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# EDUCATION MANAGEMENT INFORMATION SYSTEM IN EUROPE AND CENTRAL ASIA: **In-depth review of 13 countries**

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The information presented in this report has been collated by UNICEF, using surveys, questionnaires and information provided by experts working in partnership with UNICEF. The report has been prepared to facilitate the exchange of knowledge and to stimulate discussion. UNICEF accepts no responsibility for errors.

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# Introduction

The importance of education data has increased due to the growing demand for data-driven policymaking and education planning to achieve national and global education goals. Many governments in Europe and Central Asia have taken the initiative to strengthen their education management information system (EMIS), or more broadly their practices of managing education data, to improve the national capacity to collect, manage and use education data to achieve quality, inclusive education and learning for all. Technological advancement has played an important role in expanding the scope of data collection, improving data management, and unlocking the value of data to strengthen the national education system and service delivery.

EMIS has evolved as a complex system as it was updated and redesigned to meet the increasing data demands. EMIS entails data management at different education levels from early learning to primary, secondary and tertiary education. It covers an entire cycle from needs assessment to data collection, data processing and management, data analysis and dissemination of data outputs. EMIS engages a broad range of education stakeholders including Ministries, government agencies, local governments, academia, school personnel, teachers and teacher unions, students, their families, the private sector and civil society organizations. EMIS is also linked with various external systems such as the population register, geographical databases and national health systems.

In order to understand the current status and functionality of EMIS and help policymakers and education authorities improve the effectiveness of EMIS, UNICEF Europe and Central Asia Regional Office (ECARO), with the support of UNICEF Country Offices, launched a regional survey of EMIS in 2022. The survey was designed to collect the information about EMIS at primary and secondary education level and pre-primary education level, respectively. Based on UNESCO's definition<sup>1</sup>, EMIS is defined in this survey as a system to collect, integrate, process, maintain and disseminate education-related data and information to support policy analysis and formulation and education planning and management. It is a system of people, technology, models, methods, processes, procedures, rules and regulations that function together to provide education stakeholders with an integrated set of data and information to support the fulfilment of their responsibilities.

UNICEF sent out the survey on EMIS to the Ministry of Education and other Ministries that govern pre-primary, primary and secondary education in UNICEF Programme Countries in the region and received responses from 13 countries (Armenia, Azerbaijan, Bulgaria, Croatia, Kazakhstan, Kosovo<sup>2</sup>, Moldova, Montenegro, North Macedonia, Romania, Serbia, Tajikistan and Uzbekistan), all of which have been in the process of reviewing their EMIS in the past two years. This report is organised in three parts: Section 1 presents the summary of survey findings; Section 2 offers in-depth profiles of EMIS in each country; and Section 3 presents, a list of considerations for strengthening EMIS in the region.

<sup>1</sup> UNESCO, *Education for All by 2015: Will we make it? EFA global monitoring report, 2008*. Paris: UNESCO, 2008.

<sup>2</sup> All references to Kosovo in this report should be understood to be in the context of United Nations Security Council Resolution 1244 (1999).

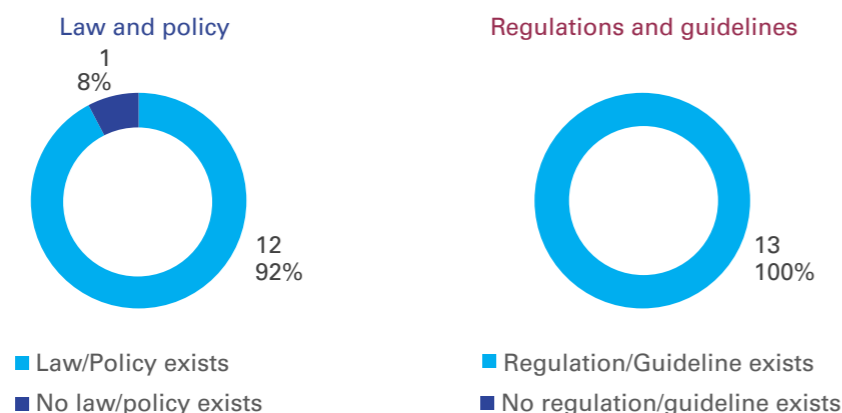
## Summary of EMIS Survey Findings

## Data governance

### Legal, policy and regulatory framework

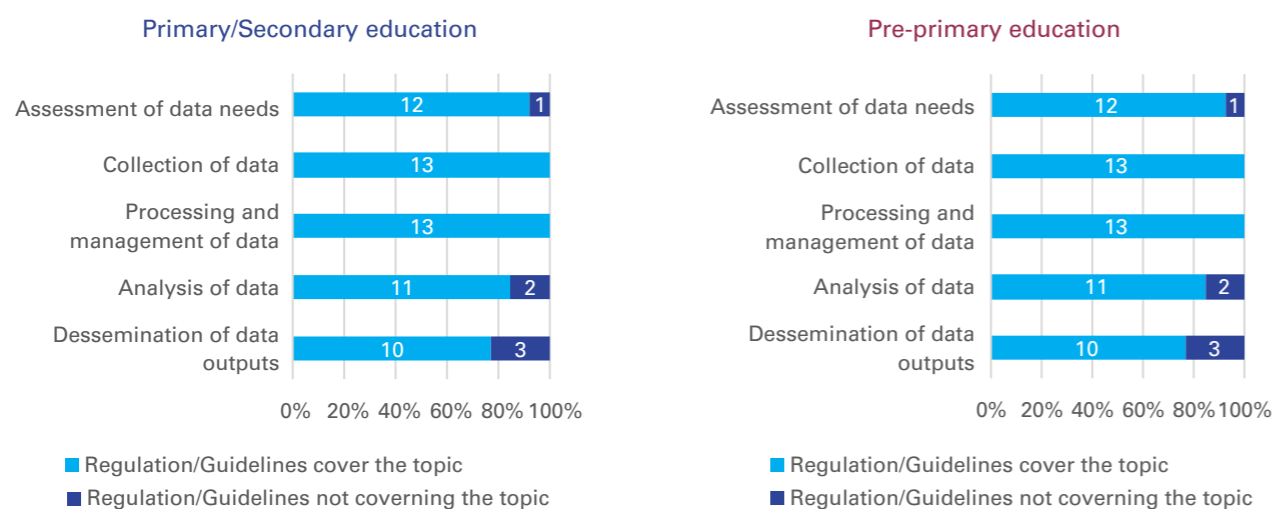
Legal, policy or regulatory frameworks help countries and economies ensure that education data are collected, processed and used according to set rules and standards. The 2022 EMIS survey found that all the countries and economies except for Kosovo have education law or policy that governs EMIS for both primary/secondary and pre-primary education. All the countries and economies have regulations or guidelines on the operation of EMIS for primary/secondary and pre-primary education. This indicates an existence of normative foundations for effective and efficient education data management in the region in general.

**Figure 1: Existence of law, policy, regulations and guidelines on EMIS**



However, there is variation in the extent to which the national guidelines regulate the operation of EMIS. For both primary/secondary and pre-primary education, all countries/economies have regulations and guidelines on data collection (e.g., who collects data; methods and instruments of data collection), and data processing and management (e.g., how to clean data; protocols for data storage and access). However, one country has no national regulation or guideline on assessment of data needs (i.e., selection of data to be collected), two have none on data analysis (e.g., how to analyse data; selection of indicators to be developed), and three have none on dissemination of data outputs (e.g., in what format the data outputs are disseminated).

**Figure 2: Existence of national regulations and guidelines on EMIS, by stage of EMIS operation**

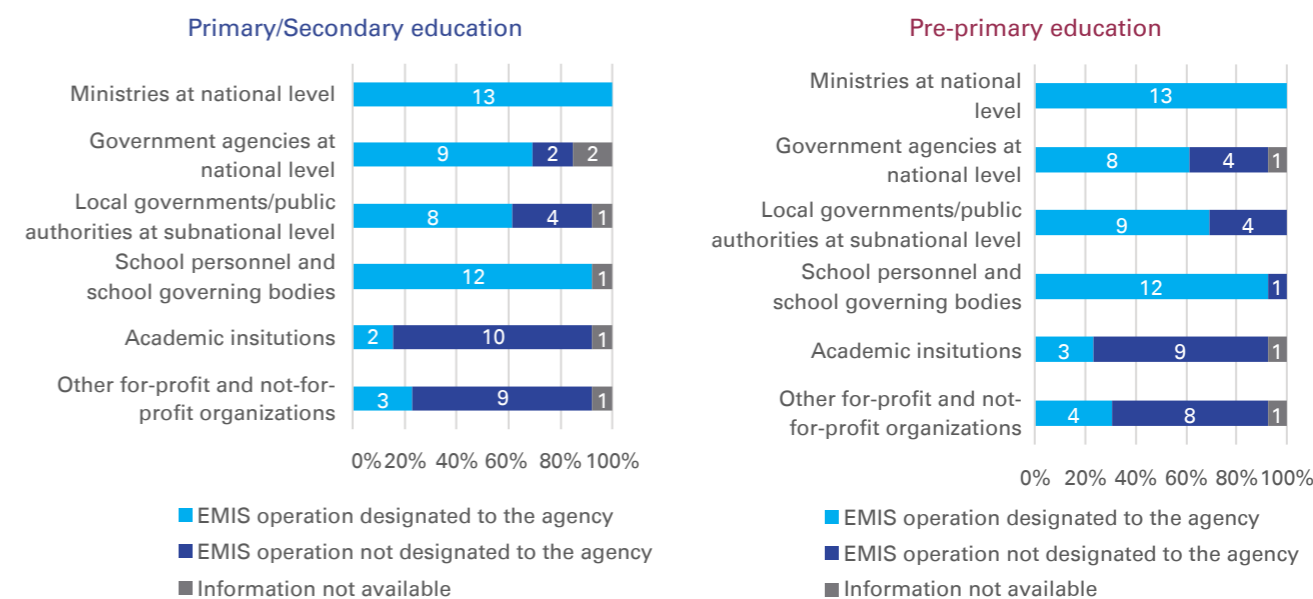


## Organizational arrangements

Given that EMIS engages multiple organizations and personnel at different administrative levels, the stakeholders involved must have clear roles and responsibilities in EMIS operation. Formally assigning EMIS-related tasks to organizations and personnel helps ensure accountability for effective education data management and use.

At national level, Ministries are designated to operate EMIS in all the countries and economies, while other government agencies are reported to have a formal role in EMIS operation in more than 60 per cent of the countries and economies. At subnational level, over 60 per cent of the countries and economies have also devolved some responsibilities to local governments and public authorities such as municipalities, provinces and district education offices. School personnel and school governing bodies, as direct providers of education services, are assigned to support EMIS in the majority of the countries and economies. Academic institutions such as universities and teacher training colleges and other for-profit and not-for-profit organizations are commissioned to support EMIS operation in a few surveyed countries and economies.

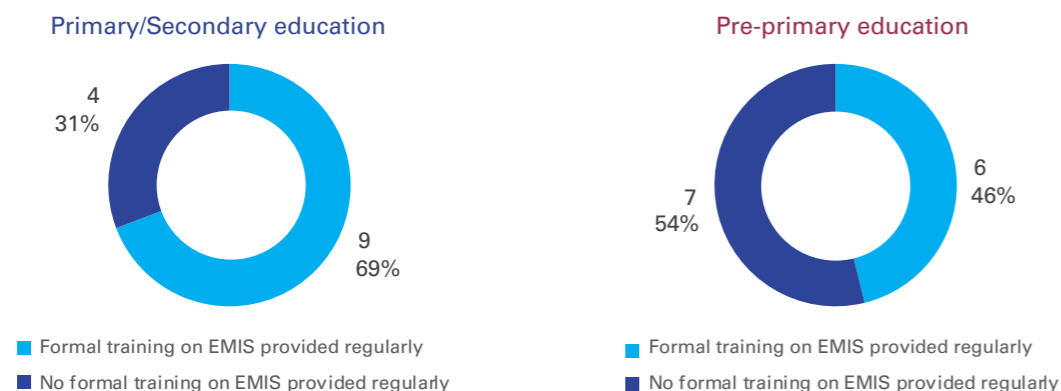
**Figure 3: Organizations and personnel formally designated to support EMIS operation**



## Training on EMIS operation

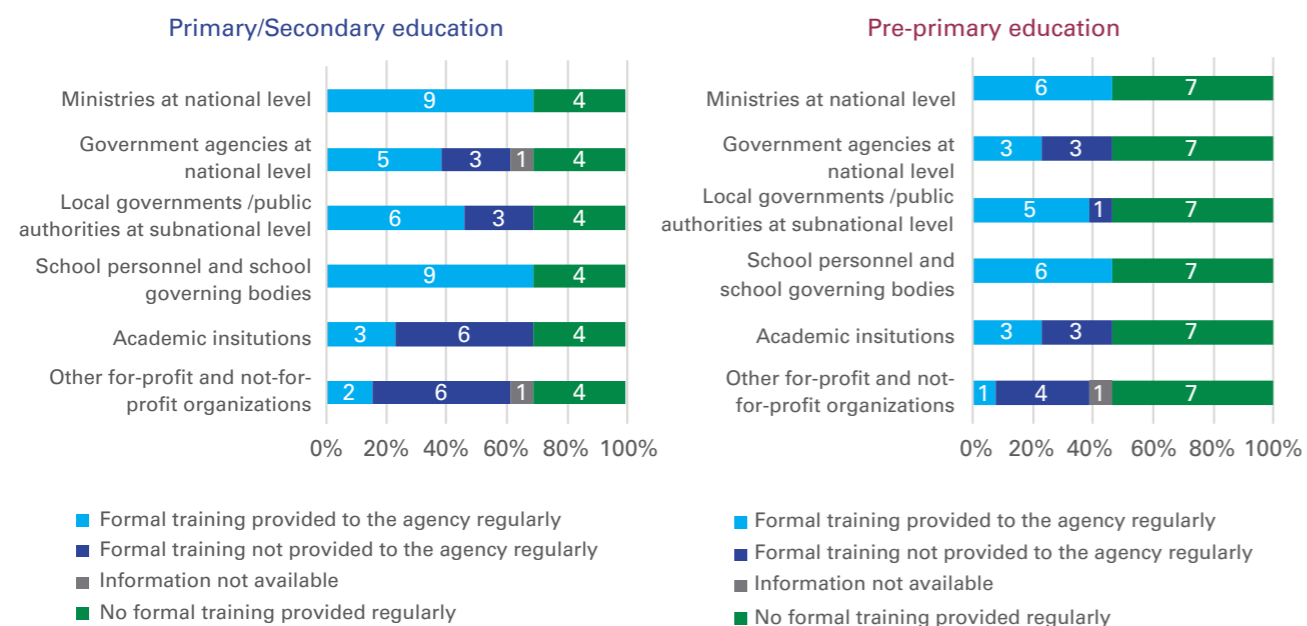
The organizations and personnel that are formally designated to operate EMIS would require formal training to fulfil their roles and responsibilities. The importance of such training increases as the scope of data collection expands and use of IT infrastructure and software becomes common. However, formal training on EMIS is provided on a regular basis in only nine and six out of the 13 surveyed countries and economies in primary/secondary and pre-primary education respectively. A lack of formal training may impact timely data collection and effective use of educational data.

**Figure 4: Provision of formal training on EMIS on a regular basis**



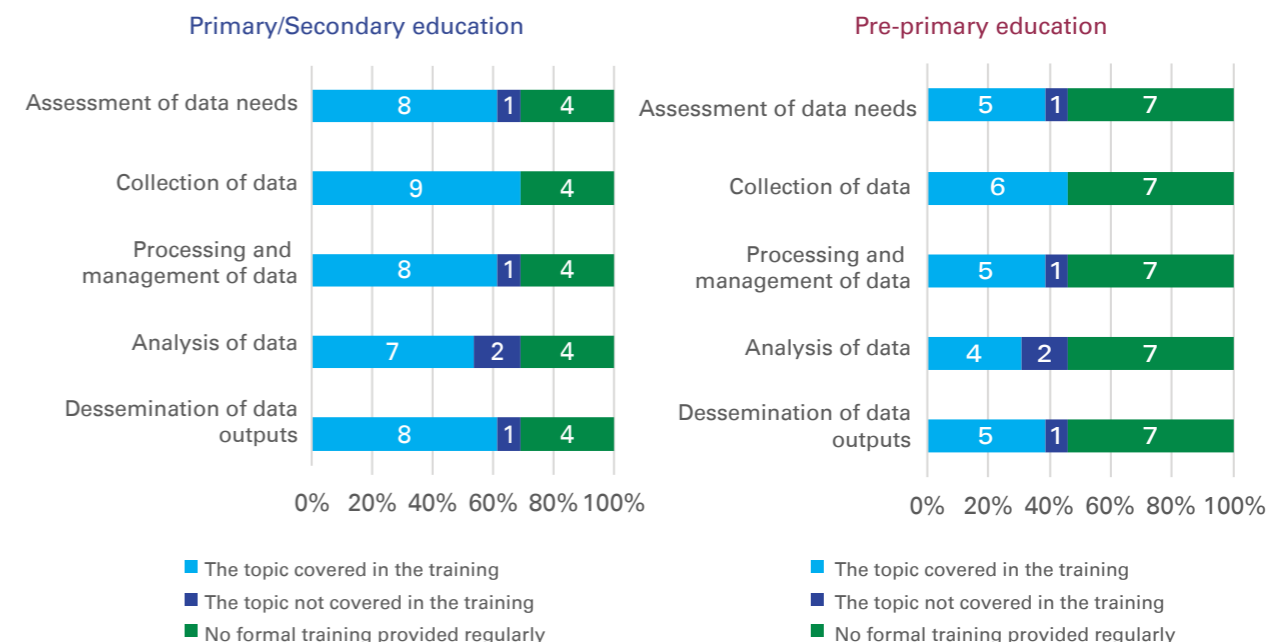
Even in the countries and economies where EMIS training is provided formally, such opportunities are given to specific stakeholders only. For instance, EMIS training is made available for Ministries in nine and six countries and economies in primary/secondary and pre-primary education respectively. Local governments receive EMIS training in less than half of the countries and economies. At both education levels, school personnel and school governing bodies are stakeholders that are most likely to receive EMIS training. On the other hand, EMIS training is made available for academic institutions and other for-profit and not-for-profit organizations in a few countries and economies only.

**Figure 5: Organizations and personnel receiving formal EMIS training regularly**



In the majority of the countries and economies where formal EMIS training is provided, the training covers topics such as data needs assessment, data collection, data processing and management, and dissemination of data outputs. Training on data analysis is offered in a smaller number of countries at both primary/secondary and pre-primary education levels.

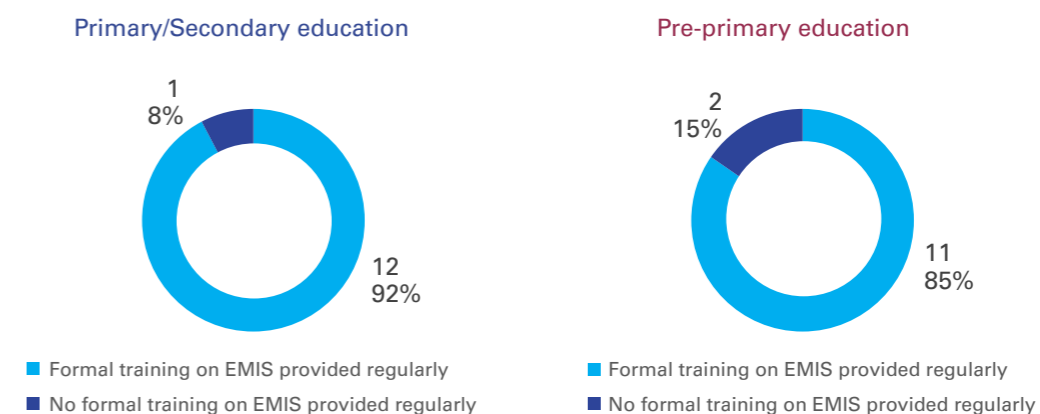
**Figure 6: Areas of formal EMIS training provided**



### Budgetary arrangements

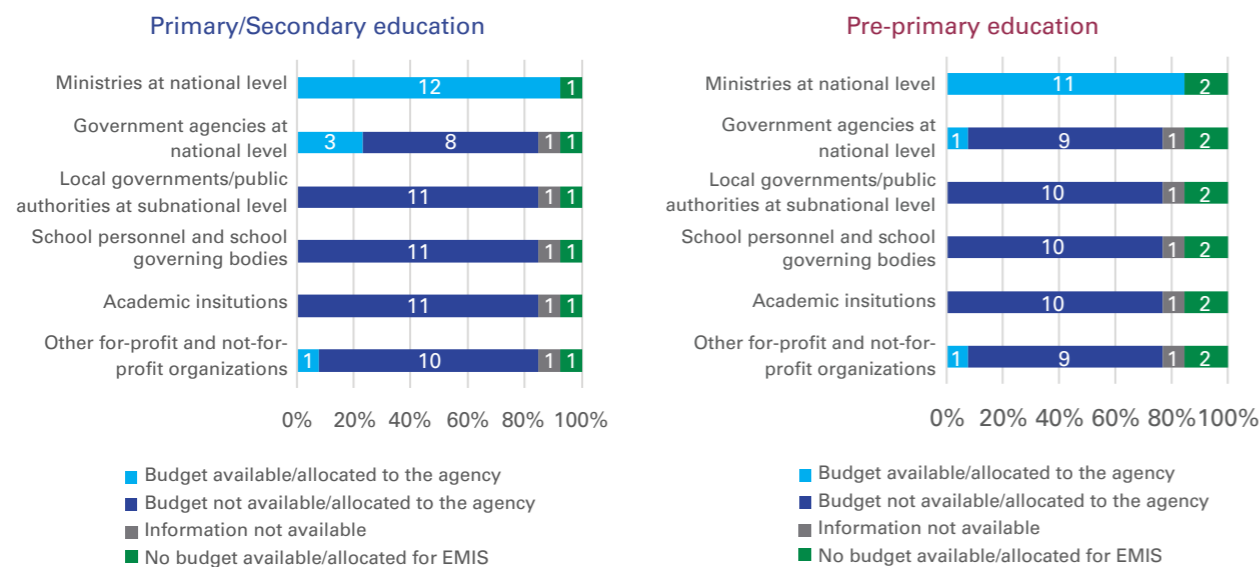
The development and operation of EMIS require financial resources for staff and IT infrastructure among others. Securing financial resources is key for effective EMIS operation in a sustainable manner. Most of the countries and economies secure and allocate budget for EMIS, except for Kosovo (which does not include a budget for primary/secondary and pre-primary education) and Moldova (which excludes a budget for pre-primary education).

**Figure 7: Provision of budget for EMIS operation**



However, in the majority of the countries and economies budget for EMIS is secured only for the Ministry-level EMIS management. Although in a few countries' government agencies receive budget for EMIS development and operation, it is reported that local governments, schools and academic institutions do not receive budget earmarked for EMIS. It is, however, possible that these organizations use unearmarked budget to support EMIS.

Figure 8: Budget provision by organization

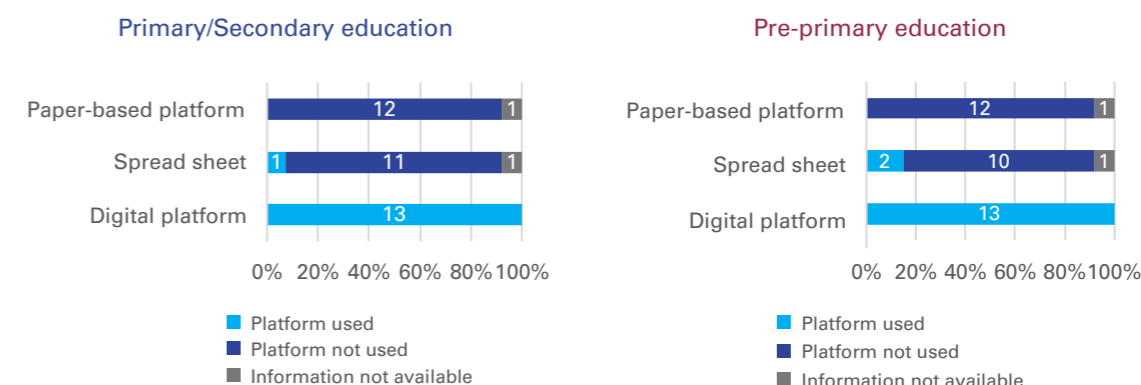


## EMIS platform

### Types of platforms

The use of digital platforms has become common for data management in the education sector. Although it requires investment in infrastructure and continued maintenance and updating, digital EMIS facilitates efficient data collection, management and use. In this survey, all countries reported the use of digital platforms for both primary/secondary and pre-primary education. Most of them reported that they had developed their own digital platform. For instance, Bulgaria developed web-based software system using .NET technology and MSSQL server, while Moldova's platform is based on Oracle APEX. It is reported that spreadsheets are also used in Moldova and North Macedonia.

Figure 9: Platform for EMIS



### Digital platforms

#### Open and closed platforms

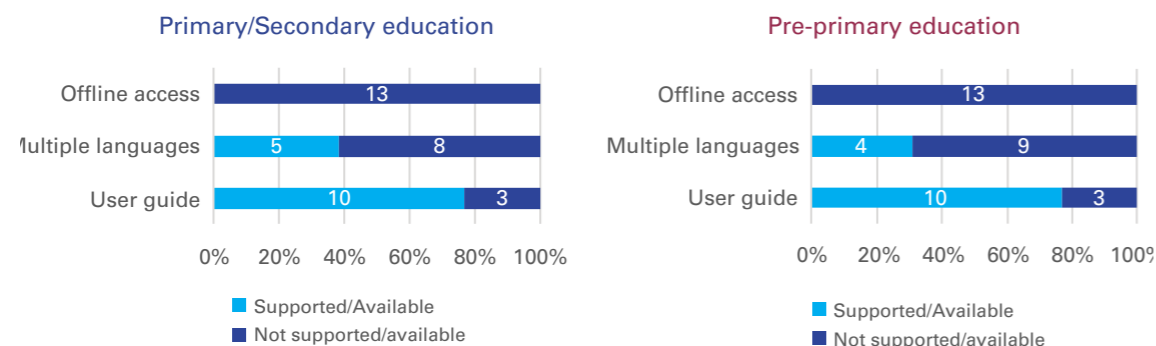
Use of open-source platforms gives developers greater flexibility to modify the design and functions of the platform according to their needs. It also facilitates integration of EMIS with other apps and software. However, none of the countries/economies use an open-source platform for EMIS, possibly because of national ICT regulation and guidance regarding the use of open-source platforms.

#### Supporting functions

Access to digital platforms can be restricted when Internet access is limited. There are solutions to facilitate use of digital platforms without Internet access, such as use of local servers. However, all the countries and economies reported that offline access is not supported in their digital platforms.

Use of digital platforms is also facilitated with several other supporting functions such as multiple language interface and content, and the availability of a user guide. For instance, about one third of countries and economies reported that their digital platforms support multiple languages. A user guide for digital EMIS has also been developed and made available in over 70 per cent of the countries and economies.

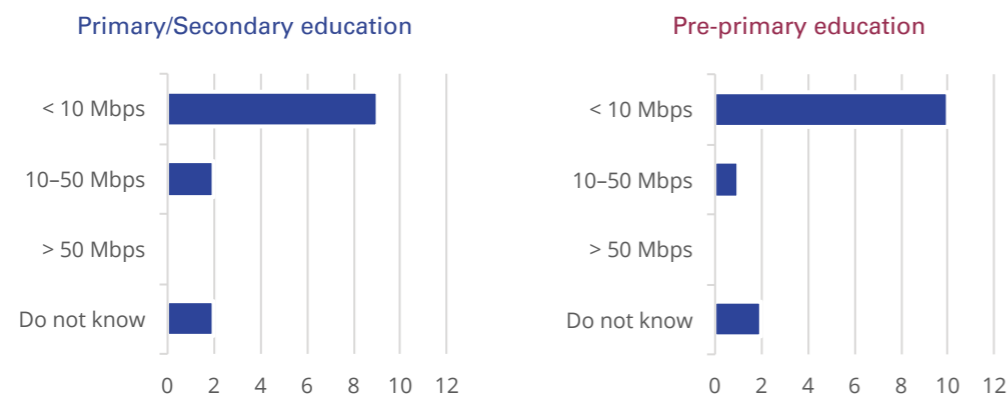
Figure 10: Supporting functions of digital platforms



Required Internet speed

It is possible that access to and use of digital platforms are restricted if the Internet speed available at the Ministry, local education offices and schools is not fast enough to meet the minimum network bandwidth required for using the platform. Most countries and economies reported that the minimum required speed for using EMIS is less than 10 Mbps, while 10–50 Mbps are considered necessary in Bulgaria for both primary/secondary and pre-primary education and Uzbekistan at primary/secondary education level. Since most countries in the region have a median internet speed over 50 Mbps<sup>3</sup>, these minimum requirements could possibly be met for the majority, but effort to close the digital divide at local level remains needed.

Figure 11: Minimum Internet speed required for digital platforms



<sup>3</sup> According to the Speed Global Index (<https://www.speedtest.net/global-index#mobile>).

## Scope of data

### Assessment of data needs

It is not possible to collect all data and information relating to education systems. In addition, much of the information collected is not necessarily used for education planning and management in a meaningful way. It is therefore important to assess types of data that are critical and useful to provide quality education and achieve educational goals.

If formal procedures on data needs assessment are established, countries and economies can assess and update their need for education data on a regular basis and in a consistent way. Among the 13 countries, eight have formal procedures to assess data needs on a regular basis for primary/ secondary education and six for pre-primary education. These formal procedures include regular consultation, surveys and evaluation.

Figure 12: Existence for formal procedures to assess education data needs

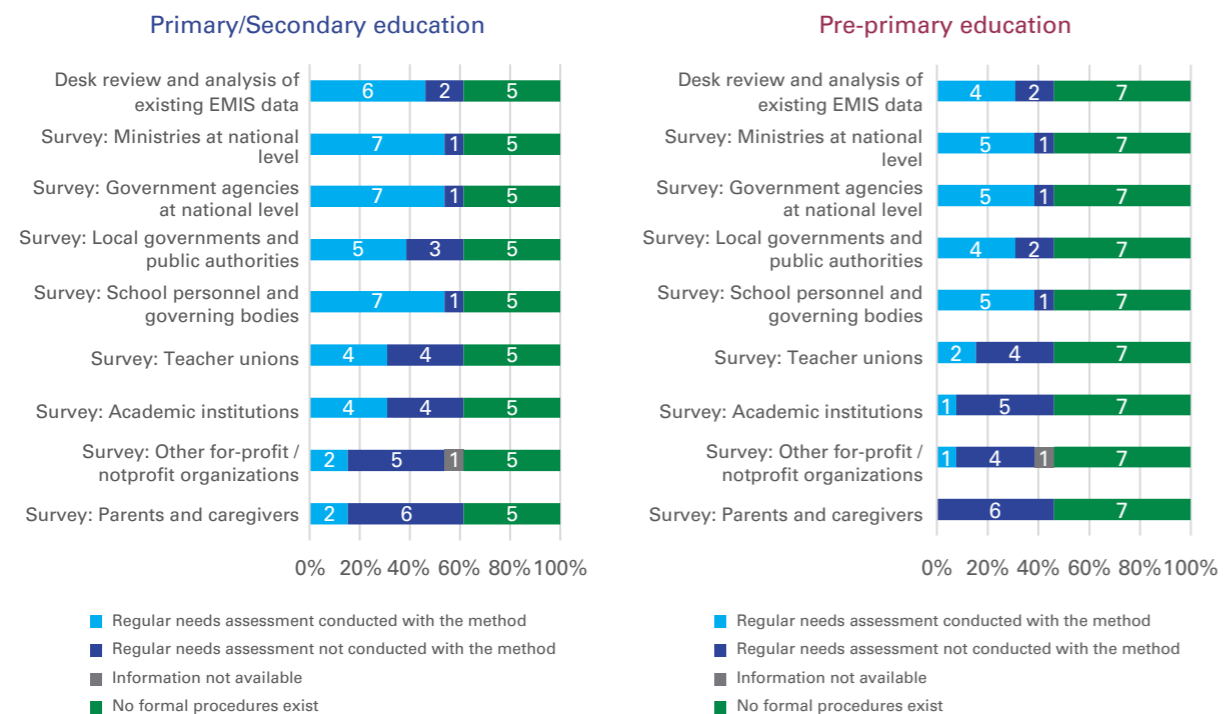


With regard to methods for data needs assessment, desk review and analysis of existing EMIS data is regularly conducted in only six and four out of 13 countries and economies for primary/secondary and pre-primary education respectively. The countries and economies also conduct consultation and surveys with various stakeholders to understand data needs. For instance, Ministries, government agencies and schools are consulted in seven and five countries and economies at primary/secondary and pre-primary education level respectively, while local governments and public authorities are also consulted in needs assessment in about one third of the countries and economies. Teacher unions and academic institutions are also consulted for their data needs in some countries and economies.

Parents and caregivers are the group that are least often consulted with for data needs assessment – no countries and economies consult this group for pre-primary education and only two countries (North Macedonia and Tajikistan) do so at primary/secondary education level. This indicates that education data needs are mostly defined from the perspectives of suppliers of education services, not from customers’ and beneficiaries’ point of view.

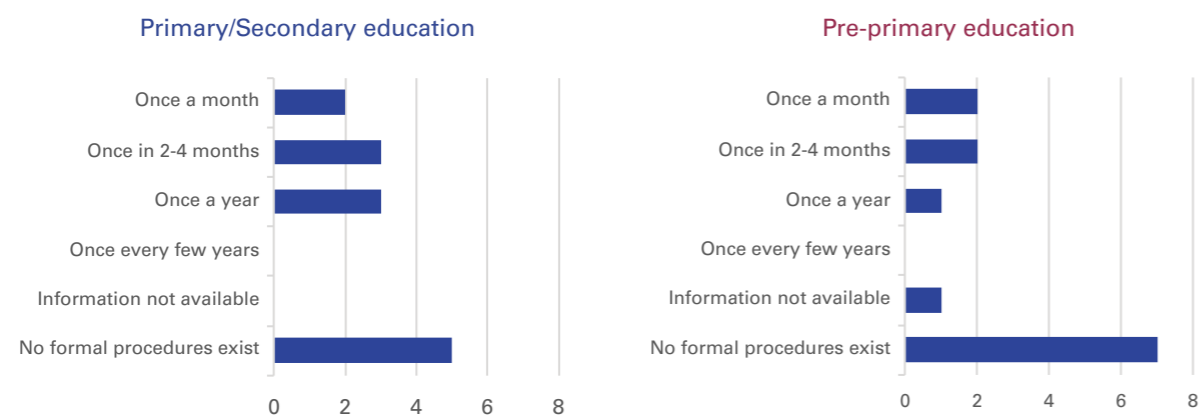


**Figure 13: Methods of data needs assessment**



In the countries and economies where there are formal procedures for the regular assessment of education data needs, the assessment is conducted at least once a year. It is administered once a month in Croatia and Uzbekistan and once in 2–4 months or every semester in Armenia, Azerbaijan and Montenegro.

**Figure 14: Frequency of data needs assessment**



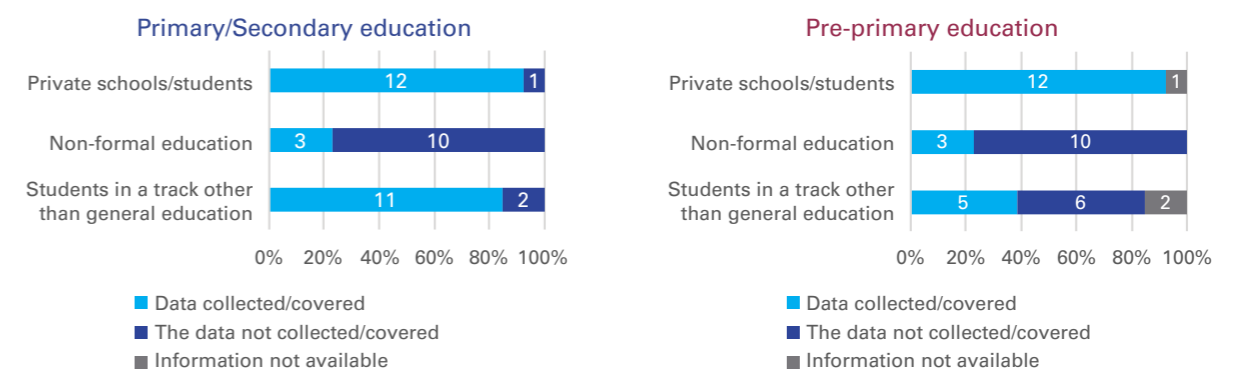
Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS can provide more comprehensive data on education when it covers subsectors of education. For instance, EMIS collects data on private schools and students in all countries and economies except for primary/secondary education in North Macedonia. It is worth noting that three surveyed countries and economies also collect data on non-formal education. EMIS also includes data on students studying in programmes other than the general education track, such as technical and vocational education and training

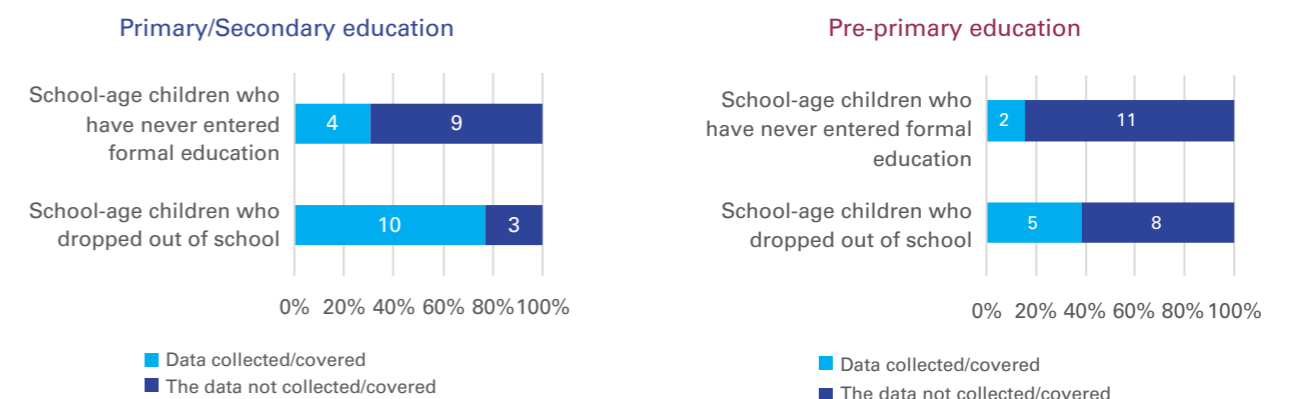
(TVET), in over 80 per cent of the countries and economies at primary/secondary education level. The percentage for pre-primary education is lower possibly due to an absence of multiple learning tracks and programmes.

**Figure 15: Coverage of subsectors in EMIS**



EMIS also covers data on children who are not in the school system in some of the countries and economies. Such data are critical for the State and national education authorities to support out-of-school children and fulfil their obligation to ensure the right to education. According to the present survey, EMIS collects data on out-of-school children who have never entered formal education in four and two out of 13 countries and economies for primary/secondary and pre-primary education respectively. Data on children who have dropped out of school are also collected by EMIS in ten and five countries and economies at each education level respectively. In these countries and economies, these data could be used to bring out-of-school children back to school or support their continued learning outside of school.

**Figure 16: Coverage of out-of-school children in EMIS**



### School-, teacher- and student-level data

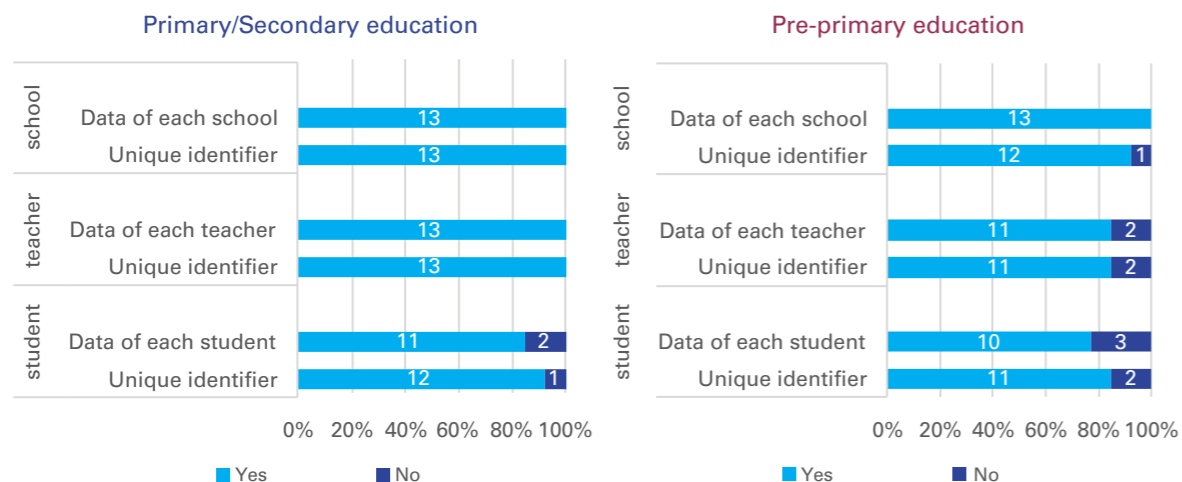
Collecting data on each school, teacher and student is critical to understand the variation in educational environments and needs within the country/economy and to assess the degree of educational inequality. For instance, there might be a variation in educational conditions between urban and rural schools, between newly appointed and experienced teachers, and between children with and without functional difficulties.

At primary/secondary education level, EMIS collects data on each school and teacher with unique identifiers in all the countries and economies. Data on each student are also collected in the majority of countries and economies except for Kosovo and Tajikistan. In pre-primary education, while all the surveyed countries and economies include data from each pre-primary school, data on each teacher and/or student are not collected



in Croatia, Kosovo and Tajikistan. A lack of individual data could pose a challenge in understanding and responding to the teaching and learning needs of teachers and students.

**Figure 17: Collection of school-, teacher- and student-level data**

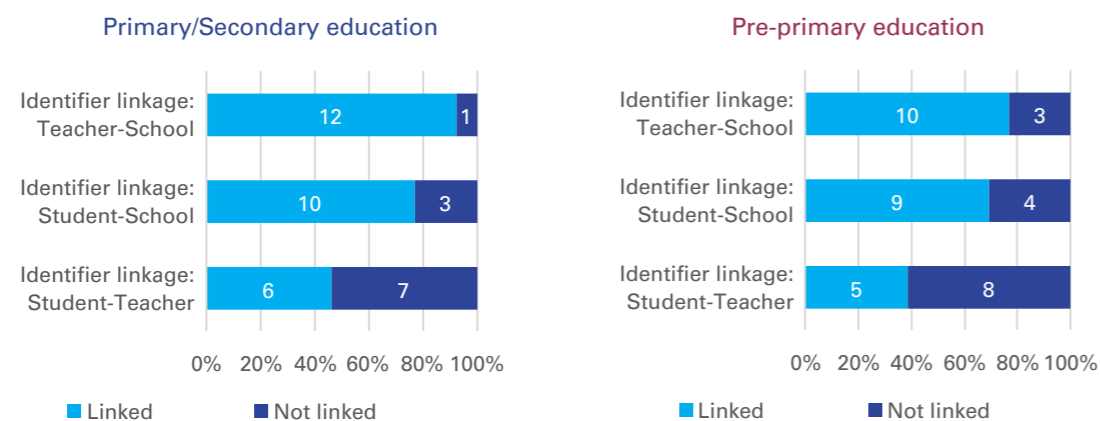


### Unique identifier

When the unique identifiers of schools, teachers and students are linked with one another, EMIS provides data in multilevel structures where students are nested within teachers/classrooms and teachers/classrooms are nested within schools. This not only helps education planning and management (e.g., allocation of teachers to schools; student transfers) but also enables stakeholders to analyse how school, teacher and student factors are associated with the quality of education service delivery and learning outcomes.

According to the survey results, school-teacher and school-student links are developed in the majority of the countries and economies. However, a link between student and teacher is available in less than half of the surveyed countries and economies. Since teachers play a critical role in supporting the learning of their students through day-to-day teaching and learning activities, this could be a bottleneck to measure the effectiveness of each teacher in promoting learning (i.e., teacher value-added).

**Figure 18: Links of identifiers across school, teacher and student levels**

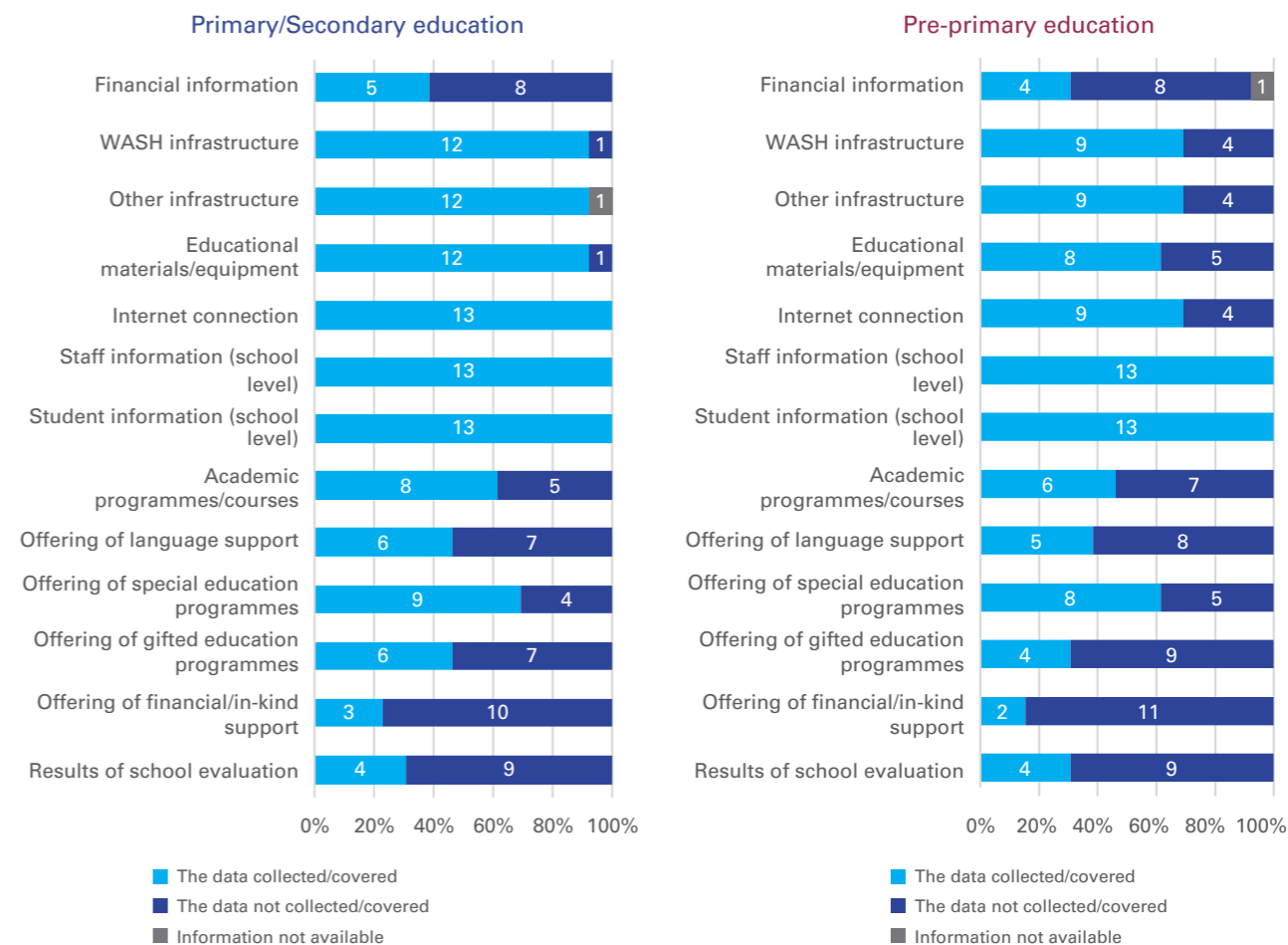


### School data

EMIS includes staff and student information aggregated to school level (e.g., the number of students enrolled in a given school) in all the countries and economies. Data on school infrastructure, education materials and Internet connection are also collected in over 90 per cent and 60 per cent of the countries and economies for primary/secondary and pre-primary education respectively. Information about school finance and academic programmes is not covered in EMIS in many countries and economies, although availability of special education programmes is asked by EMIS in nine and eight countries and economies at primary/secondary and pre-primary education level respectively. It is worth noting that four countries/economies have EMIS that include the results of school evaluation (e.g., school performance evaluation).

The surveyed countries and economies also reported that other school data in EMIS include information about school founders, official recognition of schools, classroom characteristics, language of instruction, course-based learning results, and number of children per group, among other information. The detailed information on schools is useful to monitor school conditions and environment, identify investment needs, and plan and support school improvement.

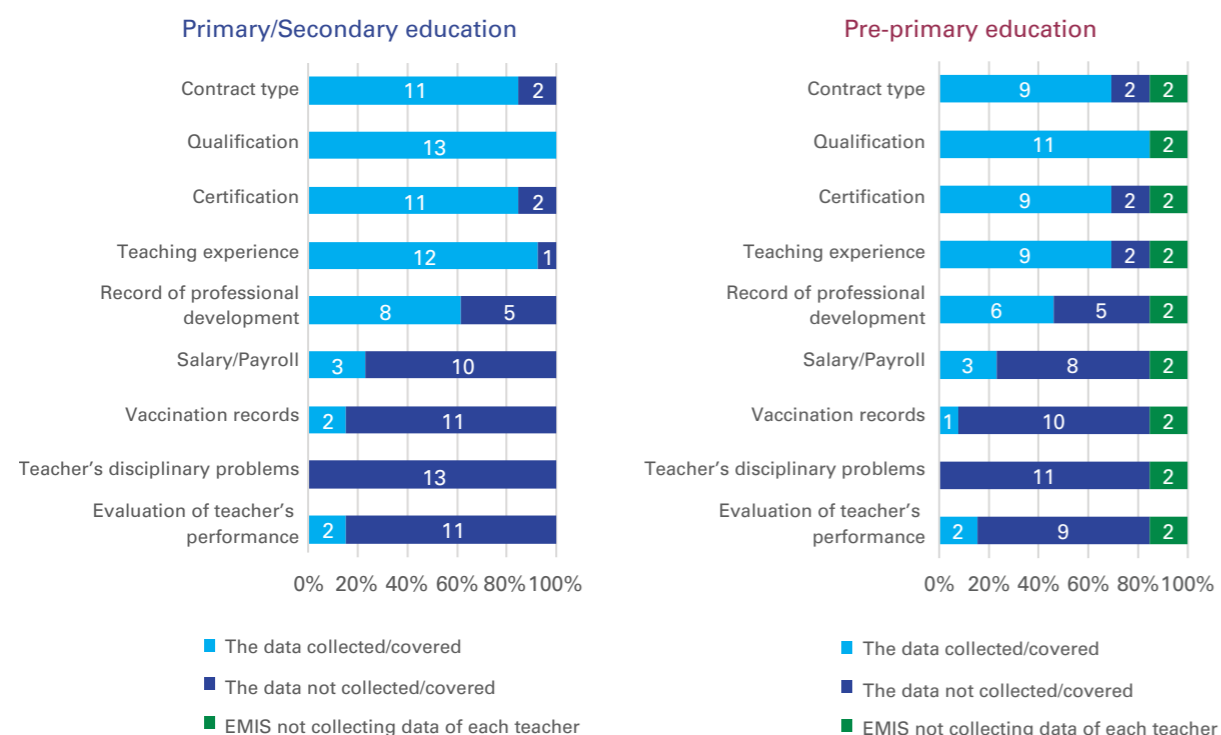
**Figure 19: School data collected and included in EMIS**



## Teacher data

The majority of the countries and economies collect information on contract, qualification, certification and teaching experience of each teacher in their EMIS. Eight and six countries and economies (out of 13) also keep a record of teacher professional development for primary/secondary and pre-primary education respectively. Such information facilitates teacher management and support such as teacher recruitment, deployment and professional development. On the other hand, only a few countries and economies have EMIS that include each teacher's salary, vaccination records, and performance evaluation. Teachers' disciplinary problems are not recorded in EMIS in any of the countries/economies.

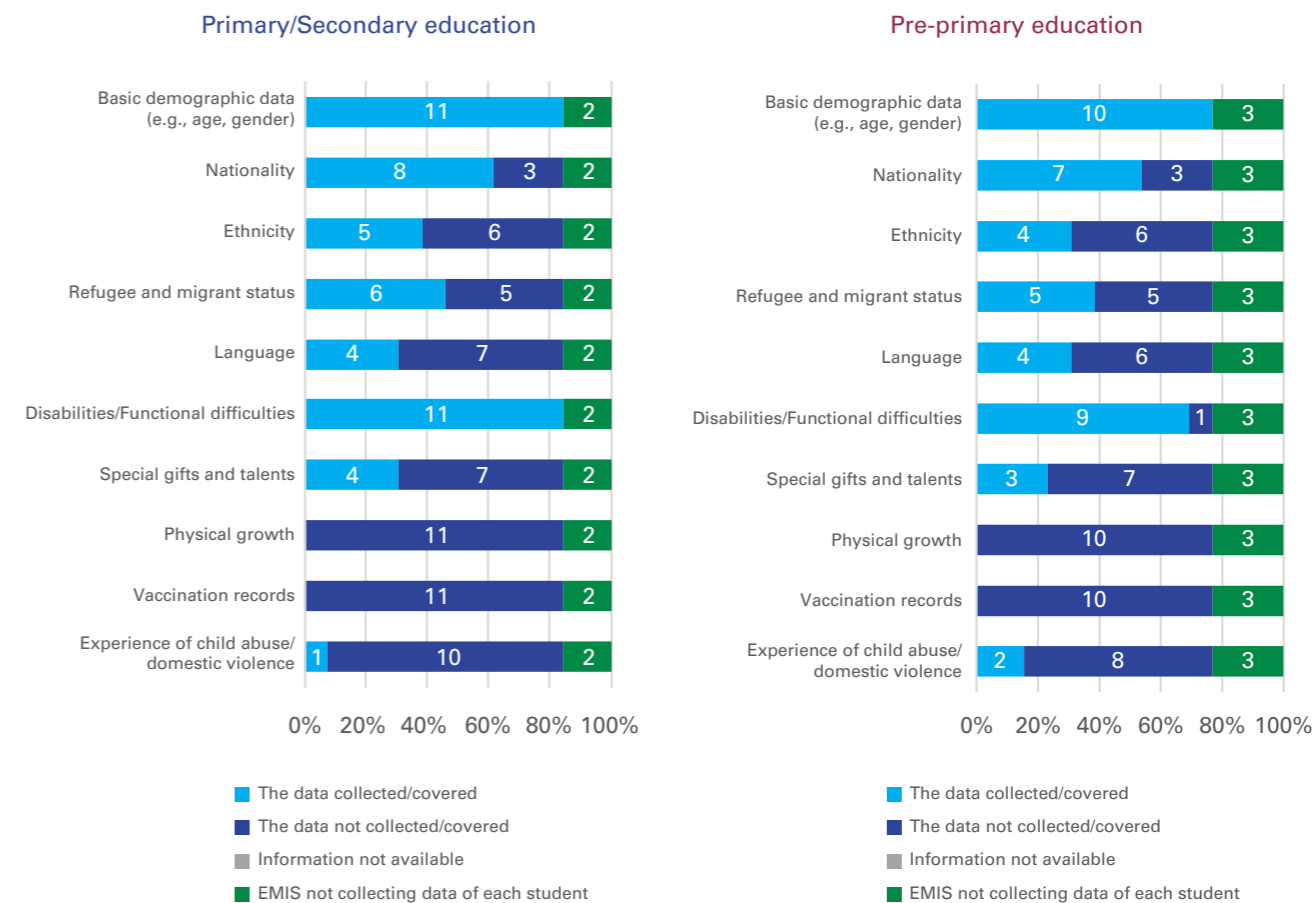
Figure 20: Teacher data collected and included in EMIS



## Student data

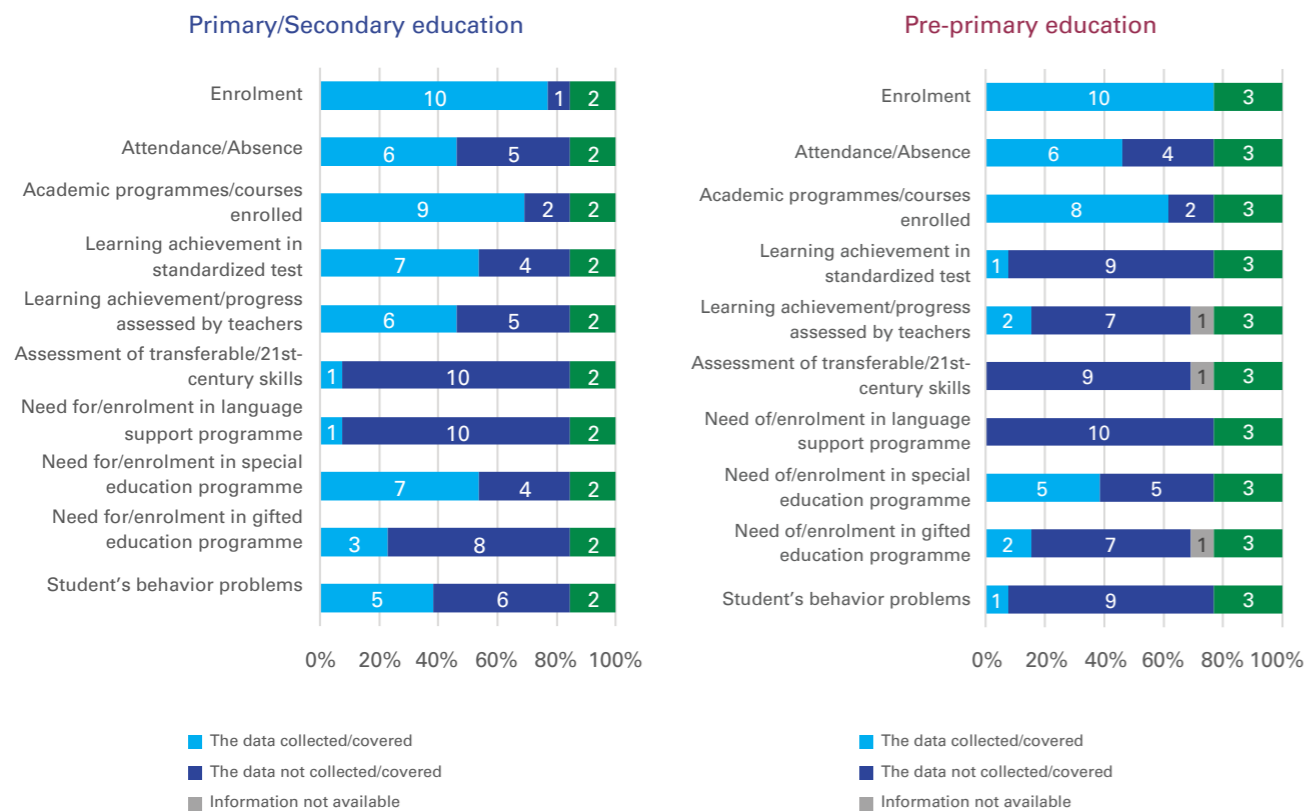
Regarding demographic data about each student, EMIS covers basic information (e.g., age and gender), nationality and disability/functional difficulties in the majority of countries and economies for both primary/secondary and pre-primary education. Information such as ethnicity, refugee and migrant status, language (e.g., native language, language spoken at home), and special talents are included in EMIS in between three and six countries and economies. On the other hand, EMIS does not cover information on the physical growth and vaccination records of each child in any of the countries and economies. It is worth noting that experience of abuse and domestic violence is included in EMIS in Moldova at pre-primary education level and Montenegro at both primary/secondary and pre-primary education levels, which is helpful to provide protection and support. For example, in Montenegro, EMIS provides data not only on frequency of violence but also types of violence and measures taken against it.

Figure 21: Student demographic data collected and included in EMIS



Concerning educational data on each student, EMIS includes information on each student's enrolment, and programmes/courses in most surveyed countries and economies. At primary and secondary education level, learning achievement and progress are also recorded in EMIS in about half of the surveyed countries and economies. While a need for and/or enrolment in special education programmes is covered in about half of surveyed countries and economies, a need for and enrolment in language support programmes is rarely covered in EMIS. Student's behavioural problems are included in EMIS at primary/secondary education in five countries and economies (out of 13). Such data on each student would help identify students' unique learning needs and provide tailored education support.

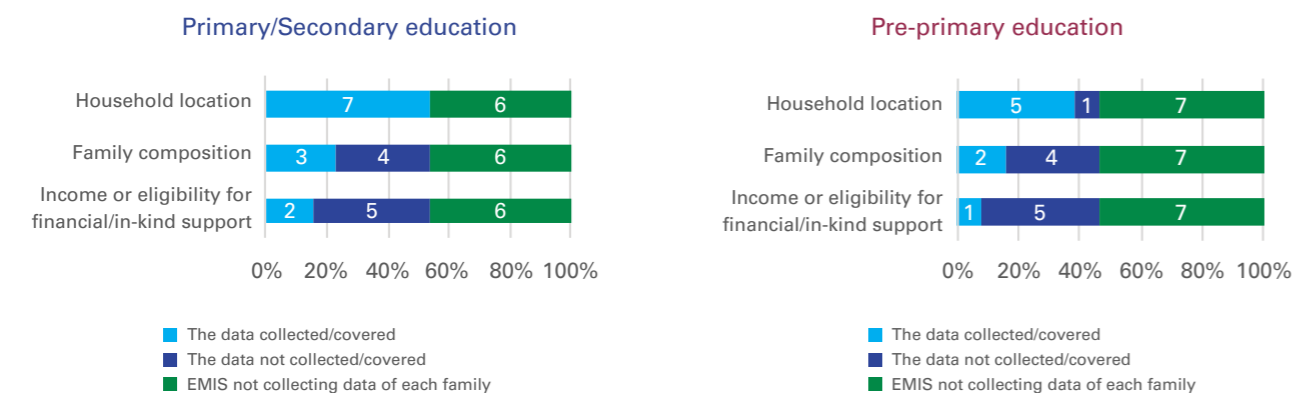
**Figure 22: Student educational data collected and included in EMIS**



### Household data

Given that family environments impact student learning and well-being, household data can be a help for education stakeholders to adjust education and learning support in a way to meet their students' unique needs. EMIS collects household location data in seven and five countries and economies (out of 13) in primary/secondary and pre-primary education respectively. A few countries and economies also include data on family composition and income or eligibility for financial/in-kind support for education.

**Figure 23: Household data collected and included in EMIS**

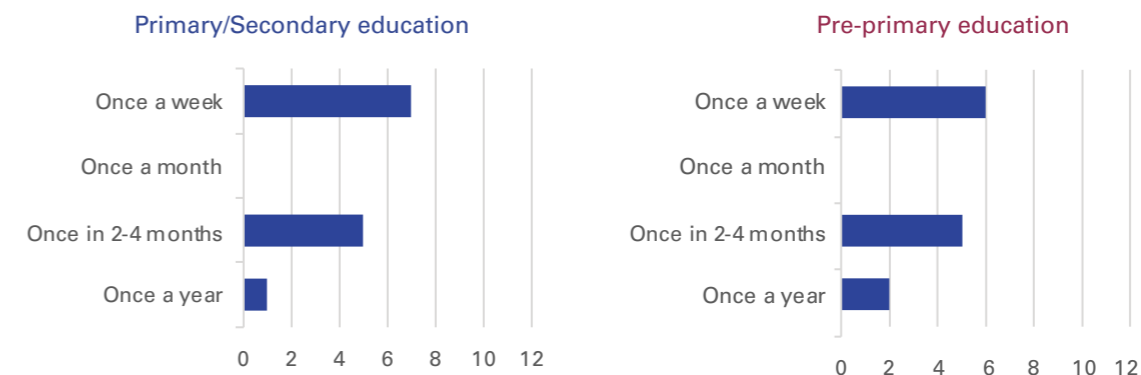


## Data collection and processing

### Data collection

Frequent data collection helps track changing educational situations, and it also needs to be organized with the school and academic calendar in mind. Among the 13 countries and economies, the majority collect data for EMIS once a week, while 5 countries and economies reported that the data are collected once every 2–4 months or once a semester.

**Figure 24: Frequency of data collection**



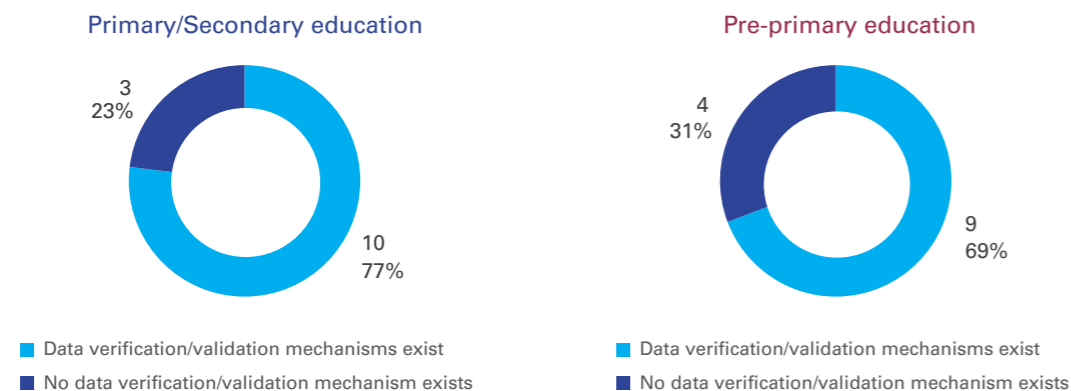
Note: When the frequency differs with types of data, the most frequent data collection cycle is presented.

### Data verification and validation

Ensuring the accuracy and reliability of education data is critical for data-driven education planning and management. However, verification and validation of education data is not an easy task because an increasing amount of data is being collected from diverse stakeholders through various instruments. This indicates a need for institutional mechanisms to verify and validate EMIS data in a systematic manner.

According to this survey, ten and nine countries and economies (out of 13) have mechanisms to verify and validate data collected for EMIS at primary/secondary and pre-primary education level respectively. The countries and economies reported that various measures were being taken. These include: agreeing on a protocol on data collection and management with a national institute of statistics; transferring demographic data from a national register of population and citizens; constructing grade 1 student data using EMIS at pre-primary education; checking consistency of data through comparison with data in the previous year; having EMIS data reports verified by a national agency for Information and Communications Technology (ICT); exchanging EMIS data with other Ministries and institutions for potential cross-checking; and asking parents to review their child data.

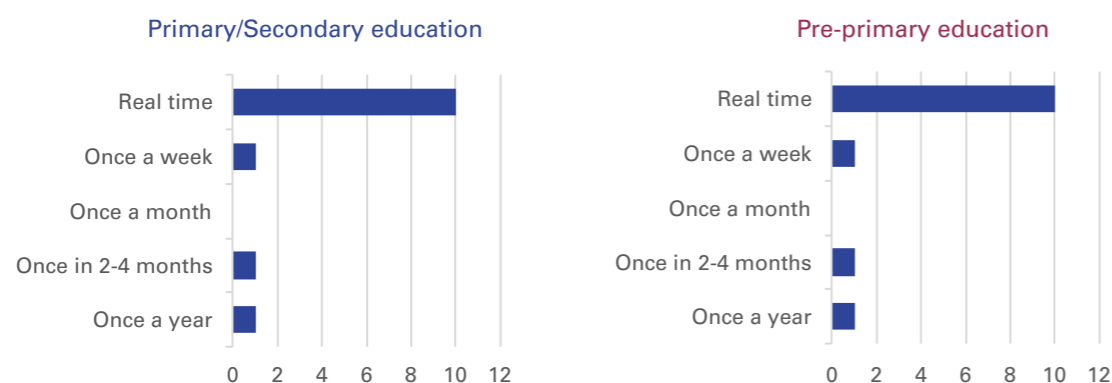
Figure 25: Existence of data verification/validation mechanisms



### Data update

Collected data need to be cleaned and updated in EMIS platforms on a regular basis. Among the 13 countries and economies, collected data are updated in EMIS platforms on a real-time basis in 10 countries and economies at both primary/secondary and pre-primary education levels, taking advantage of digital technology. EMIS data are also updated once a week in Serbia, once every 2–4 months in Azerbaijan, and once a year in Tajikistan.

Figure 26: Frequency of data update



Note: When the frequency differs with types of data, the most frequent data update cycle is presented.

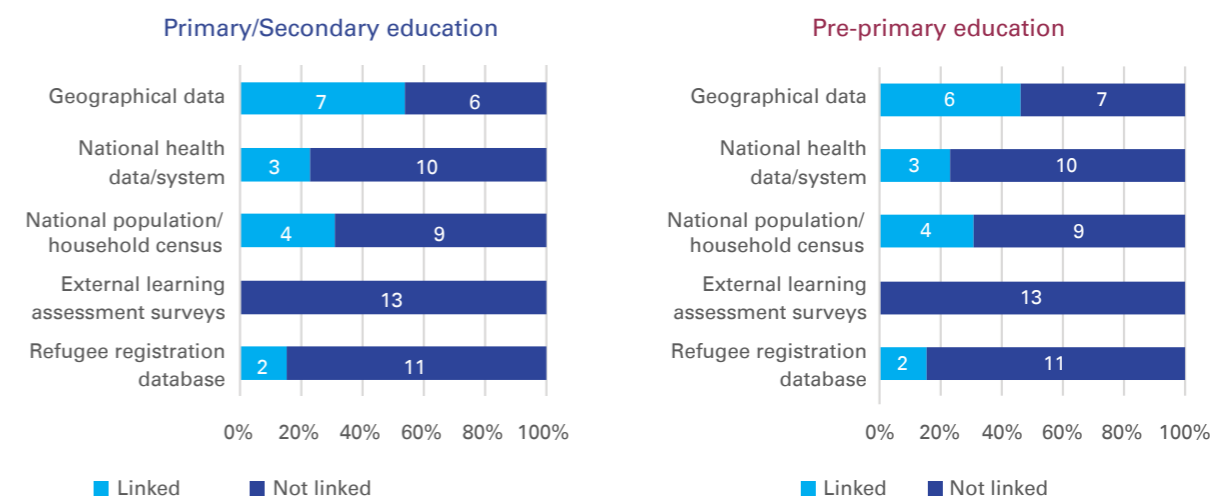
## Integration with other data/systems

### Linkage to external data and system

When EMIS is linked with external data and systems, it allows education stakeholders to leverage the cross-sectoral data to implement informed education planning and management based on cross-sectoral knowledge and evidence. However, creating and maintaining a data linkage could be costly.

A cross-sectoral linkage for EMIS is not necessarily common in the surveyed countries and economies. For instance, EMIS is linked with geographical data (e.g., school GIS) in about half of the countries and economies, and only less than one third link EMIS with national health systems, national census data and/or the refugee registration database. However, several countries and economies reported that EMIS is integrated with other external systems. For instance, the EMIS is linked with a labour-market database in Serbia and with public services for citizens in Uzbekistan, while the EMIS in Kazakhstan is linked with systems of the Ministry of Labour and Social Protection of the Population (MTC3H) and the Ministry of Justice (MHO PK).

Figure 27: External data and systems linked to EMIS



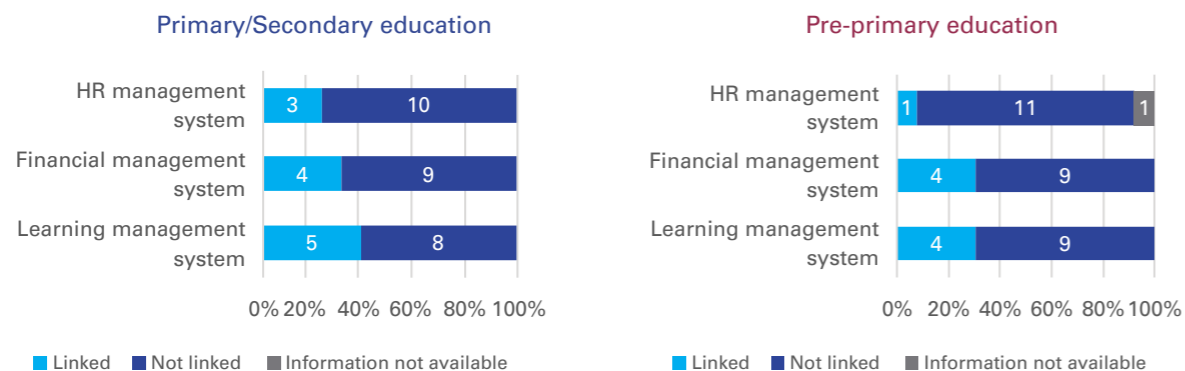
### Linkage to other data and systems in the education sector

EMIS can also be integrated with other data and systems in the education sector, which helps improve the effectiveness and efficiency of data management in the sector. However, EMIS is linked with human resources (HR) management systems and/or financial management systems in less than 40 per cent of the surveyed countries and economies. EMIS is also integrated with learning management systems in about one third of the countries and economies in primary/secondary and pre-primary education. These figures indicate that there is room for developing more integrated data management systems even within the education sector.

However, a few countries reported that EMIS is linked with other internal systems at primary/secondary education level. For instance, it is integrated with the Information System on Personalization of Study Documents (SIPAS) and National Register of Qualification (NRQ) in Moldova, and with the E-Diary system in North Macedonia.



Figure 28: Internal data and systems in the education sector linked to EMIS



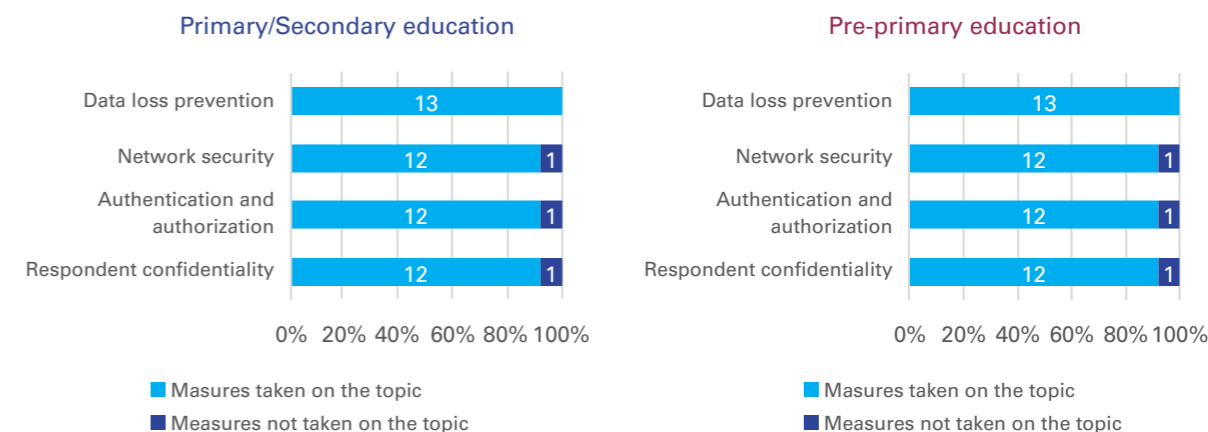
## Data security, privacy and access

### Data security and privacy

The importance of data security and privacy has increased in the education sector given that a growing amount of demographic and educational data are collected, stored and used to support data-driven education planning and management. These data are stored in a data server and managed with digital platforms, which increase cybersecurity risks.

Among the 13 countries and economies surveyed, all of them implement data loss prevention (e.g., data backup). All 13 countries/economies, except for Tajikistan, also have in place measures on network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality (e.g., personally identifiable information removed from public access data). Kosovo also reported that audit log and password lock are used to enhance data security and privacy.

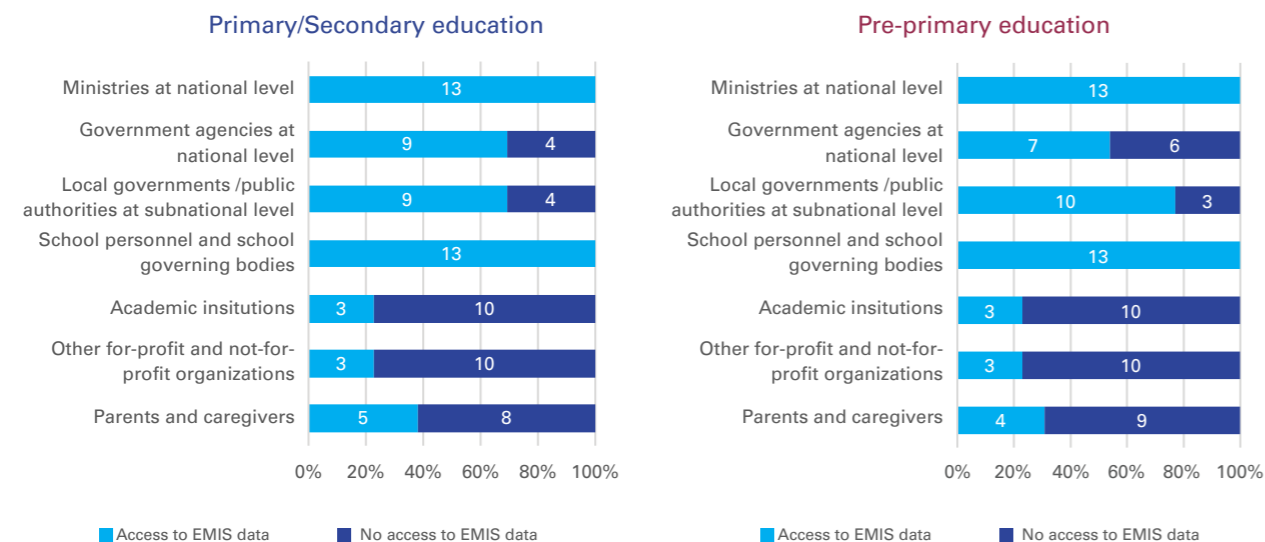
Figure 29: Data security and privacy measures implemented for EMIS



### Access to EMIS data

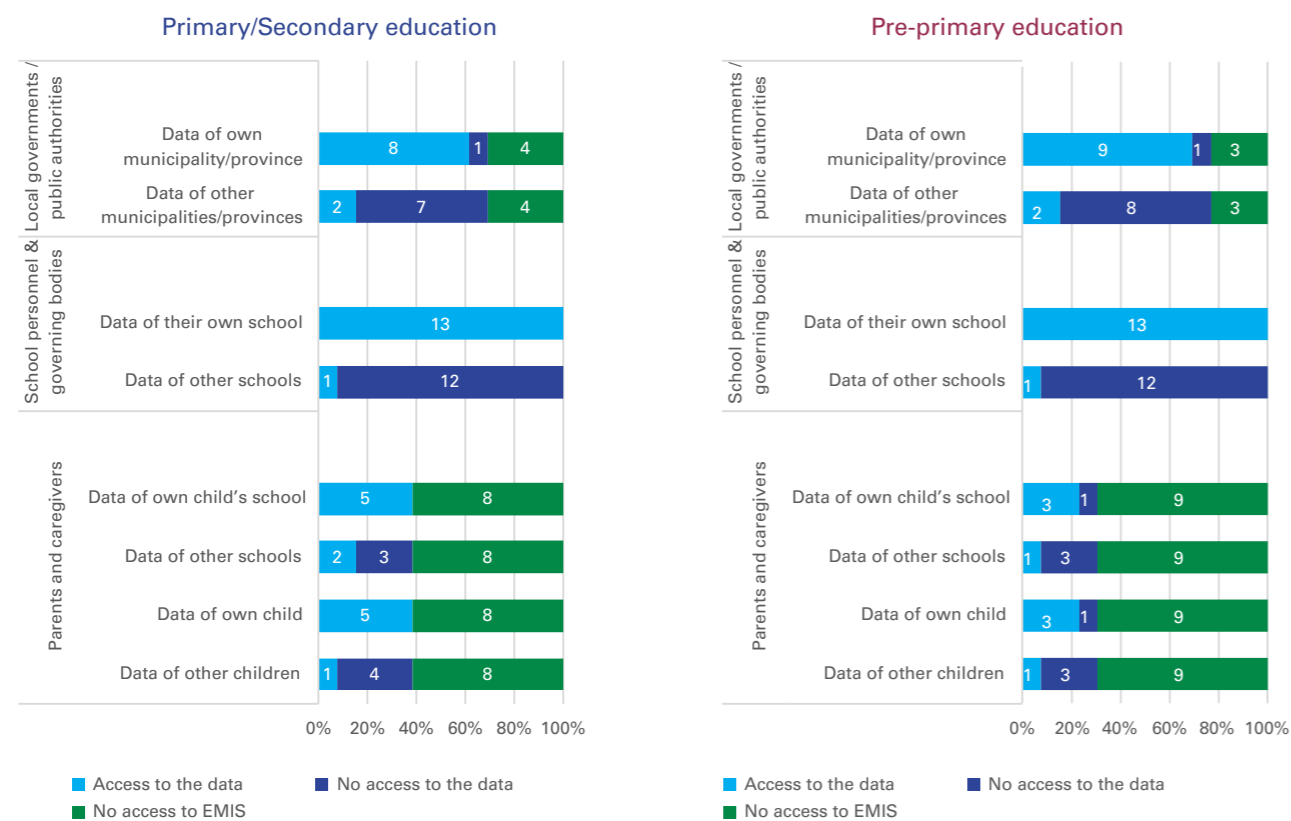
Access to EMIS data, which include sensitive information, is restricted to certain stakeholders for review and use. For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries and schools in all the countries and economies, while government agencies and local governments also have access to EMIS data in the majority of the countries and economies. Parents and caregivers, who have a direct interest in the quality and outcomes of the education service their children receive, can access EMIS data in only 38 per cent and 31 per cent of the countries and economies at primary/secondary education and pre-primary education level respectively. Academic institutions and other for-profit and not-for-profit organizations do not have access to EMIS data in most of the countries and economies.

Figure 30: Organizations and personnel granted access to EMIS data



When local education stakeholders are allowed to access the data of other localities and schools, they are able to compare their educational conditions with those in other areas and schools. However, access to EMIS data is limited to data from one's own jurisdiction and school in the majority of the countries and economies. Only in Armenia can schools access the EMIS data of other schools. When access to EMIS is granted, parents and caregivers can look at data on their own child and his/her school but are not allowed to access data from other schools and children in the majority of the countries and economies.

Figure 31: Access to EMIS data in own and other jurisdictions and schools

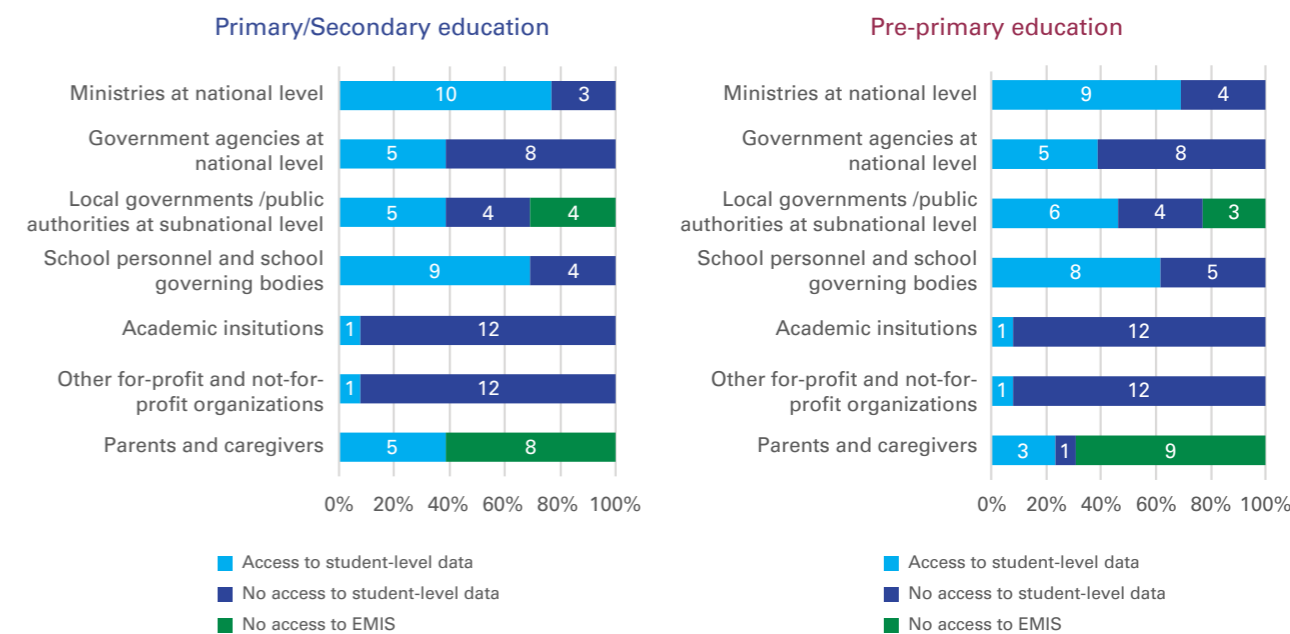


### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting students' learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries and schools in over 60 per cent of the surveyed countries and economies. Government agencies and local governments also have access to student-level data in around 40 per cent of the countries and economies.

On the other hand, academic institutions and other for-profit and not-for-profit organizations are hardly granted access to student-level data. Academic institutions have the capacity to contribute to evidence generation and provide policy recommendations through research. Giving academic institutions access to student-level data, without personally identifiable information, may help promote the effective use of EMIS data.

Figure 32: Organizations and personnel granted access to student-level data in EMIS

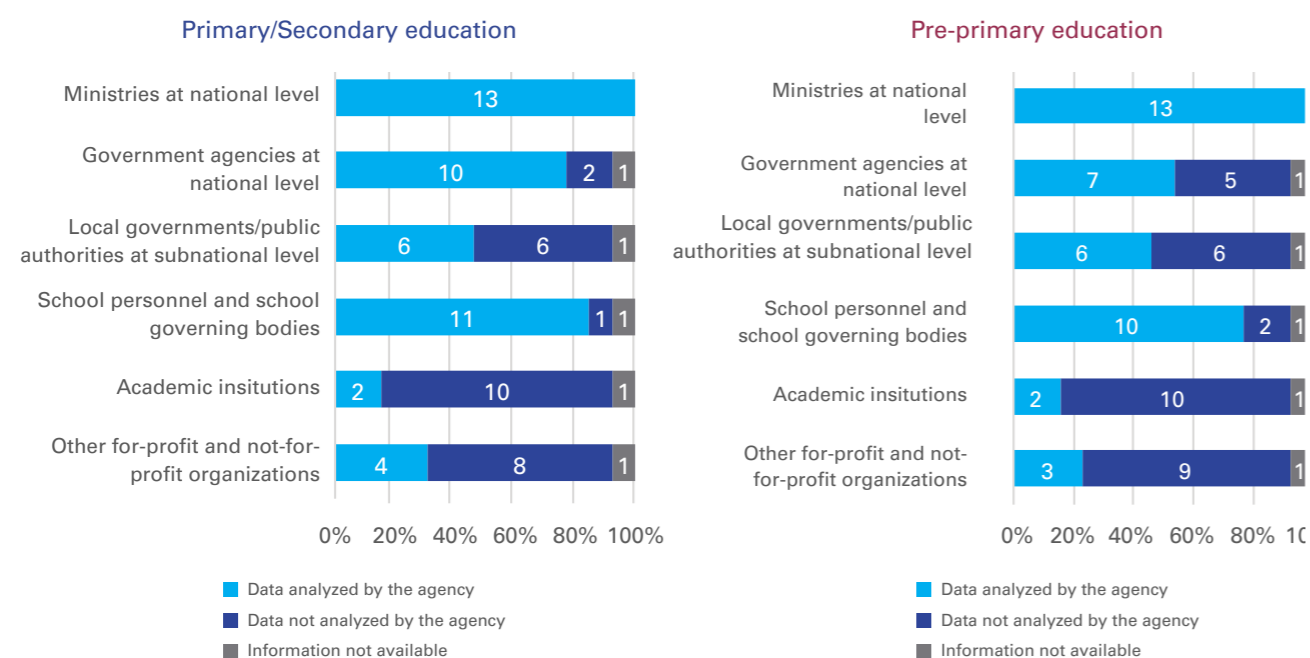


## Data analysis

### Organizations analysing EMIS data

Data collected and stored in EMIS need to be analysed to provide evidence and insights that are useful to inform education planning and management. Across the surveyed countries and economies, Ministries analyse EMIS data for both primary/secondary and pre-primary education, while school personnel and school governing bodies conduct analysis in the majority of the countries and economies. Government agencies and local governments are also engaged in EMIS data analysis in many countries and economies. Academic institutions such as universities and teacher training colleges conduct data analysis using EMIS data in only two countries and economies, possibly because access to EMIS data is not granted to academic institutions in many of the countries and economies.

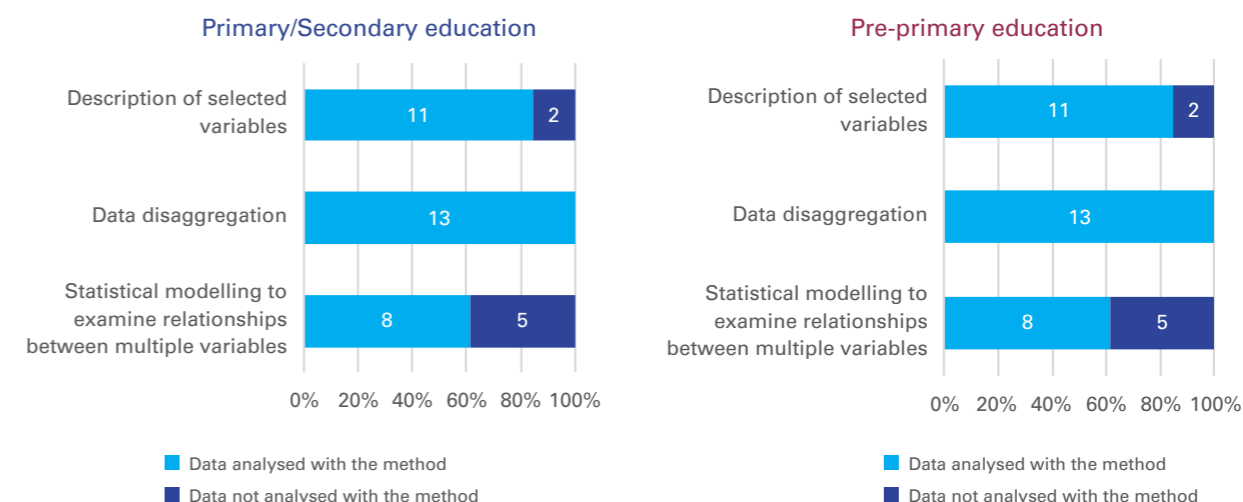
Figure 33: Organizations analysing EMIS data



### Types of data analysis

In the majority of the surveyed countries and economies, the education stakeholders analyse EMIS data by describing selected data (e.g., enrolment, average test scores) and/or disaggregating data into different groups and categories to assess heterogeneity in educational situations (e.g., enrolment rate by urban/rural area; achievement by gender). In about 60 per cent of the countries and economies, statistical analysis is conducted using methods such as regression analysis to examine relationships between multiple variables.

Figure 34: Types of data analysis using EMIS data

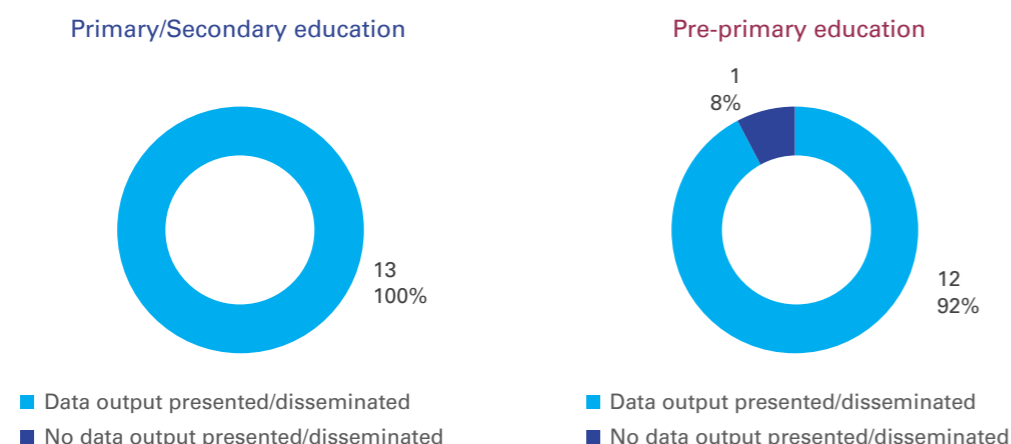


## Reporting and dissemination of data output

### Reporting and dissemination of data output

The results of EMIS data analysis are disseminated to education stakeholders for the purpose of monitoring and reporting as well as fulfilling educational accountability in all the countries/economies except for pre-primary education in North Macedonia.

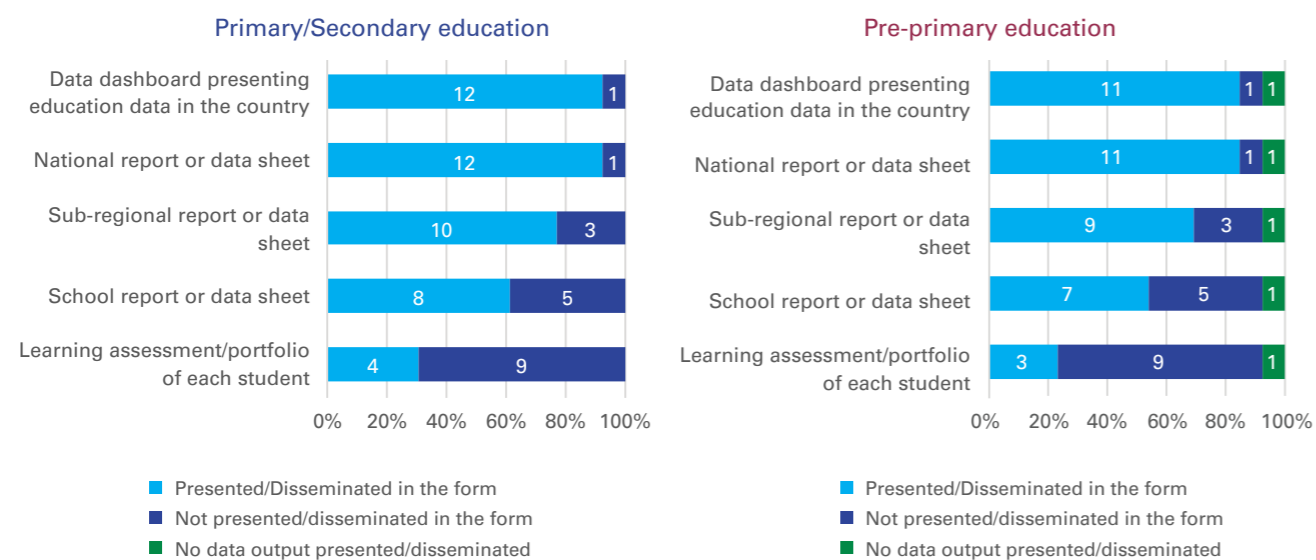
**Figure 35: Reporting and dissemination of results of EMIS data analysis**



### Formats of reporting and dissemination of data output

The data outputs are disseminated and reported in the format of data dashboards as well as national and subregional reports and data sheets in the majority of the countries/economies. The data outputs are also shared in the format of school reports or data sheets in eight and seven of the 13 surveyed countries/economies at primary/secondary and pre-primary education level respectively. It is worth noting that less than one third of the countries/economies share learning data with students and their families in the format of learning assessment and portfolio.

**Figure 36: Formats of reporting and dissemination of results of EMIS data analysis**



# EMIS profile by country



# EMIS in Armenia

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Armenia. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 1: Existence of law, policy, regulations and guidelines on EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

### Organizational and budgetary arrangements

Armenia formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries have a formal role to play in EMIS operation and receive budget for the development and operation of EMIS. Formal EMIS training is provided to Ministries, local governments and public authorities at subnational level, schools and academic institutions on a regular basis.

**Table 2: Organizational and budgetary arrangements for EMIS operation in Armenia**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•	•	•
- Government agencies at national level	NA	NA	NA	•	•	NA
- Local governments and public authorities at subnational level	NA	•	NA	•	•	NA
- School personnel and school governing bodies	NA	•	NA	•	•	NA
- Academic institutions	NA	•	NA	NA	•	NA
- Other for-profit and not-for-profit organizations	NA	NA	NA	NA	NA	NA

Note: NA indicates information is not available.

### Areas of training provided

The EMIS training provided to local governments and public authorities, schools and academic institutions covers a range of topics, including needs assessment, data collection, data processing/management, and dissemination of data outputs, to help these organizations fulfil their roles and responsibilities. However, data analysis is not covered in the formal training.

**Table 3: Areas of formal EMIS training provided in Armenia**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis		
- Dissemination of data outputs	•	•

## EMIS platform

### Types of platforms

Armenia uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The country developed its own digital platform, which is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 4: EMIS platforms and functions in Armenia**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

The country has formal procedures to assess needs for education data at primary/secondary education level on a regular basis, and to select data to be collected. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with a range of education stakeholders, which include Ministries, government agencies, local governments and public authorities, school and teacher unions and academic institutions. The needs assessment is conducted once every 2–4 months or once a semester.

**Table 5: Formal procedures to assess education data needs in Armenia**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	Yes	No
- Desk review and analysis of existing EMIS data	•	
- Consultation and survey with:		
- Ministries at national level	•	
- Government agencies at national level	•	
- Local governments and public authorities at subnational level	•	
- School personnel and school governing bodies	•	
- Teacher unions	•	
- Academic institutions	•	

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	Yes	No
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment	Once in 2-4 months	

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary education covers several subsectors, as well as children who are not in the school system. It collects data on private schools/students and students studying in programmes other than the general education track, such as TVET programmes, although information on non-formal education is not covered. It also collects data on out-of-school children who have never entered formal education and those who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school. EMIS at pre-primary education level also collects data about private pre-primary schools and students.

**Table 6: Coverage of subsectors and out-of-school children in EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education	•	NA
<b>Children out of school</b>		
- School-age children who have never entered formal education	•	
- School-age children who dropped out of school	•	

Note: NA indicates information is not available.

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including infrastructure, materials, Internet connection, staff and students and programmes offered, although school finance information is not covered. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 7: School data collected and included in EMIS in Armenia**

Information about each school	Primary/Secondary	Pre-primary
	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support	•	•
- Offering of special education programmes	•	•
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, experience of teaching and records of professional development as well as teacher remuneration. The information on each teacher would facilitate teacher management and support as well as their professional development. However EMIS does not include information related to teachers' disciplinary problems and performance.

**Table 8: Teacher data collected and included in EMIS in Armenia**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll	•	•
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in the country collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to nationality, refugee/migrant status, and disabilities and functional difficulties. On the other hand, it does not cover information such as language, special talents, physical growth, and vaccination records.

Regarding educational information, EMIS includes information about each student's enrolment, attendance/absence, programmes/courses taken, and need for and enrolment in special education programmes. At primary/secondary education level, EMIS also includes learning achievement and progress measured by standardized testing and teachers, as well as assessment of transferable and twenty-first-century skills. In addition, collection of data on need for and enrolment in gifted programme and student's behavioural problems is in process for EMIS in primary/secondary education. The information about each student would help identify students' needs and provide tailored learning support.

**Table 9: Student data collected and included in EMIS in Armenia**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity		
- Refugee and migrant status	•	•
- Language		
- Disabilities and functional difficulties	•	•
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence	•	•
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers	•	NA
- Assessment of transferable and twenty-first century skills	•	NA
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	•
- A need for and enrolment in gifted education programmes		NA
- Student's behaviour problems		

Note: NA indicates information is not available.

## Household data

EMIS in the country does not collect and include data on students' families either at primary/secondary or pre-primary education level. Given that family environments impact student learning and well-being, collecting household information may help schools and teachers adjust teaching practices and support provided to children.

**Table 10: Household data collected and included in EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	No	No
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique identifier

EMIS in the country assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at both primary/secondary and pre-primary education levels. This indicates that EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also helps in analysing how school, teacher and student factors are associated with education service delivery and learning.

**Table 11: Unique identifier for schools, teachers and children in EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code	•	•
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code	•	•
- Student code linked to teacher code	•	•

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week and updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, EMIS in primary/secondary education is interconnected with the databases of the State Population Registry and the Civil Status Acts Registration Agency.

**Table 12: Frequency of data collection and update and existence of data verification/validation mechanisms in Armenia**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to geographical data and national population/household census data. Armenia reported that, at primary/secondary education level, EMIS is also linked with systems of the Civil Status Acts Registration Agency and the Agency for State Register of Legal Entities. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, the EMIS is not integrated with a national health system and refugee registration databases.

**Table 13: External data and systems linked to EMIS in Armenia**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system		
- National population/household census	•	•
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at both primary/secondary and pre-primary education levels. It is linked with financial management systems and learning management systems. At primary/secondary level, EMIS is also integrated with human resource management system. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector.

**Table 14: Internal data and systems in the education sector linked to EMIS in Armenia**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system	•	NA
- Financial management system	•	•
- Learning management system	•	•

Note: NA indicates information is not available.



## Data security, privacy and access

### Data security and privacy

The country implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 15: Data security and privacy measures implemented for EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to a wide range of organizations and personnel including Ministries, government agencies, local governments and public authorities, schools, academic institutions, other for-profit and not-for-profit organizations, and parents and caregivers.

Access to EMIS data is not limited to data on one's own jurisdiction and school, allowing local education stakeholders to compare their educational conditions with those in other areas and schools. For example, local governments have access to data from other municipalities, districts and provinces. Schools can look at the data of other schools. Parents and caregivers have access to data for their own child's school and other schools, although they cannot look at individual data of other children.

**Table 16: Organizations and personnel granted access to EMIS data in Armenia**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces	•	•
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools	•	•
<b>Academic institutions</b>	<b>Yes</b>	<b>Yes</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>Yes</b>	<b>Yes</b>

	Primary/Secondary	Pre-primary
<b>Parents and caregivers</b>	<b>Yes</b>	<b>Yes</b>
- Data of own child's school	•	•
- Data of other schools	•	•
- Data of own child	•	•
- Data of other children		

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries, government agencies, local governments and public authorities and schools. Academic institutions do not have access to the student-level data.

**Table 17: Organizations and personnel granted access to student-level data in EMIS in Armenia**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Armenia reported that Ministries analyse data collected by EMIS for both primary/secondary and pre-primary education. Since summary information of educational at primary/secondary level is made available to all the stakeholder groups, these stakeholders may also conduct analyses of EMIS data.

**Table 18: Organizations analysing EMIS data in Armenia**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	NA	NA
- Local governments and public authorities at subnational level	NA	NA
- School personnel and school governing bodies	NA	NA
- Academic institutions	NA	NA
- Other for-profit and not-for-profit organizations	NA	NA

Note: NA indicates information is not available.

## Types of data analysis

The education stakeholders in the country conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 19: Types of data analysis using EMIS data in Armenia**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

The country reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. The analysis of learning data is also shared with students and their families in the format of learning assessment and portfolio.

**Table 20: Reporting and dissemination of results of EMIS data analysis in Armenia**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents	•	•

## EMIS in Azerbaijan

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Azerbaijan. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 21: Existence of law, policy, regulations and guidelines on EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

#### Organizational and budgetary arrangements

Azerbaijan formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, local governments and public authorities at subnational level, and schools have a formal role to play in EMIS operation. Additionally, academic institutions and other for-profit and not-for-profit organizations are assigned to support EMIS for pre-primary education. Formal EMIS training is provided to Ministries, local governments and public authorities and schools on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 22: Organizational and budgetary arrangements for EMIS operation in Azerbaijan**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•	•	•
- Government agencies at national level	•			•		
- Local governments and public authorities at subnational level	•	•		•	•	
- School personnel and school governing bodies	•	•		•	•	
- Academic institutions				•		
- Other for-profit and not-for-profit organizations				•		

## Areas of training provided

The formal training on EMIS operation, which is provided to Ministries, local governments and public authorities, and schools, covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the organizations fulfil their roles and responsibilities.

**Table 23: Areas of formal EMIS training provided in Azerbaijan**

	Primary/Secondary	Pre-primary
	<b>Yes</b>	<b>Yes</b>
<b>Provision of formal and regular training</b>		
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

## EMIS platform

### Types of platforms

Azerbaijan uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The digital platform, *General Education Information System*, is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 24: EMIS platforms and functions in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	<b>No</b>	<b>No</b>
<b>Spreadsheet</b>	<b>No</b>	<b>No</b>
<b>Digital platform</b>	<b>Yes</b>	<b>Yes</b>
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Azerbaijan has formal procedures to assess needs for education data at primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. Although analysis of the relevance and usefulness of existing data is not formally implemented, the country conducts consultation and survey with selected education stakeholders, which include Ministries, government agencies, local governments and public authorities and schools. The needs assessment is conducted once every 2–4 months or once a semester.

**Table 25: Formal procedures to assess education data needs in Azerbaijan**

	Primary/Secondary	Pre-primary
	<b>Yes</b>	<b>Yes</b>
<b>Existence of formal procedures to assess data needs regularly</b>		
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment	Once in 2-4 months	Once in 2-4 months

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary and pre-primary education covers data about private schools and students. However, it does not collect data about students studying in programmes other than the general education

track, although there is a separate database for TVET. EMIS also does not cover out-of-school children, including those who have dropped out of school.

**Table 26: Coverage of subsectors and out-of-school children in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)		
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school		

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including infrastructure, materials, Internet connection, staff and students, programmes offered and school evaluation, although school finance information is not included. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 27: School data collected and included in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Information about each school</b>		
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support		
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	•
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation	•	•

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers a wide range of information such as contract, qualifications and certification, experience of teaching and records of professional development, teacher remuneration, and vaccination records, as well as their performance data. The information about each teacher facilitates teacher management and support as well as their professional development.

**Table 28: Teacher data collected and included in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Information about each teacher</b>		
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll	•	•
- Vaccination records	•	•
- Teacher's disciplinary problems		
- Evaluation of teacher's performance	•	•

## Student data

EMIS in Azerbaijan collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to refugee/migrant status, disabilities and functional difficulties, and special talents. On the other hand, it does not cover information such as nationality, language, physical growth, and vaccination records. Regarding educational information, EMIS includes data on each student's enrolment, attendance/absence, programmes/courses taken, need for and enrolment in gifted programmes, and behavioural problems. At primary/secondary education level, EMIS also includes learning achievement and progress measured by standardized testing and teachers, as well as need for special education programmes. The information on each student would help identify students' needs and provide tailored learning support.

**Table 29: Student data collected and included in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Information about each student</b>		
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality		
- Ethnicity		
- Refugee and migrant status	•	•
- Language		
- Disabilities and functional difficulties	•	•
- Special gifts and talents	•	•
- Physical growth		



	Primary/Secondary	Pre-primary
<b>Information about each student</b>	<b>Yes</b>	<b>Yes</b>
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence	•	•
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers	•	
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	
- A need for and enrolment in gifted education programmes	•	•
- Student's behaviour problems	•	•

## Household data

EMIS in Azerbaijan does not collect and include data on students' families either at primary/secondary or pre-primary education level. Given that family environments impact student learning and well-being, collecting household information may help schools and teachers adjust teaching practices and support provided to children.

**Table 30: Household data collected and included in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	<b>No</b>	<b>No</b>
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Azerbaijan assigns unique identifiers to schools, teachers, and students and these codes are linked with one another at both primary/secondary and pre-primary education levels. This indicates that EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning.

**Table 31: Unique identifier for schools, teachers and children in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	<b>Yes</b>	<b>Yes</b>
<b>Unique teacher code</b>	<b>Yes</b>	<b>Yes</b>
- Teacher code linked to school code	•	•
<b>Unique student code</b>	<b>Yes</b>	<b>Yes</b>
- Student code linked to school code	•	•
- Student code linked to teacher code	•	•

## Data collection and processing

### Data collection, validation and update

EMIS collects data and updates its information once every 2–4 months or once a semester for both primary/secondary and pre-primary education. However, there is no mechanism to ensure the accuracy and reliability of collected data.

**Table 32: Frequency of data collection and update and existence of data verification/validation mechanisms in Azerbaijan**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once in 2–4 months	Once in 2–4 months
- Frequency of data update	Once in 2–4 months	Once in 2–4 months
- Existence of mechanisms to ensure data accuracy and reliability		

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to national population/household census data and refugee registration database. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with geographical data and national health systems.

**Table 33: External data and systems linked to EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census	•	•
- External learning assessment survey		
- Refugee registration database	•	•

## Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at both primary/secondary and pre-primary education levels. It is linked with human resource management systems, financial management systems, and learning management systems. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector.

**Table 34: Internal data and systems in the education sector linked to EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system	•	•
- Financial management system	•	•
- Learning management system	•	•

## Data security, privacy and access

### Data security and privacy

Azerbaijan implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 35: Data security and privacy measures implemented for EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to a wide range of organizations and personnel including Ministries, government agencies, local governments and public authorities, schools, academic institutions, and parents and caregivers.

However, local education stakeholders have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. For example, local governments have access to data from their own municipalities, districts and provinces only. Schools cannot look at the data of other schools. Parents and caregivers have access to the data of their own child and his/her school only.

**Table 36: Organizations and personnel granted access to EMIS data in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>Yes</b>	<b>Yes</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>Yes</b>	<b>Yes</b>
- Data of own child's school	•	•
- Data of other schools		
- Data of own child	•	•
- Data of other children		

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries, government agencies, local governments and public authorities, schools and academic institutions.

**Table 37: Organizations and personnel granted access to student-level data in EMIS in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions	•	•
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Azerbaijan reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by a wide range of stakeholders including Ministries, government agencies, local governments and public authorities, schools and academic institutions.

**Table 38: Organizations analysing EMIS data in Azerbaijan**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions	•	•
- Other for-profit and not-for-profit organizations		

## Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include descriptions of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 39: Types of data analysis using EMIS data in Azerbaijan**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Azerbaijan reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards showing education indicators and national reports and data sheets. The outputs are not presented in the format of subregional and school reports or a learning portfolio for individual students.

**Table 40: Reporting and dissemination of results of EMIS data analysis in Azerbaijan**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets		
- School report and data sheets		
- Learning assessment and portfolio of each student shared with the student and his/her parents		

## EMIS in Bulgaria

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Bulgaria. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 41: Existence of law, policy, regulations and guidelines on EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

#### Organizational and budgetary arrangements

Bulgaria formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries, local governments and public authorities at subnational level, and schools, have a formal role to play in EMIS operation. Formal EMIS training is also provided to these organizations on a regular basis. Budget for EMIS operation is made available for Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 42: Organizational and budgetary arrangements for EMIS operation in Bulgaria**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•	•	•
- Government agencies at national level	NA			NA		
- Local governments and public authorities at subnational level	•	•		•	•	

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	Yes	Yes	Yes	Yes	Yes
- School personnel and school governing bodies	•	•		•	•	
- Academic institutions						
- Other for-profit and not-for-profit organizations						

Note: NA indicates information is not available.

## Areas of training provided

The formal training on EMIS operation, which is provided to Ministries, local governments and public authorities and schools, covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the organizations fulfil their roles and responsibilities.

**Table 43: Areas of formal EMIS training provided in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	Yes	Yes
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

## EMIS platform

### Types of platforms

Bulgaria uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. It has developed a web-based software system based on .NET technology and a MSSQL server, which is not an open-source platform. It does not offer offline access or multiple languages, and no user guide is available. The minimum Internet speed required for using the platform is reported at 10–50 Mbps.

**Table 44: EMIS platforms and functions in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	NA	NA
<b>Spreadsheet</b>	NA	NA
<b>Digital platform</b>	Yes	Yes
- Open-source platform		

	Primary/Secondary	Pre-primary
- Offline access		
- Multiple languages		
- User guide		
- Required Internet speed	10-50 Mbps	10-50 Mbps

Note: NA indicates information is not available.

## Scope of data

### Assessment of data needs

Bulgaria has formal procedures to assess needs for education data at primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with a range of education stakeholders, which include Ministries, government agencies, local governments and public authorities, schools and teacher unions. The needs assessment is conducted once a year for primary/secondary education.

**Table 45: Formal procedures to assess education data needs in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	Yes	Yes
- Desk review and analysis of existing EMIS data	•	•
- Consultation and survey with:		
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Teacher unions	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations	NA	NA
- Parents and caregivers		
- Frequency of needs assessment	Once a year	NA

Note: NA indicates information is not available. When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary and pre-primary education collects data about private schools/students, while it does not cover students studying in programmes other than the general education track, such as TVET programmes, as well as non-formal education. EMIS also collects data about out-of-school children who have never entered formal education and those who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school.



**Table 46: Coverage of subsectors and out-of-school children in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)		
<b>Children out of school</b>		
- School-age children who have never entered formal education	•	•
- School-age children who dropped out of school	•	•

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including school finance, infrastructure, materials, Internet connection, staff and students, offering of language support, offering of special education and gifted programmes, and school evaluation. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 47: School data collected and included in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Information about each school</b>	Yes	Yes
- Financial information	•	•
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	NA	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered		
- Offering of language support	•	•
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	•
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation	•	•

Note: NA indicates information is not available.

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualification and certification, and experience of teaching. The information about each teacher would facilitate teacher management and support. However, EMIS does not include data on professional development, teacher remuneration, vaccination records and information related to teachers' disciplinary problems and performance.

**Table 48: Teacher data collected and included in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Information about each teacher</b>	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development		
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Bulgaria collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS ranges from basic information such as age and gender to refugee/migrant status, disabilities and functional difficulties, and special talents. It is also reported that language information is collected on a voluntary basis. On the other hand, EMIS does not cover information such as nationality, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment, programmes/courses taken, learning achievement and progress measured by standardized testing and teachers, and a need for and enrolment in special education programmes and gifted programmes. The information about each student would help identify students' needs and provide tailored learning support.

**Table 49: Student data collected and included in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Information about each student</b>	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality		
- Ethnicity		
- Refugee and migrant status	•	•
- Language		
- Disabilities and functional difficulties	•	•
- Special gifts and talents	•	•
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence		
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	•

	Primary/Secondary	Pre-primary
Information about each student	Yes	Yes
- Learning achievement and progress assessed by teachers	•	•
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	•
- A need for and enrolment in gifted education programmes	•	•
- Student's behaviour problems		

## Household data

EMIS in Bulgaria also collects and includes data on students' families both at primary/secondary and pre-primary education levels. It includes household location. It is also reported that EMIS collects information about language spoken at home, as well as parents' education and employment status, on a voluntary basis. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 50: Household data collected and included in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
Information about students' family	Yes	Yes
- Household location	•	•
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Bulgaria assigns unique identifiers to schools, teachers and students at both primary/secondary and pre-primary education levels. However, these codes are not linked with one another. If these codes were linked, EMIS in the country would be able to provide multilevel education data with a nested structure. This not only helps education planning and management but also helps in analysing how school, teacher and student factors are associated with education service delivery and learning.

**Table 51: Unique identifier for schools, teachers and children in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code		
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code		
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once every 2–4 months or once a semester, but updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, EMIS data are checked with reference to registries maintained by first-tier data administrators such as Civil Registration and Administrative Services.

**Table 52: Frequency of data collection and update and existence of data verification/validation mechanisms in Bulgaria**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once in 2–4 months	Once in 2–4 months
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is not linked to geographical data, national health systems or refugee registration databases. However, the country reported that EMIS is linked to the National Population Database. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management.

**Table 53: External data and systems linked to EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. A lack of integrated data system may impact the effectiveness and efficiency of data management in the sector.

**Table 54: Internal data and systems in the education sector linked to EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Bulgaria implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 55: Data security and privacy measures implemented for EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, local governments and public authorities, schools, and parents and caregivers. However, local education stakeholders have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. For example, local governments have access to data from their own municipalities, districts and provinces only. Schools cannot look at data from other schools.

**Table 56: Organizations and personnel granted access to EMIS data in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>No</b>	<b>No</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•

	Primary/Secondary	Pre-primary
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>Yes</b>	<b>Yes</b>
- Data of own child's school	•	•
- Data of other schools		
- Data of own child	•	•
- Data of other children	•	•

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries and school. Local governments and academic institutions do not have access to the student-level data.

**Table 57: Organizations and personnel granted access to student-level data in EMIS in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Bulgaria reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries, local governments and public authorities and schools.

**Table 58: Organizations analysing EMIS data in Bulgaria**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level		

	Primary/Secondary	Pre-primary
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment) and disaggregation of data into different groups and categories to assess heterogeneity in educational situations.

**Table 59: Types of data analysis using EMIS data in Bulgaria**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables		

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Bulgaria reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The country reported that the data outputs are reported and disseminated in the format of lists and tables. The outputs are not presented in the format of national, subregional and school reports and data sheets, or a learning portfolio for individual students.

**Table 60: Reporting and dissemination of results of EMIS data analysis in Bulgaria**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country		
- National report and data sheets		
- Subregional report and data sheets		
- School report and data sheets		
- Learning assessment and portfolio of each student shared with the student and his/her parents		

## EMIS in Croatia

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Croatia. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. It has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 61: Existence of law, policy, regulations and guidelines on EMIS in Croatia**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

#### Organizational and budgetary arrangements

Croatia formally designates certain organizations and personnel to support EMIS with the provision of training and budget. Ministries and schools have a formal role to play in EMIS operation for both primary/secondary and pre-primary education. Additionally, government agencies at national level are assigned to support EMIS for primary/secondary education level. Formal EMIS training is provided on a regular basis only at primary/secondary education level. Budget for EMIS operation is made available and allocated to Ministries and government agencies, although schools may use their non-earmarked budget to support EMIS.

**Table 62: Organizational and budgetary arrangements for EMIS operation in Croatia**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•		•



	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>
- Government agencies at national level	•	•	•			
- Local governments and public authorities at subnational level						
- School personnel and school governing bodies	•	•		•		
- Academic institutions						
- Other for-profit and not-for-profit organizations						

## Areas of training provided

The formal training on EMIS operation at primary/secondary education level, which is provided to Ministries, government agencies and schools, covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the organizations fulfil their roles and responsibilities.

**Table 63: Areas of formal EMIS training provided in Croatia**

Provision of formal and regular training	Primary/Secondary	Pre-primary
	Yes	No
- Assessment of data needs	•	
- Data collection	•	
- Data processing/management	•	
- Data analysis	•	
- Dissemination of data outputs	•	

## EMIS platform

### Types of platforms

Croatia uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The country developed an own digital platform, which is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available.

**Table 64: EMIS platforms and functions in Croatia**

	Primary/Secondary	Pre-primary
	No	No
<b>Paper-based</b>	<b>No</b>	<b>No</b>
<b>Spreadsheet</b>	<b>No</b>	<b>No</b>
<b>Digital platform</b>	<b>Yes</b>	<b>Yes</b>
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	NA	NA

Note: NA indicates information is not available.

## Scope of data

### Assessment of data needs

Croatia has formal procedures to assess needs for education data at both primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. The needs assessment is conducted once a month. However, neither analysis of the relevance and usefulness of existing data nor consultation and survey are conducted on a regular basis.

**Table 65: Formal procedures to assess education data needs in Croatia**

Existence of formal procedures to assess data needs regularly	Primary/Secondary	Pre-primary
	Yes	Yes
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment	Once a month	Once a month

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary education collects data about private schools/students and students studying in programmes other than the general education track such as TVET programmes, although information about

non-formal education is not covered. It also collects data on children who have dropped out of school, which could be used to bring these children back to school or support continued learning outside of school. EMIS at pre-primary education level also collects data about private preschools and students.

**Table 66: Coverage of subsectors and out-of-school children in EMIS in Croatia**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. EMIS for primary/secondary education covers a wide range of information including infrastructure, materials, Internet connection, staff and students and programmes offered, although school finance information is not covered. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development. On the other hand, EMIS at pre-primary level collects basic data only, such as staff and student information.

**Table 67: School data collected and included in EMIS in Croatia**

	Primary/Secondary	Pre-primary
Information about each school	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	
- Other school infrastructure	•	
- Educational materials and equipment	•	
- School Internet connection	•	
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	
- Offering of language support		
- Offering of special education programmes	•	
- Offering of gifted education programmes	•	
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS collects and includes data on each teacher in primary/secondary education but not at pre-primary level. EMIS in primary/secondary education covers information about teacher contract, qualification and certification, experience of teaching and records of professional development. The information on each teacher facilitates teacher management and support as well as their professional development. However EMIS does not cover data on teacher remuneration, vaccination records, or information related to teachers' disciplinary problems and performance.

**Table 68: Teacher data collected and included in EMIS in Croatia**

	Primary/Secondary	Pre-primary
Information about each teacher	Yes	No
- Contract type	•	
- Qualification	•	
- Certification	•	
- Teaching experience	•	
- Records of professional development	•	
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Croatia collects data on each student in primary/secondary education but not in pre-primary education. At primary/secondary education level, students' demographic data included in EMIS range from basic information such as age and gender to nationality, ethnicity, refugee/migrant status, disabilities and functional difficulties, and special talents. On the other hand, it does not cover information such as language, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment, attendance and absence, programmes/courses taken, learning achievement and progress measured by standardized testing and teachers, and need for and enrolment in language support programmes, special education programmes and gifted programmes, as well as behavioural problems. The information about each student would help identify students' needs and provide tailored learning support.

**Table 69: Student data collected and included in EMIS in Croatia**

	Primary/Secondary	Pre-primary
Information about each student	Yes	No
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	
- Nationality	•	
- Ethnicity	•	
- Refugee and migrant status	•	
- Language		

	Primary/Secondary	Pre-primary
Information about each student	Yes	No
- Disabilities and functional difficulties	•	
- Special gifts and talents	•	
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	
- Attendance and absence	•	
- Academic programmes and courses enrolled	•	
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers	•	
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes	•	
- A need for and enrolment in special education programmes	•	
- A need for and enrolment in gifted education programmes	•	
- Student's behaviour problems	•	

## Household data

EMIS in Croatia collects and includes data on students' families at primary/secondary education level only. EMIS includes household location, but it does not cover data on family composition or family income and eligibility for financial/in-kind support. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 70: Household data collected and included in EMIS in Croatia**

	Primary/Secondary	Pre-primary
Information about students' family	Yes	No
- Household location	•	
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Croatia assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at primary/secondary education level, except for a student-teacher link. This indicates that, in general, EMIS in primary/secondary education provides multilevel education data with a nested structure. This not only helps education planning and management but also helps in analysing how school, teacher and student factors are associated with education service delivery and learning, although a lack of the student-teacher link limits the scope of analysis. In pre-primary education, EMIS provides unique identifiers to schools only, because data about each teacher and student is not collected.

**Table 71: Unique identifier for schools, teachers and children in EMIS in Croatia**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	No
- Teacher code linked to school code	•	
<b>Unique student code</b>	Yes	No
- Student code linked to school code	•	
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week for primary/secondary education and once a year for pre-primary education. However, its information is updated on a real-time basis at both education levels. There are mechanisms to ensure the accuracy and reliability of collected data in primary/secondary education. For example, data on students are derived from the main OIB register (i.e., central register of all citizens), which is linked with EMIS. Educational data also come from the e-register book.

**Table 72: Frequency of data collection and update and existence of data verification/validation mechanisms in Croatia**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a year
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	

*Note:* When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to geographical data. Croatia reported that, at primary/secondary education level, EMIS is also linked with OIB register and e-register book of students. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with the national health system, census data, and refugee registration databases.

**Table 73: External data and systems linked to EMIS in Croatia**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

## Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. A lack of integrated data system may impact the effectiveness and efficiency of data management in the sector.

**Table 74: Internal data and systems in the education sector linked to EMIS in Croatia**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Croatia implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 75: Data security and privacy measures implemented for EMIS in Croatia**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries and schools. Government agencies have access to EMIS data at primary/secondary education only. Schools have access to EMIS data of their own school only, which limits the capacity to compare their educational conditions with those in other schools. Parents and caregivers are not granted access to EMIS data.

**Table 76: Organizations and personnel granted access to EMIS data in Croatia**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>No</b>
<b>Local governments and public authorities at subnational level</b>	<b>No</b>	<b>No</b>
- Data of own municipality, district and province		
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For primary/secondary, access to student-level data is granted to Ministries, government agencies and schools, while local governments and academic institutions do not have access to the student-level data.

**Table 77: Organizations and personnel granted access to student-level data in EMIS in Croatia**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>No</b>
- Ministries at national level	•	
- Government agencies at national level	•	
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	
- Academic institutions		
- Other for-profit and not-for-profit organizations		



## Data analysis

### Organizations analysing EMIS data

Croatia reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries and schools. Government agencies also conduct analysis of EMIS data at primary/secondary education levels.

**Table 78: Organizations analysing EMIS data in Croatia**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 79: Types of data analysis using EMIS data in Croatia**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Croatia reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. The outputs are not presented in the format of a learning portfolio for individual students.

**Table 80: Reporting and dissemination of results of EMIS data analysis in Croatia**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents		

# EMIS in Kazakhstan

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Kazakhstan. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. It has also set regulations or guidelines on EMIS operation at both education levels, which cover data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data), data analysis through analytical modules, and dissemination of data outputs (e.g., in which format and with whom data outputs are shared). However, the regulations and guidelines do not cover assessment of data needs (e.g., how to define data needs).

**Table 81: Existence of law, policy, regulations and guidelines on EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs		
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

### Organizational and budgetary arrangements

Kazakhstan formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, local governments and public authorities at subnational level, schools and academic institutions have a formal role to play in EMIS operation. Formal, regular EMIS training is also provided to these organizations as well as other for-profit and not-for-profit organizations that are commissioned to support EMIS operation. Budget for EMIS operation is made available and allocated to Ministries and government agencies only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 82: Organizational and budgetary arrangements for EMIS operation in Kazakhstan**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•	•	•

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
- Government agencies at national level	•	•	•	•	•	•
- Local governments and public authorities at subnational level	•	•		•	•	
- School personnel and school governing bodies	•	•		•	•	
- Academic institutions	•	•		•	•	
- Other for-profit and not-for-profit organizations		•			•	

### Areas of training provided

The formal training on EMIS operation covers the topic of data collection methods and practice, which helps ensure the collection of required data on time, and data analysis regarding how to construct analytical queries and download processed statistical information. However, the training does not cover other topics such as needs assessment, data processing/management, and dissemination of data outputs.

**Table 83: Areas of formal EMIS training provided in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs		
- Data collection	•	•
- Data processing/management		
- Data analysis	•	•
- Dissemination of data outputs		

## EMIS platform

### Types of platforms

Kazakhstan uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. It developed an own digital platform, which is not an open-source platform. The digital platform does not offer offline access, but it supports multiple languages with a user guide. The platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 84: EMIS platforms and functions in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages	•	•
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Kazakhstan does not have formal procedures to assess needs for education data on a regular basis at primary/secondary and pre-primary education levels. However, there are some activities on data needs assessment although they are not implemented regularly. For instance, the Government and the Ministry of Education decide on the inclusion of new datapoints and indicators based on research or recommendations derived from assessments.

**Table 85: Formal procedures to assess education data needs in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	No	No
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment		

### Coverage of data collection

EMIS in primary/secondary and pre-primary education covers several subsectors. It collects data about private schools/students and students studying in programmes other than the general education track, such

as TVET programmes, while information about non-formal education is not covered. EMIS also includes dropout rates through integration with another national information system, which contains data on all citizens, although the dropout data are not updated in real time.

**Table 86: Coverage of subsectors and out-of-school children in EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	•
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	•

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including infrastructure, materials, Internet connection, staff and students, language support and offering of financial/in-kind support to students and their families, as well as school evaluation, although school finance information is not covered. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 87: School data collected and included in EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Information about each school</b>	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered		
- Offering of language support	•	•
- Offering of special education programmes		
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families	•	•
- Results of school evaluation	•	•

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about qualifications, experience of teaching and records of professional development as well as teachers' performance. It is reported that EMIS also collects teachers' demographic information, as well as data on education and their professional categories. The information about each teacher would facilitate teacher management and support as well as their professional development. However, EMIS does not include contract data, certification, remuneration, or vaccination records.

**Table 88: Teacher data collected and included in EMIS in Kazakhstan**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type		
- Qualification	•	•
- Certification		
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance	•	•

## Student data

EMIS in Kazakhstan collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to nationality, refugee/migrant status, language, and disabilities and functional difficulties. Regarding educational information, EMIS includes information about each student's enrolment, and in primary/secondary education, behavioural problems. The data on each student would help identify and respond to their unique needs. However, EMIS does not cover information such as attendance, courses taken, and learning achievement assessed by teachers.

**Table 89: Student data collected and included in EMIS in Kazakhstan**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity	•	•
- Refugee and migrant status	•	•
- Language	•	•
- Disabilities and functional difficulties	•	•
- Special gifts and talents		
- Physical growth		

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence		
- Academic programmes and courses enrolled		
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems	•	

## Household data

EMIS in Kazakhstan does not collect and include data on students' families either at primary/secondary or pre-primary education level. Given that family environments impact student learning and well-being, collecting household information may help schools and teachers adjust teaching practices and support provided to children.

**Table 90: Household data collected and included in EMIS in Kazakhstan**

Information of students' family	Primary/Secondary	Pre-primary
	No	No
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Kazakhstan assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at both primary/secondary and pre-primary education levels, except for a student-teacher link. This indicates that, in general, EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also helps in analysing how school, teacher and student factors are associated with education service delivery and learning, although the lack of a student-teacher link limits the scope of analysis.



**Table 91: Unique identifier for schools, teachers and children in EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code	•	•
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code	•	•
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week, with some data collected every three days. EMIS updates its information on a real-time basis for both primary/secondary and pre-primary education. The accuracy and reliability of data are secured to some extent by integrating EMIS with other information systems that provide primary data to EMIS.

**Table 92: Frequency of data collection and update and existence of data verification/validation mechanisms in Kazakhstan**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, geo coordinates of educational institutions are included as datapoints within EMIS. EMIS is also linked to national health systems and State databases of individuals (i.e., population census). The country reported that EMIS is also linked with systems of the Ministry of Labour and Social Protection of the Population (MTC3H) and the Ministry of Justice (MIO PK). These enable education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with refugee registration databases.

**Table 93: External data and systems linked to EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system	•	•
- National population/household census	•	•
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at both primary/secondary and pre-primary education levels. It is linked with learning management systems. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector. However, it is not linked with human resource management systems and financial management systems.

**Table 94: Internal data and systems in the education sector linked to EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system	•	•

## Data security, privacy and access

### Data security and privacy

Kazakhstan implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 95: Data security and privacy measures implemented for EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

## Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, government agencies, local governments and public authorities, schools, and other for-profit and not-for-profit organizations. However, local governments and schools have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. Parents and caregivers do not have access to EMIS data.

**Table 96: Organizations and personnel granted access to EMIS data in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	Yes	Yes
<b>Government agencies at national level</b>	Yes	Yes
<b>Local governments and public authorities at subnational level</b>	Yes	Yes
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	Yes	Yes
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	No	No
<b>Other for-profit and not-for-profit organizations</b>	Yes	Yes
<b>Parents and caregivers</b>	No	No
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries, government agencies, local governments and public authorities, schools, and other for-profit and not-for-profit organizations. However, academic institutions do not have access to the student-level data.

**Table 97: Organizations and personnel granted access to student-level data in EMIS in Kazakhstan**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	Yes	Yes
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations	•	•

## Data analysis

### Organizations analysing EMIS data

Kazakhstan reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by a wide range of stakeholders including Ministries, government agencies, local governments and public authorities, schools, academic institutions, and other for-profit and not-for-profit organizations.

**Table 98: Organizations analysing EMIS data in Kazakhstan**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions	•	•
- Other for-profit and not-for-profit organizations	•	•

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 99: Types of data analysis using EMIS data in Kazakhstan**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Kazakhstan reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are made available in the format of national dashboards but with restricted access. However, the data outputs are also reported and disseminated in the format of national and subregional reports and data sheets. Learning assessment and portfolios of students are accessible by children and their parents and caregivers through an internal system called *Kundelik*.

**Table 100: Reporting and dissemination of results of EMIS data analysis in Kazakhstan**

Reporting and dissemination of data output	Primary/Secondary	Pre-primary
	Yes	Yes
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets		
- Learning assessment and portfolio of each student shared with the student and his/her parents	•	•

## EMIS in Kosovo

### Data governance

#### Legal, policy and regulatory framework

There is no national law or policy on EMIS for either primary/secondary or pre-primary education. However, Kosovo has set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 101: Existence of law, policy, regulations and guidelines on EMIS in Kosovo**

Existence of education law / policy on EMIS	Primary/Secondary	Pre-primary
	No	No
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

#### Organizational and budgetary arrangements

Kosovo formally designates certain organizations and personnel to support EMIS at both primary/secondary and pre-primary education levels. Ministries, local governments and public authorities at subnational level, and schools, have a formal role to play in EMIS operation. However, no formal EMIS training is provided to these organizations on a regular basis. Budget for EMIS operation is also not allocated to these organizations, although they may use non-earmarked budget to support EMIS.

**Table 102: Organizational and budgetary arrangements for EMIS operation in Kosovo**

Organizational and budgetary arrangements for EMIS operation	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
	Yes	No	No	Yes	No	No
- Ministries at national level	•			•		
- Government agencies at national level						
- Local governments and public authorities at subnational level	•			•		
- School personnel and school governing bodies	•			•		

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
- Academic institutions						
- Other for-profit and not-for-profit organizations						

## EMIS platform

### Types of platforms

Kosovo uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The government developed an own digital platform, which is not an open-source platform. The platform does not offer offline access, but it supports multiple languages. No user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 103: EMIS platforms and functions in Kosovo**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages	•	•
- User guide		
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Kosovo does not have formal procedures to assess needs for education data on a regular basis at primary/secondary and pre-primary education levels. This may pose a challenge in identifying and defining data that are relevant and useful to ongoing education planning and management.

**Table 104: Formal procedures to assess education data needs in Kosovo**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	No	No
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment		

### Coverage of data collection

EMIS in primary/secondary education covers various subsectors as well as children who are not in the school system. It collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes, as well as data about non-formal education. It also collects data on out-of-school children who have never entered formal education and those who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school. EMIS at pre-primary education level also collects data about private pre-primary schools and students.

**Table 105: Coverage of subsectors and out-of-school children in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education	•	
- Students in tracks other than general education (e.g., TVET)	•	
<b>Children out of school</b>		
- School-age children who have never entered formal education	•	
- School-age children who dropped out of school	•	

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers school information on infrastructure, materials, Internet connection and staff and students. It is also reported that, at primary/secondary level, course-based average academic results are included. These school data would help monitor school conditions, identify investment needs in each school, and plan and support school development. On the other hand, EMIS does not cover data on school finance, programmes and courses offered, and provisions of support programmes.



**Table 106: School data collected and included in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
Information about each school	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure		
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered		
- Offering of language support		
- Offering of special education programmes		
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS also collects and include data on each teacher at both primary/secondary and pre-primary education levels. It includes data about teachers' qualifications but does not cover information about contract, certification, teaching experience, remuneration, vaccination records or their performance.

**Table 107: Teacher data collected and included in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
Information about each teacher	Yes	Yes
- Contract type		
- Qualification	•	•
- Certification		
- Teaching experience		
- Records of professional development		
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS does not collect data on each student either at primary/secondary or pre-primary education level. Such student-level data may help education authorities, schools and teachers to better understand and meet the learning needs of students in Kosovo.

**Table 108: Student data collected and included in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
Information about each student	No	No
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)		
- Nationality		
- Ethnicity		
- Refugee and migrant status		
- Language		
- Disabilities and functional difficulties		
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment		
- Attendance and absence		
- Academic programmes and courses enrolled		
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS does not collect and include data on students' families either at primary/secondary or pre-primary education level. Given that family environments impact student learning and well-being, collecting household information could help schools and teachers adjust teaching practices and support provided to children.

**Table 109: Household data collected and included in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
Information of students' family	No	No
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS assigns unique identifiers to schools and teachers at both primary/secondary and pre-primary education levels. There is no student identifier because EMIS does not collect data about each student. The school and teacher codes are linked with each other, allowing the EMIS to provide multilevel education data with a nested structure at levels of school and teacher. This not only helps education planning and management but also enables analysis of how school and teacher factors are associated with education service delivery.

If Kosovo collected student data and linked them to school and teacher codes, it could fully leverage education data to examine how school environments, teachers' skills and student characteristics are related to student learning, and use the results to improve education planning and management.

**Table 110: Unique identifier for schools, teachers and children in EMIS in Kosovo**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code	•	•
<b>Unique student code</b>	No	No
- Student code linked to school code		
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once every 2–4 months or every semester, but updates its information on a real-time basis for both primary/secondary and pre-primary education. However, there is no mechanism to ensure the accuracy and reliability of collected data.

**Table 111: Frequency of data collection and update and existence of data verification/validation mechanisms in Kosovo**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once in 2–4 months	Once in 2–4 months
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability		

*Note:* When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to refugee registration databases. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management for refugee students. However, EMIS is not integrated with geographical data, national health systems or census data.

**Table 112: External data and systems linked to EMIS in Kosovo**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database	•	•

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. A lack of integrated data system may impact the effectiveness and efficiency of data management in the sector.

**Table 113: Internal data and systems in the education sector linked to EMIS in Kosovo**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Kosovo implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 114: Data security and privacy measures implemented for EMIS in Kosovo**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

## Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, local governments and public authorities, and schools. However, local governments and schools have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. Parents and caregivers do not have access to EMIS data.

**Table 115: Organizations and personnel granted access to EMIS data in Kosovo**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>No</b>	<b>No</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Data analysis

### Organizations analysing EMIS data

It is reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries, local governments and public authorities, and schools.

**Table 116: Organizations analysing EMIS data in Kosovo**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level		
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 117: Types of data analysis using EMIS data in Kosovo**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Kosovo reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets.

**Table 118: Reporting and dissemination of results of EMIS data analysis in Kosovo**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents		

# EMIS in Moldova

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Moldova. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 119: Existence of law, policy, regulations and guidelines on EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

### Organizational and budgetary arrangements

Moldova formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, local governments and public authorities at subnational level, and schools have a formal role to play in EMIS operation. Additionally, other for-profit and not-for-profit organizations are commissioned to support EMIS for pre-primary education. Formal EMIS training is provided to most of these organizations as well as academic institutions on a regular basis. Budget for EMIS operation is made available and allocated to Ministries for primary/secondary education only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 120: Organizational and budgetary arrangements for EMIS operation in Moldova**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>
- Ministries at national level	•	•	•	•	•	
- Government agencies at national level	•	•		•	•	
- Local governments and public authorities at subnational level	•	•		•	•	
- School personnel and school governing bodies	•	•		•	•	
- Academic institutions		•			•	
- Other for-profit and not-for-profit organizations				•		

### Areas of training provided

The formal training on EMIS operation, which is provided to Ministries, government agencies, local governments and public authorities, schools and academic institutions, covers a range of topics from needs assessment to data collection, data processing/management, and dissemination of data output to help these organizations fulfil their roles and responsibilities. However, the training does not cover data analysis.

**Table 121: Areas of formal EMIS training provided in Moldova**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis		
- Dissemination of data outputs	•	•

## EMIS platform

### Types of platforms

Moldova uses spreadsheets and a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The country uses Oracle Application Express (APEX), which is not an open-source platform. The platform does not offer offline access, but it supports multiple languages with a user guide. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.



**Table 122: EMIS platforms and functions in Moldova**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	Yes	Yes
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages	•	•
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Moldova does not have formal procedures to assess needs for education data on a regular basis at primary/secondary and pre-primary education levels. This may pose a challenge in identifying and defining data that are relevant and useful to ongoing education planning and management.

**Table 123: Formal procedures to assess education data needs in Moldova**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	No	No
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
← Ministries at national level		
← Government agencies at national level		
← Local governments and public authorities at subnational level		
← School personnel and school governing bodies		
← Teacher unions		
← Academic institutions		
← Other for-profit and not-for-profit organizations		
← Parents and caregivers		
- Frequency of needs assessment		

### Coverage of data collection

EMIS in primary/secondary education covers several subsectors as well as children who are not in the school system. It collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes, while information about non-formal education

is not covered. EMIS also collects data about children who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school.

**Table 124: Coverage of subsectors and out-of-school children in EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	NA
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	NA
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	

Note: NA indicates information is not available.

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers information on school finance, staff and students, and academic programmes offered including special education programmes. It is also reported, at both education levels, that EMIS includes data about a founder, recognition of school, and language of instruction. EMIS in primary/secondary education also covers data on school infrastructure, offering of financial/in-kind support, and school evaluation. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 125: School data collected and included in EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Information about each school</b>	Yes	Yes
- Financial information	•	•
- Water, sanitation and hygiene (WASH) infrastructure	•	
- Other school infrastructure	•	
- Educational materials and equipment	•	
- School Internet connection	•	
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support		
- Offering of special education programmes	•	•
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families	•	
- Results of school evaluation	•	

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, experience of teaching and records of professional development. It is also reported that EMIS includes data on teachers' demographic information such as ages and nationalities, teaching degree, and reasons for leaving previous school. At primary/secondary education level, EMIS also includes information about needs for remote education. The information about each teacher would facilitate teacher management and support as well as their professional development. However, EMIS in the country does not include data on teacher remuneration, vaccination records, and information related to teachers' disciplinary problems and performance.

**Table 126: Teacher data collected and included in EMIS in Moldova**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Moldova collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to nationality, ethnicity, language, and disabilities and functional difficulties. The country also reported that, at primary/secondary education level, EMIS includes distance from home to school and how each student comes to school. On the other hand, EMIS in the country does not cover information such as refugee/migrant status, special talents, physical growth, and vaccination records.

Regarding educational information, EMIS includes information about each student's enrolment, attendance and absence, programmes/courses taken, and need for and enrolment in special education programmes. It is also reported that EMIS in primary/secondary education includes each student's learning achievement measured by standardized testing, behavioural problems and need for remote learning, while food-related information is collected in EMIS in pre-primary education. The information about each student would help identify students' needs and provide tailored learning support.

**Table 127: Student data collected and included in EMIS in Moldova**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
- Ethnicity	•	•
- Refugee and migrant status		
- Language	•	•
- Disabilities and functional difficulties	•	•
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence	•	•
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	•
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems	•	

## Household data

EMIS in Moldova also collects and includes data on students' families both at primary/secondary and pre-primary education levels. It includes household location and family composition. In primary/secondary education, EMIS also collects data about household income or eligibility for financial/in-kind support. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 128: Household data collected and included in EMIS in Moldova**

Information about students' family	Primary/Secondary	Pre-primary
	Yes	Yes
- Household location	•	•
- Family composition	•	•
- Income or eligibility for financial/in-kind support for education	•	

## Unique Identifier

EMIS in Moldova assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at both primary/secondary and pre-primary education levels, except for a student-teacher link. This indicates that, in general, EMIS in the country provides multilevel education data with a nested

structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning, although the lack of a student–teacher link limits the scope of analysis.

**Table 129: Unique identifier for schools, teachers and children in EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code	•	•
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code	•	•
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once every 2–4 months or once a semester but updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, data on children and staff (e.g., name and date of birth) are extracted from the State Register of Population. For primary/secondary education, information about the first graders is taken from EMIS Early Education Module (i.e., EMIS at pre-primary education), and student data are derived from EMIS when students are promoted to the next grade or transfer to another school. All schools and institutions also present reports generated from EMIS, and the Center for Information and Communication Technologies in Education verifies the reports.

**Table 130: Frequency of data collection and update and existence of data verification/validation mechanisms in Moldova**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once in 2–4 months	Once in 2–4 months
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is not linked with geographical data, national health systems, census data or refugee registration databases. This may limit the capacity to leverage cross-sectoral data for informed education planning and management.

**Table 131: External data and systems linked to EMIS in Moldova**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. However, Moldova reported that, at primary/secondary education level, EMIS is linked with various internal systems including the Information System on Personalization of Study Documents (SIPAS), Automated Data Processing System (ADPS), National Register of Qualification (NRQ), and Electronic Catalogue Information System (SICE). In the pre-primary education system, EMIS is integrated with the Management Information System in Education for General Education Institutions. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector.

**Table 132: Internal data and systems in the education sector linked to EMIS in Moldova**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Moldova implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality. All measures taken at primary/secondary education level are ensured in accordance with Law no. 133/2011 on the protection of personal data, Order no. 203/2019 on the approval of the Internal Policy on Cyber Security of the Ministry of Education, and Order no. 383/2019 on the approval of the Data Security Policy within the Ministry of Education.

**Table 133: Data security and privacy measures implemented for EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

## Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, government agencies, local governments and public authorities, and schools. However, local governments and schools have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. Parents and caregivers have access to EMIS data at primary/secondary education level only. They have access to data about their own child's school and other schools, but they cannot look at the individual data of other children.

**Table 134: Organizations and personnel granted access to EMIS data in Moldova**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>Yes</b>	<b>No</b>
- Data of own child's school	•	
- Data of other schools	•	
- Data of own child	•	
- Data of other children		

## Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries, government agencies, local governments and public authorities, and schools. Academic institutions do not have access to the student-level data.

**Table 135: Organizations and personnel granted access to student-level data in EMIS in Moldova**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

The country reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries, government agencies, and school.

**Table 136: Organizations analysing EMIS data in Moldova**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders analyse EMIS data for both primary/secondary and pre-primary education by disaggregating the data into different groups and categories to assess heterogeneity in educational situations.

**Table 137: Types of data analysis using EMIS data in Moldova**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)		
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables		



## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Moldova reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports data sheets. The country reported that, for primary/secondary education, the public portal website presents statistical, depersonalized data as well. The outputs are not presented in the format of a learning portfolio for individual students.

**Table 138: Reporting and dissemination of results of EMIS data analysis in Moldova**

Reporting and dissemination of data output	Primary/Secondary	Pre-primary
	Yes	Yes
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents		

## EMIS in Montenegro

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Montenegro. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. It has also set regulations or guidelines on EMIS operation at both education levels, which cover assessment of data needs (e.g., how to define data needs), data collection (e.g., who collects data and how), and data processing/management (e.g., how to clean and store data). However, the regulations and guidelines do not address data analysis and dissemination of data outputs (e.g., in which format and with whom data outputs are shared).

**Table 139: Existence of law, policy, regulations and guidelines on EMIS in Montenegro**

Existence of education law / policy on EMIS	Primary/Secondary	Pre-primary
	Yes	Yes
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis		
- Dissemination of data outputs		

#### Organizational and budgetary arrangements

Montenegro formally designates certain organizations and personnel to support EMIS, with provision of training and budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, and schools have a formal role to play in EMIS operation. Formal EMIS training is provided to Ministries and schools on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 140: Organizational and budgetary arrangements for EMIS operation in Montenegro**

Organizational and budgetary arrangements for EMIS operation	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
- Ministries at national level	•	•	•	•	•	•
- Government agencies at national level	•			•		

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	Yes	Yes	Yes	Yes	Yes
- Local governments and public authorities at subnational level						
- School personnel and school governing bodies	•	•		•	•	
- Academic institutions						
- Other for-profit and not-for-profit organizations						

## Areas of training provided

The formal training on EMIS operation, which is provided to Ministries and schools, covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the organizations fulfil their roles and responsibilities.

**Table 141: Areas of formal EMIS training provided in Montenegro**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	Yes	Yes
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

## EMIS platform

### Types of platforms

Montenegro uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The country developed a web-based digital platform, which is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 142: EMIS platforms and functions in Montenegro**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Montenegro has formal procedures to assess needs for education data at both primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with selected education stakeholders, which include Ministries, government agencies, school and teacher unions. The needs assessment is conducted once every 2–4 months or once a semester.

**Table 143: Formal procedures to assess education data needs in Montenegro**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	Yes	Yes
- Desk review and analysis of existing EMIS data	•	•
- Consultation and survey with:		
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Teacher unions	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment	Once in 2-4 months	Once in 2-4 months

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

## Coverage of data collection

EMIS in the country covers various subsectors both at primary/secondary and pre-primary education levels. It collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes, as well as data on non-formal education. However, EMIS does not collect data about out-of-school children, including those who have dropped out of school.

**Table 144: Coverage of subsectors and out-of-school children in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education	•	•
- Students in tracks other than general education (e.g., TVET)	•	•
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school		

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers information including infrastructure, Internet connection, staff and students, programmes offered and school evaluation, while some information such as school finance and materials is not covered. These school data would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 145: School data collected and included in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
Information about each school	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment		
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support		
- Offering of special education programmes		
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, and experience of teaching. The information about each teacher would facilitate teacher management and support. However EMIS does not include data on professional development, teacher remuneration, vaccination records or information related to teachers' disciplinary problems and performance.

**Table 146: Teacher data collected and included in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
Information about each teacher	Yes	Yes
- Contract type	•	?
- Qualification	•	?
- Certification	•	?
- Teaching experience	•	?
- Records of professional development		
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Montenegro collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to refugee/migrant status, disabilities and functional difficulties and special talents as well as experience of child abuse and domestic violence. On the other hand, EMIS does not cover information such as nationality, language, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment and programmes/courses taken. In primary/secondary education, EMIS also covers data on each student's attendance and absence, learning achievement and progress measured by standardized testing and teachers, need for and enrolment in special education programmes, and behavioural problems. The information about each student would help identify students' needs and provide tailored learning support.

**Table 147: Student data collected and included in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
Information about each student	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality		
- Ethnicity		
- Refugee and migrant status	•	•
- Language		
- Disabilities and functional difficulties	•	•

	Primary/Secondary	Pre-primary
Information about each student	Yes	Yes
- Special gifts and talents	•	•
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence	•	•
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence	•	
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers	•	
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems	•	

## Household data

EMIS in Montenegro also collects and includes data on students' families both at primary/secondary and pre-primary education levels. It includes household location and family composition. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 148: Household data collected and included in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
Information about students' family	Yes	Yes
- Household location	•	•
- Family composition	•	•
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Montenegro assigns unique identifiers to schools, teachers, and students and these codes are linked with one another at both primary/secondary and pre-primary education levels. This indicates that EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning.

**Table 149: Unique identifier for schools, teachers and children in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
Unique school code	Yes	Yes
Unique teacher code	Yes	Yes
- Teacher code linked to school code	•	•
Unique student code	Yes	Yes
- Student code linked to school code	•	•
- Student code linked to teacher code	•	•

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week but updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, student registration is done using the child's identification number, and basic demographic data are taken from the central register of citizens, which is administered by the authority of the Ministry of the Interior. EMIS exchanges data with other institutions, and the data are also used as an administrative source for the National Statics of Montenegro, which provides opportunities for cross-checking of data between agencies. Furthermore, students receive printed certificates issued by EMIS and parents have online access to their children's attendance and achievements. This also contributes to improving the accuracy of EMIS data.

**Table 150: Frequency of data collection and update and existence of data verification/validation mechanisms in Montenegro**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

*Note:* When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

EMIS is not linked to geographical data, national health systems, census data or refugee registration databases. However, the country reported that EMIS at primary/secondary education level is linked to the system and data of the Ministry of Interior, the Ministry of Labor and Social Welfare, and National Statistical Office (Monstat). This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management.

**Table 151: External data and systems linked to EMIS in Montenegro**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. A lack of integrated data system may impact the effectiveness and efficiency of data management in the sector.

**Table 152: Internal data and systems in the education sector linked to EMIS in Montenegro**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Montenegro implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality. For example, *Dnevnik*, an online grade book at primary/secondary education level, can be accessed by students and their families using a username and password.

**Table 153: Data security and privacy measures implemented for EMIS in Montenegro**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to a wide range of organizations and personnel including Ministries, government agencies, local governments and public authorities, schools, academic institutions and other for-profit and not-for-profit organizations. However, parents and caregivers have access to EMIS data at primary/secondary education level only.

Local governments have access to data from both their own and other municipalities, districts and provinces. However, schools and parents and caregivers are allowed to look at data from their own school only. This limits the capacity to compare their educational conditions with those in other schools.

**Table 154: Organizations and personnel granted access to EMIS data in Montenegro**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces	•	•
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>Yes</b>	<b>Yes</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>Yes</b>	<b>Yes</b>
<b>Parents and caregivers</b>	<b>Yes</b>	<b>No</b>
- Data of own child's school	•	
- Data of other schools		
- Data of own child	•	
- Data of other children		

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to school personnel and school governing bodies. Ministries, government agencies, local governments and public authorities and academic institutions do not have access to the student-level data.



**Table 155: Organizations and personnel granted access to student-level data in EMIS in Montenegro**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

The country reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries, government agencies, school, and other for-profit and not-for-profit organizations.

**Table 156: Organizations analysing EMIS data in Montenegro**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations	•	•

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 157: Types of data analysis using EMIS data in Montenegro**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Montenegro reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. The web portal, *Školska Statistika* (skolskastatistika.edu.me), provides access to a wide range of data outputs, which include statistics on pre-primary, primary and secondary education including information about specific schools as well as the number of teachers and children affected by the COVID-19 pandemic. At primary/secondary education level, learning data (e.g., grades) are shared with students and their families through an online grade book, *Dnevnik* (https://www.dnevnik.edu.me/login).

**Table 158: Reporting and dissemination of results of EMIS data analysis in Montenegro**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents	•	

# EMIS in North Macedonia

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in North Macedonia. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation at both education levels, which cover assessment of data needs (e.g., how to define data needs), data collection (e.g., who collects data and how), and data processing/management (e.g., how to clean and store data). However, the regulations and guidelines do not address data analysis and dissemination of data outputs (e.g., in which format and with whom data outputs are shared).

**Table 159: Existence of law, policy, regulations and guidelines on EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	Yes	Yes
<b>Existence of regulations / guidelines on EMIS</b>	Yes	Yes
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis		
- Dissemination of data outputs		

### Organizational and budgetary arrangements

North Macedonia formally designates certain organizations and personnel to support EMIS, with provision of training and budget. Ministries and school have a formal role to play in EMIS operation for both primary/secondary and pre-primary education. Additionally, government agencies at national level are assigned to support EMIS at primary/secondary education level. Formal EMIS training is provided to these organizations on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 160: Organizational and budgetary arrangements for EMIS operation in North Macedonia**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	Yes	Yes	Yes	No	Yes
- Ministries at national level	•	•	•	•		•

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	Yes	Yes	Yes	No	Yes
- Government agencies at national level	•	•				
- Local governments and public authorities at subnational level						
- School personnel and school governing bodies	•	•		•		
- Academic institutions						
- Other for-profit and not-for-profit organizations						

### Areas of training provided

The formal training on EMIS operation at primary/secondary education level, which is provided to Ministries, government agencies and schools, covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the organizations fulfil their roles and responsibilities.

**Table 161: Areas of formal EMIS training provided in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Provision of formal and regular training</b>	Yes	No
- Assessment of data needs	•	
- Data collection	•	
- Data processing/management	•	
- Data analysis	•	
- Dissemination of data outputs	•	

## EMIS platform

### Types of platforms

North Macedonia uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. Spreadsheets are also used by the Ministry of Labour and Social Policy for the purpose of managing and using pre-primary education data. The digital platform is not an open-source platform. The platform does not offer offline access, but it supports multiple languages. No user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 162: EMIS platforms and functions in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	Yes
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages	•	
- User guide		
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

The country has formal procedures to assess needs for education data on a regular basis at primary/secondary education level only. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with a wide range of education stakeholders, which include Ministries, government agencies, schools, teacher unions, academic institutions, for-profit and not-for-profit organizations and parents and caregivers. The needs assessment is conducted once a year.

**Table 163: Formal procedures to assess education data needs in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	Yes	No
- Desk review and analysis of existing EMIS data	•	
- Consultation and survey with:		
- Ministries at national level	•	
- Government agencies at national level	•	
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	
- Teacher unions	•	
- Academic institutions	•	
- Other for-profit and not-for-profit organizations	•	
- Parents and caregivers	•	
- Frequency of needs assessment	Once a year	

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary education collects data about students studying in programmes other than the general education track, such as TVET programmes, while information about private schools/students

and non-formal education is not covered. It also collects data about out-of-school children who have never entered formal education and those who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school. EMIS at pre-primary education level collects data about private pre-primary schools and students instead.

**Table 164: Coverage of subsectors and out-of-school children in EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students		•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	
<b>Children out of school</b>		
- School-age children who have never entered formal education	•	
- School-age children who dropped out of school	•	

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. EMIS in primary/secondary education covers a wide range of information including infrastructure, materials, Internet connection, staff and students, programmes and courses, offering of special education and gifted programmes, although school finance information is not covered. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development. On the other hand, EMIS in pre-primary education collects basic information only, which includes staff and student information as well as offering of special education programmes. It is also reported that, at pre-primary education level, EMIS includes data on the number of groups and the number of children per group.

**Table 165: School data collected and included in EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Information about each school</b>	Yes	Yes
- Financial information		
- Water, sanitation and hygiene (WASH) infrastructure	•	
- Other school infrastructure	•	
- Educational materials and equipment	•	
- School Internet connection	•	
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	
- Offering of language support	•	
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, and experience of teaching. The information about each teacher would facilitate teacher management and support. However EMIS does not include data on professional development, teacher remuneration, vaccination records or information related to teachers' disciplinary problems and performance.

**Table 166: Teacher data collected and included in EMIS in North Macedonia**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development		
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in North Macedonia collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and gender to nationality, ethnicity, language, and disabilities and functional difficulties. On the other hand, EMIS does not cover information such as refugee/migrant status, special talents, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment and programmes/courses taken. In pre-primary education, each student's attendance and absence data are also included in EMIS. The data on each student would help identify and respond to students' unique needs.

**Table 167: Student data collected and included in EMIS in North Macedonia**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity	•	•
- Refugee and migrant status		
- Language	•	•
- Disabilities and functional difficulties	•	•
- Special gifts and talents		

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence		•
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS in North Macedonia collects and includes data on students' families at primary/secondary education level only. It includes household location and family composition. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 168: Household data collected and included in EMIS in North Macedonia**

Information about students' family	Primary/Secondary	Pre-primary
	Yes	No
- Household location	•	
- Family composition	•	
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in North Macedonia assigns unique identifiers to schools, teachers and students and these codes are linked with one another at both primary/secondary and pre-primary education levels. This indicates that EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning.

**Table 169: Unique identifier for schools, teachers and children in EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	Yes
<b>Unique teacher code</b>	Yes	Yes
- Teacher code linked to school code	•	•
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code	•	•
- Student code linked to teacher code	•	•

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week but updates its information on a real-time basis for both primary/secondary and pre-primary education. However, there is no mechanism to ensure the accuracy and reliability of collected data.

**Table 170: Frequency of data collection and update and existence of data verification/validation mechanisms in North Macedonia**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability		

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to geographical data. The country reported that, at pre-primary education level, EMIS is also linked national health systems. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with census data and refugee registration databases.

**Table 171: External data and systems linked to EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system		•
- National population/household census		

	Primary/Secondary	Pre-primary
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems, and learning management systems within the education sector. However, the country reported that EMIS in primary/secondary education is integrated with E-Diary systems. This integrated data system would contribute to improving the effectiveness and efficiency of data management.

**Table 172: Internal data and systems in the education sector linked to EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

North Macedonia implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 173: Data security and privacy measures implemented for EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries and schools. Government agencies have access to EMIS data at primary/secondary education only. Schools have access to EMIS data from their own school only, which limits their capacity to compare their educational conditions with those in other schools. Parents and caregivers do not have access to EMIS data.



**Table 174: Organizations and personnel granted access to EMIS data in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	Yes	Yes
<b>Government agencies at national level</b>	Yes	No
<b>Local governments and public authorities at subnational level</b>	No	No
- Data of own municipality, district and province		
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	Yes	Yes
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	No	No
<b>Other for-profit and not-for-profit organizations</b>	No	No
<b>Parents and caregivers</b>	No	No
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries and schools. Local governments and public authorities and academic institutions do not have access to the student-level data.

**Table 175: Organizations and personnel granted access to student-level data in EMIS in North Macedonia**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	Yes	Yes
- Ministries at national level	•	•
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

North Macedonia reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries and schools. Government agencies and other for-profit and not-for-profit organizations also conduct analysis of EMIS data at primary/secondary education level.

**Table 176: Organizations analysing EMIS data in North Macedonia**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations	•	

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment) and disaggregation of data into different groups and categories to assess heterogeneity in educational situations.

**Table 177: Types of data analysis using EMIS data in North Macedonia**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	?	•
- Data disaggregation	?	•
- Statistical analysis of relationships between multiple variables		

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

North Macedonia reports and disseminates the results of data analyses for primary/secondary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. The analysis of learning data is also shared with students and their families in the format of a learning assessment and portfolio.

**Table 178: Reporting and dissemination of results of EMIS data analysis in North Macedonia**

Reporting and dissemination of data output	Primary/Secondary	Pre-primary
	Yes	No
- Data dashboards showing key education indicators in the country	•	
- National report and data sheets	•	
- Subregional report and data sheets	•	
- School report and data sheets	•	
- Learning assessment and portfolio of each student shared with the student and his/her parents	•	

# EMIS in Romania

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Romania. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 179: Existence of law, policy, regulations and guidelines on EMIS in Romania**

Existence of education law / policy on EMIS	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

### Organizational and budgetary arrangements

Romania formally designates certain organizations and personnel to support EMIS, with provision of budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, local governments and public authorities at subnational level, schools, and other for-profit and not-for-profit organizations have a formal role to play in EMIS operation. However, no formal EMIS training is provided to these organizations on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 180: Organizational and budgetary arrangements for EMIS operation in Romania**

Organizational and budgetary arrangements for EMIS operation	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
	Yes	No	Yes	Yes	No	Yes
- Ministries at national level	•		•	•		•
- Government agencies at national level	•			•		

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	No	Yes	Yes	No	Yes
- Local governments and public authorities at subnational level	•			•		
- School personnel and school governing bodies	•			•		
- Academic institutions						
- Other for-profit and not-for-profit organizations	•		•	•		•

## EMIS platform

### Types of platforms

Romania uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The digital platform is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 181: EMIS platforms and functions in Romania**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Romania has formal procedures to assess needs for education data at both primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with a wide range of education stakeholders, which include Ministries, government agencies, local

governments and public authorities, schools, academic institutions, for-profit and not-for-profit organizations and parents and caregivers. The needs assessment is conducted once a year.

**Table 182: Formal procedures to assess education data needs in Romania**

Existence of formal procedures to assess data needs regularly	Primary/Secondary	Pre-primary
	Yes	Yes
- Desk review and analysis of existing EMIS data	•	•
- Consultation and survey with:		
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Teacher unions		
- Academic institutions	•	•
- Other for-profit and not-for-profit organizations	•	•
- Parents and caregivers		
- Frequency of needs assessment	Once a year	Once a year

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in primary/secondary and pre-primary education covers several subsectors as well as children who are not in the school system. It collects data of private schools/students and students studying in programmes other than the general education track such as TVET programmes, while information of non-formal education is not covered. EMIS also collects data of out-of-school children who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school.

**Table 183: Coverage of subsectors and out-of-school children in EMIS in Romania**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	•
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	•

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including school finance, infrastructure, materials, Internet connection, staff and students, programmes and courses, language support, and offering of financial/in-kind support. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 184: School data collected and included in EMIS in Romania**

Information about each school	Primary/Secondary	Pre-primary
	Yes	Yes
- Financial information	•	NA
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support	•	•
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	•
- Offering of financial/in-kind support to students and their families	•	•
- Results of school evaluation		

Note: NA indicates information is not available.

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, experience of teaching and records of professional development. The information about each teacher would facilitate teacher management and support as well as their professional development. However, EMIS does not include data on teacher remuneration, vaccination records or information related to teachers' disciplinary problems and performance.

**Table 185: Teacher data collected and included in EMIS in Romania**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in the country collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS range from basic information such as age and

gender to nationality, language, and disabilities and functional difficulties. On the other hand, EMIS does not cover information such as refugee/migrant status, special talents, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment and programmes/courses taken. In primary/secondary education, learning achievement assessed by standardized testing is also included in EMIS. The data on each student would help identify students' needs and provide tailored learning support.

**Table 186: Student data collected and included in EMIS in Romania**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity		
- Refugee and migrant status		
- Language	•	•
- Disabilities and functional difficulties	•	•
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence		
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test	•	
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS in Romania also collects and includes data on students' families both at primary/secondary and pre-primary education levels. It includes household location and family income or eligibility for financial/in-kind support, while family composition is not covered in EMIS. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 187: Household data collected and included in EMIS in Romania**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	<b>Yes</b>	<b>Yes</b>
- Household location	•	•
- Family composition		
- Income or eligibility for financial/in-kind support for education	•	•

## Unique Identifier

EMIS in Romania assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at both primary/secondary and pre-primary education levels, except for a student–teacher link. This indicates that, in general, EMIS in the country provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning, although the lack of a student–teacher link limits the scope of analysis.

**Table 188: Unique identifier for schools, teachers and children in EMIS in Romania**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	<b>Yes</b>	<b>Yes</b>
<b>Unique teacher code</b>	<b>Yes</b>	<b>Yes</b>
- Teacher code linked to school code	•	•
<b>Unique student code</b>	<b>Yes</b>	<b>Yes</b>
- Student code linked to school code	•	•
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once every 2–4 months or once a semester, but updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure validation of collected data. For example, in primary/secondary education, the accuracy and reliability of collected data is secured by following protocols agreed between the Ministry of Education and the National Institute of Statistics.

**Table 189: Frequency of data collection and update and existence of data verification/validation mechanisms in Romania**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once in 2–4 months	Once in 2–4 months
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to geographical data. This enables education stakeholders to leverage the data for more informed education planning and management. However, EMIS is not integrated with national health systems, census data or refugee registration databases.

**Table 190: External data and systems linked to EMIS in Romania**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS is not linked with human resource management systems, financial management systems and learning management systems within the education sector. A lack of integrated data system may impact the effectiveness and efficiency of data management in the sector.

**Table 191: Internal data and systems in the education sector linked to EMIS in Romania**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Romania implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.



**Table 192: Data security and privacy measures implemented for EMIS in Romania**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

## Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, local governments and public authorities, and schools. However, local governments and schools have access to EMIS data from their own jurisdiction and school only, which limits their capacity to compare their educational conditions with those in other areas and schools. Parents and caregivers do not have access to EMIS data.

**Table 193: Organizations and personnel granted access to EMIS data in Romania**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>No</b>	<b>No</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province	•	•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries and local governments and public authorities. Schools and academic institutions do not have access to the student-level data.

**Table 194: Organizations and personnel granted access to student-level data in EMIS in Romania**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level		
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies		
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Romania reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by a wide range of stakeholders including Ministries, government agencies, local governments and public authorities, schools and other for-profit and not-for-profit organizations.

**Table 195: Organizations analysing EMIS data in Romania**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations	•	•

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment) and disaggregation of data into different groups and categories to assess heterogeneity in educational situations.

**Table 196: Types of data analysis using EMIS data in Romania**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables		

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Romania reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. The data outputs are not presented in the format of a learning portfolio for individual students.

**Table 197: Reporting and dissemination of results of EMIS data analysis in Romania**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents		

## EMIS in Serbia

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Serbia. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation at both education levels, which cover assessment of data needs (e.g., how to define data needs), data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data), and data analysis. However, the regulations and guidelines do not address dissemination of data outputs (e.g., in which format and with whom data outputs are shared).

**Table 198: Existence of law, policy, regulations and guidelines on EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs		

#### Organizational and budgetary arrangements

Serbia formally designates certain organizations and personnel to support EMIS, with provision of budget at both primary/secondary and pre-primary education levels. Ministries and school have a formal role to play in EMIS operation. However, no formal EMIS training is provided to these organizations on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although schools may use their non-earmarked budget to support EMIS.

**Table 199: Organizational and budgetary arrangements for EMIS operation in Serbia**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>
- Ministries at national level	•		•	•		•
- Government agencies at national level						

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	No	Yes	Yes	No	Yes
- Local governments and public authorities at subnational level						
- School personnel and school governing bodies	•			•		
- Academic institutions						
- Other for-profit and not-for-profit organizations						

## EMIS platform

### Types of platforms

Serbia uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The country developed an own digital platform, which is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available. The digital platform works in a low bandwidth environment with the minimum Internet speed requirement of lower than 10 Mbps.

**Table 200: EMIS platforms and functions in Serbia**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	< 10 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Serbia does not have formal procedures to assess needs for education data on a regular basis at primary/secondary and pre-primary education levels. This may pose a challenge in identifying and defining data that are relevant and useful to ongoing education planning and management.

**Table 201: Formal procedures to assess education data needs in Serbia**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	No	No
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment		

### Coverage of data collection

EMIS in primary/secondary and pre-primary education covers several subsectors as well as children who are not in the school system. It collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes, while information about non-formal education is not covered. EMIS also collects data about children who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school.

**Table 202: Coverage of subsectors and out-of-school children in EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		
- Students in tracks other than general education (e.g., TVET)	•	•
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	•

### School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including school finance, infrastructure, materials, Internet connection, staff and students, programmes and courses, and offering of special education and gifted programmes. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 203: School data collected and included in EMIS in Serbia**

Information about each school	Primary/Secondary	Pre-primary
	Yes	Yes
- Financial information	•	•
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered	•	•
- Offering of language support	•	•
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	•
- Offering of financial/in-kind support to students and their families	•	•
- Results of school evaluation	•	•

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification, experience of teaching and records of professional development as well as teacher remuneration. The information about each teacher would facilitate teacher management and support as well as their professional development. However, EMIS does not include data on vaccination records or information related to teachers' disciplinary problems and performance.

**Table 204: Teacher data collected and included in EMIS in Serbia**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	•
- Records of professional development	•	•
- Salaries/Payroll	•	•
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in the country collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data included in EMIS ranges from basic information such as age and gender

to nationality, ethnicity, and disabilities and functional difficulties. On the other hand, EMIS does not cover information such as refugee/migrant status, language, special talents, physical growth, and vaccination records. Regarding educational information, EMIS includes information about each student's enrolment, attendance and absence, programmes/courses taken, learning progress assessed by teachers, and need for and enrolment in special education programmes. The data on each student would help identify students' needs and provide tailored learning support.

**Table 205: Student data collected and included in EMIS in Serbia**

Information about each student	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity	•	•
- Refugee and migrant status		
- Language		
- Disabilities and functional difficulties	•	•
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment	•	•
- Attendance and absence	•	•
- Academic programmes and courses enrolled	•	•
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers	•	•
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes	•	•
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS in Serbia also collects and includes data on students' families both at primary/secondary and pre-primary education levels. It includes household location. Family composition and income or eligibility for financial/in-kind support are not covered in EMIS. However, it is reported that EMIS collects information about parents' education and employment, which are used to compute socioeconomic status index. Given that family environments impact student learning and well-being, the household information would be used to adjust teaching practices and support provided to children.

**Table 206: Household data collected and included in EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	<b>Yes</b>	<b>Yes</b>
- Household location	•	•
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in the country assigns unique identifiers to schools, teachers and students, and these codes are linked with one another at both primary/secondary and pre-primary education levels. This indicates that EMIS in Serbia provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning.

**Table 207: Unique identifier for schools, teachers and children in EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	<b>Yes</b>	<b>Yes</b>
<b>Unique teacher code</b>	<b>Yes</b>	<b>Yes</b>
- Teacher code linked to school code	•	•
<b>Unique student code</b>	<b>Yes</b>	<b>Yes</b>
- Student code linked to school code	•	•
- Student code linked to teacher code	•	•

## Data collection and processing

### Data collection, validation and update

EMIS collects data and updates its information approximately once a week for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For instance, the accuracy of EMIS data is ensured by checking and comparing with the data from previous year. Data entering progress is also monitored from another system.

**Table 208: Frequency of data collection and update and existence of data verification/validation mechanisms in Serbia**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Once a week	Once a week
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is linked to geographical data, national health systems, and census data. Serbia reported that EMIS is also linked with labour-market databases. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with refugee registration databases for example.

**Table 209: External data and systems linked to EMIS in Serbia**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	•
- National health data and system	•	•
- National population/household census	•	•
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at both primary/secondary and pre-primary education. It is linked with learning management systems. Serbia also reported that EMIS is integrated with enrolment databases. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector. However, EMIS is not linked with human resource management systems and learning management systems.

**Table 210: Internal data and systems in the education sector linked to EMIS in Serbia**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system	•	•
- Learning management system		

## Data security, privacy and access

### Data security and privacy

Serbia implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.



**Table 211: Data security and privacy measures implemented for EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

## Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries and schools. Schools have access to EMIS data for their own school only, which limits their capacity to compare their educational conditions with those in other schools. Parents and caregivers do not have access to EMIS data.

**Table 212: Organizations and personnel granted access to EMIS data in Serbia**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>No</b>	<b>No</b>
<b>Local governments and public authorities at subnational level</b>	<b>No</b>	<b>No</b>
- Data of own municipality, district and province		
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries. Local governments and public authorities, schools and academic institutions do not have access to the student-level data.

**Table 213: Organizations and personnel granted access to student-level data in EMIS in Serbia**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Serbia reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries and government agencies at national levels. Local and school-level stakeholders are not engaged in analysis of EMIS data.

**Table 214: Organizations analysing EMIS data in Serbia**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment) and disaggregation of data into different groups and categories to assess heterogeneity in educational situations.

**Table 215: Types of data analysis using EMIS data in Serbia**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables		

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Serbia reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in the formats of data dashboards and national reports and data sheets. The outputs are not presented in the format of subnational and school reports or a learning portfolio for individual students.

**Table 216: Reporting and dissemination of results of EMIS data analysis in Serbia**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets		
- School report and data sheets		
- Learning assessment and portfolio of each student shared with the student and his/her parents		

## EMIS in Tajikistan

### Data governance

#### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Tajikistan. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 217: Existence of law, policy, regulations and guidelines on EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Existence of education law / policy on EMIS</b>	<b>Yes</b>	<b>Yes</b>
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

#### Organizational and budgetary arrangements

Tajikistan formally designates certain organizations and personnel to support EMIS, with provision of budget at both primary/secondary and pre-primary education levels. Ministries, government agencies at national level, local governments and public authorities at subnational level, schools, academic institutions, and other for-profit and not-for-profit organizations have a formal role to play in EMIS operation. However, no formal EMIS training is provided to these organizations on a regular basis. Budget for EMIS operation is made available and allocated to Ministries only, although other organizations may use their non-earmarked budget to support EMIS.

**Table 218: Organizational and budgetary arrangements for EMIS operation in Tajikistan**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	Yes	No	Yes	Yes	No	Yes
- Ministries at national level	•		•	•		•
- Government agencies at national level	•			•		
- Local governments and public authorities at subnational level	•			•		
- School personnel and school governing bodies	•			•		
- Academic institutions	•			•		
- Other for-profit and not-for-profit organizations	•			•		

## EMIS platform

### Types of platforms

Tajikistan uses a digital platform to store and manage education data in EMIS for both primary/secondary and pre-primary education. The digital platform is not an open-source platform. It does not offer offline access or multiple languages, but a user guide is available.

**Table 219: EMIS platforms and functions in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	No	No
<b>Spreadsheet</b>	No	No
<b>Digital platform</b>	Yes	Yes
- Open-source platform		
- Offline access		
- Multiple languages		
- User guide	•	•
- Required Internet speed	NA	NA

Note: NA indicates information is not available.

## Scope of data

### Assessment of data needs

Tajikistan does not have formal procedures to assess needs for education data on a regular basis at primary/secondary and pre-primary education levels. This may pose a challenge in identifying and defining data that are relevant and useful to ongoing education planning and management.

**Table 220: Formal procedures to assess education data needs in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Existence of formal procedures to assess data needs regularly</b>	No	No
- Desk review and analysis of existing EMIS data		
- Consultation and survey with:		
- Ministries at national level		
- Government agencies at national level		
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies		
- Teacher unions		
- Academic institutions		
- Other for-profit and not-for-profit organizations		
- Parents and caregivers		
- Frequency of needs assessment		

### Coverage of data collection

EMIS in primary/secondary and pre-primary education covers various subsectors. It collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes, as well as data on non-formal education. EMIS at primary/secondary education level also collects data about children who have dropped out of school. The data could be used to bring these children back to school or support continued learning outside of school.

**Table 221: Coverage of subsectors and out-of-school children in EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education	•	•
- Students in tracks other than general education (e.g., TVET)	•	•
<b>Children out of school</b>		
- School-age children who have never entered formal education		
- School-age children who dropped out of school	•	

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. It covers a wide range of information including WASH infrastructure, materials, Internet connection, staff and students, language support, and offering of special education and gifted programmes. Data about general school infrastructure is covered in EMIS at primary/secondary education level only, while EMIS in pre-primary education includes school/institutional evaluation. The detailed information about schools would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development.

**Table 222: School data collected and included in EMIS in Tajikistan**

Information about each school	Primary/Secondary	Pre-primary
	Yes	Yes
- Financial information		•
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	
- Educational materials and equipment	•	•
- School Internet connection	•	•
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered		
- Offering of language support	•	•
- Offering of special education programmes	•	•
- Offering of gifted education programmes	•	•
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		•

## Teacher data

EMIS collects and includes data on each teacher in primary/secondary education but not in pre-primary education. EMIS at primary/secondary education level covers information about contract, qualifications and certification, experience of teaching and records of professional development. The information about each teacher would facilitate teacher management and support as well as their professional development. However, EMIS does not include data on teacher remuneration, vaccination records or information related to teachers' disciplinary problems and performance.

**Table 223: Teacher data collected and included in EMIS in Tajikistan**

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	No
- Contract type	•	
- Qualification	•	
- Certification	•	
- Teaching experience	•	
- Records of professional development	•	

Information about each teacher	Primary/Secondary	Pre-primary
	Yes	No
- Salaries/Payroll		
- Vaccination records		
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Tajikistan does not collect data on each student both either at primary/secondary or pre-primary education level. Such student-level data may help education authorities, schools and teachers to better understand and meet the learning needs of students in the country.

**Table 224: Student data collected and included in EMIS in Tajikistan**

Information about each student	Primary/Secondary	Pre-primary
	No	No
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)		
- Nationality		
- Ethnicity		
- Refugee and migrant status		
- Language		
- Disabilities and functional difficulties		
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment		
- Attendance and absence		
- Academic programmes and courses enrolled		
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS in the country does not collect and include data on students' families at primary/secondary or pre-primary education level. Given that family environments impact student learning and well-being, collecting household information may help schools and teachers adjust teaching practices and support provided to children.

**Table 225: Household data collected and included in EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	No	No
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Tajikistan assigns unique identifiers to schools, teachers and students at primary/secondary education level. School codes and teacher codes are linked with each other, allowing the EMIS to provide multilevel education data with a nested structure at levels of school and teacher. This not only helps education planning and management but also enables analysis of how school and teacher factors are associated with education service delivery. In pre-primary education, unique identifiers are given to students only, not to schools and teachers.

**Table 226: Unique identifier for schools, teachers and children in EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	Yes	No
<b>Unique teacher code</b>	Yes	No
- Teacher code linked to school code	•	
<b>Unique student code</b>	Yes	Yes
- Student code linked to school code		
- Student code linked to teacher code		

## Data collection and processing

### Data collection, validation and update

EMIS collects data and updates its information once a year for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, EMIS data are compared with the data in the previous year.

**Table 227: Frequency of data collection and update and existence of data verification/validation mechanisms in Tajikistan**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a year	Once a year
- Frequency of data update	Once a year	Once a year
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary and pre-primary education, EMIS is not linked with geographical data, national health systems, census data or refugee registration databases. This may limit the capacity to leverage cross-sectoral data for informed education planning and management.

**Table 228: External data and systems linked to EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)		
- National health data and system		
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

### Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at both primary/secondary and pre-primary education levels. It is linked with learning management systems. EMIS in pre-primary education is also integrated with financial management systems. This integrated data system contributes to improving the effectiveness and efficiency of data management in the sector.

**Table 229: Internal data and systems in the education sector linked to EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system		
- Financial management system		•
- Learning management system	•	•



## Data security, privacy and access

### Data security and privacy

Tajikistan implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup). However, no measures are taken for network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality (e.g., personally identifiable information removed from public access data).

**Table 230: Data security and privacy measures implemented for EMIS in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security		
- Authentication and authorization		
- Respondent confidentiality		

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, government agencies, local governments and public authorities, and schools. Schools have access to EMIS data for their own school only, which limits their capacity to compare their educational conditions with those in other schools. Parents and caregivers do not have access to EMIS data.

**Table 231: Organizations and personnel granted access to EMIS data in Tajikistan**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>Yes</b>	<b>Yes</b>
- Data of own municipality, district and province		
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

## Data analysis

### Organizations analysing EMIS data

Tajikistan reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries, government agencies, local governments and public authorities, and schools.

**Table 232: Organizations analysing EMIS data in Tajikistan**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 233: Types of data analysis using EMIS data in Tajikistan**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)		
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Tajikistan reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national and subregional reports and data sheets. The outputs are not presented in the format of school reports and data sheets.

**Table 234: Reporting and dissemination of results of EMIS data analysis in Tajikistan**

Reporting and dissemination of data output	Primary/Secondary	Pre-primary
	Yes	Yes
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets		
- Learning assessment and portfolio of each student shared with the student and his/her parents		

# EMIS in Uzbekistan

## Data governance

### Legal, policy and regulatory framework

There is a legal, policy and regulatory framework for EMIS in Uzbekistan. The country has national education law or policy that governs education data management for primary/secondary and pre-primary education. The country has also set regulations or guidelines on EMIS operation, which cover the entire EMIS cycle from needs assessment (e.g., how to define data needs) to data collection (e.g., who collects data and how), data processing/management (e.g., how to clean and store data) and data analysis as well as dissemination of data outputs (e.g., in which format and with whom data outputs are shared) at both primary/secondary and pre-primary levels.

**Table 235: Existence of law, policy, regulations and guidelines on EMIS in Uzbekistan**

Existence of education law / policy on EMIS	Primary/Secondary	Pre-primary
	Yes	Yes
<b>Existence of regulations / guidelines on EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Assessment of data needs	•	•
- Data collection	•	•
- Data processing/management	•	•
- Data analysis	•	•
- Dissemination of data outputs	•	•

### Organizational and budgetary arrangements

Uzbekistan formally designates certain organizations and personnel to support EMIS, with provision of training and budget. Ministries, government agencies at national level, and local governments and public authorities at subnational level have a formal role to play in EMIS operation for both primary/secondary and pre-primary education. Additionally, schools and other for-profit and not-for-profit organizations are assigned to support EMIS at primary/secondary level. Formal EMIS training is provided on a regular basis only for primary/secondary education. Budget for EMIS operation is made available and allocated to Ministries, while government agencies receive funding for EMIS operation for primary/secondary education only. Other organizations may use their non-earmarked budget to support EMIS.

**Table 236: Organizational and budgetary arrangements for EMIS operation in Uzbekistan**

	Primary/Secondary			Pre-primary		
	Designation of responsibility	Provision of regular training	Budgetary provision	Designation of responsibility	Provision of regular training	Budgetary provision
<b>Organizational and budgetary arrangements for EMIS operation</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>
- Ministries at national level	•	•	•	•		•
- Government agencies at national level	•	•	•	•		
- Local governments and public authorities at subnational level	•	•		•		
- School personnel and school governing bodies	•	•				
- Academic institutions						
- Other for-profit and not-for-profit organizations	•	•				

## Areas of training provided

The formal training on EMIS operation at primary/secondary education level covers a range of topics from needs assessment to data collection, data processing/management, data analysis and dissemination of data outputs. It helps the Ministries, government agencies, local governments and public authorities, schools and for-profit and not-for-profit organizations to fulfil their roles and responsibilities.

**Table 237: Areas of formal EMIS training provided in Uzbekistan**

	Primary/Secondary	Pre-primary
	<b>Yes</b>	<b>No</b>
<b>Provision of formal and regular training</b>		
- Assessment of data needs	•	
- Data collection	•	
- Data processing/management	•	
- Data analysis	•	
- Dissemination of data outputs	•	

## EMIS platform

### Types of platforms

Uzbekistan uses digital platforms to store and manage education data in EMIS for both primary/secondary and pre-primary education. The digital platforms are not an open-source platform. The platforms do not offer offline access, but they support multiple languages with a user guide. The minimum Internet speed required is reported to be 10–50 Mbps for the platform for primary/secondary education and lower than 10 Mbps for pre-primary education.

**Table 238: EMIS platforms and functions in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Paper-based</b>	<b>No</b>	<b>No</b>
<b>Spreadsheet</b>	<b>No</b>	<b>No</b>
<b>Digital platform</b>	<b>Yes</b>	<b>Yes</b>
- Open-source platform		
- Offline access		
- Multiple languages	•	•
- User guide	•	•
- Required Internet speed	10–50 Mbps	< 10 Mbps

## Scope of data

### Assessment of data needs

Uzbekistan has formal procedures to assess needs for education data at both primary/secondary and pre-primary education levels on a regular basis, and to select data to be collected. The procedures include desk review and analysis of the relevance and usefulness of existing data in EMIS as well as consultation and survey with a range of education stakeholders, which include Ministries, government agencies, local governments and public authorities, and schools. For data needs assessment in primary/secondary education, academic institutions and parents and caregivers are also consulted with. The needs assessment is conducted once a month.

**Table 239: Formal procedures to assess education data needs in Uzbekistan**

	Primary/Secondary	Pre-primary
	<b>Yes</b>	<b>Yes</b>
<b>Existence of formal procedures to assess data needs regularly</b>		
- Desk review and analysis of existing EMIS data	•	•
- Consultation and survey with:		
- Ministries at national level	•	•
- Government agencies at national level	•	•
- Local governments and public authorities at subnational level	•	•
- School personnel and school governing bodies	•	•
- Teacher unions		
- Academic institutions	•	
- Other for-profit and not-for-profit organizations		
- Parents and caregivers	•	
- Frequency of needs assessment	Once a month	Once a month

Note: When the frequency differs with types of data, the most frequent needs assessment cycle is presented.

### Coverage of data collection

EMIS in Uzbekistan covers various subsectors. At primary/secondary education level, EMIS collects data about private schools/students and students studying in programmes other than the general education track, such as TVET programmes. On the other hand, EMIS in pre-primary education collects data about private

institutions/students as well as information about non-formal education. Data about children who have never entered formal education or have dropped out of school are made available only in EMIS in pre-primary school education. The data could be used to bring these children back to school or support continued learning outside of school.

**Table 240: Coverage of subsectors and out-of-school children in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Subsectors/Tracks</b>		
- Private schools/students	•	•
- Non-formal education		•
- Students in tracks other than general education (e.g., TVET)	•	
<b>Children out of school</b>		
- School-age children who have never entered formal education		•
- School-age children who dropped out of school		•

## School data

EMIS in primary/secondary and pre-primary education collects and includes data on each school. EMIS in primary/secondary education covers information such as school finance, infrastructure, materials, Internet connection and staff and students. EMIS at pre-primary education level collects basic information on infrastructure and staff and students. The school data would help the country to monitor school conditions, identify investment needs in each school, and plan and support school development. However, programme information is not covered at either education level.

**Table 241: School data collected and included in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
Information about each school	Yes	Yes
- Financial information	•	
- Water, sanitation and hygiene (WASH) infrastructure	•	•
- Other school infrastructure	•	•
- Educational materials and equipment	•	
- School Internet connection	•	
- Staff information aggregated to school level	•	•
- Student information aggregated to school level	•	•
- Academic programmes/courses offered		
- Offering of language support		
- Offering of special education programmes		
- Offering of gifted education programmes		
- Offering of financial/in-kind support to students and their families		
- Results of school evaluation		

## Teacher data

EMIS also collects and includes data on each teacher at both primary/secondary and pre-primary education levels. It covers information about contract, qualifications and certification. At primary/secondary education level, EMIS also collects data on teaching experience and vaccination records. The information about each teacher would facilitate teacher management and support. However, EMIS does not cover records of professional development, teacher remuneration, or information related to teachers' disciplinary problems and performance.

**Table 242: Teacher data collected and included in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
Information about each teacher	Yes	Yes
- Contract type	•	•
- Qualification	•	•
- Certification	•	•
- Teaching experience	•	
- Records of professional development		
- Salaries/Payroll		
- Vaccination records	•	
- Teacher's disciplinary problems		
- Evaluation of teacher's performance		

## Student data

EMIS in Uzbekistan collects data on each student both at primary/secondary and pre-primary education levels. Students' demographic data in EMIS include basic information such as age and gender and nationality. Disabilities and functional difficulties are included in EMIS in primary/secondary education. On the other hand, EMIS in the country does not cover information such as refugee/migrant status, language, special talents, physical growth, and vaccination records. Regarding educational information, EMIS in pre-primary education cover information about each student's enrolment, attendance and absence, and a need for and enrolment in special education programmes. However, these education data are not collected in EMIS at primary/secondary education level. The student data collected by EMIS would help identify students' needs and provide tailored learning support.

**Table 243: Student data collected and included in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
Information about each student	Yes	Yes
<b>Demographic Information</b>		
- Basic demographic information (e.g., age, gender)	•	•
- Nationality	•	•
- Ethnicity		
- Refugee and migrant status		
- Language		
- Disabilities and functional difficulties	•	

	Primary/Secondary	Pre-primary
<b>Information about each student</b>	<b>Yes</b>	<b>Yes</b>
- Special gifts and talents		
- Physical growth		
- Vaccination records		
- Experience of child abuse and domestic violence		
<b>Educational information</b>		
- Enrolment		•
- Attendance and absence		•
- Academic programmes and courses enrolled		
- Learning achievement measured by standardized test		
- Learning achievement and progress assessed by teachers		
- Assessment of transferable and twenty-first century skills		
- A need for and enrolment in language support programmes		
- A need for and enrolment in special education programmes		•
- A need for and enrolment in gifted education programmes		
- Student's behaviour problems		

## Household data

EMIS in the country collects and includes data on students' families at pre-primary education level only. It is reported that EMIS in pre-primary education collects data about students' parents. Given that family environments impact student learning and well-being, collecting household information may help schools and teachers adjust teaching practices and support provided to children.

**Table 244: Household data collected and included in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Information about students' family</b>	<b>No</b>	<b>Yes</b>
- Household location		
- Family composition		
- Income or eligibility for financial/in-kind support for education		

## Unique Identifier

EMIS in Uzbekistan assigns unique identifiers to schools, teachers, and students and these codes are linked with one another at both primary/secondary and pre-primary education levels, except for a student-teacher link in pre-primary education. This indicates that EMIS in the country, particularly in primary/secondary education, provides multilevel education data with a nested structure. This not only helps education planning and management but also enables analysis of how school, teacher and student factors are associated with education service delivery and learning.

**Table 245: Unique identifier for schools, teachers and children in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Unique school code</b>	<b>Yes</b>	<b>Yes</b>
<b>Unique teacher code</b>	<b>Yes</b>	<b>Yes</b>
- Teacher code linked to school code	•	•
<b>Unique student code</b>	<b>Yes</b>	<b>Yes</b>
- Student code linked to school code	•	•
- Student code linked to teacher code	•	

## Data collection and processing

### Data collection, validation and update

EMIS collects data approximately once a week but updates its information on a real-time basis for both primary/secondary and pre-primary education. There are mechanisms to ensure the accuracy and reliability of collected data. For example, data are exchanged and cross-checked by relevant Ministries and governmental institutions via an interdepartmental integration portal.

**Table 246: Frequency of data collection and update and existence of data verification/validation mechanisms in Uzbekistan**

	Primary/Secondary	Pre-primary
- Frequency of data collection	Once a week	Once a week
- Frequency of data update	Real time	Real time
- Existence of mechanisms to ensure data accuracy and reliability	•	•

Note: When the frequency differs with types of data, the most frequent data collection/update cycle is presented.

## Integration with other data/systems

### Linkage to external data and system

For both primary/secondary education, EMIS is linked to geographical data and national health systems. The country reported that, at pre-primary education level, EMIS is also linked with public service systems for citizens. This enables education stakeholders to leverage the cross-sectoral data for informed education planning and management. However, EMIS is not integrated with census data and refugee registration databases.

**Table 247: External data and systems linked to EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
- Geographical data (e.g., GIS)	•	
- National health data and system	•	



	Primary/Secondary	Pre-primary
- National population/household census		
- External learning assessment survey		
- Refugee registration database		

## Linkage to other data and systems in the education sector

EMIS has a linkage with other data and systems within the education sector at primary/secondary education level. It is linked with human resource management systems, financial management systems, and learning management systems. This integrated data system would contribute to improving the effectiveness and efficiency of data management in the sector.

**Table 248: Internal data and systems in the education sector linked to EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
- Human Resource (HR) management system	•	
- Financial management system	•	
- Learning management system	•	

## Data security, privacy and access

### Data security and privacy

Uzbekistan implements measures to ensure data security and privacy for EMIS at both primary/secondary and pre-primary education levels. These include measures on data loss prevention (e.g., data backup), network security (e.g., firewalls and mandatory security updates), authentication and authorization (e.g., user registration), and respondent confidentiality.

**Table 249: Data security and privacy measures implemented for EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Implementation of measures to ensure data security and privacy</b>	<b>Yes</b>	<b>Yes</b>
- Data loss prevention	•	•
- Network security	•	•
- Authentication and authorization	•	•
- Respondent confidentiality	•	•

### Access to EMIS data

For both primary/secondary and pre-primary education, access to EMIS data is granted to Ministries, government agencies and school. Local governments and public authorities have access to EMIS at pre-primary education level only. Local governments and schools have access to EMIS data from their own

jurisdiction and primary school only, which limits their capacity to compare their educational conditions with those in other areas and schools. Parents and caregivers do not have access to EMIS data.

**Table 250: Organizations and personnel granted access to EMIS data in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Ministries at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Government agencies at national level</b>	<b>Yes</b>	<b>Yes</b>
<b>Local governments and public authorities at subnational level</b>	<b>No</b>	<b>Yes</b>
- Data of own municipality, district and province		•
- Data of other municipalities, districts and provinces		
<b>School personnel and school governing bodies</b>	<b>Yes</b>	<b>Yes</b>
- Data of own school	•	•
- Data of other schools		
<b>Academic institutions</b>	<b>No</b>	<b>No</b>
<b>Other for-profit and not-for-profit organizations</b>	<b>No</b>	<b>No</b>
<b>Parents and caregivers</b>	<b>No</b>	<b>No</b>
- Data of own child's school		
- Data of other schools		
- Data of own child		
- Data of other children		

### Access to student-level data

Student-level data allow education stakeholders not only to develop education plans tailored to the learning needs of each child but also to explore the variation in student characteristics and education outcomes to analyse factors facilitating or limiting learning. For both primary/secondary and pre-primary education, access to student-level data is granted to Ministries and school. At pre-primary education level, government agencies and local governments also have access to the student-level data.

**Table 251: Organizations and personnel granted access to student-level data in EMIS in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Data about each student collected and included in EMIS</b>	<b>Yes</b>	<b>Yes</b>
- Ministries at national level	•	•
- Government agencies at national level		•
- Local governments and public authorities at subnational level		•
- School personnel and school governing bodies	•	•
- Academic institutions		
- Other for-profit and not-for-profit organizations		

## Data analysis

### Organizations analysing EMIS data

Uzbekistan reported that, for both primary/secondary and pre-primary education, data collected by EMIS are analysed by Ministries. Government agencies and schools conduct analysis of EMIS data at primary/secondary education level only.

**Table 252: Organizations analysing EMIS data in Uzbekistan**

	Primary/Secondary	Pre-primary
- Ministries at national level	•	•
- Government agencies at national level	•	
- Local governments and public authorities at subnational level		
- School personnel and school governing bodies	•	
- Academic institutions		
- Other for-profit and not-for-profit organizations		

### Types of data analysis

The education stakeholders conduct various data analyses for both primary/secondary and pre-primary education. These include description of selected data (e.g., enrolment), disaggregation of data into different groups and categories to assess heterogeneity in educational situations, and statistical analysis such as regression analysis to examine relationships between multiple variables.

**Table 253: Types of data analysis using EMIS data in Uzbekistan**

	Primary/Secondary	Pre-primary
- Description of selected data (e.g., average)	•	•
- Data disaggregation	•	•
- Statistical analysis of relationships between multiple variables	•	•

## Reporting and dissemination of data output

### Formats of reporting and dissemination of data output

Uzbekistan reports and disseminates the results of data analyses for both primary/secondary and pre-primary education. The data outputs are reported and disseminated in various formats, which include data dashboards and national, subregional and school reports and data sheets. At pre-primary education level, the analysis of learning data is also shared with students and their families in the format of learning assessment and portfolio.

**Table 254: Reporting and dissemination of results of EMIS data analysis in Uzbekistan**

	Primary/Secondary	Pre-primary
<b>Reporting and dissemination of data output</b>	<b>Yes</b>	<b>Yes</b>
- Data dashboards showing key education indicators in the country	•	•
- National report and data sheets	•	•
- Subregional report and data sheets	•	•
- School report and data sheets	•	•
- Learning assessment and portfolio of each student shared with the student and his/her parents		•

# Considerations for EMIS development and upgrading

Data management is a critical lever for effective and efficient education planning and management, which requires the collection, management and use of a large amount of information about a nation's children, teachers and schools across education levels. The governments in Europe and Central Asia are continuing to invest in the development and upgrading of EMIS, with the help of technological advancement, to meet the demand for education data, facilitate data-driven education policymaking, and support delivery of quality inclusive education services for all children.

This survey identified that the policy environment for EMIS and functions and characteristics of EMIS vary from country to country. On the one hand, this can be interpreted as a reflection of the efforts each country and economy has made to meet their own educational data needs. However, the holistic review and comparison of EMIS in the region also help us come up with several considerations for ways to strengthen EMIS in future.

**Formally assigning roles in EMIS operation with budgetary provision:** Given that EMIS operation engages multiple organizations and personnel at different administrative levels, concerned stakeholders must have clear roles and responsibilities in EMIS operation. Formally assigning EMIS-related tasks to organizations and personnel helps fulfil accountability for effective education data management and use. Securing earmarked budget for EMIS operation is also key for effective EMIS operation in a sustainable manner. This survey found that budget for EMIS is secured only for Ministries in the majority of the countries and economies, even if other organizations such as local governments and schools have a formal role in EMIS operation.

**Providing formal, regular training on EMIS operation:** The organizations and personnel that are designated to operate EMIS may need training to fulfil their roles and responsibilities. The importance of such training increases as the scope of data collection expands and use of IT infrastructure and software becomes common. However, formal training on EMIS is not provided on a regular basis in some countries and economies, and when provided, such opportunities are given to specific organizations such as Ministries and schools. Providing training on education data management to those engaged in EMIS operation would help ensure timely data collection and effective data management and use.

**Strengthening supporting functions in digital EMIS:** All the countries and economies use digital platforms to facilitate efficient data collection, management and use. However, the utility of digital EMIS can be improved further by installing several supporting functions. For instance, although the digital platforms are accessible in low network bandwidth, offline access is not supported in any of the countries and economies. Installing offline solutions such as use of local servers may facilitate EMIS operation in areas with limited Internet access. In addition, a user guide for digital EMIS, and when relevant multiple language interface, can also facilitate use of EMIS. Such supporting functions are considered important given that EMIS relies on the engagement of multiple stakeholders who are in different localities and with different level of needs and capacity.

**Establishing formal procedures to assess education data needs on a regular basis:** Some education data collected are not necessarily used for education planning and management in meaningful ways. It is therefore important to establish formal procedures to assess and identify types of data that are critical and useful to achieve their educational objectives on a regular basis. These include desk review and analysis of existing EMIS data as well as surveys and consultation with key stakeholders such as Ministries, local governments, schools, teacher unions, academia, and local communities including parents and caregivers.

**Exploring the possibility to include data of non-formal education and out-of-school children in consideration of cost effectiveness:** EMIS can provide more comprehensive data about the educational and learning situations of children when it covers information related to the provision of and access to non-formal education (e.g., catch-up courses) and data on children out of the school system. Data on school-age children who have never enrolled in school or who have dropped out of school is particularly critical for the State and national education authorities to identify and help these children return to school or receive alternative, accredited learning. Collecting information about non-formal education and out-of-school children should be considered in its benefit and cost as it requires additional financial and human resources and inter-agency coordination.

**Collecting data about each school, teacher and student with unique identifier:** Collecting data about each school, teacher and student is critical to understanding variations in educational environments and needs within country and to assess the degree of educational inequality. Student-level data in particular allow education stakeholders to develop education plans tailored to the learning needs of each child. In addition, when unique identifiers of schools, teachers and students are assigned and linked with one another, EMIS provides data in a multilevel structure where students are nested within teachers/classrooms and teachers/classrooms are nested within schools. This not only helps education planning and management (e.g., allocation of teachers to schools; student transfers) but also enables stakeholders to analyse how school, teacher and student factors are associated with the quality of education service delivery and learning outcomes, as evidence for policymaking and programme development.

**Establishing data verification and validation mechanisms:** With the use of digital EMIS, the countries and economies collect and update a large amount of EMIS data in a short cycle. However, this also increases the risk of inaccuracy and unreliability of education data, which could in turn be a bottleneck for effective education planning and management. To ensure the accuracy and reliability of data, institutional mechanisms should be in place to verify and validate EMIS data. These include agreeing on data management protocols with national institutes of statistics, transferring demographic data from the national population database, and reviewing EMIS data with relevant stakeholders for cross-checking.

**Linking EMIS to other data systems in consideration of cost effectiveness:** When EMIS is linked with external data and systems such as geographical data, the health system, national census data, and refugee registration database, it allows education stakeholders to implement informed education planning and management based on cross-sectoral knowledge and evidence. EMIS can also be integrated with other data and systems within the education sector such as HR and financial databases, which helps improve the effectiveness and efficiency of data management in the sector. However, creating and maintaining a data linkage are often costly. The long-term benefit and cost should be considered for data integration for EMIS.

**Strengthening data security and privacy in education:** The importance of data security and privacy has increased given the growing amount of student and school data collected, stored and used in the education sector. Even though the majority of the surveyed countries and economies implement measures on data loss prevention, network security, authentication and authorization and respondent confidentiality, cybersecurity risks in education need to be assessed and mitigated. For instance, there has been a global rise in cyberattacks in the education sector, various forms of data are collected by EdTech and other firms through Internet browser and app children use, and children in school breach the privacy rights of other children. Guidance, training and enforcement on cybersecurity particularly at school, teacher and student level need to be strengthened.

**Granting academic institutions access to EMIS data for data analysis and evidence generation:** Data collected in EMIS generate value only when they are used and analysed for specific education objectives. While the data are made available for and analysed by Ministries, local governments and schools, academic institutions such as universities and teacher training colleges do not analyse EMIS data in the majority of the countries and economies. Academic institutions have the capacity to conduct data analysis, generate scientific evidence and insights, and provide policy and programme recommendations. Granting them access to EMIS data, possibly a version with personally identifiable information removed, with a formal written agreement on data security and protection, would help leverage EMIS data for effective education planning and management.

**Disseminating data analysis outputs widely for knowledge-sharing and increased accountability:**

The data outputs can be disseminated and reported in various formats including data dashboards, national and subregional reports and data sheets, and school reports. Learning data are also shared with students and their families in the format of learning assessment and portfolio in several countries and economies. Sharing educational status and results not only helps the State to fulfil accountability for the provision of quality education services but also contribute to strengthening a knowledge base and raising a sense of accountability held by other educational actors including school personnel, parents and other community members.

Finally, it is worth mentioning that these considerations are interrelated. They need to be discussed and addressed with each other in mind. For example, regular training leads to more standardized and timely analysis and dissemination, and unique identifier should be designed in a way that also enables the linkage between EMIS and other data systems.

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