions and institutional-level policies. Additionally, Lithuania has the Statistical Law, and all information systems must have their own regulations defined by system regulation acts.

Data governance and legislation in K-12 education have 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 1st 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](#).

In **Sweden** data collection for statistical use at the national level is regulated by law and partially by other kinds of regulation. The National Agency of Education is mandated to issue some of these regulations, for example, the regulation which defines a collection of personal information about students and staff members who participate in digital national tests, and sharing those data with the National Agency.

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); [Confidentiality and Data Protection in Education](#); [Deputy Data Protection Ombudsman’s Initiative](#)
- 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.

From 18 October 2024, the European NIS2 directive is officially part of **Belgian** legislation and apply to a large group of companies. For education, it stipulates in most cases that they must comply with the basic level. Through the cybersecurity action plan of the Knowledge Centre Digisprong (part of the Flemish Department of Education & Training), the Flemish government wants to support compulsory education in Flanders to meet this basic level.

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 (16), Regional government level (4), Local government level (10), and School level (17). 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.

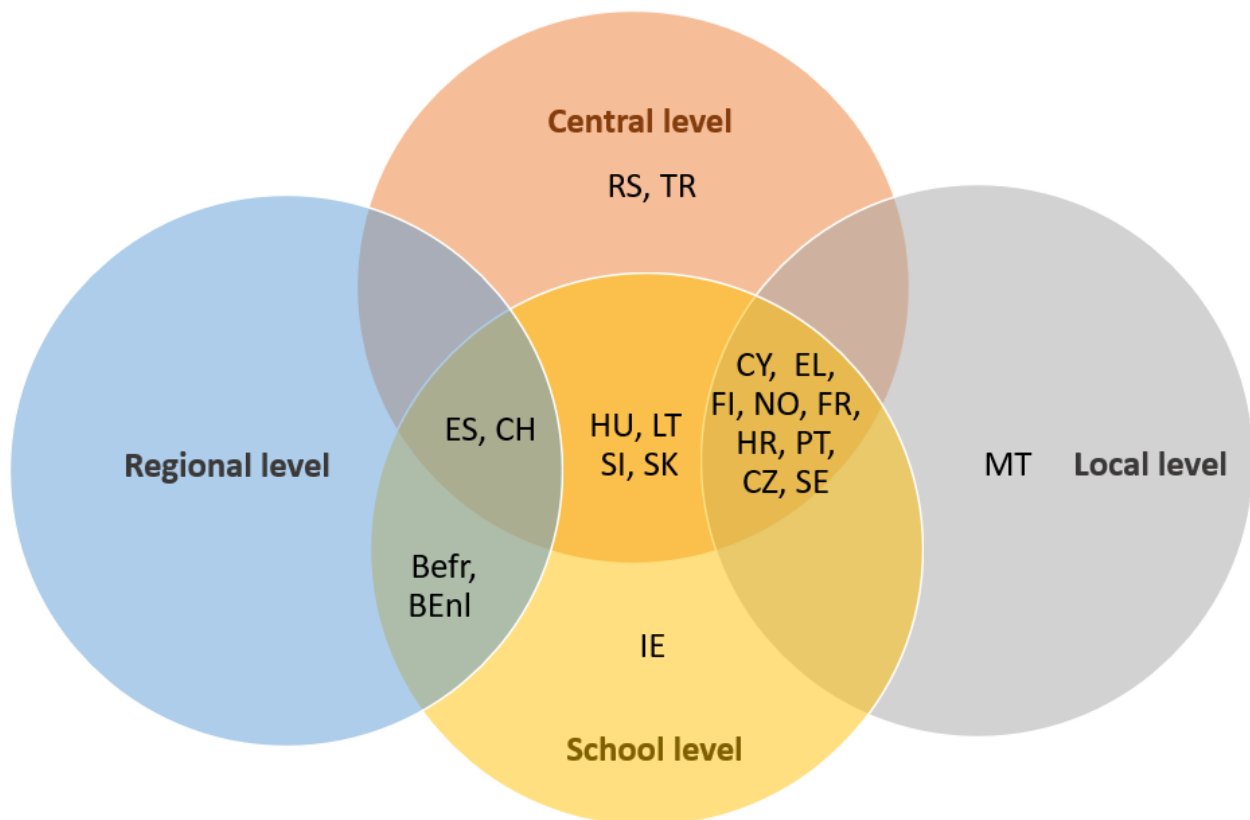


Figure 1. Level of data management

Management of data only at the **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 of education. The Department of education 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 the **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. The web application "Dataloop" 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 the school level for organisational and pedagogical purposes, and at the 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.

In **Lithuania**, student data is processed both centrally and decentrally. Centralized data processing is carried out through [the student register](#), which is administered by the National Education Agency. This register collects and processes essential and standardized data about all Lithuanian students, including personal identity data, learning progress, results (e.g., exams), educational programs, etc.

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 organisation 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 **Sweden**, data management depends on the level of digitalisation of the municipality and schools. At the local level data is collected and saved at the local level i.e. schools and school owners (municipal or independent). As many schools have system support for their data the service providers can be involved. Some documents, like grading documents, are regulated but have to be paper based as well. At the national level educational data is collected mainly for statistical purposes. This data is provided from the local level often in files. At the local level, these data are stored in administrative systems from which they can be exported.

In ten countries, Croatia, Cyprus, Czech Republic, 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 level.

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 educational [institutions](#) such as NISpVU (National Information System for Higher Education Registration), “e-Class” register, NISPI (National High School Enrolment and Enrolment Information System).

In the **Czech Republic**, the Education law states what data about students is the school obliged to collect into the school matrix and that the Ministry of Education gathers this data for statistical purposes in an anonymized form.

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 the 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 the 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 the use of the data at the country level.

In **Greece**, data management is organised at the central level by the Ministry of Education, at the regional level by the Regional Education Directorates, and at the 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). At a national level, there is not a collection of personal data of students, but rather aggregated data provided by the regional administrations. One of the main national infrastructures for the collection and use of educational data is the statistical portal of the Ministry of Education. This system guarantees the standardised collection of data by the schools, the aggregation by autonomous communities and the final publication at the state level, complying with quality and data protection standards. The portal integrates with other international sources such as Eurostat or the OECD and facilitates interoperability processes with regional systems.

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, CZ, EL, ES, FR, HR, IE, LT, MT, PT, RS, TR) and the National Agency for Data Protection (BE-NL, CH, CZ, ES, FR, HU, LT, PT, SE, SI, SK). In BE-NL, FI, FR, CZ, LT, SE and PT, the local authorities are also monitoring data management in education. In BE-NL, CH, CZ, ES, FR, IE and PT, this is done together with the school boards. Some specific instances are mentioned by seven countries:

- ES: Regional Educational Administrations and local administrations

- CH: Cantonal offices of data protection, Cantonal authorities
- CY: Ministry of Education; School Admin Teams, District Education Offices;
- CZ: Office for Personal Data Protection
- SI: Inspectorate of the Republic of Slovenia for Education and Sport;
- HU: At the institutional level - the head of the school, the system administrator; At the central level - the Educational Authority.
- SE: Each municipality or school owner is responsible for their data management including monitoring their schools. At the national level, it is IMY <https://www.imy.se/en/>



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, Sweden and Norway**, municipalities (**local authorities**) are responsible for data monitoring. In **Spain**, some schools (mainly ECEC) depend on the local authorities. In Switzerland cantons monitor data, which is similar with the Finnish and Swedish approach in which education providers are organised 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 a Ministry of Education organised 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.

Organisation 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 at 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 (18 countries), social benefits (16), 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. **Czech Republic** mentions that in the case of formative assessment, the collected data go beyond academic performance and might contain a behaviour report, feedback, progress-tracking etc. **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 the 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 provides daily care for the child, information about pupils who are under protection by some sort of restraining order or living at a secret address, and information about some pupils' health data when they are needed for adapting the education properly.

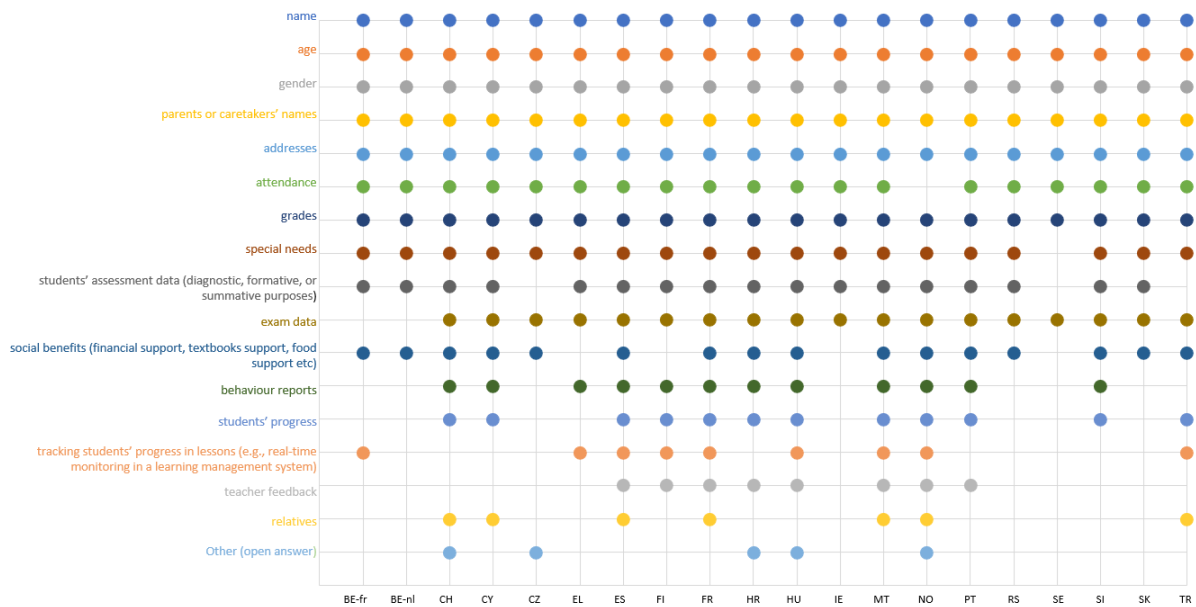


Figure 3. What kind of data about students is collected

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 organisational 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 the administration. This is partially because such access was not foreseen at the time of deployment and usually requires 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 from 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.

In **Sweden**, sharing data between systems is not defined and protected because this is done through paper. There are however discussions on how this kind of data should be structured (i.e. need for standardisation) and ongoing work on how unstructured information can be securely exchanged - [Secure Digital Communication](#).

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.

In **Hungary** the data retention period at both the local school level and the national level is determined by law. At the institutional level, student data is stored for 10 years from the

termination of the legal relationship. At the national level, the retention period for student data may vary depending on the specific registry. Unless otherwise provided by law, the body responsible for the operation of the educational register deletes the personal data of individuals in the educational register on the last day of the eightieth year following the very first entry into the educational register, or in the case of a deceased person, on the last day of the fifth year from the date the fact of death came to the knowledge of the body responsible for the operation of the educational register.

Respondents from **Slovakia** mentioned that they have stored 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 19th 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 teachers' private files or within the 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 the 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, and 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 organisation. 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.

Finnish [Espoo Data Protection Violation](#) is interesting case where a significant precedent was set by the Supreme Administrative Court of Finland (KHO) in a case involving the City of Espoo's handling of student data in basic education (KHO:2024:73). The case concerned the use of a digital platform in which students' personal data was processed without sufficient legal basis or transparency. The court found that Espoo had failed to adequately inform students and guardians about the nature and purpose of the data processing.

The court emphasized that data minimization and transparency are essential under the GDPR. It ruled that students and guardians must be clearly informed about what data is collected, how it is used, and who has access to it. The lack of proper documentation and consent mechanisms was a critical failure.

The decision reinforced that municipalities must ensure all digital tools used in education comply with data protection laws, even when developed or procured externally. This case has prompted many municipalities and schools to re-evaluate their data governance practices, especially regarding third-party digital services and platforms.

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 Flows

Data flows, or data exchange, are organised in different contexts and consist of three elements:

- Data sender: Person or institution that transmits the data to another person or institution.
- Data type: specific content of the data exchange.
- Data recipient: person or institution that receives the data from another person or institution.

Some of the usual contexts in education are: administration, planning and monitoring of educational system, educational research, teaching and learning and commercial purposes.

In **Croatia** the Ministry of Science and Education forwards statistical data from its databases according to the request of institutions and private persons. Data refer to school institutions, teachers and pupils, as well as their grades and results they achieved at the State Matura exams. The data that is shared is aggregated and anonymous. The data is shared via web servers in a protected environment, and some information is available publicly. One of the example is [EMA- Education management application](#) for collecting data about teachers' professional development.

Finland mentions three ecosystems that are in use for data flows: [DigiOne ecosystem](#) (owned and developed by a few big cities/education providers), [MPASSid](#) (owned and developed by MoE and The National Agency for Education) and [Digital service package for continuous learning](#). These systems rely on data protection agreements, anonymization, encryption, and role-based access control to ensure that student data is handled securely and lawfully.

Monitoring of data management is conducted at multiple levels: Schools and education providers are responsible for local implementation and compliance; Municipalities oversee broader governance and infrastructure while National agencies, such as the Finnish National Agency for Education and the Office of the Data Protection Ombudsman, provide guidance and conduct oversight.

French Ministry of Education has a culture of collecting, producing and making data available to third parties through organised channels. Data flow exchange agreements between local and regional authorities were the subject of a report by the Inspectorate General for Education, Sport and Research in October 2022. An example of a data exchange project, [the IDEE program](#) facilitates access for researchers to administrative data on education, as well as to methodological tools and measurement instruments. The program also develops partnerships, training and research dissemination activities for the benefit of various stakeholders in National Education.

In **Greece** educational data (relating to the daily operation of the schools) are managed through the "Myschool" centralised information system of the Ministry of Education, Religious Affairs and Sports operated and managed by Computer Technology Institute and Press "Diophantus" – CTI. Several data flows are present in the Myschool system: data transfer when students change school or level of education; aggregated statistical data for MoE. Other systems are in use for collecting and exchanging data about teachers, single-sign-on service and educational content creation and sharing.

Student data in **Lithuania** is used for various purposes and by various entities in order to ensure a smooth educational process and the efficiency of the education system. First of all, the data is used by the schools themselves, organizing and managing the educational process (monitoring student progress, etc.), handling administrative matters and supervising school activities. Data monitoring is carried out centrally by the National Education Agency (NES) and the Ministry of Education, Science and Sports (MES), carrying out strategic planning and management of the entire education system. Various reports are published, including information on school achievements (information cards, etc.). Municipalities, being responsible for the supervision and financing of the activities of educational institutions, also actively use the data. Data can also be used by parents, students themselves, other institutions, such as healthcare institutions, the State Data Agency (Statistics Department) and research institutions. Part of the education data is publicly published on the state-run [Lithuanian Open Data Portal](#), and therefore can be used by various organizations for various purposes. For example, a private initiative to create [school rankings](#) using anonymized data (magazine "Ratings").

Norwegian Feide is a centralised identity management solution for the educational sector of Norway and is short for «common electronic identity management». With Feide, students and employees in the educational sector get one digital identity that gives them access to web services in the educational field. Feide simplifies authorisation and access control for third-party data providers. A service provider can register a data source, which can then be made available to other applications in the Feide ecosystem in a controlled manner.

Directorate-General for Statistics of Education and Science from **Portugal** described data flow in the [dissemination of national education statistics](#), by Statistics Portugal (INE). DGEEC is, in the context of official statistics on schools, students, teachers and staff, in non-tertiary education a data sender, and INE is the data recipient. Type of data that is shared: official education statistics – related to Portugal: schools, by level of education, type, number of students, by level of education,

type of school, type of courses, grade, sex, age, school results, number of teachers, by level of education, sex, age group, subject, type of school, qualifications, number of non-teaching staff, by sex, age group, type of school, qualifications, etc. Filled tables are then sent to INE, which inserts the information in its databases, and publicly disseminates the data (in different open and free formats).

In **Serbia**, the Ministry of Education through the Unified Information System of Education, collects data from the education institutions regarding the teaching staff, students, etc. The system of data collection is operated through an online portal with restricted access to specific school representatives on one end and the Ministry employees on the other. Aggregated data on the number (of schools, students, teaching staff, etc.) are made available publicly through the open data system published by the Ministry.

Central Repository in **Slovakia**, a [centralised electronic register](#), collects information about students and employees on a yearly basis. Schools regularly collect and store information on their students and employees through the use of school information systems. On the market, there are two main school information systems providers, [aScAgenda](#) and [eŠkola](#). These school information systems automatise administration and learning processes – school timetable, substituting, grading, etc. [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.

Slovenian OrKa is a tool for primary school practitioners to identify and ensure the quality of work in their schools. It provides a secure and confidential environment for accessing data and offers users an easy overview of pupils' performance in the national examinations at school and nationally. It allows a variety of comparisons: between pupils in the school and their peers in Slovenia, between departments or learning groups within the school, by year, etc. The teacher can prepare task-by-task analyses for his/her pupils and view the individual task with the solution and the digitised answers of the pupils.

Spain has a robust system for the collection and management of educational data led by the Ministry of Education, Vocational Training and Sports, through the Sub-Directorate General of Statistics and Studies and in collaboration with the autonomous communities. The [INEE \(National Institute for Educational Evaluation\)](#) coordinates the development of the State System of Education Indicators, a key tool for understanding the national educational reality and guiding political decisions. This system is based on the systematic collection of statistical data and their conversion into key indicators, in order to facilitate the design of evidence-based educational policies. It also allows for the monitoring of strategic objectives such as those of the EU 2030 framework and the UNESCO SDGs. In addition, INEE coordinates Spain's participation in international assessments and in the development of comparable indicators through the OECD's INES project, which are included in the Education at a Glance report.

Swedish schools and preschools (data providers) submit data to Statistics Sweden, which is responsible for collecting data on behalf of the National Agency for Education (data recipient). This

data includes administrative information, students' achievements and examination results, information about staffing, schools' finances and more, as regulated by specific guidelines. Statistics Sweden (data provider) transfers this data to the National Agency for Education (data recipient) who publishes the aggregated results as [Official statistics](#) and other statistics on their website.

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.

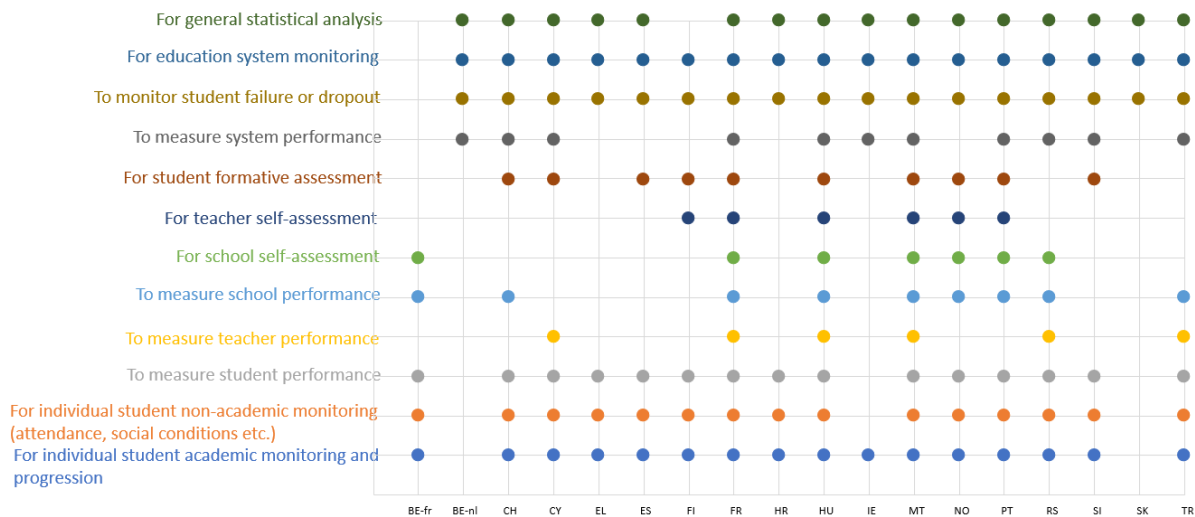


Figure 4. Purpose for collecting student data.

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 the individual level (student academic and non-academic monitoring, measurement of student performance) as well as at the 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 the 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), and academic orientation (10). They reported that they use the data least for: curriculum planning (4), stakeholder accountability (3) and district accountability (0).

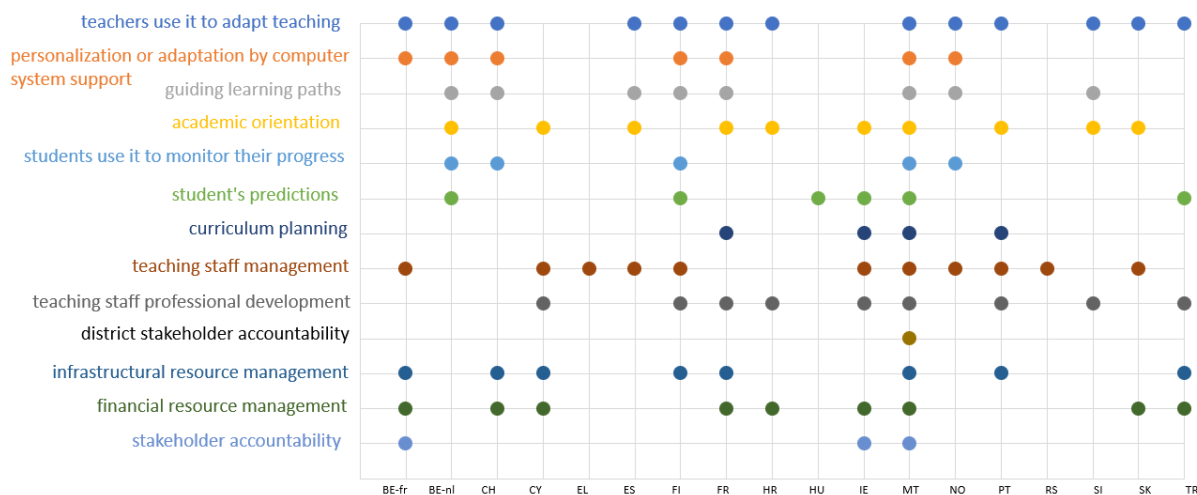


Figure 5. Mostly used forms of data use for learning

Regarding the use at the **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 organised 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;
- teacher's 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 databases 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 helping students in their school or study choice.

School management platforms or applications 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 the **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, HU, 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.

The Ministry of Education and Culture, Science and Technology of the **Czech Republic** has launched 2023 a project [Data-analytical support for evaluation and management of the educational system of the Czech Republic](#), the aim of which is to clarify and streamline the use of

data in the field of education so that there is more targeted support for schools, pupils and teachers.

In **Finland**, a comprehensive national project "Framework for Digitalisation in Early Childhood Education and Care, Comprehensive School Education and Liberal Adult Education" has been launched, aiming also to enable information management across sectors at various levels of administration and in intersectoral data flows.

French Digital Strategy published in 2023 mentions "Sharing indicators for management and evaluation purposes". One of the objectives is to produce the first version of a digital education dashboard. This digital education dashboard could be useful at both local and national levels. The first beneficiaries of this dashboard will be school managers, representatives of local authorities and representatives of the Ministry.

The data published by the **Spanish** Ministry does not only serve as a tool for transparency and accountability, but are also actively used by researchers, policymakers, and schools to guide pedagogical decisions, design support programs, and evaluate the effectiveness of interventions. Reports such as '[Panorama de la Educación](#)' or '[Las cifras de la educación en España](#)' allow for rigorous annual monitoring of the education system. The State System of Indicators is a key tool for converting the data collected into useful indicators for planning, evaluation and policy design. It allows the monitoring of the education system at all levels (local, regional, state and international), promotes transparency and supports the preparation of annual reports that influence political decision-making. Spain also uses these indicators to align its system with the priorities of the European Union (2030 Goals) and international organisations such as the OECD and UNESCO.

More information about the examples mentioned by some of the participating countries can be found in the final chapter.

Teachers' professional development

In the 2022 preliminary collection of information four main areas are recognised by the participating countries as most important for future development and research: data literacy, efficient data use, standardisation 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, and 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 Serbia, the SELFIE tool is also a recognized and recommended resource to be used by schools and teachers.

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 the 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.

The Institute of Educational Policy (IEP) in **Greece** is a scientific and research body that supports the Ministry of Education, Religious Affairs and Sports in matters related to primary and secondary education, teacher training, etc. It is running a series of seminars for teachers in order to contribute to their professional development (e.g. newly hired teachers have to undergo a seminar from IEP during their first year of service). CTI manages training and certification programs for teachers in the subject of how to use information technology in teaching (at level A, B1 and B2).

The **Lithuanian** education system is constantly improving teachers' data literacy by implementing various decentralized professional development programs, including it in teacher training studies and promoting the use of data systems in everyday work. One of the programs was implemented by the [Educational Technology Center](#). There is no direct "exam" for data literacy; teachers demonstrate their abilities through daily activities, for example, by filling in electronic diaries and other databases, analysing student progress data (e.g. achievement results, attendance), and making educational decisions.

Forms and frequency

Teachers' professional development for any topic, in participating countries, is more often organised on school and national level. On a national level in the form of Online course with or without mentors, Online lecture, or webinar and Face-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, CZ
Online course without mentors	ES, FI, HR, MT, PT	ES, FI, HR, PT	ES, FI, FR, HR	ES, FI, FR, HR, MT, NO, PT, CZ
Online workshop	FI, FR, HR, MT, PT, RS, SI	FI, FR, HR, PT	FI, FR, HR, PT, SI	FI, FR, HR, MT, RS, SI, CZ
Online lecture or webinar	ES, FI, HR, MT, RS	ES, FI, HR	ES, FI, HR, PT, CZ	ES, FI, HR, MT, PT, RS, SI, CZ
Online or hybrid conference	ES, FI, MT, PT, SI	PT, FI, ES	ES, FI, PT	ES, FI, MT, PT, RS, SI, CZ
Face-to-face conference	ES, FI, HR, MT, PT, SI	ES, FI, HR, PT	ES, FI, HR, PT, CZ	ES, FI, HR, MT, PT, RS, SI, CZ
Face-to-face workshop	FI, FR, HR, MT, PT, RS, SI, CZ	FI, FR, HR, PT, CZ	FI, FR, HR, PT, CZ	FI, HR, MT, PT, RS, SI

The most frequent form of teacher professional development in participating countries is Online course with mentors on the 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 a local level in the forms of Online course with mentors, Online lecture or webinar, and Online or hybrid conference on local and regional levels.

Teachers' professional development could be organised in different forms and with different length. Trainings are organised 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 have received 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 \(1st edition\)](#), MOOC [Design your School's Digital Plan \(4th Edition\)](#), SPOOC [Terms of use, BigData and network economics](#), NOOC [Quality of Digital Educational Resources: Accessibility \(1st edition\)](#).

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

Spain mentioned that all tutors must have completed a training course on online tutoring to provide adequate support to attendees. In Serbia, the 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.

In **Hungary**, Educational Authority offered accredited training courses in the field of measurement and evaluation: Student Assessment with Traditional and Online Tasks; TeachUp1 Formative Assessment and Personalized Learning in Practice; "Without a Red Pen" (Piros toll nélkül). They also provide several courses related to data literacy: Digital Databases in Education; Basic Data Protection Knowledge for Public Education Institutions.

Data Literacy

Combining inputs collected from thirteen countries we may describe Data literacy as a multifaceted competence that combines technical skills, critical thinking, and ethical awareness. Data literacy is the ability to read, understand, create, and communicate data as information ([DALI project](#)). It is essential for navigating the data-rich world we live in, enabling individuals to make informed decisions and contribute meaningfully to their fields.

Data Literacy descriptions

Each country has a unique approach to defining and integrating data literacy, reflecting their educational priorities and societal needs. Here we summarised keywords and aspects of data literacy the respondents to the questionnaire mentioned.

Table 3. Data literacy descriptions

Country	Description	Key aspects
Belgium-Flanders	The skill of transforming information into actionable instructional knowledge and practices by collecting, analysing, and interpreting data.	Combines data understanding with standards, disciplinary knowledge, curriculum knowledge, pedagogical content knowledge, and understanding of how children learn.
Croatia	The ability to derive valid information from data.	Part of digital literacy and learning analytics
Czech Republic	Not explicitly defined; focuses more on information literacy.	Includes gathering, storing, coding, and modelling data.
Finland	The ability to collect, manage, evaluate, and interpret information critically and effectively. Not explicitly defined.	Includes understanding data collection, analysis, presentation, and ethical, legal, and societal aspects. Part of multiliteracy.
France	Developing a data culture within public administrations.	Awareness of data's potential, legal and ethical issues, and project implementation using AI technologies.
Greece	The ability to read, write, and communicate data within a specific context. Not explicitly defined.	Understanding data sources, constructions, and analytical methods.
Norway	Acquiring, processing, interpreting, and assessing information from digital sources with digital judgment, means being able to follow rules for privacy and showing consideration for others online. Not explicitly defined.	Using and navigating digital resources, safeguarding information, and data security. Implicitly included in digital skills.
Portugal	Associated with understanding legal aspects related to personal data, and how personal data is used in the educational context, including learning platforms/tools for evaluation purposes. Not explicitly defined.	Emphasizes the importance of understanding personal data use in education.
Serbia	Skilled data analysis involving locating, selecting, interpreting, reading, merging, and presenting trustworthy data for professional tasks, decision-making, and everyday engagements, while critically assessing the	Locating, interpreting, and presenting data; critical assessment of data sources.

	reliability and validity of different data sources.	
Slovakia	Included in digital literacy. Not explicitly defined.	Focuses on the use and management of data, primarily for teachers.
Slovenia	Developing a data literacy framework as part of projects	In progress.
Spain	Developing a data literacy framework as part of projects	In progress.
Sweden	Included in digital literacy within the national curriculum.	Understanding digitalisation's impact, developing digital competence, and critical evaluation of information.

In most of the participating countries data literacy is present as part of the broader digital literacy frameworks. It is integrated into different subject curricula or cross-curricula topics with the aim to develop students' competences in handling data. Focus is often on understanding the legal implications of data use, including privacy and security.

It is important to acknowledge that various countries are currently undertaking projects that prioritise data literacy. Consequently, we may anticipate forthcoming modifications in the status of data literacy within national curriculums and frameworks.

Data Literacy competences

Although [DigCompEdu framework](#) does not explicitly mention data literacy, some statements are mentioned in the DigCompEdu proficiency [levels](#), like:

- Effectively protecting personal and sensitive data and restricting access to resources as appropriate.
- Evaluating a range of digital data to inform teaching
- Strategically employing digital tools for data generation
- Using digital data to reflect on learning patterns and teaching strategies
- Innovating data generation and evaluation
- Using digital data to enhance the effectiveness of feedback and support
- Using digital data to evaluate and improve teaching

We asked survey participants to reflect on a broader set of competences from the [Data Literacy Framework for citizens created in the DALI Erasmus+ project](#). [Although there are many more data literacy frameworks we chose this one as an example as it was](#) recently developed in the European Union and received positive feedback and interest from the educational community. Many more

The DALI Data Literacy Framework describes the competences that characterise a data-literate citizen. [The DALI Data Literacy Framework](#) comprises three main elements: Understanding Data,

Acting on Data and Engaging Through Data. A fourth transversal element Ethics & Privacy can be found in each of the three main elements because an ethical perspective underlies all the knowledge and skills and levels in the framework.

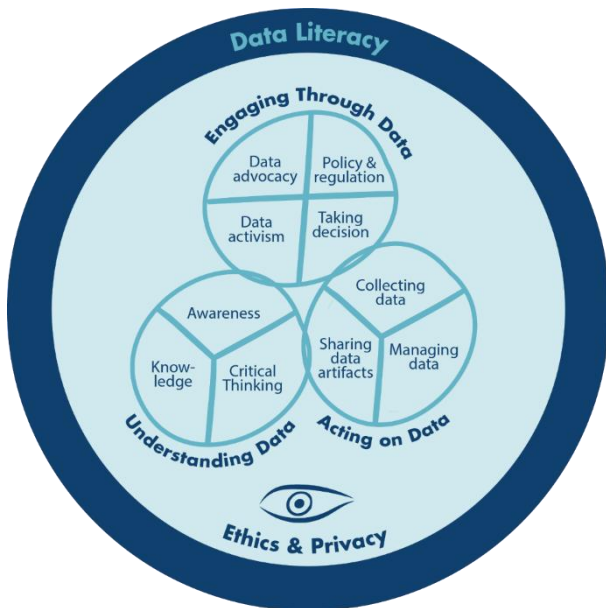


Figure 6. Illustration of DALI Data Literacy Framework ([Source project web page](#))

Here is a summary of competences listed in DALI Data Literacy Framework, a full list with all competences and indicators of progressive levels of data literacy expertise is available on the [project website](#).

Table 4. DALI Data Literacy Framework competences

Understanding data		
<p>Knowledge: Education stakeholders are knowledgeable about data forms, usage, sources, collection, technological requirements, processing, persistence, and security. They understand data sources, types, formats, and technologies used for data creation and use. They also understand data security, surveillance, and rights in big data.</p>	<p>Awareness: Education stakeholders are aware of the generation of data through apps, and websites, as well as the existence of their data profile. They are aware that data is a complex representation of reality, and has potential drawbacks in various sectors like health, education, economics, and security. They are also aware of the fact that data is monetized, and there are trade-offs when sharing data.</p>	<p>Critical thinking: Education stakeholders are able to critically analyse the relationship between humans and data, the decision-making process, data tools, targeted advertising, misrepresentation of data, and data monetisation, as well as the purpose of data collection and monetisation.</p>

Acting on data		
Collecting data: Education stakeholders can configure privacy settings, revoke access, request data erased, use collected data for behaviour change, and make informed decisions when interacting with data-collecting actors like mobile apps, internet portals, and employers.	Managing data: Education stakeholders possess skills in organising, processing, protecting, storing, moving, manipulating, evaluating data quality, and identifying misrepresentations of data.	Sharing data artifacts: Education stakeholders have the ability to synthesise, visualise, and represent data in various formats, translate data into everyday language, and share their data through an open repository.
Engaging through data		
Policy and regulation: Education stakeholders have the knowledge and skills to participate in data-based policy-making processes and interact with key stakeholders, such as data protection agencies, to resolve data use issues.	Taking decisions: Education stakeholders are equipped with the knowledge and skills to make informed decisions based on data analysis, balance individual and social benefits with data use risks, and understand their roles in acting on data from various perspectives.	Data activism: Education stakeholders can use data activism, enforce their data rights, and self-regulate their own data footprint.

We received information from twelve participating countries regarding the presence of some of the competences from the DALI framework in **teachers' professional development** in their respective countries. **The area that receives the most attention is "Understanding Data" specifically the sub-category of Knowledge.** There is relatively less focus on the area called "Acting on data," which is identified by nine countries. In contrast, the area called "Engaging through data," specifically related to Policy and legislation, and Data Activism is only addressed by three countries.

Understanding Data

- Knowledge: 12 countries
 - Belgium-Flanders, Croatia, Czech Republic, Finland, France, Greece, Norway, Portugal, Serbia, Slovakia, Slovenia, Spain
- Awareness: 10 countries
 - Belgium-Flanders, Croatia, Czech Republic, Finland, Greece, Norway, Portugal, Serbia, Slovenia, Spain
- Critical Thinking: 8 countries
 - Croatia, Czech Republic, Finland, Norway, Portugal, Serbia, Slovenia, Spain

Acting on Data

- Collecting Data: 9 countries
 - Croatia, Czech Republic, Finland, France, Greece, Norway, Portugal, Slovenia, Spain
- Managing Data: 7 countries
 - Croatia, Czech Republic, Finland, Greece, Portugal, Serbia, Spain
- Sharing Data Artifacts: 6 countries
 - Belgium-Flanders, Croatia, Czech Republic, Finland, Serbia, Spain

Engaging through Data

- Policy and Regulation: 3 countries
 - Croatia, Norway, Portugal
- Taking Decisions: 7 countries
 - Belgium-Flanders, Croatia, Czech Republic, Finland, France, Serbia, Spain
- Data Activism: 3 countries
 - Finland, Greece, Norway, Spain

On the level of competences differences are more visible.

Three of the most represented competences are from the area of Understanding Data:

- Education stakeholders know what data is, what form it takes and how it can be used in society: 9 countries
- Education stakeholders know how data can be collected from different environments: 9 countries
- Education stakeholders are aware that they generate data using apps, websites, driving their car, etc.: 9 countries

Three of the least represented competences are in the area of Acting on Data and Engaging through data.

- Managing Data - Education stakeholders have the skills to manipulate data - Spain
- Policy and regulation - Education stakeholders have the knowledge and skills to interact with key stakeholders (e.g., data protection agencies) as needed for the resolution of issues related to data use (their own or other's data) - Portugal
- Data Activism - Education stakeholders have the knowledge and skills to use data as a basis or activism for data engagement - Spain

A table with all competences and responses from the countries is presented in the Annex.

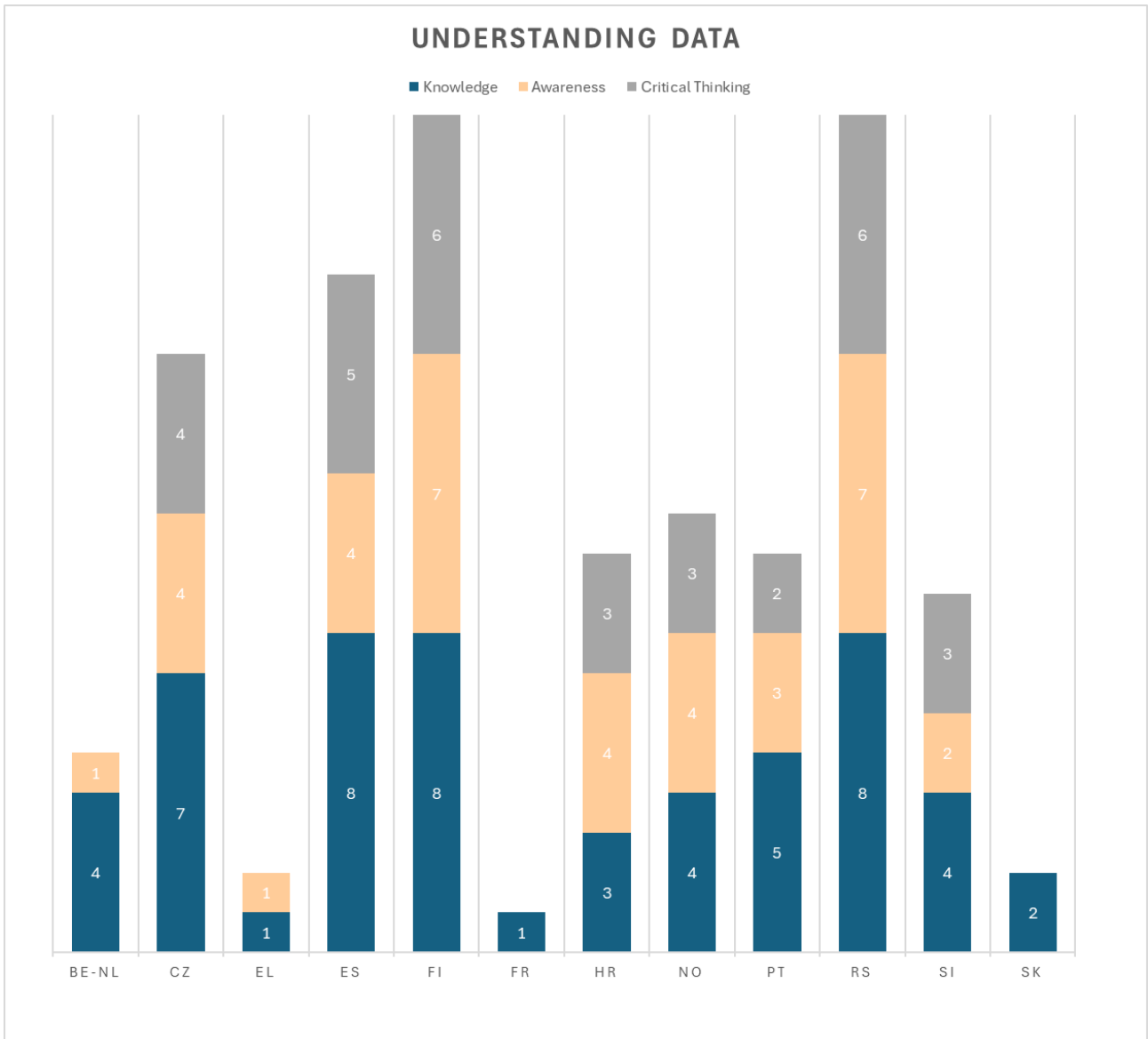


Figure 7. Number of competences marked in each sub-area of "Understanding data" per country

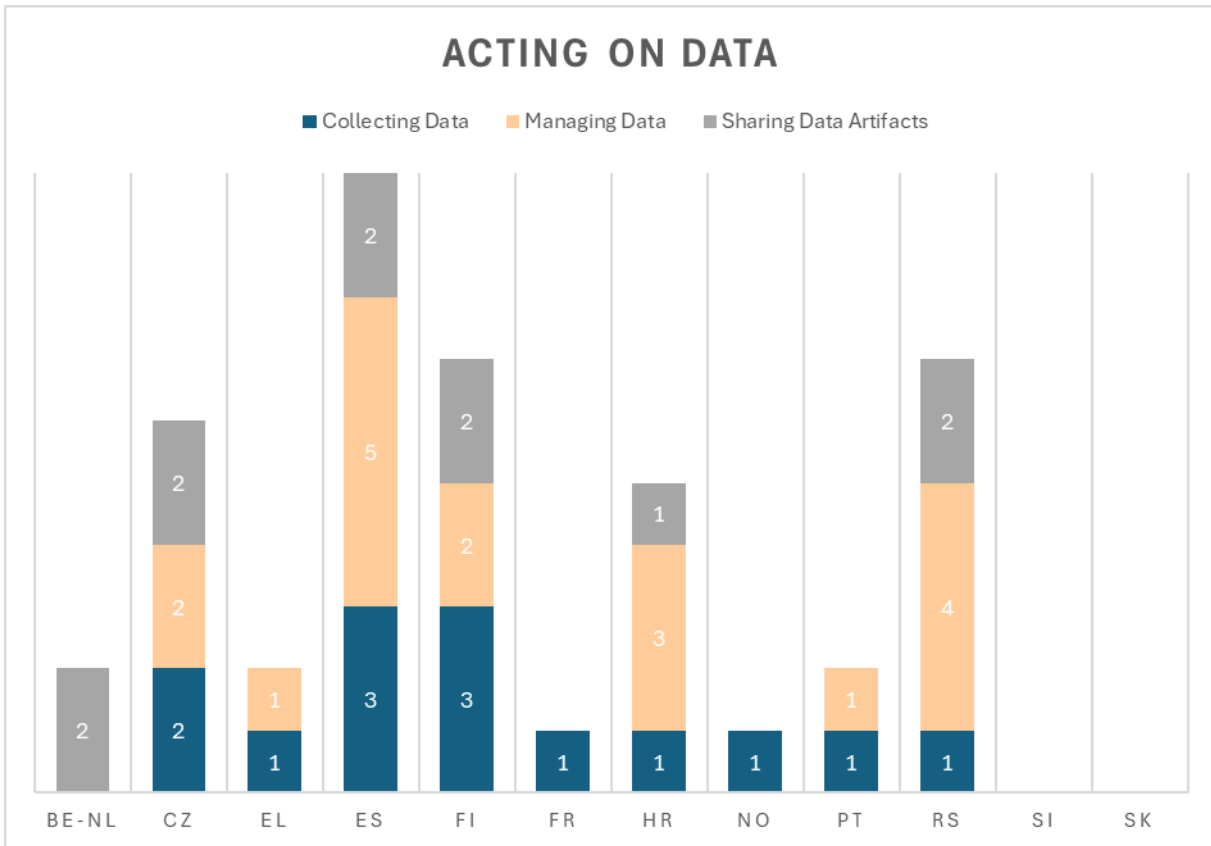


Figure 8. Number of competences marked in each sub-area of "Acting on data" per country

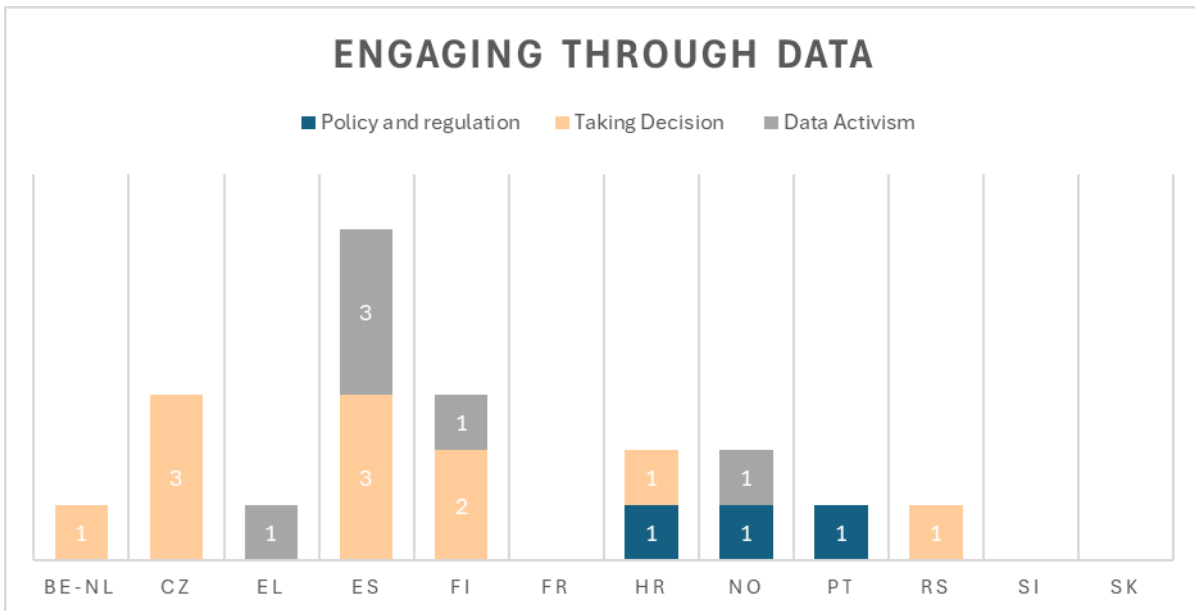


Figure 9. Number of competences marked in each sub-area of "Engaging through data" per country

Teachers' data literacy needs

According to the public authorities who replied to the questionnaire, there is a growing **growing recognition of the need for data literacy** as a vital ability for teachers across various countries. Shared aspects encompass the requirement for teacher training to provide educators with the essential abilities to proficiently analyse, interpret, and utilise data in educational environments. Many countries highlight the importance of using data to inform instructional practices, customise teaching to meet the specific needs of each student and enhance educational outcomes as a whole.

Nevertheless, there are **several challenges and gaps** that need to be addressed, including the absence of targeted training programs, difficulties in recognition of data literacy, and the necessity for continuing professional development. The integration of data literacy with digital literacy is given significant importance, with a specific focus on privacy, information security, and ethical considerations. In general, there is a deliberate endeavour to improve the understanding and utilisation of data among teachers. However, there is still a substantial amount of work that has to be done to tackle the current gaps and obstacles.

Belgium-Flanders

In Flanders, teachers and school leaders should be able to analyse and interpret data effectively, presenting it in clear formats and using visualisation tools. This involves presenting data in clear, understandable formats and using visualization tools to enhance comprehension, being able to assess and read dashboards and use different sources of learning data. , There exists a growing awareness of the significance of data-driven decision-making in educational contexts and comprehensive data literacy professional development (CPD) for teachers and school leaders , but there is a significant gap in providing teachers with the necessary skills and support.

Croatia

The necessity to provide additional training for teachers to discover and analyse meaningful information from databases, analyse it correctly, and use it effectively is recognised in Croatia. However, obstacles exist in data literacy, and teachers may not fully realise the benefits. The use of devices and the internet can also pose challenges. Continuous education of teachers for data literacy is necessary and it can help overcome those obstacles.

Czech Republic

Tackling data in relation to social networks is one of topic in focus in Czech Republic as it is a controversial topic ever-present in the lives of youngsters and adults alike that overlaps with technical, ethical, philosophical, and psychological (...) questions. Importance of the artificial intelligence was also mentioned.

Finland

Data literacy skills are recognised as crucial for Finnish teachers as a way of ensuring understanding data collection, management, and processing, as well as the benefits and drawbacks of different data uses. Currently, only a small group of experts are involved in quality data collection and sharing but additional efforts for enhancing skills in data management are in progress.

France

Currently, French teachers are mainly trained in data protection. There is no specific data training, but rather training in critical thinking, pedagogical practices or digital tools that enable teachers to develop a data culture. However, through Artificial Intelligence Partnerships teachers are becoming familiar with other aspects, e.g. using digital data to reflect on learning patterns and teaching strategies.

Greece

Currently, professional development opportunities on data literacy topics for Greek teachers are very limited, but knowledge, awareness, managing data and decision-making areas are getting into focus.

Norway

The Norwegian Government aims to achieve 2030 goals in data management and digital literacy, focusing on privacy, information security, and universal design in digital solutions used in kindergartens, schools, and afterschool activities. These solutions should facilitate holistic interaction between administration, service areas, owners, managers, staff, students, and the home. Data sharing and use should be ethically and securely managed, and the sector should have digitalization-friendly regulations. Collaboration on standards and best practices will ensure simple and safe digital solutions can be used together to adapt to different needs.

In 2023, an expert group appointed by the Norwegian Government launched an Official Norwegian Report on learning analysis, recognizing the need for teacher competence development. These include critical assessment, analytical competence, ethics and privacy, and the disappearance of the distinction between school and home in digital learning environments.

Portugal

The areas of data literacy that need priority to develop teachers' capacity are the use of digital data to reflect on learning patterns; strategically employing digital tools for data generation; the use of digital data to guide learning pathways; teaching strategies and the use of digital data to enhance the effectiveness of feedback and support; using digital data to evaluate and improve teaching.

Serbia

The Midterm Plan of the Ministry of Education for 2024-2026, aligned with the implementation of the Education Strategy in the Republic of Serbia until 2030, emphasizes priority measures outlined in the updated Digital Competences Framework for Teachers. This framework prioritizes

enhancing teachers' competences for hybrid teaching and fostering the use of self-evaluation tools for digital competences, among other key areas. Additionally, given the recent introduction of the central information system in education, there's a notable interest in improving data management practices.

Slovakia

Professional development for Slovakian teachers have been focusing on the use of digital technologies and tools in education, without a lot of emphasis on data literacy so far.

Slovenia

The framework for developing digital competencies is lately covering the topic of data literacy, so more CPD is expected. Many unstructured data are collected in education that could be processed and used for enhancing the quality of education including Learning analytics.

Spain

Data literacy is becoming more and more present in the Spanish curricula thanks to the emphasis placed by the new education law (LOMLOE) and the Spanish Framework for the Digital Competence of Teachers (MRCDD). Data protection, management, privacy, security, and digital well-being are recognised as important for teachers at four levels: as individuals, as members of an educational community, and as professionals within the classroom. As well as raising awareness about profiling, predictions and automated decision making which can lead to inequality.

Some examples of data literacy professional development programs

Belgium Flanders

The Flemish Department of Education and Training is organising a network day on data literacy with focus on elementary schools. The Central Testing support centre is taking various initiatives around data literacy, such as e-courses, inspiration guides, doctoral studies, etc. The school advisory services have received specific funding for the policy priority on data literacy.

Croatia

Teachers have the possibility to participate in various international Massive Open Online Courses, which cover topics such as how to use digital technologies to access information to enhance teaching and learning practices, to communicate with and support students and parents effectively, and to share and learn with colleagues and others beyond the school for example, organised by European Schoolnet.

Cyprus

Key thematic areas for data literacy integrated into teachers' training programmes, courses, and interventions include:

- Digital Learning Environments
- Effective Use of Digital Tools

- STEM/STEAM Education and Data Integration
- Assessment Methodologies Utilizing Digital Technologies
- AI in Education: Learning for AI and Learning with AI
- Ethical, Safe, Fair, Inclusive, and Responsible Use of Digital Technologies, Environments, and Immersive Technologies (e.g., AI, XR)
- Media Literacy
- Cultivating Multiple Literacies in conjunction with Digital and Data Literacy

Czech Republic

Some activities are organised by The Czech National Coalition for Digital Skills and Jobs (DigiKoalice). Data forms part of many seminars that do not explicitly mention it as it is a ubiquitous topic in ICT.

Finland

The Finnish National Agency for Education annually funds around 200 in-service training for the educational sector. For several years, part of the funding has been allocated to enhancing digital competence, which among others includes some competences related to data and data economy, possibilities of utilizing learning analytics, data-driven decision-making, understanding the principles of artificial intelligence and its pedagogically appropriate use. Data literacy is not explicitly in the curriculum but is embedded in broader digital competence and multiliteracy. Teachers choose their CPD topics; employers are responsible for ensuring competence. Training topics include AI, data economy, cybersecurity, and ethical data use.

The Finnish National Agency for Education has annually supported the in-service teacher training with approximately 15 million euros in state grants, but this funding has been discontinued as of the beginning of 2025 in accordance with the government's savings program.

France

Since 2018, teachers have been trained to use data in compliance with the GDPR, in various ways depending on the local education authority.

Norway

The Norwegian Directorate for Education and Training has developed a Professional Digital Competence Framework for Teachers based on national regulations, guidelines for teacher education programmes, the national curriculum, the Basic Skills Framework, and the National Qualifications Framework, as well as input from the scientific community, teacher educators and syndicates. Framework includes several areas that are connected with data literacy, such as: understanding the impact digital development has on the upbringing of children and young people, reflecting on ethical and legal issues using learning analysis and artificial intelligence, applying and teaching rules about privacy, data security, copyright and source criticism.

Portugal

Teachers' Digital Empowerment plan is in implementation by The Directorate-General for Education (DGE) in collaboration with the "Centros de Formação de Associação de Escolas" (CFAE - Schools Association Training Centres). That plan covers some aspects of data literacy, like importance of comprehending the utilisation of personal data within the educational framework, encompassing learning platforms which collect student information for assessment purposes, digital tools that collect useful data to assess and provide further and important information regarding students' learning performances.

The Directorate-General for Education (DGE), in collaboration with the National Cybersecurity Centre (CNCS) and the National Data Protection Commission (CNPd), has issued a set of recommendations and guidelines to be considered in the use of distance learning support technologies.

DGE, through the SeguraNet Awareness Centre, is promoting teacher training courses and workshops on Digital Citizenship. One of these courses focuses on Data Protection and Cybersecurity in Schools. This course is being delivered by Schools Association Training Centres (CFAE).

Serbia

The catalogue of professional development programs for teachers includes numerous accredited programs on the topic of improvement of digital competencies and use of ICT in teaching.

Slovakia

The National Center for Digital Transformation of Education offers a 50-hour professional development titled "School digital transformation" based on DigComp. In one of the modules, the participants learn how to collect data about the state of their schools and how to set smart goals. Furthermore, the Center organises webinars about cybersecurity.

Slovenia

Several projects are tackling data literacy, such as: ORCA - data processing, data use, and data visualisation on national examinations; Project DALI4US: data analytics, collecting data; processing and analysing data, clustering; data mining using AI principles, visualisation and discussion.

Spain

Continuous professional development offered by the Ministry of Education, VET and Sports (INTEF-National Institute for Educational Technologies and Teacher Training) covers examples of how data is used for learning. Several courses with focus on data literacy are organised: SPOOC Digital respect and personal data protection, MOOC Educating on digital safety and privacy, NOOC Minors and online safety etc.

Sweden

One of the goals required to achieve a university degree as a qualified teacher includes aspects of digital literacy: demonstrating the capacity to use digital aids assuredly and critically in educational processes and taking into account the significance of the role of different media and digital environments in this respect.

More details about countries' responses are available in sections dedicated to each country.

Enabling and challenging elements

Enablers

The effective use of digital data in education depends on various **enablers** recognised 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 recognised 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 recognised 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.

One of the enablers in **Slovakia** would be a newly established National Center for Digital Transformation of Education aiming to create a sustainable ecosystem supporting the digital transformation of education by organising professional development and creating materials in the domain of digitalisation.

The **Swedish** National Agency recommends that schools and suppliers use Swedish Standard the SS12000 that covers the areas of data transfer between systems. It was initially developed to standardise data transfer between systems within the same school organisation. The National Agency has followed this standard when implementing the national digital testing platform where national standardised student tests are conducted.

There is a process of stabilization of teachers in **Spain**, promoted by Law 20/2021, which aims to reduce the high rate of temporary employment and offer greater job stability to teachers. This measure seeks to ensure that temporary employment in public employment does not exceed 8%, thus complying with European guidelines. To achieve this, merit-based competitions and extraordinary competitions have been launched to regularize the situation of thousands of teachers who had been on temporary contracts. This results in a more stable workforce that favours the functioning of schools and a more harmonized capacity building of teaching staff. Additionally, continuous teacher training in digital skills has become a national priority. Digital teacher certification programs ensure that teachers can effectively take advantage of the technological tools available and encourage the development of digital skills in students.

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 utilisation 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, LT, 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 regulations or ethical considerations, and 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, LT, NO, SI, SE)

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, LT, 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, LT, 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, SE, 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).

Standardisation 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), and learning analytics at the country level (FI, HU, SI, PT).

Artificial intelligence implementation includes the use of data to personalise 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, standardisation** (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, SE, SK, HR), more regular monitoring, evaluation and forecasting (MT).

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 and new initiatives will help us understand the potential and possible enhancements for supporting the efficient and meaningful use of data in education.

The three agile cycles of information collection showed that changes regarding data use, especially data literacy, and education management information systems are happening in almost all countries. In most of the participating countries data literacy is present as part of the broader digital literacy frameworks. It is integrated into different subject curricula or cross-curricula topics with the aim to develop students' competences in handling data. Focus is often on understanding the legal implications of data use, including privacy and security with many countries developing and implementing projects that prioritise data literacy and innovative data collection and exchange approaches in primary, secondary education following priorities in Erasmus+ calls for funding (e.g. 8-ERASMUS-EDU-2025-PI-FORWARD-DIGITAL-DM).

The use of data for learning faces numerous challenges across education systems, including a general lack of understanding among stakeholders about digital transformation and the role of data, which leads to uncertainty and resistance. Concerns about data sharing, reputational risks, and outdated or restrictive legislation further complicate efforts. Ethical issues, incomplete datasets, and the potential for bias in algorithms also hinder progress. The absence of universal standards for data governance and interoperability, combined with the complexity and autonomy of education systems, makes coordination difficult. Regulatory barriers, accessibility requirements, and market dynamics limit innovation and diversity in educational services. Additionally, limited financial and human resources, insufficient professional development, and teacher workload contribute to low data literacy and slow adoption of data-driven practices.

The effective use of digital data in education across various countries is supported by a range of enablers, including strategic planning, legislation, funding, technological infrastructure, and professional development. Some countries have implemented national frameworks and action plans to integrate digital technologies, while others have invested in innovation systems and AI partnerships. Platforms for assessing digital competences support data-driven education. Key infrastructural elements like national identification systems and data exchange standards are in place in more and more countries. Professional development initiatives, including teacher training and digital certification programmes, are prioritised contributing to a more consistent and digitally skilled educational workforce.

Data gathered on the use of digitally processed information for educational purposes from 2022 to 2025 indicates that this is a very dynamic domain, characterised by numerous ongoing projects

focused on educational data and data literacy, with the emergence of new rules, reports, and support measures.

Country information and examples

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 the extraction of specific figures and comparison with other institutions. [Dataloep](#) offers citizens, researchers, and 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, several tools can be used in education for adaptation by computer system support. Some examples of **Adaptive platforms 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.

In Flanders, LeerID, the single sign on solution for compulsory education, was launched in 2022. Pupils get a LeerID account that they take with them throughout compulsory education. This account contains a unique identifier. In addition to authentication, in the short term addition of an API is planned, that allows schools to share certain pupil data with educational applications after the school's agreement. This way, the applications will get advance notice of which pupils to expect, and pupils can then log in very easily using their LeerID username and password. All connected applications are treated equally and have access to the same pupil data subject to the school's agreement.

LeerID is in a growth process where we try to respond to the needs of the education landscape. The importance of transparency on data sharing is increasing step by step. A cybersecurity action plan is set up, in which the whole GDPR legislation has an important place, highlighting the importance of privacy and how to deal with it. This action plan is being rolled out gradually to keep it manageable for schools. Further exploration of the principle of a Smart Data Space with associated data vaults is also going forward.

From 18 October 2024, the European NIS2 directive is officially part of Belgian legislation and apply to a large group of companies. For education, it stipulates in most cases that they must comply with the basic level. Through the cybersecurity action plan of the Knowledge Centre Digisprong (part of the Flemish Department of Education & Training), the Flemish government wants to support compulsory education in Flanders to meet this basic level.

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 the 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.

On the website of the Ministry of Science and Education is available various data that is used for policy making at different levels or to do scientific research. CARNET's Department of Research on Digital Technologies in Education uses publicly available data on schools, employees and students published in the [School e-Mine](#) during the design and implementation of the research. It also collects data on the subjects of the educational process as well as on the educational process itself through its research. It is important to emphasize that all ethical guidelines and norms as well as GDPR rules are respected during the research.

Cyprus

Cyprus is using graded access to ensure appropriate data processing (e.g., at the 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/organisational measures.

The [eΔEA System](#) (Electronic Administration of Education), a comprehensive digital platform developed by the Ministry of Education, Sports and Youth of Cyprus, was launched with the aim to facilitate the management of educational processes and student data across all levels of public education. The system collects a wide range of student-related data, including personal information. During the current phase of implementation, it is used to manage the student enrolment and transfer procedures through electronic application submissions, document uploads, and tracking of application progress. It will gradually expand to manage student academic records (grades, attendance, assessments, and promotions), administrative planning (timetables, exam scheduling, and academic calendar) and more.

Data is exchanged electronically between schools, the Ministry, parents/guardians and school administrations via a dedicated portal. All collected data is stored securely within centralized Ministry systems under controlled access conditions. Information is retained for as long as required by law and educational policy. The Ministry enforces strict security measures to ensure student data is protected from unauthorized access or misuse. The system is accessed only by authorized users (educators, administrators, guardians) under role-based permissions. The system is compliant with Cyprus data protection laws and GDPR. Users of the system must accept and adhere to privacy policies and terms of use to maintain data confidentiality and integrity.

The 2022 preliminary collection of information, in which CYPRUS participated, identified key priorities for future development and research as recognized by participating countries. These priorities include data literacy, efficient data utilization, standardization and interoperability, and the implementation of artificial intelligence. What follows, outlines how CYPRUS has subsequently addressed these considerations, particularly in the domain of teachers' professional development in data literacy.

Cyprus Pedagogical Institute (CPI), the constituent body of the Ministry of Education, Sport and Youth (MoESY), responsible for the in-service professional development of teachers, spearheads these efforts. Recognizing that digital competence—which encompasses data and information

literacy—is a critical skill for educators, CPI’s strategic planning for professional development in digital technology and data literacy is firmly grounded in established frameworks. These include DigComp 2.2 (for citizens), DigCompEdu (for educators), and DigCompOrg (for educational organizations), and have recently been augmented by UNESCO’s AI Competence Framework for Teachers and Students.

Within this strategic context, CPI undertakes the following core activities:

- **Comprehensive Training Programmes:** organizes and delivers a range of training opportunities for in-service teachers. These include compulsory and optional courses, as well as targeted intervention programmes implemented directly within schools.
- **Sustained Professional Growth:** supports the continuous professional development of educators by providing essential resources. This includes access to qualified facilitators, support personnel, expert trainers, and appropriate tools, all designed to enhance teaching and learning methodologies and ensure a holistic educational experience for both teachers and students.

Key thematic areas for data literacy integrated into these training programmes, courses, and interventions include:

- Digital Learning Environments
- Effective Use of Digital Tools
- STEM/STEAM Education and Data Integration
- Assessment Methodologies Utilizing Digital Technologies
- AI in Education: Learning for AI and Learning with AI
- Ethical, Safe, Fair, Inclusive, and Responsible Use of Digital Technologies, Environments, and Immersive Technologies (e.g., AI, XR)
- Media Literacy
- Cultivating Multiple Literacies in conjunction with Digital and Data Literacy

Czech Republic

Some activities are organised by The Czech National Coalition for Digital Skills and Jobs (DigiKoalice). Data forms part of many seminars that do not explicitly mention it as it is a ubiquitous topic in ICT.

Based on its findings and conclusions from various types of national and international evaluation activities, the Czech School Inspectorate prepares and makes available relevant data and information about education in the Czech Republic for further use. In his outputs, he strives to look at educational topics through the lens of the situation in individual territories, in the broader context of educational contexts and factors that influence education. The goal of the Czech School Inspectorate is to offer the public an interesting tool that can be used to support education in the Czech Republic and in efforts to continuously improve its quality and effectiveness in relation to all relevant contexts. vzdelavanivdatech.cz

Finland

Basic education in Finland is organised 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 [Qridi](#). 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 organisation, 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 familiarise 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](#).

Few resources about data protection in education, confidentiality of information, and processing of personal data (in Finnish and in Swedish):

- <https://www.oph.fi/fi/uutiset/2023/opetushallitus-paivittanyt-verkkosivuilleen-ohjeistusta-koskien-salassapitoa>
- <https://tietosuoja.fi/-/apulaistietosuoja-valtuutettu-on-tehnyt-opetushallitukselle-aloitteen-opetuksessa-kayttavien-sovellusten-henkilotietojen-kasittelysta>
- <https://www.oph.fi/fi/tilastot-ja-julkaisut/julkaisut/julkisuus-ja-tiedonhallinta-opetustoimessa>
- <https://www.oph.fi/fi/uutiset/2023/teosten-kaytto-opetuksessa-helpottunut-kopiosto-ja-opetushallitus-kokosivat-ohjeet> (copyrights in education)
- <https://www.edilex.fi/uutiset/85093> (Administrative Court: Espoo violated data protection in basic education)

The government program for the term 2023-2027, published in 2023, includes the following entry:

"The government will enhance the authority of teachers and principals to address disruptive behaviour and activities during school hours. The government will enact necessary legislative changes to more effectively restrict, for example, the use of mobile devices during the school day, thereby strengthening students' focus on learning."

Data Flow examples

DigiOne ecosystem (owned and developed by a few big cities/education providers):

- <https://www.digione.fi/digione-eng/>
- <https://www.digione.fi/ekosysteemi/> (roles and data flows in Finnish)
- https://www.digione.fi/wp-content/uploads/2023/04/DigiOne-ekosysteemin_pelisaannot_2_0.pdf (the common rules in Finnish)

MPASSid (owned and developed by MoE and The National Agency for Education):

- <https://www.oph.fi/en/finnish-national-agency-education-services/mpassid>
- <https://wiki.eduuni.fi/display/OPHPALV/MPASSid+data+model+1.3>

Digital service package for continuous learning

- <https://okm.fi/en/project?tunnus=OKM069:00/2021>

However, In Finland, a comprehensive national project has been launched in the field of education called the "[Framework for Digitalisation in Early Childhood Education and Care, Comprehensive School Education and Liberal Adult Education](#)."

The goals of the project are:

- To establish a common direction for the development of digitalization in early childhood education, pre-primary and basic education, as well as liberal adult education.
- To promote equitable implementation of digital learning nationally and to strengthen digital competence comprehensively.
- To define common rules and operating models for the development of digital services and to develop appropriate allocation of resources.
- To create interoperable and comprehensive data foundation as well as analytics for decision-making support.
- To enable information management across sectors at various levels of administration and in intersectoral data flows.
- To support guidance and practical implementation of digitalization in the sectors in the future.

Data literacy is not explicitly in the curriculum but is embedded in broader digital competence and multiliteracy. Teachers choose their CPD topics; employers are responsible for ensuring competence. Training topics include AI, data economy, cybersecurity, and ethical data use.

The Finnish National Agency for Education has annually supported the in-service teacher training with approximately 15 million euros in state grants, but this funding has been discontinued as of the beginning of 2025 in accordance with the government's savings program.

Updated Guidelines and Resources (2023–2024)

1. [Confidentiality and Data Protection in Education](#)

The Finnish National Agency for Education (EDUFI) has updated its online guidance on confidentiality and the handling of personal data in schools. These updates clarify how schools should manage sensitive information and ensure compliance with data protection laws.

2. [Deputy Data Protection Ombudsman's Initiative](#)

This initiative addresses the use of educational apps and the processing of students' personal data. It encourages schools and education providers to assess the legality and transparency of digital tools used in classrooms.

3. Publication on Publicity and Information Management in Education

This document provides practical guidance for schools on managing public records, data access, and information security. It supports transparency while protecting student privacy.

4. Copyright Guidelines for Education

Developed jointly by Kopiosto and EDUFI, these guidelines help educators understand how to legally use copyrighted materials in teaching.

Finnish [Espoo Data Protection Violation](#) is interesting case where a significant precedent was set by the Supreme Administrative Court of Finland (KHO) in a case involving the City of Espoo's handling of student data in basic education (KHO:2024:73). The case concerned the use of a digital platform in which students' personal data was processed without sufficient legal basis or

transparency. The court found that Espoo had failed to adequately inform students and guardians about the nature and purpose of the data processing.

The court emphasized that data minimization and transparency are essential under the GDPR. It ruled that students and guardians must be clearly informed about what data is collected, how it is used, and who has access to it. The lack of proper documentation and consent mechanisms was a critical failure.

The decision reinforced that municipalities must ensure all digital tools used in education comply with data protection laws, even when developed or procured externally. This case has prompted many municipalities and schools to re-evaluate their data governance practices, especially regarding third-party digital services and platforms.

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.

Digital Strategy published in 2023 highlights one example of educational data use: Sharing indicators for management and evaluation purposes. One of the objectives is to produce the first version of a digital education dashboard. The aim is not, however, to release a vast amount of data, but rather to help education players evolve culturally and technically, so as to turn this information into a “strategic educational asset”. A case-based approach is favoured to demonstrate the benefits of making better use of indicators. This digital education dashboard could be useful at both local and national levels. The first beneficiaries of this dashboard will be school managers, representatives of local authorities and representatives of the Ministry. Its extension to other beneficiaries may be studied.

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 personalised 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.

The MOE has a culture of collecting, producing and making data available to third parties through organized channels. **Data flow** exchange agreements between local and regional authorities was the subject of a report by the Inspectorate General for Education, Sport and Research in October 2022. There's a difference between the use of management data for day-to-day monitoring of the statistical situation of the education system, and data that can be described as public: available to the greatest possible number of people, via the "open data" datasets notably on the « data.gouv.fr" site. While the data sets available in "open data" already offer a high level of school data qualification, they do not fully meet the expectations of local authorities, who are looking for either a level of detail (granularity) in the information that is not available through open data. The management data expected by local authorities often involve personal data which, is not available in open data sets. The first step in institutional collaboration is the agreement of July 27, 2015. Its aim is to standardize the volume and quality of information exchanged, to enable different decision-makers to dialogue more effectively in order to build coherent and efficient policies based on selected, documented and commonly recognized data. It is also a basis for contractualization, in accordance with the rules of statistical privacy and confidentiality, and the express commitment not to transfer data to third parties. clarifications are provided on the nature of the data that can be transmitted by each level of production, the uses to which it may be put, and the parties authorized to receive this material:

- by the directorate of evaluation and forecasting (DEPP): central nomenclature bank, academic and ministerial directory of educational establishments, consulting and mapping of schools on registration application, the central steering bank with reserved access, and self-evaluation of schools with reserved access, high school evaluation indicators, enrolment forecasts;
- by all local education authorities: the restricted register of staff with reserved access, the anonymous file of secondary school pupils and courses attended, local data files on public secondary schools, files for counting the number of scholarship-holders financial accounts file, academic MEFs, examination results, student flows, enrolments and intake capacities;
- by certain local education authorities, according to very strict standards, data relating to guidance;
- by the regions: the human resources and real estate data file, the health and social training social training courses, the detailed apprentice survey file, the official accommodation inventory, digital facilities and aid to high-school students.

An example of a data exchange project, [the IDEE program](#) facilitates access for researchers to administrative data on education, as well as to methodological tools and measurement instruments. It also aims to build capacity and structure partnerships for translational research between education professionals, policy-makers and research laboratories.

Greece

In Greece, data management is organised 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. In addition, new project is in plan to use data from the "Myschool" information system together with AI techniques, in order to facilitate /propose vocational guidance for students.

In Greece, **Data flows** exist at various levels. When students change schools either due to relocation or after changing levels (e.g. from primary level school to secondary level school) all their data is **transferred to the new school** (data flow internal to the "Myschool" information system).

Every semester (three semesters at the primary level and two semesters at the secondary level) grades are distributed to the parents/guardians of the students. The data are stored in the "Myschool" information system and printed in each school. There is a plan to make this an electronic service where parents/guardians will be able to retrieve the grades of their kids.

Data about completing the secondary level education is used to create an official digital certificate of completion of the secondary level education. The data flow is from "Myschool" to an electronic service hosted under the gov.gr domain (<https://www.gov.gr/ipiresies/ekpaideuse/apophoitese-apo-skholeio/psephiako-apoluterio-gumnasiou-lukeiou>).

At a central level the Ministry of Education, Religious Affairs and Sports, has access to **aggregated and statistical data** and uses it to make policy as well as strategic/tactical decisions, in order to face various situations. The data flow is from "Myschool" to a dashboard application used by the Ministry.

A "sister" information system (also centralised, and operated/managed by CTI), OPSYD, manages information about teachers who have no permanent position, and apply for a **teaching position** every year). This information system receives their applications and produces an ordered list based on the criteria imposed by the law, to from the lists from which teachers are called to duty.

Parallel to the "Myschool" information system CTI operates and manages (for the Ministry of Education, Religious Affairs and Sports) the Greek/Hellenic School Network, which interconnects the schools to the internet and offers a variety of digital/network services (communication, informational, hosting, e-learning etc.). The Greek/Hellenic **Schools Network** manages accounts (username/password) for all the teachers/educators and all the students/pupils and offers a Single

Sign-On (SSO) service that authenticates users to services. The authentication data flow transfers data (authentication verification and identification data) to the other services. One such flow is from the SSO towards "Myschool" which authenticates school accounts to use and update this information system. Vice versa, "Myschool" transfers to the Greek/Hellenic Schools Network, information about the teachers and the pupils such as their school/class, their teaching subject, their role etc., so that this information can be sent together with the authentication verification to the services that can make use of them (i.e. the asynchronous learning service eclass.sch.gr organises electronic classes and users according to their class in the school, and provides teachers with privileges to their "electronic" classes, equivalently the e-me digital educational platform (e-me.edu.gr), of the digital school (dschool.edu.gr), uses this information to organise cells and assign teachers and students to them.

Education content is hosted in Photodentro (<http://photodentro.edu.gr/>), of the digital school (dschool.edu.gr); an aggregator of electronic educational content, including digital copies of the educational books distributed and used in physical form in schools. Content from this aggregator can be and is embedded in other educational or hosting services. For example the aforementioned eclass.sch.gr and e-me.edu.gr, as well as

In Greece, data management is organised at the central level by the Ministry of Education, at the regional level by the regional education directorates, and at the 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.

Finally the Greek/Hellenic schools network, offers some services, for video and presentation creation, that are used by teachers to create and upload them. These can then be embedded to services (as mentioned above, for the content hosted in the Photodentro aggregator). In this case, however the content is produced by users/teachers alone and is not part of any official curriculum.

The Institute of Educational Policy (IEP); a scientific and research body that supports the Ministry of Education, Religious Affairs and Sports in matters related to primary and secondary education, teacher training, etc. is running a series of seminars for teachers in order to contribute to their professional development (e.g. newly hired teachers have to undergo a seminar from IEP during their first year of service. CTI manages training and certification programs for teachers in the subject of how to use information technology in teaching (at level A, B1 and B2).

All of the aforementioned information systems / services are operated and managed, on behalf Ministry of Education, Religious Affairs and Sports, by Computer Technology Institute and Press "Diophantus" - CTI.

Hungary

Hungary's [National Strategic Plan for Achieving the Objectives of the Digital Decade Policy Programme 2030](#), as outlined in Decision (EU) 2022/2481 of the European Parliament and of the Council (14 December 2022); Publication of the Digital Hungary Agency, dated 04.12.2023.

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.

Hungarian and international regulations:

- Regulation (EU) 2016/679 of the European Parliament and of the Council (GDPR)
- Act CXII of 2011 on the Right of Informational Self-Determination and Freedom of Information
- Act CXC of 2011 on National Public Education.
- Government Decree 229/2012 (VIII. 28.) on the implementation of the Act on National Public Education
- EMMI Decree No 20/2012 (VIII. 31.) on the operation of educational institutions and the naming of public educational institutions

The management of data is carried out at school and country level. In data processing, there are two types of records: local institutional records and data processing in the central education administration records. Schools record and manage pupils' personal data, school-student legal relationship related data and academic progress related data.

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.

Data collection and processing at the institution is carried out in accordance with the law and the institutions' data management policies. Central data processing and responsibilities are laid down in legislation, laws and regulations. At the level of the public administration, the lawfulness of data processing is verified by an authority. During institutional school-based local administration, parents also have access to a 'parent module', which allows them to track their child's academic progress and provide feedback regarding the data.

Key legal relationship and personal data within the public education central register are accessible to the new data-managing institution when a student transfers or progresses within public education. Higher education maintains a separate register. Some public education data, such as matriculation exam results, are accessible to higher education institutions using the educational

identification number. The Educational Authority can link data from various specialized systems based on the educational identification number.

Examples

National Public Education Portal (<http://www.nkp.hu>): Offers numerous downloadable textbooks and digital learning materials, multimedia content, animations, simulations, videos, and smart collections not tied to paper educational tools, tests, and assignments that support the processing of study material, primarily aiding independent knowledge acquisition.

Textbook Catalogue (<https://www.tankonyvkatalogus.hu/>): An online catalogue of official textbooks and supplementary materials for the 2025/2026 Academic Year.

The **KRÉTA Foreign Language Preparation Module (KRÉTA-IFM)** is a tool that supports the development of English, German, French, and Spanish language skills through individual learning. It provides a modern interface with playful, engaging tasks to foster language competencies. The IFM (Foreign Language Preparation Module) is accessible to students both from the KRÉTA Digital Collaboration Space (DKT) and directly from the Foreign Language Preparation Module Student Interface website, using the students' KRÉTA login credentials.

The **Public Education Information System (KIR)** is operated by the Educational Authority (Oktatási Hivatal). KIR is a nationwide electronic registration and data provision system built upon data supplied by those involved in public education tasks. https://www.oktatas.hu/hivatali_ugyek

The **Higher Education Information System (FIR)** is a central registry that consolidates the institutional and personal data of higher education into a single IT system, making it centrally accessible in one place. FIR contains personal data as defined by Act LXXXIX of 2018 on Educational Registration, as well as non-personal data specified in Government Decree 87/2015 (IV. 9.) on the implementation of certain provisions of Act CCIV of 2011 on National Higher Education. The student and higher education staff personal registries are based on institutional data provision, which means a one-time upload of necessary data and continuous updating of the uploaded information. Higher education institutions can submit data to FIR through their academic systems. The reliability of the data is ensured by FIR accepting only data authenticated with a digital signature.

Professional development and Data literacy

The **Pedagogical Service Centre (POK)** conducts a training needs assessment biannually, covering broad areas such as digital and mental well-being. Within the **Educational Authority (OH)**, a pedagogical evaluation working group operates, with one representative from each regionally responsible POK as a member.

In 2023: the expert advisory network was operational, and institutions requested advice, which the POKs recorded on the SZIF electronic interface. In the area of pedagogical measurement and evaluation, assistance was requested 1973 times in 2023, with 119 of these requests fulfilled.

Regarding the early warning system for dropout prevention, expert advice was requested 563 times.

During the school year opening event series and the autumn and spring pedagogical professional days, there were local presentations on this topic, for example, the utilization of national digital measurement results was a key subject.

In 2023, the Educational Authority offered accredited training courses in the field of measurement and evaluation:

- Student Assessment with Traditional and Online Tasks:
- TeachUp1 Formative Assessment and Personalized Learning in Practice:
- A 10-hour online mini-course for educators, titled "Without a Red Pen" (Piros toll nélkül), was also advertised by expert advisors.

Frequency: These courses are organized more than five times a year.

Training courses related to data literacy listed in the professional development register for teachers for the 2025/2026 school year:

1. Digital Databases in Education (blended learning)
2. Basic Data Protection Knowledge for Public Education Institutions
3. Preparation for Performing Pedagogical Measurement and Evaluation Expert Advisory Tasks
4. Preparation of Directors for Performing Tasks Related to Institutional Self-Evaluation and Inspectorate Supervision

New Professional Development Regulations from 1st January 2025

The system for teacher professional development in Hungary is being reformed starting from the **2025/2026 academic year**, with the entry into force of a new government decree (419/2024. (XII. 23.)), which took effect on January 1, 2025, replacing the previous regulation that had been in force since 1997.

In the new system, the former seven-year, 120-hour professional development cycle is replaced by a five-year cycle, during which teachers must participate in different types of training:

- Content Renewal Training: This provides subject-specific knowledge, and teachers must complete at least 60 credits from it within the cycle.
- Optional Professional Development: This develops knowledge and skills necessary for the teacher's educational work, and a maximum of 60 credits can be counted from it.
- Trainee Training: Teachers in the Trainee (Gyakornok) grade must participate once in a 15-credit training during their traineeship, provided by the National University of Public Service.

Under the new regulation, teachers must complete a total of 120 credits, with at least 15 credits per year. Those who have reached the age of 55 before the start of the given academic/educational year are exempt from the professional development obligation.

The content basis for the training courses is formed by the **National Core Curriculum**, the **National Core Programme for Kindergarten Education**, and the **matriculation/school leaving examination requirements**. In religious institutions, this may be supplemented by theological training from recognized churches. Special rules apply to special education teachers, psychologists, those working in art schools or pedagogical professional services, and religious instructors.

The aim of the training courses is to foster the development of teachers' methodological culture, their adaptation to changing expectations, and the expansion of their subject-specific knowledge.

Changes to Principals' Training

Training for principals has also been renewed. The previous two-year, self-funded public education leadership training is replaced by a one-year, free public education principal training, organized exclusively by the Educational Authority (Oktatási Hivatal).

Principals of kindergartens and schools had the opportunity between April 1-30, 2025, to select the mandatory and optional professional development courses for their teachers for the 2025/2026 academic/educational year via the Educational Authority's online platform, choosing from programs registered in the Teacher Professional Development Information System (PIR) by March 31.

From September 1, 2025, content renewal training courses will be organized by the National University of Public Service (Ludovika), while training courses supporting teachers' other competencies will be organized by the Educational Authority.

Detailed information about the new system is continuously provided on the [Educational Authority's website](#).

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.

Lithuania

Development of EMIS

The Education Management Information System (EMIS, <https://www.svis.smm.lt/en/>) in Lithuania is a key tool for systematically collecting, analysing, and systematizing education data related to the operation and development of the education system. It serves as a centralized data repository, allowing for monitoring and assessing the state of education at the national level. The initial vision in 2006 was formulated as a single, stable, reliable, secure, and easy-to-use centralized application and set of integrated databases and applications housed in the Ministry of Education and Science (MES) and accessed via the Internet.

EMIS collects data that includes information about students (demographics, attendance, achievements such as exam results, etc.), teachers, schools, curricula, textbooks, SEK, family data from social databases, social insurance, and others. All data are integrated per person ID but can only be used anonymously.

The system is accessible to all schools, municipalities, county and ministry providers, and users, with permissions appropriate to their level of responsibility within the system. The data (covering about a 20-year period) from EMIS is used differentially by various groups:

- **Non-registered users:** Access to municipalities and school profiles, and all levels of indicators.
- **Registered users:** Additional access to data by level, years, and place.
- **Specific registered users** (e.g., research groups, policy analysis groups, Statistical Department): Access to raw data tables.

Today, EMIS data is quite comprehensive and consolidates data from the entire Lithuanian education system, combining it with data from other systems per person, helping to base management decisions on data using various indicator systems. The information provided by SVIS is public (anonymized).

EMIS is continuously updating its software and data. One of the plans for the next update is to use AI for analysing data.

Strategic developments

Currently, more and more attention is paid to data-based decision-making. It is increasingly emphasized that the educational process, school management and even education policy must be based on data. More and more attention is paid to scientific research through the [Lithuanian Science Council](#), as well as through the [National Education Agency's](#) structural project aimed at studying the factors of student achievement.

By implementing various decentralized qualification development programs, more and more investments are being made in teachers' digital competence (Data literacy is part of digital competence). One of programs was done by [edtech centre](#).

Data platforms are being improved, they are being supplemented with more functionalities. More and more attention is paid to individual learning, providing the opportunity to more conveniently monitor individual student progress. For example, the e-diary TAMO <https://www.tamo.lt/> has started offering real analytics tools (for a fee), allowing you to see subject grades, averages, and their comparison with the class and school averages. It is planned to also offer more detailed analyses that help identify learning gaps and strengths. The biggest challenge remains the practical integration of data into teachers' daily work and the full exploitation of the potential of essential data at all levels of the education system.

Legislation, governance and data use

As in other countries, the Education Law and the Data Protection Law are the main legislative acts for education data in Lithuania. Additionally, Lithuania has the Statistical Law, and all information systems must have their own regulations defined by system regulation acts. The main governing bodies are the Ministry of Education (main), schools, and the National Education Agency as managers.

In Lithuania, student data is processed both centrally and decentral. Centralized data processing is carried out through the [student register](#), which is administered by the National Education Agency. This register collects and processes essential and standardized data about all Lithuanian students, including personal identity data, learning progress, results (e.g., exams), educational programs, etc. Each school, as an independent data controller, processes a large part of specific student data for its own needs. This includes daily data such as attendance records, permanent grades, comments, individual progress monitoring, specific data related to additional activities, projects, internal events, and various documents. Most often, schools use external supplier systems such as electronic diaries (e.g., TAMO, Mano dienynas) to process data.

Thus, centralized systems ensure a common nationwide student accounting and statistics collection, while decentralized management at the school level allows for efficient management of the daily educational process and provision of individualized assistance to each student. Both of these levels are necessary and complement each other. Data exchange between systems is carried out, but not in real time

Student data in Lithuania is used for various purposes and by various entities in order to ensure a smooth educational process and the efficiency of the education system.

First of all, the data is used by the schools themselves, organizing and managing the educational process (monitoring student progress, etc.), handling administrative matters and supervising school activities.

Data monitoring is carried out centrally by the National Education Agency (NESA) and the Ministry of Education, Science and Sports (MES), carrying out strategic planning and management of the entire education system. Various reports are published, including information on school achievements (information cards, etc.).

Municipalities, being responsible for the supervision and financing of the activities of educational institutions, also actively use the data. Data can also be used by parents, students themselves, other institutions, such as healthcare institutions, the State Data Agency (Statistics Department) and research institutions.

Part of the education data is publicly published on the state-run Lithuanian Open Data Portal <https://data.gov.lt/>, and therefore can be used by various organizations for various purposes. For example, a private initiative to create [school rankings](#) using anonymized data (magazine "Ratings").

Professional development and Data literacy

The Lithuanian education system is constantly improving teachers' data literacy by implementing various decentralized professional development programs, including it in teacher training studies and promoting the use of data systems in everyday work. One of the programs was implemented by the [Educational Technology Center](#)

Lithuania has established teachers' digital competence literacy requirements (corresponding to DigCompEdu), which also include data literacy. These requirements are set in various documents and integrated into teacher professional development systems. There is no direct "exam" for data literacy; teachers demonstrate their abilities through daily activities, for example, by filling in electronic diaries and other databases, analysing student progress data (e.g. achievement results, attendance), and making educational decisions.

Enablers and Obstacles

The main factors influencing data application are related to legal regulation and GDPR, the development of technological infrastructure and digitization, proper data standardization, institutional cooperation, and increasing data literacy of users.

The main obstacles hindering effective data application can be associated with concerns about data protection and privacy, low data literacy, and a lack of resources in data analytics, incompatibility of data from different systems, and effective data utilization (data exists, but it is not always used).

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.

[Feide](#) is a centralized identity management solution for the educational sector of Norway and is short for «common electronic identity management». With Feide, students and employees in the educational sector get one digital identity that gives them access to web services in the educational field. Feide simplifies authorization and access control for third party data providers. Requesting access and starting to use third party data sources on the Feide platform is straightforward for application developers. A service provider can register a data source, which can then be made available to other applications in the Feide ecosystem in a controlled manner. These data sources can also benefit from access control using Feide in a simple way.

In 2006 the Norwegian Directorate for Education and Training launched a national Framework for Basic Skills, namely oral skills, reading, writing, digital skills and numeracy. The Framework was renewed in 2020. It is a tool for subject curricula groups appointed by the Norwegian Directorate for Education and Training to develop and revise National Subject Curricula.

Data literacy is not mentioned explicitly in the Framework. However, some descriptors under several sub-categories of Digital skills in the Framework refer to it implicitly as follows:

- Use and understand means being able to use and navigate digital resources inside and outside the network and safeguard information and data security.
- Search and process means being able to acquire, process, interpret and assess information from digital sources, apply source criticism and use source references. Information from

digital sources can be information from text, sound, image, video, symbols, interactive elements or raw data from registrations and observations.

- Produce means being creative with the use of digital resources. This involves creating digital products using digital resources, either through innovation or further development and reuse.
- Communicate and interact means using digital resources for communication and interaction. Digital interaction involves the use of digital resources for planning, organizing and carrying out learning work together with others, for example through joint writing and sharing.
- Digital judgement means being able to use follow rules for privacy and showing consideration for others online. It is about using strategies to avoid unwanted incidents and showing an ability for ethical reflection and assessment of one's own role online and in social media.

The Norwegian Directorate for Education and Training has developed a [Professional Digital Competence Framework for Teachers](#). The Framework was first launched in 2017 and renewed in 2024. It is based on national regulations, guidelines for teacher education programmes, the national curriculum, the Basic Skills Framework, and the National Qualifications Framework, as well as input from the scientific community, teacher educators and syndicates.

Data literacy is not mentioned explicitly in the Norwegian Professional Digital Competence Framework for Teachers. However, the following statements under several areas in the framework refer to it implicitly:

- The teacher understands how artificial intelligence can change the way we relate to knowledge.
- The teacher understands the impact digital development has on the school and the teaching profession.
- The teacher understands the impact digital development has on the upbringing of children and young people.
- The teacher understands principles in programming and the role of algorithms in society.
- The teacher can contribute to the development of pupils' skills in algorithmic thinking.
- The teacher is familiar with the guidelines on information security and privacy.
- The teacher can reflect on ethical and legal issues using learning analysis and artificial intelligence.
- The teacher can apply and teach rules about privacy, data security, copyright and source criticism.
- The teacher develops and manages their own digital identity.
- The teacher can contribute to the pupils' development of digital judgement.
- The teacher can critically assess and benefit from artificial intelligence, learning analysis and adaptive teaching aids.
- The teacher understands how artificial intelligence challenges existing and creates new opportunities for learning.

- The teacher can use varied forms of feedback and assessment for learning in digital environments.
- The teacher keeps abreast of national governing documents and current regulations on learning and teaching in digital environments.
- The teacher understands how artificial intelligence challenges the role of the teacher and the school.

The Norwegian Professional Digital Competence Framework for Teachers is a guidance document that policy developers, heads of department, teacher educators, teachers, student teachers and others can use as a reference in their work on improving the quality of teacher education and systematic continuing professional development of teachers.

The Framework is applied in:

- 1) Developing common national frames and directions for teacher education through the preparation and further development of framework plans and guidelines for teacher education.
- 2) Planning and implementing initial and continuing teacher education through the preparation of local programme plans, and the provision of continuing professional development.
- 3) Evaluating and following up on teachers' professional digital competence through the further development of digital forms of assessment and self-evaluation tools for teachers, as well as surveys of the status of digitalisation in the teaching profession and teacher education.

The Framework also forms the basis for the CPD of school leaders in developing digitally mature schools.

In 2023 Norway launched a new national [Strategy for Digital Infrastructure and Competence Development in Kindergartens and Schools](#). The strategy does not explicitly mention data literacy as a part of teacher's competence since in Norway responsibility is on school leaders and school owners, as well as on the national level. However, here are some of the ambitions for the year 2030 when it comes to data management and digital literacy, that might indirectly have an impact on teachers as well:

- All digital solutions used in kindergartens, schools and afterschool activities meet the requirements for privacy, information security and universal design, and have been assessed and managed to ensure documentation requirements, data control and inspection requirements.
- Digital solutions for learning, management and administration facilitate holistically interaction between the levels of administration, service areas, owners, managers, staff, students and the home.
- Sharing and further use of data in the kindergarten and school sector takes place within the ethical framework and secure frameworks and regulations for the processing of personal data.

- The kindergarten and school sector has digitalisation-friendly regulations.
- Collaboration on standards and the development of best practices means that digital solutions simple and safe can be used together to adapt to different needs.

In 2023 the expert group appointed by The [Norwegian Government launched an Official Norwegian Report on leaning analysis](#). Following needs for teacher competence development have been recognized:

- Critical assessment - teachers must be able to critically assess the academic and pedagogical regulations that are built in digital resources and the associated learning analysis.
- Analytical competence - teaching aids with learning analysis will give teachers and teach different types of reports at the individual and group level, which are based on analysis of activity data from the teaching materials, possibly supplemented with other data. Teachers need to develop analytical competence for assessing and translating data from such dashboards to pedagogical practice.
- Ethics and privacy - teachers must have competence in ethics and privacy to determine what is right to do based on analyzed data. They must also have knowledge of the educational regulations and acts. Another ethical challenge of importance for privacy is that the distinction school, as the place of learning, and home, disappears in digital learning environments.

The Directorate for Education and Training has developed several online competence development packages for teachers with regards to professional development and data literacy. The Norwegian Directorate for Education and Training is assigned to considering the consequences of removing digital skills as one of the five basic skills for the youngest students.

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 (2nd, 5th and 8th 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 3rd 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 - 2nd cycle and 3rd 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.

Description of the information circuit for official education statistics, including the reporting of data to the [National Statistics Institute](#) (INE).

Data flow: Dissemination of National education statistics, by Statistics Portugal (INE).

Context of data sharing: Official statistics on schools, students, teachers and staff, in non-tertiary education.

Data sender: Directorate-General for Education and Science Statistics (DGEEC).

Data receiver: Statistics Portugal (INE).

Type of data shared: Official education statistics – related to Portugal and NUTS II - on:

- schools, by level of education, type, ...
- number of students, by level of education, type of school, type of courses, grade, sex, age, school results, ...
- number of teachers, by level of education, sex, age group, subject, type of school, qualifications, ...
- number of non-teaching staff, by sex, age group, type of school, qualifications, ...

Legal background: Regarding National statistics, DGEEC as an ONA (Other National Authority), for making Portuguese education statistics available to institutions and the general public.

[Methodological document](#)

Technical: The datasets on national education statistics are obtained from the validation/ confirmation of data reported by or collected from schools. Queries to those “major” data sets allow the filling of the tables previously sent by Statistics Portugal (INE) to the Directorate-General (DGEEC). Filled tables are then sent to INE, which inserts the information in its Databases, and publicly disseminates the data (in different open and free formats).

The training of trainers is a key component of the Portuguese [Teachers’ Digital Empowerment Plan](#) and it was prepared and implemented by DGE.

The aim of **Teachers’ Digital Empowerment** is to empower and motivate teachers to improve and enhance their digital skills which enable them to, confidently, use digital technologies for the benefit of high-quality education and training;

In what regards the Teachers’ Digital Empowerment, DGE, together with the “Centros de Formação de Associação de Escolas” (CFAE - Schools Association Training Centres), has asked teachers of basic and secondary education, working at state schools in mainland Portugal, to complete a questionnaire based on the self-reflection tool Check-In, developed by the Joint Research Centre (JRC). This tool has been ratified in several European Union countries, including Portugal, and is backed up by the DigCompEdu (Digital Skills Reference Framework). In Portugal, it has been made available by the Aveiro University. This diagnosis tool not only enables teachers to identify his/her level of digital proficiency but is also a central element to be considered in the training process of the different groups of teachers who enrolled in the training workshop classes. These training classes have been structured and oriented towards three levels of digital proficiency - levels 1, 2, and 3.

Out of a total of approximately 111 891 teachers, 99 760 participated in this self-reflection process that took place in 2021. In terms of the results obtained through the Check-In tool, 26% of the respondents were positioned at level 1, 65% at level 2, and 9% at level 3.

To cover the total number of teachers in the education system in mainland Portugal, it became necessary to prepare trainers with a previously defined profile identified by the School Association Training Centres (CFAEs). The number of teacher trainers needed was estimated based on the ratio of the number of teachers from the associated schools to the corresponding CFAEs. This selection process was based on a pre-edited and approved reference document named “Teacher

Trainer Profile". The training of trainers is a key component of the Teachers' Digital Empowerment Plan. In other words, only trainers with high digital proficiency and trained for the appropriate pedagogical integration of digital technologies in teaching and learning qualify to promote the development of teachers' digital skills, specified in the different areas of the DigCompEdu reference tool.

The training frameworks developed were theoretically supported by DigCompEdu and DigCompOrg. All the frameworks were submitted to the Conselho Científico-Pedagógico da Formação Contínua (the Scientific and Pedagogical Council for Continuous Training) for accreditation and were duly approved.

To train these trainers, DGE has streamlined the course "Training Trainers for the Teachers' Digital Skills", and, currently, there is a total of 926 certified trainers.

The accreditation processes regarding the teacher training workshops were conceived for three levels of proficiency, in order to target homogeneous groups of trainees, positioned at the same global digital skills levels (e.g. initial, intermediate, and advanced).

Similarly, the "Preschool Education Teachers' Digital Training" intends to provide early childhood educators with digital skills, so that they can meet the challenges of the 21st century and integrate digital environments into their teaching practice, given the principles set out in the Curriculum Guidelines for Preschool Education (2016).

As a complement to the training guidelines and to the training that DGE has provided to all trainers in terms of their adequacy to the different curricular contexts, a commitment to produce and make available new reference resources for the preparation and dynamization of the training workshops has arisen. Therefore, Teachers' Training Modules were designed, according to the specific curricular fields, and prepared by trainers, of recognized prestige in the different areas, with the help of the "Centros de Competência para as Tecnologias da Informação e Comunicação" (CC TIC - Information and Communication Technologies Skills Centres). In other words, only trainers with high digital proficiency and trained for the appropriate pedagogical integration of digital technologies in teaching and learning qualify to promote the development of teachers' digital competencies, specified in the different areas of the DigCompEdu reference tool.

In what concerns Teacher Digital Empowerment Training Courses, during teacher training sessions, the data literacy subject could be addressed as trainers emphasize the importance of comprehending the utilization of personal data within the educational framework, encompassing learning platforms which collect student information for assessment purposes. In fact, included in the Portuguese training framework the topic "Learning assessment: Exploring digital assessment strategies. Improving assessment approaches through digital solutions and Critical reflection on digital assessment strategies. Innovation in learning assessment using digital solutions" (Levels 1 and 2), allows teacher trainers to focus on digital tools that collect useful data to assess and provide further and important information regarding students' learning performances.

It should be noted that the subject of digital literacy is not addressed as topic in itself. During the training sessions, some questions associated with digital literacy occur and the teacher trainers addressed them integrated in other contents (e.g. learning platforms which collect student results and “performance”).

The Directorate-General for Education (DGE), in collaboration with the National Cybersecurity Centre (CNCS) and the National Data Protection Commission (CNPD), has issued a set of recommendations and guidelines to be considered in the use of distance learning support technologies. These recommendations and guidelines have been disseminated to all Portuguese School Clusters. This working group will continue to collaborate, with a focus on supporting schools and emphasizing teacher training in the areas of Cybersecurity and Data Protection.

DGE, through the [SeguraNet Awareness Centre](#), is promoting teacher training courses and workshops on Digital Citizenship. One of these courses focuses on Data Protection and Cybersecurity in Schools. This course is being delivered by Schools Association Training Centres (CFAE).

Schools Associations Training Centres (CFAE) can also develop other actions for teachers’ digital development, according to the schools' needs and interests.

New indicators have been included in the '[InfoEscolas](#)' and '[InfoCursos](#)' portals to better assess the contribution of each school or tertiary education institution to improving the quality and equity of Portugal's education and training system, as well as the satisfaction of its students' educational needs. For instance, indicators have been defined to evaluate the academic performance of student groups in relation to their socio-economic characteristics in general secondary education courses, the difference is considered between the average marks actually achieved and the 'expected' marks (taking into account schools with similar proportions of students benefiting from school social support and/or similar levels of parental education). The availability of regional data also enables school principals and other members of the educational community to compare and interpret their school's results in light of the results observed in the regional where their institution is located.

The longitudinal database (DataDGEEC) is a system that collects and stores information about individuals involved in formal education processes, such as students, teachers, non-teaching staff, and schools. This information is protected and anonymised, and a unique identifier is assigned to each individual. This identifier allows individuals to be monitored throughout their education and training process, at different levels of education, and possibly even in their future roles within the education and training system, whether as a student or as a member of the workforce (teacher or non-teacher). Since the data is anonymised, not only does it allow General-Directorate for Education and Science Statistics technicians to conduct longitudinal information analysis processes more efficiently but also allows this information to be used by different user profiles – Academia, individual researchers, etc. in a safe centre environment.

Regarding the processes of follow-up, *monitoring and evaluation of public policies*, the improvement of the capacities of DGEEC employees at the following levels should be referred: a)

ability to identify the main objectives and most relevant issues associated with each implemented policy measure; b) defining questionnaires that allow the collection of administrative or statistical data (the latter from schools) necessary for monitoring / evaluation public policy measures at any given time; c) analysing the collected information and producing detailed reports containing the main conclusions;

d) presenting data, indicators and conclusions in formats other than formal text reports in PDF format. Examples of this include the DGEEC's monitoring of the Learning Recovery Plan (Escola +) and the A+A Plan (Aprender Mais e Agora).

Serbia

In accordance with the Strategy for Education 2030, digitalisation is one of the main priorities of the education system—particularly in strengthening IT capacities at both the institutional and teacher levels, improving IT infrastructure in schools, and developing digital services for data management. These include systems such as JISP (Unified Information System of Education), ES Dnevnik (Electronic Grade Book), and similar platforms, as well as the use of digital textbooks.

The legislative framework for these developments is provided by the aforementioned strategy and its accompanying action plans, the Law on the Foundations of the Education System, and the Bylaw on the Unified Information System of Education. Over the years, these systems have been established and become fully operational. Since 2023, they have been enhanced with new features—primarily aimed at parents (timely access to information) and teachers (reducing administrative burden). One notable recent development in the system is the availability of aggregated data from ES Dnevnik to the Ministry of Education. This data has the potential to complement existing mechanisms (e.g. JISP) and to contribute to more informed decision-making at the system level.

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.

Through the **Unified information system** of Education, Ministry of Education collects data from the education institutions regarding the teaching staff, students, etc. The system of data collection is operated through online portal with restricted access to specific school representatives on one end and the Ministry employees on the other. Aggregated data on the number (of schools, students, teaching staff, etc.) are made available publicly through the open data system published

by the Ministry. The legal background is provided by the Law on Education System Foundations and Bylaw on Unified Information System of Education.

The electronic grade book (Serbian: ES Dnevnik) is a software solution that has replaced the traditional paper-based grade book in schools across Serbia. It enables teachers to record students' grades, absences, homework, and disciplinary measures, while reducing administrative workload.

Parents are given direct insight into their child's progress through a dedicated portal, where they can monitor grades and absences, receive notifications, and communicate with the school (e.g., by scheduling consultations with teachers during available time slots). Parents and other legal guardians can only view their own child's records, and students also have access to the platform. Teachers, on the other hand, can only view and edit grades for the subjects they teach. Their administrative tasks are further simplified by the ability to directly generate and print required reports. The platform has seen some recent changes. One of the recent enhancements that has been announced includes enabling the Ministry of Education to access aggregated statistical reports on key educational indicators in real time – without access to any personal data of students, parents, or teachers. Direct links to the portals are as follows: [for schools](#), and [for students and parents](#).

Data literacy in a narrow sense is mentioned as one of the [key cross-curricular competence for students](#). It is described as: to skilfully locate, choose, interpret, read, merge and present data using textual, numerical, diagrammatic, and audiovisual forms; to understand the importance of using trustworthy data for professional tasks, decision-making, and everyday engagements; to critically assess the reliability and validity of different data sources. As such, this competence is set as one of the key outcomes of education. It is perceived that this competence cannot be achieved through specific subject but rather through connecting different subjects' contents, use of different teaching and learning methods, etc. However, this competence is not part of the teacher competence frameworks as such although it is implicitly perceived as key competencies need for active participation in the contemporary society.

On the other hand, one of the eight areas of digital competences of teachers recognised in [Digital competence framework for teachers](#) is **digital environment** which encompasses competencies to ensure safety and security, information management, the application of artificial intelligence, ethical utilization of digital content, data and digital device protection and storage, student well-being, and societal contribution. To illustrate, at an advanced level, the digital competence of teachers in managing information involves fostering an educational setting where students can critically engage with information, construct and create digital content innovatively, and solve digital environment problems while upholding ethical principles. This may include tasks that require fact-checking statements in posts or web pages related to their subjects, critically assessing the reliability of sources, and highlighting potential biases or inaccuracies. Similarly, within the second area, **digital resources**, teachers are expected to have competencies to search, select and evaluate digital resources for professional purposes. This also include some competence

that can be considered as data literacy. In Serbia, the SELFIE tool is also a recognized and recommended resource to be used by schools and teachers.

The recently endorsed [Midterm Plan of the Ministry of Education for 2024-2026](#), aligned with the implementation of the Education Strategy in the Republic of Serbia until 2030, emphasizes priority measures outlined in the updated [Digital Competences Framework for Teachers](#). This framework prioritises enhancing teachers' competences for hybrid teaching, and fostering the use of self-evaluation tools for digital competences, among other key areas. Additionally, given the recent introduction of the central information system in education, there's a notable interest in improving data management practices.

Slovakia

Since 2004, the financing of schools and school facilities has been carried out in accordance with Act No. 597/2003 Coll. on Financing of Primary Schools, Secondary Schools and School Facilities, as amended, and Government Regulation No. 630/20008 Coll., which lays down details of the breakdown of funds from the state budget for schools and school facilities, as amended.

According to § 7 par. 4 of Act no. 597/2003 Coll., founders of schools, schools or school facilities are obliged to provide by 30 September of the calendar year the number of children or pupils according to the status as of 15 September of the beginning school year and other data necessary for the breakdown of funds. The data is collected by direct entry into a centralised electronic register, the Central Repository.

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.

In the past two years "SELFIE for schools" was disseminated among approximately 2,000 Slovakian schools. Aggregated data received from the SELFIE team will be used to compare the schools' score from the beginning and end of a project that equipped schools with digital technologies.

Central Repository, a centralised electronic register, collects information about students and employees on a yearly basis. More information can be found [on this portal](#). Schools regularly collect and store information on their students and employees through the use of school information systems. On the market, there are two main school information systems providers, [aScAgenda](#) and [eŠkola](#). These school information systems automatize administration and learning processes – school timetable, substituting, grading, etc. The commercial providers are responsible for safe data storage.

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. More information on the national testing can be found [on this portal](#).

In the education sector, we currently register 32 statistical surveys, of which one survey is carried out on a five-year cycle, one survey on a two-year cycle, two surveys are carried out quarterly and the others are carried out annually. The following list contains all statistical surveys in the education sector. These data are collected and analysed through Slovak Centre of Scientific and Technical Information:

- Quarterly report on work in education
- Quarterly report on the work of higher education institutions and other organizations directly managed by the Ministry of Education of the Slovak Republic
- Kindergarten report
- Report on secondary school
- Primary school report
- Report on kindergarten and primary school for children and pupils with special educational needs
- Report on school facilities of educational counselling and prevention
- Report on school and academic library
- Report on higher education
- Report on university graduates
- Statement on special educational facilities
- Report on leisure and leisure facilities for children
- Report on university canteens
- Report on school catering facilities
- Report on language school
- Report on school dormitory
- Report on university dormitory
- Report on elementary art school
- Report on sports school and sports class
- Report on the Centre of Practical Teaching, on the Centre of Professional Practice of Schools
- Report on school in nature
- Report on physical education facilities used by the school
- Statement on educational facilities in the field of physical culture

- Report on injury rate of children, pupils and students
- Annual statement on research and development potential
- Statement on the number of pupils of elementary art schools, children of kindergartens and school facilities and students of language schools in the territorial jurisdiction of the municipality
- Determination of qualifications of pedagogical employees and teaching expertise
- Report on further education
- Annual report on information technologies at school
- Statement of civic associations
- Report on Youth Information Centres (ICM)
- Statement on centers of talented youth

The new planned curriculum operates with terms such as information and digital literacy. The use of data is included [in digital literacy](#). Data literacy is not mentioned explicitly. More information on the curriculum change is [on this website](#). This curriculum is in place in only some of the pilot schools. However, the National Strategy for Digital Competencies describes a measure tackling the use and management of data. The measure focuses primarily on teachers, but it can secondarily affect the students as well. The overall measure is described as followingly:

“Supporting the use of open resources, creating innovative educational content and pedagogical practices, supporting good practices and educational programmes developed in cooperation with employers with a focus on the development of informatics and digital culture with an impact on the widest possible group of schools, teachers and pupils:”

The National Center for Digital Transformation of Education offers a 50-hour professional development titled “School digital transformation”. The participants learn about DigComp and are offered seminars in the main areas of DigComp (also related to data). In one of the modules the participants learn how to collect data about the state of their schools and how to set smart goals. The course works with Selfie and Selfie for Teachers. Furthermore, the Center organizes webinars for their alumni which deal also with cybersecurity. More information can be found [on this website](#).

One of the enablers would be a newly established National Center for Digital Transformation of Education. The Center has been established as a development research and education workplace within the implementation of the national project "Digital Transformation of Education and School" (DiTEdu) in order to create a sustainable ecosystem supporting the digital transformation of education. Its role is to organize professional development and create materials in the domain of digitalization.

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 Digtirajen učitelj (DigiSustain Teacher) where the digital (11 day), sustainable competence (1 day) and financial literacy) will be developed and assessed (expect 20.000 teachers).

An additional example is [OrKa](#) is a tool for primary school practitioners to identify and ensure the quality of work in their school. It provides a secure and confidential environment for accessing data and, most importantly, offers users an easy overview of pupils' performance in the national examinations at school and nationally. It allows a variety of comparisons: between pupils in the school and their peers in Slovenia, between departments or learning groups within the school, by year, etc. The teacher can prepare task-by-task analyses for his/her pupils, view the individual task with the solution and the digitised answers of the pupils. This helps to identify areas of strength and weakness in pupils' knowledge. The software also provides a value-added analysis that measures the progress of students' knowledge from grades 6 to 9.

Data literacy is developed:

- as part of the proposed curriculum of Basic knowledge of computer sciences (Framework for computing and informatics from kindergarten to high school; https://redmine.lusy.fri.uni-lj.si/attachments/download/3060/Porocilo_RINOS_10_1_22.pdf (pp. 13 – 14) and activities in the development projects B-RIN (<https://novice.sio.si/2023/12/20/b-rin-od-pricakovanj-do-prve-izvedbe/>; 10 kindergarten and basic schools), Katarina (no web page yet; 10 general upper secondary schools) and

Innovative pedagogy 5.0 (<https://inovativna-sola.si/>; 40 schools). The projects started last year and they are in the process of the development of projects' curriculum

- as part of development activities different documents on Digital Citizenship (Council of Europe; <https://rm.coe.int/16809382f9>)
- As part of Erasmus+ project DALI4US (Data Literacy in upper secondary schools; 2024 – 2026; www is not yet established; use of the tool Orange, <https://orangedatamining.com/>). The project started in 2024 and is in the process of developing the data literacy framework.

Several projects nationally and internationally address teachers' and students' data literacy in the age of generative AI, in the framework of developing digital competencies and basic knowledge of computing sciences and digital citizenship.

Spain

From 2023 to 2025, Spain has experienced several strategic developments and significant changes in the use of student data for learning. **More structured digitalisation of the education system.** As a result of the educational digitalisation plans financed by the European Next Generation funds, the use of digital learning management platforms was consolidated. Virtual platforms in the different educational territories centralise and collect data on academic performance, attendance, and participation, though their use very much depend on the decision made by the school, the didactic departments and the teachers. In addition, the digital training plans for teachers include competencies in educational data analysis, which empowered teachers to make informed decisions. The funds from the Recovery and Resilience Mechanism are being key to implementing technology in classrooms, including the ethical use of data.

Increased awareness of data protection. The application of the General Data Protection Regulation (GDPR) was strengthened, requiring impact assessment for the use of digital platforms with sensitive data of minors. This led to a critical review of the use of big tech platforms in some territories. Some schools are abandoning the use of the Big Techs' solutions due to ethical and privacy concerns.

Pilot experiences with open and democratic data platforms. Initiatives such as the Democratic Digitalisation Plan in Barcelona, promoted by Xnet, promoted the development of sovereign digital infrastructures with local control of educational data. These platforms try to ensure that data is used only for pedagogical purposes, avoiding commercial exploitation. They represent a pioneering model of education data sovereignty and participatory governance that has been watched with interest in other regions.

Data integration to combat inequality. Some autonomous communities (such as the Valencian Community or Andalusia) have begun to integrate socioeconomic data, migrant origin and special educational needs to design early intervention policies and personalized support. However, this is still in its early stages and varies greatly between territories.

Systems without interoperability. Many tools developed separately without a common standard have generated "data silos", which has made it difficult to create an Education Data Hub on a national scale.

Unified digital platforms and ecosystems in Spain

There are varied examples of SSO systems and Unified digital platforms and ecosystems across the different Spanish educational administrations. Not all of them use the explicit term "Single Sign-On" to refer to their integrated authentication systems. They may use terms such as "single account," "integrated access," "educational digital identity," etc. These systems are constantly evolving, with new integrations and features being added over time and the information about the architecture and internal workings of these systems is not public for security and privacy reasons. Here are some of the examples of such systems.

[EducamosCLM](#) is the educational environment of the region of Castilla-La Mancha, that provides tools for schools, teachers, families, and students, accessible with a single sign-on. The educational community can access communication, planning and monitoring tools, a virtual secretary for online procedures and academic records, the official LMS integrated, a collaborative teaching environment (Microsoft Teams tools, cloud services, etc), educational management tools for schools (Delphos), among others.

[EducaMadrid](#) is the educational platform that provides a digital environment for teaching, learning in the region of Madrid. EducaMadrid integrates varied services and tools: Virtual Classrooms, media library, cloud, email, educational portal (user management, websites and collaborative spaces for centres, teachers and students), MAX (Madrid-linuX: free operating system based on GNU/Linux). The Virtual Classroom is also accessible through a mobile app for the consultation of materials, the delivery of assignments and communication through messaging and push notifications. Moreover, [EMPieza](#) is a part of EducaMadrid educational environment that facilitates students, teachers and families to access a wide range of educational services with a single login: Virtual classrooms, media library, e-mail or Cloud services.

[SÉNECA](#) (Andalucía): Comprehensive management platform that collects data on attendance, evaluation, communication with families and academic monitoring. Although it is not explicitly referred to as a single "SSO system" with a specific, publicly known name, the Andalusian Regional Government has made progress in integrating credentials for accessing various educational services such as the Moodle for schools, educational email (@educacion.junta-andalucia.es), and other management applications. A single account is used to access these resources, which functionally resembles an SSO. The Séneca Portal, the comprehensive education management system in Andalusia, requires a single authentication to access its various modules and services for teachers, students, and families.

[EducarM](#) (Region of Murcia): Academic management system that allows schools and families to access school data, evaluation and communication. EduCARM is the educational portal of the Autonomous Community of the Region of Murcia. Its main objective is to integrate information and communication technologies (ICT) into the educational field of the region, offering various services and resources to the educational community: students, teachers, families, and schools.

The Basque Department of Education has developed authentication systems for integrated access to platforms such as [Ikasgunea](#) (its virtual learning space) and other educational services. The goal is to ensure that users can access different resources with the same credentials.

These are only some examples, and other autonomous communities are also using or developing systems that functionally act as SSOs, integrating access to their educational platforms and digital services. This may include the integration of credentials for accessing EVAs, academic management platforms, email, and other digital resources.

The **Ministry of Education** offers a statistical yearbook that compiles relevant data on education in Spain, facilitating access to crucial information for decision-making and research. Link: [Anuario estadístico. Las cifras de la educación en España | Ministerio de Educación, Formación Profesional y Deportes](#)

Using Data to Address Educational Inequality

The ICILS 2023 report provides valuable data on students' digital competence in Spain and highlights how the COVID-19 pandemic has accelerated the need for digitalisation in schools, helping to address educational inequality [ICILS 2023 - Informe español - ICILS 2023 - Estudio Internacional sobre Competencia Digital | Ministerio de Educación, Formación Profesional y Deportes](#)

The OECD's Education at a Glance 2024 report highlights how data is being used to reduce equity gaps in the Spanish education system. [Panorama de la Educación 2024. Indicadores de la OCDE. Equidad en Educación: Las brechas se cierran pero es necesario hacer más | Blog de INEE](#)

The [State System of Education Indicators](#) offers the results of the main educational statistics both at the national level and disaggregated by autonomous community, also presenting international data that allow Spain to be placed within the framework of the OECD and the European Union, on the indicators related to the new strategic framework for European cooperation in the field of education and training with a view to the European Area and beyond. The perspectives of the ownership of the centres and the gender of the students are also considered in the presentation of the data.

Digital Textbooks

It is important to clarify that the adoption of digital textbooks is not mandated by the educational administration, but rather a decision made by each school, department, or teacher. This autonomy allows institutions and educators to select the resources that best meet the needs and characteristics of their students, thereby promoting a more personalized and effective teaching approach. The flexibility in choosing digital educational materials facilitates the integration of new technologies in the classroom and fosters a dynamic and up-to-date learning environment.

The National Center for Curriculum Development in Non-Proprietary Systems ([CEDEC](#)), a unit integrated in the National Institute of Educational Technologies and Teacher Training (INTEF), leads the [EDIA Project](#)—an initiative that provides open educational resources (OER) aimed at fostering digital, inclusive teaching based on active methodologies. These resources, structured as

learning situations, cover all educational stages—from Early Childhood to Vocational Training—and are developed using [eXeLearning](#), allowing teachers to download, adapt, and reuse them in diverse contexts. Each resource is aligned with the official curriculum and includes teaching guides, rubrics, interactive activities, and assessment tools, promoting both digital competence and collaborative learning. Due to their comprehensive and in-depth nature, these materials can serve as a substitute for traditional printed textbooks, as they fully cover the curricular content of each grade level, with the added benefits of constant updates and being freely available. Furthermore, CEDEC supports teacher communities around the use of these resources, encouraging innovation and the exchange of best practices. <https://cedec.intef.es/que-hacemos/> and <https://intef.es/recursos-educativos/situaciones-aprendizaje/>

Moreover, digital materials and textbooks provided by Publishers are also used extensively in Primary and Secondary Schools in Spain. Their use is not compulsory, but it depends on the decision made by schools, didactic departments and teachers. On their part, the educational administrations may facilitate their use through agreements with specific publishers to integrate their materials in the official digital ecosystems, as it is the case of the region of Madrid that integrates in the EducaMadrid LMS the digital textbooks of specific publishers. Another example is the region of Andalucía that offers a collection of Digital Educational Objects (more than 70,000 resources) on various subjects from 5th grade of Primary to 4th grade of Secondary, coming from specific publishers. These are two examples that are present in other regions. Links:

<https://innovacionyformacion.educa.madrid.org/madrid5e>

<https://www.juntadeandalucia.es/educacion/eaprendizaje/objetos-digitales-educativos/>

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.

It is crucial to highlight that the data collected primarily focuses on academic performance. This approach allows for an accurate evaluation of students' progress and areas for improvement, providing concrete data on their performance in various subjects and educational activities. By concentrating on academic performance, patterns and trends can be identified that are essential for implementing effective teaching and learning strategies. This, in turn, ensures a high-quality education, tailored to the specific needs of students and aimed at maximizing their academic potential.

These developments reflect a strategic approach towards personalizing learning, simplifying access to educational resources, and creating clear and accountable policies for data use.

Collaboration between different actors has been key to the successful implementation of these

changes. In summary, although there are still significant challenges such as territorial fragmentation or the lack of a cohesive national policy on education data, Spain has taken important steps towards a more strategic, ethical and learning-focused management of student data.

It is important to highlight that the management of education in Spain is the responsibility of the educational administrations of the different autonomous territories, which implies a decentralized system. Each educational administration has the responsibility to administer and manage it by identifying its specific characteristics and adapting it to its needs. This decentralization allows for greater flexibility and responsiveness to local particularities. For this reason, the specific data is managed by the education departments of the autonomous communities.

At a national level, there is not a collection of personal data of students, but rather aggregated data provided by the regional administrations. One of the main national infrastructures for the collection and use of educational data is the statistical portal of the Ministry of Education. This system guarantees the standardised collection of data by the schools, the aggregation by autonomous communities and the final publication at the state level, complying with quality and data protection standards. The portal integrates with other international sources such as Eurostat or the OECD and facilitates interoperability processes with regional systems.

Spain has a robust system for the collection and management of educational data led by the Ministry of Education, Vocational Training and Sports, through the Sub-Directorate General of Statistics and Studies and in collaboration with the autonomous communities. The [INEE \(National Institute for Educational Evaluation\)](#) coordinates the development of the State System of Education Indicators, a key tool for understanding the national educational reality and guiding political decisions.

This system is based on the systematic collection of statistical data and their conversion into key indicators, in order to facilitate the design of evidence-based educational policies. It also allows for the monitoring of strategic objectives such as those of the EU 2030 framework and the UNESCO SDGs. In addition, INEE coordinates Spain's participation in international assessments and in the development of comparable indicators through the OECD's INES project, which are included in the Education at a Glance report.

The data published by the Ministry does not only serve as a tool for transparency and accountability, but are also actively used by researchers, policymakers, and schools to guide pedagogical decisions, design support programs, and evaluate the effectiveness of interventions. Reports such as '[Panorama de la Educación](#)' or '[Las cifras de la educación en España](#)' allow for rigorous annual monitoring of the education system.

The State System of Indicators is a key tool for converting the data collected into useful indicators for planning, evaluation and policy design. It allows the monitoring of the education system at all levels (local, regional, state and international), promotes transparency and supports the preparation of annual reports that influence political decision-making. Spain also uses these

indicators to align its system with the priorities of the European Union (2030 Goals) and international organisations such as the OECD and UNESCO.

In general, **training courses and resources** (such as inspiring teaching and learning experiences) offered by the Ministry of Education, VET and Sports (INTEF-National Institute for Educational Technologies and Teacher Training) do cover examples of how data is used for learning. They will be specified in the following subsections:

- Training courses: online teacher training and other events about different topics, including use of data in education <https://intef.es/formacion-y-colaboracion/aprendizaje-en-linea/>
- Educational resources can be found in this webpage related to different topics (innovative methodologies, use of technology, activities, kits, etc.): <https://intef.es/recursos-educativos/>
- Inspiring teaching and learning experiences: INTEF publishes in its webpage inspiring experiences of teachers implementing the use of technology in the classroom, innovative methodologies and other creative experiences that can be used by other teachers and are publicly disseminated. They can be search by educational level, topics, or subjects. <https://intef.es/recursos-educativos/experiencias-educativas-inspiradoras/>

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](#), [5th Centenary of the First Round the World Race](#), [The Bamak Quest](#), [Historias embotelladas](#).

Data literacy is a very recent term and has been used in some publications and research, as can be seen here.

- Developing the DALI framework of data literacy for citizens: <https://revistas.uned.es/index.php/ried/article/view/37773>
- Questionnaire on data literacy for teachers: https://www.researchgate.net/publication/377086724_Cuestionario_de_alfabetizacion_de_datos_para_el_profesorado
- Integrating data literacy in the curricula of University Degrees through the methodology of “[Learning through data](#)”.

In the National Plan for Digital Transition “[España en Digital 2025](#)”: it is mentioned that it is important to address the high demand of specialists in digital technologies, including experts in data analytics, AI or cybersecurity. and in the [National Plan for 2026](#) it is stated among the objectives for 2026 is the digital transformation of education and the development of digital competence.

However, many aspects of the DigCompEdu framework and our own National Framework include statements referring to the use of digital data. See the [Spanish Framework for the Digital Competence of Teachers](#).

Spanish CPD offer includes them as well as many resources the Ministry of Education, VET and Sports has published (AseguraTIC “Security for underaged in digital media” <https://intef.es/recursos-educativos/aseguratic/>).

In general, training courses and resources (such as inspiring teaching and learning experiences) offered by the Ministry of Education, VET and Sports (INTEF-National Institute for Educational Technologies and Teacher Training) do cover examples of how data is used for learning. They can be found here:

- Training courses: online teacher training and other events about different topics, including use of data in education <https://intef.es/formacion-y-colaboracion/aprendizaje-en-linea/>
- Educational resources can be found in this webpage related to different topics (innovative methodologies, use of technology, activities, kits, etc.): <https://intef.es/recursos-educativos/>
- Resources for teachers, families, students: AseguraTIC “Security for underaged in digital media” <https://intef.es/recursos-educativos/aseguratic/> .
- Inspiring teaching and learning experiences: INTEF publishes in its webpage inspiring experiences of teachers implementing the use of technology in the classroom, innovative methodologies and other creative experiences that can be used by other teachers and are publicly disseminated. They can be search by educational level, topics, or subjects. <https://intef.es/recursos-educativos/experiencias-educativas-inspiradoras/>

CPD offered by the Ministry of Education, VET and Sports (INTEF-National Institute for Educational Technologies and Teacher Training) do cover examples of how data is used for learning. Training courses: online teacher training and other events about different topics, including use of data in education <https://intef.es/formacion-y-colaboracion/aprendizaje-en-linea/>

- SPOOC [Respeto digital y protección de datos personales](#) (“Digital respect and personal data protection”)
- MOOC [Una IA para aprender](#) (“An AI for learning”)
- MOOC [Educar en seguridad y privacidad digital - 2ª Edición](#) (Educating on digital safety and privacy – 2nd edition)
- NOOC [Menores y seguridad en la red – 5ª edición](#) (Minors and online safety – 5th edition)
- NOOC [Inteligencia Artificial en el día a día – 3ª edición](#) (Day to day AI – 5th edition)
- NOOC [Familias digitales: potenciando el buen uso de las redes sociales en familia – 2ª edición](#) (Digital families: empowering good use of social networks in the family – 2nd edition)

Resources: (guides and others)

- [No te enredas en Internet](#) (“Don’t get yourself tangled on the Internet”) Guide with information about safety and privacy online.
- [Guía para centros educativos](#) (“Guide/handbook/manual for schools”) Guide compiling frequently asked questions and their answers regarding the handling of data from minors in educational centres.
- [Orientaciones para prestadores de servicios de Cloud Computing](#) (“Guidelines for Cloud Computing service providers”) Guide to help understanding what cloud computing is.
- [Enséñales a ser legales en Internet](#) (“Teach them how to be legal on the Internet”)
- [Guies APDCAT](#) Guide containing information for educators and families about safety and privacy online.
- [Protección de datos y prevención de delitos \(Fichas\)](#) (“Data protection and crime prevention (Files)”) Guide compiling information about multiple criminal practices online.
- [Protección de datos y prevención de delitos \(Guía\)](#) (“Data protection and crime prevention (Guide)”) Guide compiling information about multiple criminal practices online.
- [Guía e-Legales, para la gente “legal” de Internet](#) (“e-Legals guide, for ‘legal’ people on the Internet”) Practical guide that tackles the legal aspects with which the Net users, especially kids and teenagers, face everyday.
- [Criterios para el tratamiento de datos personales en centros educativos](#) (“Criteria for the handling of personal data in schools”) Criteria to follow in the handling of personal data in educational centres.
- [FAQ: Solicitud de certificado negativo de delitos de naturaleza sexual](#) (“FAQ: Negative Sexual Offences Certificate request”) To partake in activities that involve regular contact with minors, it is mandatory to provide a Negative Sexual Offences Certificate.
- [Modelo de registro de incidencias TIC en el centro](#) (“ICT incidences registry model for schools”) When using devices, mistakes and improvement requests may arise. It might be very useful to have a ICT incidence registry in place.

- [Modelos de consentimiento sobre datos personales](#) (“Personal data consent model”) There are circumstances where requesting written express consent is necessary to be able to handle personal data.
- Árboles de decisiones para trabajar la seguridad en Internet (“Decision trees to work on Internet safety”) With this decision trees you will be able to promote
- [Cuidado con la Webcam](#) (“Careful with the Webcam”) Audiovisual educational resource for preventing risks related to the unwise use of the webcam and the presence of malware.

In Spain, both new obstacles and facilitators have emerged in the field of education.

Obstacles:

Concerns about data privacy and the use of external virtual platforms. Although there have been advances in data protection legislation, there are still concerns about the use of external platforms (those provided by Big Techs and even private publishers' platforms) that store data outside the scope of the educational administrations control, which can lead to insecurities regarding the treatment of student privacy. The lack of platform interoperability also makes it difficult to integrate student data in an anonymous way and a correct analysis and data-driven decision-making.

Digital Divide. The pandemic has shown that not all students have the same access to technology and a stable internet connection which has been significantly reduced in the recent years. Yet, despite digitization efforts, some students still lack their own devices or stable connectivity, and new technologies, like Artificial Intelligence, are also promoting inequalities again.

New Facilitators:

There is a **process of stabilization of teachers in Spain**, promoted by Law 20/2021, which aims to reduce the high rate of temporary employment and offer greater job stability to teachers. This measure seeks to ensure that temporary employment in public employment does not exceed 8%, thus complying with European guidelines. To achieve this, merit-based competitions and extraordinary competitions have been launched to regularize the situation of thousands of teachers who had been on temporary contracts. This results in a more stable workforce that favours the functioning of schools and a more harmonized capacity building of teaching staff.

Advances in the digitalisation of classrooms and access to connectivity. The deployment of fibre optics in most public schools throughout Spain, especially after the pandemic crisis, has been key to reducing digital divides. This has also been promoted through the Recovery, Transformation and Resilience Plan, which includes specific funds for the digitalisation of schools. Projects, such as the '[Educa en Digital](#)', have facilitated access to digital platforms and resources in rural and disadvantaged areas. This has allowed for more equitable access to learning technologies, a crucial point in a country with significant variations between regions.

Digital Competencies of Teachers. Continuous teacher training in digital skills has become a national priority. Digital teacher certification programs ensure that teachers can effectively take

advantage of the technological tools available and encourage the development of digital skills in students.

Regulation around data protection and advances in privacy legislation. Although privacy and data protection remain a challenge, in Spain there has been a strengthening of regulation with the Organic Law on Data Protection (LOPDGDD) and its alignment with the European GDPR. In addition, transparency in the use of educational platforms has been promoted, with a greater focus on the security of students' personal information.

Sweden

Data collected for statistical use at the national level is regulated by law and some by other kind of regulation. The National Agency of Education is mandated to issue some of this regulations. As an example will school organizers provide personal information about students and staff members that should participate in digital national tests to the National Agency according to such regulations.

Data is gathered at the levels of school, organiser, municipality, and state. The main body of such collection is justified primarily on the basis a public interest. There are, however, instances where consent is considered necessary (when the basis of public interest is not met).

Depending on the level of digitalisation at the local level data is collected and saved at the local level i.e. schools and school owners (municipal or independent) As many schools have system support for their data the service providers can be involved Some like grading documents are regulated but has to be paper-based as well. At the national level educational data is collected mainly for statistical purposes. This data are provided from the local level often in files. At the local level these data are stored in administrative systems from which they can be exported.

Each municipality or school owners are responsible for their data management including monitoring their schools. At the national level it is IMY <https://www.imy.se/en/>

Data is gathered at the levels of school, organiser, municipality, and state. The main body of such collection is justified primarily on the basis a public interest. There are, however, instances where consent is considered necessary (when the basis of public interest is not met). The main body of data gathered at the national level is stored indefinitely. The National Archives guide what can be purged or not, while individual assessments also occur locally. Therefore, some data can be purged at school level.

Schools and preschools (data providers) submit data to Statistics Sweden, which is responsible for collecting data on behalf of the National Agency for Education (data recipient). This data includes administrative information, students' achievements and examination results, information about staffing, schools' finances and more, as regulated by specific guidelines. Statistics Sweden (data provider) transfers this data to the National Agency for Education (data recipient) who publishes the aggregated results as *Official statistics* and other statistics on their website

(<https://www.skolverket.se/skolutveckling/statistik>). This practice is regulated by Chapter 26, Section 25 of the Swedish Education Act (2010:800) and Section 1 of the Regulation (1992:1083) on certain reporting duties for school authorities, etc., as well as the Swedish National Agency for Education's regulations on data collection from the school authorities, etc. (SKOLFS 2011:142). This means that school organisers (municipal/independent) have a duty to report data. The information provided is protected under Chapter 24, Section 8 of the Public Access to Information and Secrecy Act (2009:400). The statistics are also governed by the Act (2001:99) on official statistics and the Regulation (2001:100) on official statistics.

Some of the data collected i.e. [Register](#) of all schools including organisation within a specific school organiser, addresses and more. School owners/schools are required to update the information in a digital service. This information is searchable, and data can be exported in Excel-format and also through an API. At least some school organisers use the [API](#) to get the most updated information about their own schools.

One source of information about the use of data can be found in a [report from IFOUS](#) which summarises a project with a number of school organisers [IFAU](#) is an independent research organisation.

One of the goals required to achieve a university degree as a qualified teacher includes aspects of digital literacy: demonstrating the capacity to use digital aids assuredly and critically in educational processes and taking into account the significance of the role of different media and digital environments in this respect.

Digital literacy is included in the national curricula, as well as in subject and course descriptions. For example, in the national curriculum for compulsory school, preschool class and school-age education the following can be found in the first chapter "Fundamental values and mission of the school":

Schools shall help pupils to develop an understanding of how digitalisation affects the individual and societal development. All pupils shall be given the opportunity to develop their ability to use digital technology. They shall also be given the opportunity to develop a critical and responsible approach to digital technology, so that they are able to recognise opportunities, understand risks and evaluate information. Education shall thus provide pupils with the conditions to develop digital competence and an approach that promotes entrepreneurship. (page 8-9,

<https://www.skolverket.se/getFile?file=12435>)

Beyond that specific competences are included in many subjects, some examples are:

From art, years 7-9:

- Digital creation and processing of photographs, moving images and other types of art.

From civics, years 7-9:

- How media is produced, distributed and consumed, and the opportunities and difficulties this may present for the role of the media in a democratic society.

- The principles of newsworthiness and how they can affect people's images of the world around them. How individuals and groups are portrayed in the media, for example based on gender and ethnicity, and how this can affect norm formation and values.
- Critical examination of information, positions and arguments related to social issues in digital media as well as in other types of sources.

From mathematics, years 7-9:

- Methods for calculating with fractions and decimals in rough estimates, mental arithmetic and written calculations. Use of digital tools in calculations.
- Programming in a visual and text-based programming environment. How algorithms are created, tested and improved in programming.
- Tables, diagrams and graphs and how they are interpreted and used to describe one's own investigation results and those of others, both with and without digital tools.

(All from: <https://www.skolverket.se/getFile?file=12435>)

On a more general, societal level the Swedish Agency for Digital Government has published a report on digital literacy: <https://www.digg.se/om-oss/nyheter/analys-och-uppfoljning/nyheter/2024-01-04-ny-rapport-svenskarnas-digitala-kompetens-ar-god-men-det-finns-utmaningar>

In [Education - AI4edu](#) project, consortium of six organizations from four EU member states including Luleå University of Technology, Sweden is working together to investigate, develop, implement and evaluate next generation intelligent educational assistants, powered by leading edge AI and language technologies, designed to conversationally interact with students and to support teachers and students in fulfilling their teaching and learning goals, in a way that makes them acceptable as engaging, flexible, effective, reliable and helpful partners.

[Datadriven skolförbättring | ifous.se](#) are research and design programs implemented in 2020-2024 aimed at teachers, principals and administrative leaders who, together with researchers, wanted to test their experience and contribute to the creation of new scientific knowledge around data-driven school improvement at the classroom, school and principal level.

Enablers – The National Agency recommends that schools and suppliers use Swedish Standard the SS12000 that covers the areas of data transfer between systems. It was initially developed to standardise data transfer between systems within the same school organisation. The National Agency has followed this standard when implementing the national digital testing platform where national standardised student tests are conducted.

Obstacles – Sweden's decentralized school system, where each school organisation is responsible for their own schools, leads to many different infrastructural solutions regarding data, data transfer and digitalisation in general.

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.

Turkey

Data management is provided centrally. Data is kept in the data processing services of the Ministry of National Education. The data of the students are in the system until they start university. The data that can be seen is determined by creating a separate profile for each user.

ANNEX Table 5. Countries' responses about Data Literacy competences

Understanding Data												
Knowledge - Education stakeholders know												
what data is, what form it takes and how it can be used in society	BE-NL	HR	CZ	FI			NO	PT	RS		SI	ES
that data has different sources, types and formats	BE-NL	HR	CZ	FI				PT	RS			ES
how data can be collected from different environments	BE-NL	HR	CZ	FI				PT	RS	SK	SI	ES
there are technological pre-conditions for data creation and use				FI					RS			ES
that data is processed and manipulated by algorithms and apps	BE-NL		CZ	FI			NO		RS			ES
that data is persistent and potentially stored			CZ	FI			NO	PT	RS			ES
the concepts of data security, data surveillance, big data and small data			CZ	FI		EL	NO		RS		SI	ES
their data rights			CZ	FI	FR			PT	RS	SK	SI	ES
Awareness - Education stakeholders are aware that:												
they generate data using apps, websites, driving their car, etc.		HR	CZ	FI		EL	NO	PT	RS		SI	ES
there exists data about them in profiles (My Data)		HR	CZ	FI			NO	PT	RS			ES
data is a representation of reality; it is not reality itself	BE-NL	HR	CZ	FI					RS			
data is complex, and there are variations in the complexity of data		HR	CZ	FI			NO		RS			
there are potential and drawbacks of big data in different realms of society such as health, education, economics, security, etc.				FI			NO		RS		SI	ES
data is monetised (e.g., "data as the new oil")				FI					RS			
there are trade-offs when sharing your data				FI				PT	RS			ES
Critical Thinking - Education stakeholders are able to think critically about:												
the relationship between humans and data: the use of automated processes vs human actions		HR	CZ	FI			NO		RS		SI	ES
who is making the decision (the human or the algorithm)		HR		FI			NO		RS			ES
how data tools work		HR	CZ	FI				PT	RS		SI	ES
data being used for targeted advertisements			CZ	FI				PT	RS		SI	ES
the misrepresentation of data			CZ	FI			NO		RS			ES
how data is monetised, for which purposes it is being collected				FI					RS			

Acting on Data												
Collecting Data - Education stakeholders have the skills to:												
configure privacy settings, revoke access, request to have your data erased		HR	CZ	FI	FR	EL	NO					ES
use collected data to change your own behaviour (e.g., from a health app)			CZ	FI				PT				ES
make informed decisions when interacting with data-collecting actors (e.g. mobile apps, internet portals and employers)				FI					RS			ES
Managing Data - Education stakeholders have the skills to:												
organise data		HR	CZ	FI					RS			ES
process, protect and store their own data		HR	CZ	FI		EL			RS			ES
move data from one application to another		HR						PT				ES
manipulate data												ES
evaluate the quality of data			CZ						RS			ES
identify misrepresentation of data			CZ						RS			
Sharing Data Artifacts - Education stakeholders have the skills to:												
synthesise, visualise and represent data in different formats	BE-NL	HR	CZ	FI					RS			ES
translate data into everyday language (e.g., tell a story about data)	BE-NL			FI					RS			
share their data through an open repository			CZ									ES
Engaging through Data												
Policy and regulation - Education stakeholders have the knowledge and skills to:												
participate in data-based policy-making processes		HR					NO					
interact with key stakeholders (e.g., data protection agencies) as needed for the resolution of issues related to data use (their own or other's data)								PT				
Taking Decision - Education stakeholders have the knowledge and skills to:												
make their own decisions based on critical consideration of data	BE-NL	HR	CZ	FI	FR				RS			ES
understand the balance between individual and social benefits and the risks related to data use			CZ									ES
be aware of their own role in acting on data from their different roles (professional, parent, citizen, etc.)			CZ	FI								ES
Data Activism - Education stakeholders have the knowledge and skills to:												
use data as a basis or activism for data engagement												ES
put their data rights into practice						EL						ES
self-regulate their own data footprint				FI			NO					ES



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