# REVIEW OF EDUCATION MANAGEMENT INFORMATION SYSTEMS (EMIS) THAT TRACK INDIVIDUAL STUDENT DATA

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# Acknowledgements

## Ministry of Education, Culture, Science and Sports

The Ministry of Education, Culture, Science and Sports (MECSS) has shown a great interest in this research, illustrated by the willingness of many staff to be interviewed and to provide open responses. There is growing awareness amongst the interviewed MECSS staff of the potential of using more and better-quality data for decision-making. This was not only evident during interviews and small-group discussions, it was also illustrated by the Vice-Minister who opened the validation workshop, emphasizing the importance of availability of reliable data to move the education sector forward.

The time-availability and the openness of Director-Generals, National Directors and other staff were instrumental to inform the analyses and formulation of recommendations. The ESIS Team itself has been an excellent facilitator of the research: not only did the staff provide highly relevant documentation, they also could reflect on the EMIS development from a historical perspective and were able and willing to share some critical opinions. These critical views were exceptionally valuable and are reflected in the conclusions and recommendations of the report.

The school level is where equitable access and the quality of education service delivery must be measured. So, it has been exceptionally meaningful to listen to the experiences of staff working at school or soum level. These staff should continue to inform the development of EMIS, so that the system becomes relevant not only at macro-level, but also to individual schools.

Lastly, a word of thanks goes out to the MECSS staff and education stakeholders who were interviewed or participated in the validation workshop. It was positive to observe how staff from the MECSS and other organizations worked together in small groups, providing valuable feedback to complete the findings and shape the recommendations. This research has been a great collaborative effort that has raised the awareness of the need and urgency to develop the EMIS. It is a journey and it is hoped that this report can serve as guide.

# UNICEF

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UNICEF country offices manage and implement programmes supporting children's rights through 14 offices in 28 countries including 14 Pacific Island States throughout the East Asia and the Pacific region. UNICEF has supported various aspects of EMIS development in these countries either directly or through collaboration. UNICEF has also supported numerous studies which either promote or use EMIS and EMIS data. For example, UNICEF has recently supported studies on Out-of-School Children[1] in 10 countries in the region, which relied heavily on EMIS and household survey data to help identify those children and their characteristics who are at risk of dropping out and who were out of school. The Out Of-of-School Children Initiative (OOSCI) was a collaboration with UNESCO Institute for Statistics (UIS) and host governments.

At the regional level, UNICEF continues to address inequity issues in the region by facilitating and supporting regional initiatives and partnerships, such as: Asia-Pacific Thematic Working Group on Education 2030/SDG4, which UNICEF co-chairs with UNESCO; Enhancing Statistical Capacity for Education with UNESCO Institute for Statistics; Association of Southeast Asian Nations (ASEAN) Declaration on Strengthening Out-of-School Children and Youth Working Group with UNESCO; East Asia and Pacific United Nations Girls' Education Initiative (EAP UNGEI), with multiple partners; Asia-Pacific Regional Policy Forum on Early Childhood Care and Education (ECCE); Pacific Regional Forum for ECCE (PRC4ECCE); Asia-Pacific Multilingual Education (MLE) Working Group. All of these initiatives rely on accurate and timely data to help inform stakeholders of disparities and other issues within education throughout the region.[2]

Other initiatives encourage countries to seek improved methods of obtaining quantitative data on learners and use data to influence policy and resource allocation. An example includes the development of a regional assessment: the Southeast Asia Primary Learning Metrics (SEA-PLM),[3] in collaboration with Southeast Asian Ministers of Education Organization (SEAMEO) and Australian Council for Educational Research (ACER), to ensure greater focus on learning (including global citizenship) in participating countries and enable the comparison of learning standards across ASEAN.

1 Including Vietnam, Philippines, Indonesia, Cambodia, Thailand, Lao PDR, Malaysia, Myanmar, PNG and Timor-Leste.
2 https://www.unicef.org/UNICEF_EAPRO_Education_FINAL.pdf, Accessed on 5 Feb 2019
3 http://www.seaplm.org/seaplm/, Accessed on 14 Feb 2019

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# Definitions

**Administrative Data:** All school and student data, including student management data, student learning data, school finance data, etc.

**EMIS:** An education management information system (EMIS) is a system that manages education information. As mentioned above, in different contexts, this system may be referred to by a different name. An EMIS can manage a wide range of data including: student information (demographics, enrollment, discipline and other functional elements); instructional/learning information (assessment and achievement data, teacher evaluations, curriculum effectiveness data and other elements related to progression through school); longitudinal data; and business intelligence (financial and human resource data, strategic metrics, etc.).

**ESIS:** An integrated EMIS for pre-primary and general education of Mongolia. Abbreviation of the Education Sector Information System.

**Local:** This refers to all the administrative subdivisions that fall under the sub-national level. For example, municipalities, counties, district and, communes.

**Metadata:** A set of data that describes and gives information about other data.

**National:** This refers to the whole country. The national level refers to legislation mandated by the central government.

**Sub-national:** This refers to the administrative level that immediately follows the national level. For example: aimags in Mongolia. Aimag is an administrative unit of Mongolia, equivalent to provinces. There are 21 aimags in Mongolia with a population of 15,000 to 45,000 each. Administrative unit below aimag is soum. There are 334 soums in Mongolia. Administrative subdivision of the capital city of Mongolia is called khoroo. The khoroo is often translated as subdistrict or microdistrict. A khoroo is below the level of a district.

**Summative Indicators:** Variables derived from individual-level data such as administrative, financial, or human resources data.

**General Education:** It includes primary, lower and upper secondary schools. (GOM, 2006)

**Tugrug (MNT):** Official monetary unit in Mongolia used since 1925. (Exchange rate in April 9, 2019: 1 USD=2,631.64 MNT (Bank of Mongolia, www.mongolbank.mn).

# Acronyms

| | |
|---|---|
| **ADB** | Asian Development Bank |
| **ACER** | Australian Council for Educational Research |
| **ASEAN** | Association of Southeast Asian Nations |
| **CapED** | Capacity Development for Education |
| **DFAT** | Department of Foreign Affairs and Trade (Australian Government) |
| **DHS** | Demographic and Health Surveys |
| **DMEIA** | Department of Monitoring, Evaluation and Internal Audits (Mongolia) |
| **DPA** | Department of Public Administration (Mongolia) |
| **DFI** | Department of Finance and Investment (Mongolia) |
| **DQAF** | Data Quality Assessment Framework |
| **EAP** | East Asia and the Pacific |
| **EAPRO** | East Asia and Pacific Regional Office for UNICEF |
| **ECCE** | Early Childhood Care and Education |
| **EGMA** | Early Grade Maths Assessment |
| **EGRA** | Early Grade Reading Assessment |
| **EMIS** | Education Management Information System |
| **ESIS** | Education Sector Information System |
| **GAML** | Global Alliance to Monitor Learning |
| **GEPD** | General Education Policy Department (Mongolia) |
| **HEMIS** | Higher Education Management Information System |
| **HERP** | Higher Education Reform Project |
| **HRIS** | Human Resource Information System |
| **HRMIS** | Human Resource Management Information System |
| **ICT** | Information and Communications Technology |
| **IECD** | Integrated Early Childhood Development |
| **ISCED** | International Standard Classification of Education |
| **LANA** | Literacy and Numeracy Assessment |
| **MECSS** | Ministry of Education, Culture, Science and Sports |
| **MDG** | Millennium Development Goals |
| **MIS** | Management Information System |
| **MLE** | Asia-Pacific Multilingual Education |
| **MLSP** | Ministry of Labour and Social Protection |
| **MNCEA** | Mongolian National Council for Education Accreditation |

| | |
|---|---|
| **NDA** | National Development Agency |
| **NSO** | National Statistical Office |
| **NVETMC** | National Vocational Education and Training Methodology Centre |
| **OEDC** | Organisation for Economic Co-operation and Development |
| **OOSCI** | Out-of School Children |
| **PIRLS** | Progress in International Reading Literacy Study |
| **SABER** | Systems Approach for Better Education Results |
| **SDG** | Sustainable Development Goal |
| **SDSN** | Sustainable Development Solutions Network |
| **SDV** | Sustainable Development Vision |
| **SEAMEO** | Southeast Asian Ministers of Education Organization |
| **SEA-PLM** | Southeast Asia Primary Learning Metrics |
| **SIS** | School Information System |
| **TIMSS** | Trends in International Mathematics and Science Study |
| **TVET** | Technical and Vocational Education and Training |
| **TVET PICD** | TVET Policy implementation and coordination department (Mongolia) |
| **UIS** | UNESCO Institute for Statistics |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organization |
| **UNICEF** | United Nations Children's Fund |
| **UMED** | Ulaanbaatar Metropolitan Education Department |

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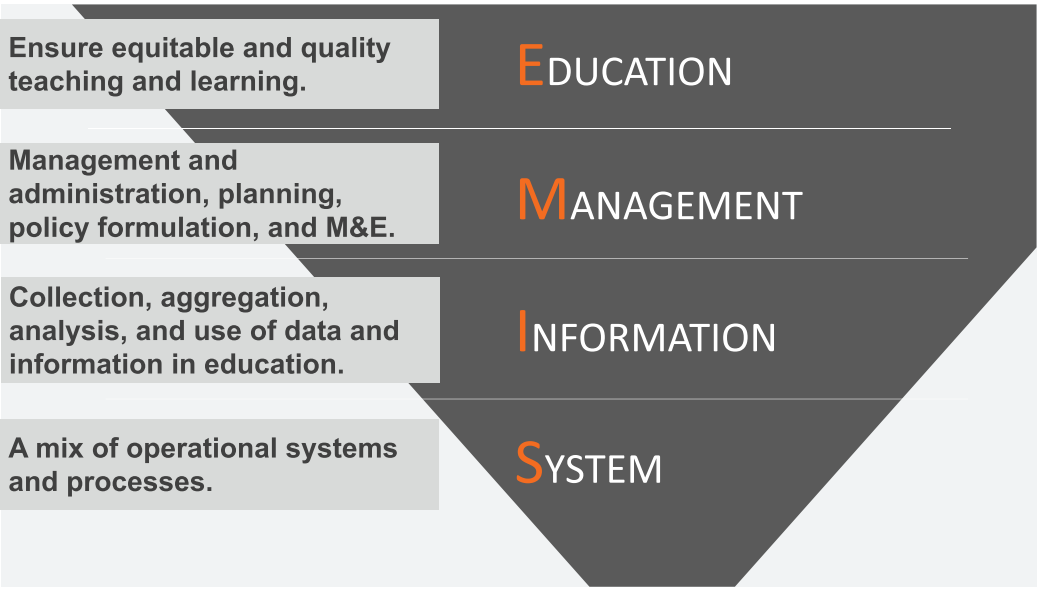
# Executive summary

This review of Education Management Information System (EMIS) has examined policy and data gaps of EMIS and reviewed the extent to which data is analyzed and utilized for decision-making by the Ministry of Education, Culture, Science and Sports (MECSS) of Mongolia. The review examined all facets and components that are necessary to fully capitalize on the potential of the EMIS as a facilitator of data-driven decision-making.

EMIS can be defined as a mix of operational systems and processes, increasingly supported by digital technology, that enable the collection, aggregation, analysis, and use of data and information in education, including for management and administration, planning, policy formulation, and monitoring and evaluation (M&E) (refer figure 1).

**Figure 1. EMIS Conceptual Diagram**




As a central administrative organization in charge of education, The MECSS of Mongolia is responsible for development and implementation of the EMIS for general, non-formal and higher education except for Technical and Vocational Education and Training (TVET) which is under responsibility of the Ministry of Labor and Social Protection (MLSP). Since 2013, the MECSS of Mongolia aims to develop systems based on information and communication technology (ICT), that can support education sector management, optimal planning, decision making process and delivering better education services in Mongolia through creating an integrated database.

**EMIS in Mongolia is termed Education Sector Information System (ESIS) and is integrated EMIS for pre-primary to upper secondary education as well as non-formal education. Other sub-sector information systems are referred to as EMIS.**

The ESIS supports pre-primary, primary, secondary and non-formal education sector management, monitoring, planning, decision making processes, and delivering better education services in Mongolia. The TVET sector has no integrated EMIS. Instead there are several stand-alone applications for recording student test results, graduation and attendance. The EMIS for higher education (HEMIS) is currently under development and has not fully been implemented nationwide yet.

The study concluded that the current ESIS is well managed in terms of data collection, processing and reporting. The ESIS has a comprehensive record of all education instititutions, teaching staff and student data which is used by the MECSS for policy and planning and operation of the education system. The ESIS contains all public and private pre-primary, general and non-formal education information. The key advantage of ESIS is that it

downloads individual data from the civil registration system of the General Authority for State Registration using personal identification number. Therefore, there is no duplicated registration of pupils and teachers. It also collects relevant individual student data that can potentially be used for equity analysis in education sector.

However, the utilization of ESIS system for the purposes of policy and planning remains inadequate. The study also revealed gaps in policy to support ESIS system. Key ministry strategic documents have expired in 2015-2016 such as the Education Sector Master Plan (ESMP) 2006-2015,[4] and there are no strategies which support development of the EMIS going forward.

The ongoing development of the Education Sector Mid-Term Development Plan (ESMTDP) 2021-2030 offers a good opportunity for the MECSS to develop and implement a dedicated strategy for EMIS. The recommendations from this report should be used as an input to develop future strategy and policy documents.

# Main Findings

The EMIS is termed ESIS in Mongolia for pre-primary to upper secondary education levels and was developed as a single centralized system solution to education data based on a strategic plan generated in 2012.[5] It is an integrated information system covering pre-primary to upper secondary education level including non-formal education. ESIS is designed to encourage users and stakeholders to utlise the system in day-to-day work and generate required reports at any time. It is accessible to teachers and head teachers at the school level and a parental portal is presently being piloted which enables parents and students to gain access to their personal records and progress and to interact with the teacher. The single integrated database enables all users and stakeholders to enter relevant data and access information.

However other sectors are not well covered by EMIS in Mongolia. The TVET has no integrated EMIS. Instead there are several stand-alone applications for recording student tests, graduation and attendance. Required information is not able to be presented in timely and accurate manner because of the absence of an EMIS in the form of a centralized database for TVET. As a result, TVET colleges either don't have systems for data storage or are using different systems. Developing an EMIS for TVET based on the existing IT systems will be more cost-effective compared to the present approach. The EMIS for higher education is currently under development and is being piloted and has not fully been implemented nationwide. An EMIS for Higher Education is planned as a stand alone system and data would not be integrated with the ESIS.

There are two key strategic policy documents to develop and strengthen the EMIS. The ESMP 2006-2015 and the "Policy on Information and Communication Technology in Education Sector 2012-2016" expired in 2015 and 2016 respectively. Neither plan is sufficient to ensure EMIS is properly developed and maintained. The EMIS, including education sector infrastructure and hardware, is not supported by a dedicated strategic plan or a policy. The MECSS is developing ICT policy in education (2018-2024). There is need to develop a comprehensive ESIS Strategic Plan and an ICT Implementation Plan for MECSS and its attached agencies. The plan should be developed and integrated with the existing education and ICT policies. The strategic plan should specify the development budget required to reform systems and the changes to operational budget and requirements for each sub-sector. There is also a need to improve coordination between EMIS development in the different sub-sectors to encourage integration and data sharing. A high-level working group or steering committee would help stakeholders ensure EMIS meets expectations in each sub-sector.

The MECSS has only one specialist, who is responsible for all education sectors' statistical data related issues and one ICT specialist, who is responsible for all IT related issues. Re-organizing the unit responsible for the ICT, ESIS and educational statistics at the MECSS and increasing the number of positions required to support ESIS,

4 Government of Mongolia, *Master Plan to develop Education of Mongolia in 2006-2015* (GOM, 2006). https://www.globalpartnership.org/content/master-plan-develop-education-mongolia-2006-2015, accessed 12 April 2019

5 ADB, *EMIS Strategic Plan for Mongolia*, (2012, ADB, Jim Shoobridge)

would help increase the capacity of MECSS to manage ESIS and to expand it to the TVET sector and integrate with the HEMIS.

Students are tracked through the system from pre-primary to upper secondary education level including student's movements, transitions, transfer, dropouts, attendance, academic progress, homework and other aspects of each student. Mongolia has robust laws concerning the confidentiality of individual data. The Law on Personal Secrecy (Privacy Law) of Mongolia (1995) defines personal privacy in detail and guides the security to individual data which is implemented through access to ESIS.

Student records are updated by teachers for background data,[6] data on progress and learning outcomes. However, some data is likey not recorded accurately such as disability and wealth status. The ESIS contains sufficient data to enable prediction of children at risk of dropping out such as low attendance. Improved early warning notice to teachers and schools could help reduce dropout by enabling teachers to intervene earlier before a child drops out.

ESIS has strong connectivity to some government systems which helps verify individual student and teacher data could enable data to be shared with other systems. ESIS is aligned with the civil registration system of the General Authority for State Registration. This provides a unique idenfier[7] as a basis for all student records. However, ESIS is not well integrated with other government systems despite having capacity to do so. Connecting the ESIS with other systems, such as immigration, health and social welfare would help ESIS address issues concerning school drop-out including children at risk of dropping out using data of the integrated household information database. Connecting ESIS to IT system of the Ministry of Finance to monitor financial and budget performance of educational institutions.

Data quality checks are not made and there are no processes in place to ensure data quality. A survey of data quality would help inform actions to address data quality issues such as improved standards and verification.

ESIS is used to monitor many of the SDG targets but there is scope to improve the use of ESIS data in SDG monitoring as there are some indicators which are not well addressed through ESIS. ESIS data is used for defining strategy, policy and regulation, planning, determining resource allocation, monitoring, and education sector planning and analysis. It is currently being used for developing the new ESMTDP 2021-2030. There is significant scope to increase the use of EMIS in the monitoring of the education sector and in planning by using EMIS generated data for helping to develop national education policies and for monitoring of the ESMTDP when developed, particularly in the areas of TVET and Higher Education where education data is weakest.

At present the ESIS general reports which can meet the needs of the community, academia, and other government organizations, and educational institutions to a sufficient extent, but their use still remains unsatisfactory. There is a need to analyse the education data requirements of different government organisations such as the Ministry of Finance, and ensure reports are produced and disseminated relevant to their functions. Enhancing the capacity of human resources to use the EMIS at all levels of educational sector through in-service training of staff will also help increase data use.

6 Bacground data includes biodata, data on the location of the student, their family, socio-economic data and other data relating to the characteristics of the student.

7 A unique identifier is a code that can be used to reference a record and is unique and consistent for that record. In this case the record is a student record.

# Recommendations

The following recommendations are derived from this research. The recommendations are divided into two parts. The first part lists headline recommendations which are those recommendations which are deemed to be most important and necessary. The second part lists secondary recommendations which, whilst important, are considered less critical.

Secondary Recommendations are clustered under three general areas:

1. Strengthen the Enabling Environment
2. EMIS Development and Implementation
3. EMIS Data Analysis and Use

These recommendations were reviewed and discussed by the MECSS and stakeholders on validation workshop, which held on May 1, 2019. The updated recommendations submitted to UNICEF country office and MECSS for review and feedback. The table below presents consolidated recommendations, summarizing and merging the detailed recommendations.

**Table 1. Headline Recommendations derived from this research**

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| H1 | Develop a dedicated EMIS policy document to support the strategic plan (refer below). The dedicated EMIS policy document should be developed specifying the overall architectural target state for EMIS as well as the roles and responsibilities of all parties in the further development and operation of EMIS. The EMIS policy document should articulate wider utilization of EMIS data in monitoring of education targets and goals data exchange between government agencies relating to EMIS data. As part of the plan, review the budget required for full EMIS operation and allocate budget provision annually. | 1.01.5<br>1.02.1 | H | 2019-2021 | MECSS (Department of Public Administration - DPA)<br>MLSP (TVET Policy Implementation and Coordination Department -PICD) |
| H2 | Develop a comprehensive EMIS Strategic and operational Plan for EMIS for MECSS and its attached agencies which should specify resources required for development and operation of EMIS in line with the recommendations made in this document concerning expanding MECSS staffing for the operation and development of EMIS. The plan should also reinforce the vision for a single integrated EMIS for all sub-sectors including TVET and Higher Education. This should also help ensure budget stability for operation and development of EMIS. | 1.01.1<br>1.11.3<br>1.12.1<br>1.14.1 | H | 2019-2020 | MECSS (DPA) |

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| H3 | Re-organize the unit, department responsible for the ICT, EMIS, and educational statistics at the MECSS and increase the number of positions to ensure sufficient specialists able to coordinate EMIS development, application and operations with minimum reliance on contracted staff where feasible. The unit should be allocated responsibility for systems in sub-sectors. | 1.11.1<br>1.11.2 | H | 2019-2020 | MECSS (DPA) |
| H4 | Allocate software, hardware, human resource expenses for development and operation of EMIS for TVET and higher education in annual state budget. | 1.12.2 | H | 2019-2024 | MoF<br>MLSP (TVET PICD) |
| H5 | Integrate TVET EMIS with ESIS and HEMIS systems. There is a potential need to process, analyse all type of EMIS related information in the integrated manner to enable reporting on different aspects of the education system to help monitor policies and plans. | 1.02.3 | H | 2019-2020 | MECSS (DPA)<br>MLSP (TVET PICD) |
| H6 | Develop a Module for registering data of children with disability. Capture the data from the Social welfare IT system. Increase the awareness among teachers and parents of importance of entering the accurate information of students with disabilities. This will ensure the accuracy of the primary registration information. | 1.04.1<br>1.04.2 | M | 2020-2021 | MECSS (DPA, GEPD)<br>ESIS Team |
| H7 | Share relevant ESIS data with immigration, health and social welfare systems. This could be achieved by creating a shared data repository between ministry groups storing key national data on individuals which could then be refenced by staff at the service delivery points (schools, hospitals etc.) to ensure children were properly referenced and receiving essential services in all sectors. | 1.09.1<br>1.09.2 | H | 2019-2024 | MoF<br>MECSS (DPA)<br>ESIS Team |
| H8 | Register the children in the ESIS whose data does not exist in the civil registry with assistance from organizations including administrative, social welfare, child right protection organizations and NGOs. | 1.05.4<br>1.04.4 | H | 2020 | State Registration Office<br>MECSS (DPA, GEPD)<br>ESIS Team |
| H9 | Analyse the current EMIS system to ensure quality and readiness of the application architecture, data architecture, technology architecture, and business architecture, and its linkage with other systems and conduct assessment of hardware and infrastructure of the EMIS and make recommendations for improvement. | 1.06.1 | H | 2020 | MECSS (DPA) |
| H10 | Undertake a business analysis with respect to providing consistency of the system functionalities with daily tasks of teachers, and optomise teachers use of ESIS. For example, by eliminating the paper journal, it should be possible to reduce teachers' workload and also reduce costs for publication and distribution of paper forms. | 2.04.1 | H | 2019 | MECSS (DPA, GEPD) |

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| H11 | Develop Higher Education Management Information System (HEMIS) and TVET EMIS. Facilitate connection of both systems to the ESIS. As priority, the 9, 12 grade pupils information shall be retrieved automatically from ESIS to TVET EMIS. | 2.05.1<br>2.05.2 | H | 2020-2021 | MECSS (DPA)<br>MLSP (TVET PICD) |
| H12 | Set up a simplified system where the government and non-government organizations submit their requests or needs to obtain reports and statements from the EMIS and such requests are responded in accordance with established legislation and procedure. | 2.05.3 | M | 2020-2021 | MECSS (DPA)<br>ESIS Team |
| H13 | Identify children at risk of dropping out through ESIS based on existing data such as students' attendance, student transfer, and other factors. This information should be sent to the head teacher and teacher who should follow a process of action. | 1.05.1 | M | 2022 | Education institutions |
| H14 | Develop an in-service training module on the use of ESIS and ESIS data for management staff at all levels. Conduct training in cooperation with the Institute of Teacher's Professional Development. | 1.07.2 | H | 2019-2024 | MECSS<br>Education Institutions |

**Table 2.Secondary Recommendations derived from this research**

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| 1. Strengthen the Enabling Environment | | | | | |
| S1 | Establish a working group or steering committee which consists of representatives from relevant stakeholders such as; governmental authorities, schools, universities, NGO`s and private sector to develop long term plan of EMIS. The steering committee should be charged with responsibility for approving and coordinating EMIS development. | 1.01.2 | H | 2019-2020 | MECSS (DPA) |
| S2 | Strengthen capacity of policy makers, high level managers and key staff by delivering a common understanding of current trend in the use of ICTs in education, its costs and benefits and its use in all aspects of education planning, monitoring and administration. | 1.01.3 | H | 2019-2020 | MECSS (DPA) |

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| S3 | Update the existing "Methodologies for measuring education indicators" by adding methodologies used for measuring SDG 4. Review data for SDG 4 indicators of primary, secondary and higher education against existing statistics and forms, and update existing forms to ensure capture of SDG 4 and create new forms if required. The additional data required for remaining indicators of SDG 4 goal's indicators should be collected and calculated in ESIS and HEMIS systems. Modifications to the software will be required to ensure data storage and reporting of SDG indicators. | 1.03.1<br>1.03.2<br>1.03.3<br>1.03.4 | M | 2020-2023 | MECSS (DPA)<br>NSO<br>Custodian agencies UNESCO/ UIS and UNICEF |
| S4 | Include the ESIS data input responsibility in the job description and labour contract of teachers and other staff. This will ensure the entrance of accurate and timely data to ESIS and provide pupils' information security at the initial data entry. | 1.07.3 | H | 2019-2020 | MECSS (General Education Policy Department) |
| S5 | Conclude a confidentiality agreement with every member of the ESIS and HEMIS systems' Development Teams for data protection and privacy. | 1.08.1 | H | 2019-2020 | MECSS (DPA) |
| S6 | Conclude a confidentiality agreement with officers and include appropriate clauses on data accuracy and data completeness and data security to TVET employee job description. | 1.08.5 | H | 2020 | MLSP (TVET PICD) |
| S7 | Develop and implement EMIS data storage and backup procedures. | 1.08.3 | H | 2019-2020 | MECSS ESIS Team |
| S8 | Delineate roles, responsibility and work schedules of MECSS and EMIS Development teams. | 1.10.1 | H | 2019 | MECSS (DPA) |
| S9 | Implement change management and risk management functions in the EMIS and perform any changes based on change requests. | 1.10.2 | H | 2019 | MECSS (DPA) |
| S10 | MECSS improves cooperation and coordination among the government, non-government and private organizations in the area of accumulation and utilization of the EMIS through the approval of EMIS data regulations for the exchange of information. | 1.10.3 | M | 2020 | MECSS (DPA) |
| S11 | Incorporate in the state budget allocated to kindergartens and schools the costs necessary for financing the activities related to use of EMIS by kindergartens and schools | 1.12.3 | H | 2019-2024 | MECSS (DPA, Department of Finance and Investment - DFIf) |
| S12 | Employ full time staff responsible for EMIS data quality and analysis in the education and cultural department, and education department. | 1.10.5 | H | 2020-2021 | MECSS (DPA, DFI, Policy departments) |

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| **2. EMIS System Development and Implementation** | | | | | |
| S13 | Improve delivery of EMIS services through strengthening education sector IT infrastructure and hardware and facilitate private sector participation in development, maintenance and utilization of the EMIS such as software development, hardware supply, system maintenance, system audit, technical services, internet service, data storage and data backup. | 1.01.4<br>1.01.6 | H | 2019-2024 | MECSS (DPA) |
| S14 | Connect ESIS with the integrated household information database as it is used as an Inter-Sectorial Database. Use the data from the household information database to address issues concerning school drop-out among children, including children at risk of dropping out. Connect the ESIS to other system and databases such as the citizen registry and facilitate registration of children who arrived from overseas, dual cultured families, children with special needs, national minorities, status of household income, and use such data for helping to identify children with special needs and those at risk of dropping out. | 1.05.2 | H | 2020 | MLSP<br>MECSS (DPA, GEPD)<br>ESIS Team |
| S15 | Register children studying in monasteries. | 1.05.5 | H | 2020 | MECSS (GEPD) ESIS Team |
| S16 | Develop all technical documentation for ESISs' existing modules and applications. | 1.06.2 | H | 2019-2024 | ESIS Team |
| S17 | Conduct an audit of the data completeness and quality of the ESIS data and make recommendations for improvements to validation and verification processes. | 1.06.3<br>1.07.5 | H | 2019-2024 | MECSS (DPA, GEPD) |
| S18 | Revise ESIS to track and store user access and activity log and develop guidelines for storage and archiving of user logs. | 1.08.2 | M | 2020 | MECSS (DPA)<br>ESIS Team |
| S19 | Procure back-up servers and locate them in the National data centre. Increase the number and capacity of existing EMIS servers. | 1.08.4<br>1.13.2 | H | 2019-2024 | MECSS (DPA) |
| S20 | Share ESIS with the Financial system of the Ministry of Finance ensure financial and budget information can be reported with other ESIS data. | 1.10.4 | H | 2020-2021 | MECSS (DFI, DPA)<br>MoF |
| S21 | Improve the Internet connectivity speed for the ESIS to institutions such as schools. | 1.11.4 | H | 2019-2024 | MECSS (DPA) |
| S22 | Enter teacher data, photo and graduation certificate are stored in ESIS.[8] | 1.13.1 | H | 2020 | ESIS Team<br>Education Departments<br>Schools and kindergartens |

8 Server storage capacity is presently too limited.

| SN | Recommendation | #Ref in report | Priority (High, Medium, Low) | Timeline | Responsible |
|---|---|---|---|---|---|
| S23 | Integrate ESIS with the school management application software such as "Dnevnik", "Nomch", "Avdar" that are used by some schools for registering school and teachers' daily activities, student's attendance, and communicating with parents in order to decrease the teacher workload in manually performed activities. | 2.04.2 | L | 2021 | MECSS (DPA, GEPD)<br>ESIS Team |
| S24 | Store and report data on day-care and school lunch through ESIS. | 2.04.3 | L | 2020 | MECSS (GEPD) ESIS Team |
| S25 | Calculate variable cost per child information based on ESIS data linked to transfer of children between schools. | 2.06.1 | L | 2020 | MECSS (GEPD, DFI, DPA)<br>ESIS Team |
| 3. EMIS Data Analysis and Use | | | | | |
| S26 | ESIS data should be used to generate implementation plans and budgets and for developing and monitoring the national education policies and ESMP. | 1.02.2 | H | 2019-2024 | MECSS (DPA, DFI)<br>MoF |
| S27 | Ensure EMIS data required for equity analysis is comprehensive. Include data in ESIS on school transportation such as distance from school and mode of transportation, pupils' socio-economic background including housing condition, vulnerable group assessment such as social risks, risks resulting from school and family background (divorce, alcoholism, family income). | 1.04.3 | M | 2020 | MECSS (DPA, GEPD)<br>ESIS Team |
| S28 | Register children living overseas and use the data to enhance supervision and provision of necessary support services. | 1.05.3 | H | 2020 | MECSS (DPA, GEPD)<br>Immigration Office |
| S29 | Strengthen head teacher and teacher capacity to use ESIS by incorporating ESIS use into the contents of in-service and pre-service teacher trainings. | 1.07.1<br>2.03.2 | H | 2019-2024 | MECSS (DPA)<br>MSUE |
| S30 | Develop an information communication strategy for the dissemination of ESIS data through media such as television, radio, the MoE web site, social media and printed publications for purposes of providing other organizations and citizens with improved access to ESIS data. | 2.01.1 | M | 2019-2020 | MECSS<br>Education Institutions |
| S31 | Analyse the education data requirements of different government organisations such as the Ministry of Finance, and ensure reports are produced and disseminated relevant to their functions. | 2.01.2 | M | 2019-2020 | MECSS (DPA, Policy departmens)<br>Education Institutions |
| S32 | Conduct an annual survey on the use of ESIS and ESIS data at all levels of the ministry and use the results of the survey to improve ESIS | 2.02.2 | M | 2019-2024 | MECSS<br>Education Institutions |
| S33 | Estimate a different rate of meal costs of kindergarten children based on living standard of population using the data on household income maintained by the Ministry of Labour and Social Protection. | 2.06.4 | M | 2020-2021 | MECSS<br>MLSP |

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# 1 Introduction

## 1.1 Purpose and Scope of the Review

Given the importance of quality disaggregated data on education for SDG reporting and national monitoring and systems improvement purposes, the United Nation Children's Fund's (UNICEF's) East Asia and Pacific Regional Office (EAPRO), after consultation with the United Nations Educational, Scientific and Cultural Organization (UNESCO), has assisted Mongolia to undertake a review of its EMIS, to help identify ways in which the EMIS can be strengthened to promote equitable quality education and learning in the region. The review has examined and assessed the status of policy and data gaps and the extent to which the EMIS is being analysed and utilised. The review has had a particular focus on systems relating to individualised student data and tracking.

It is hoped that the findings generated in the review will lead to actioned recommendations for improving the EMIS and its use by the Government of Mongolia and its partners, and that the findings will also help to inform UNICEF EAPRO and other development partners on how they can better support the EMIS's operation and utilisation in Mongolia. In the broader context, this review is being used to inform a three-country study which will make general recommendations regarding how countries can develop their EMIS. It is hoped that the findings generated in the broader study will lead to actionable recommendations for improving the EMIS and its use by governments globally, and that the findings will help partners to offer assistance in the area of EMIS development. This review has therefore involved government and partners during all phases and in the approval of the final report, to help ensure government and partners have full ownership of the findings and recommendations, which will lead to their eventual inclusion in national education policies and sector plans.

Two main review areas are investigated in this review, each having review questions which are responded to help inform conclusions and recommendations. The review questions, focusing on EMIS that track individual students at the school level, are separated into two areas:

- **Policy and data gaps** – This covers: plans to strengthen the EMIS; the coverage of national plans and SDGs in the EMIS; the coverage of equity and out-of-school children; quality, quality assurance, and data privacy; interaction with other data systems, management and position in the overall education data architecture; and resourcing and budgeting.
- **Data analysis and utilisation** – This covers: accessibility; processes of interpretation, analysis, and use; use for operations and monitoring, reporting, and planning; operation in relation to various systems; use for equitable resource distribution; and other requirements for improvements.

Responses in relation to both areas have helped inform the recommendations derived from this review. It is hoped that the findings and recommendations can help direct the Government of Mongolia towards improved and more effective implementation of its EMIS and provide guidance for other governments intending to develop their EMIS and to enable individual child tracking systems.

## 1.2 Methodology

The research was conducted over 3 working months and was conducted by the UNICEF country office, a national consultant and with support of an international consultant. The primary methodology of data collection and analysis was qualitative. The qualitative research was informed by a comprehensive literature review (refer Bibliography) and by interviews with key stakeholders (refer Annex A). The research was conducted in three phases as shown in the diagram below. In practice phase 1 (desk review) and phase 2 (key informant interviews) were conducted concurrently to ensure a continuous process of information triangulation and validation. Phase 3 involved a workshop with key stakeholders to be able to discuss and validate findings and finalize recommendations.

**Figure 2. Phases of the EMIS Research**

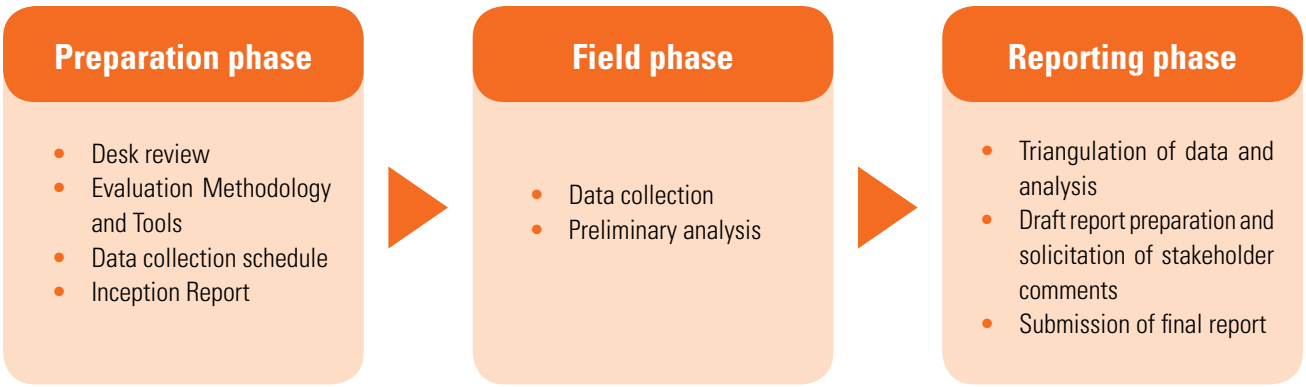
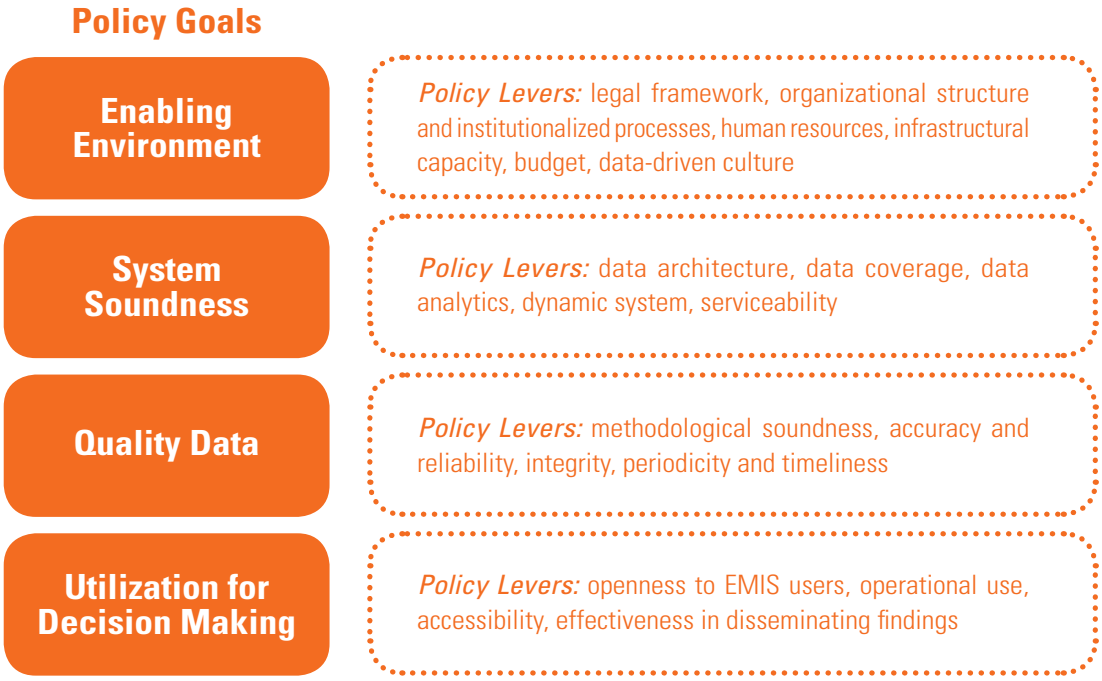



**Figure 3. SABER-EMIS Thematic Areas of Analysis**




Source: Saber EMIS Framework Paper, World Bank[9]

Key informant interviews were informed by the research questions as well as by the World Bank Systems Approach for Better Education Results (SABER)-EMIS methodology and tools commonly used in EMIS evaluation[10] and UNESCO's Data Quality Assessment Framework (DQAF).[11]

9 Abdul-Hamid, H, SABER EMIS Framework Paper, (World Bank, 2014).

10 The SABER-EMIS methodology utilises a structured evaluation process to provide education systems analyses, assessments, diagnosis, and opportunities for dialogue. At the global level, it improves the education systems knowledge base and uses this information to implement effective reforms. http://saber.worldbank.org/index.cfm?indx=8&pd=2&sub=4, accessed 27 March 2019

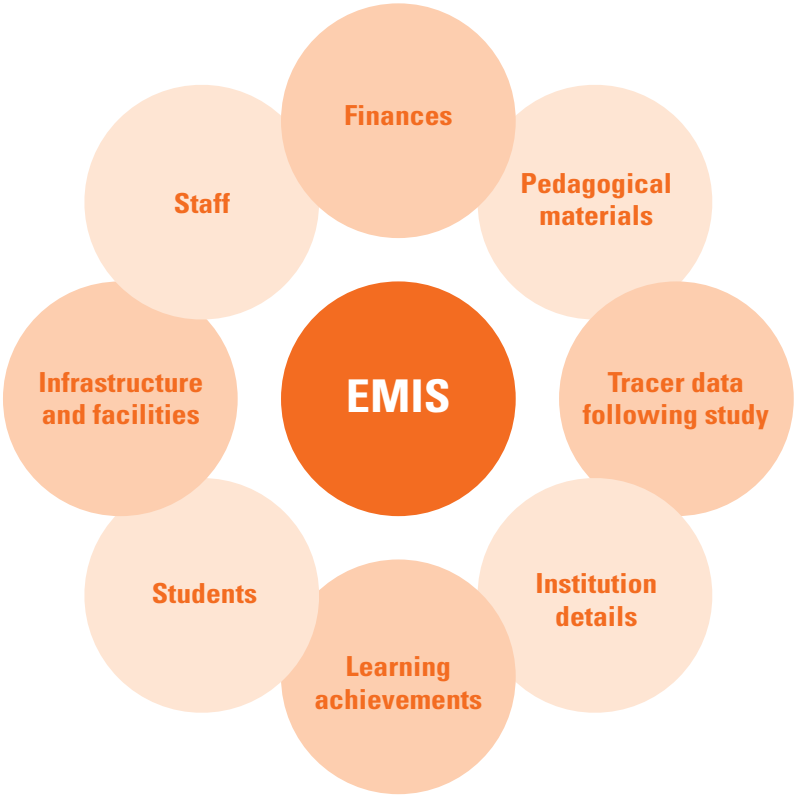
11 Developed to implement evaluation methodologies that assess the quality of data produced by national statistical systems using such standards and tools for assessing education data quality produced by member states. http://dqaf.uis.unesco.org/index.php?title=The_DQAF_Manual, accessed 27 March 2019

## 1.3 EMIS in the Global Context

EMIS can be defined as the ensemble of operational systems and processes, increasingly supported by digital technology, that enable the collection, aggregation, analysis, and use of data and information in education, including for management and administration, planning, policy formulation, and monitoring and evaluation (M&E). This definition insists on the systemic nature of EMIS — a fact which is often overlooked in efforts to reinforce government information systems.[12]

A comprehensive EMIS is defined as not only including **administrative and pupil data,** but also **financial, human resources,** and **learning data** as well as data on graduate's post study. This information should be available both at the individual and aggregate level and be used for policy-analysis and formulation, planning, monitoring and management at all levels of an education system.[13] It is a system of people, technology, models, methods, processes, procedures, rules and regulations that function together to provide education leaders, decision-makers and managers at all levels with a comprehensive, integrated set of relevant, reliable, unambiguous and timely data and information to support them in completion of their responsibilities".[14]

**Figure 4. Elements of an EMIS covering all sub-sectors of the Education Sector**




The type of data entered into the system needs to follow logic, defined methodology, and have a well-defined purpose. A successful EMIS is credible, operational in planning and policy dialogue as well as teaching, and learning. It produces and monitors education statistics within an education system and has a multifaceted structure, comprising the technological and institutional arrangements for collecting, processing, and disseminating data.[15] It is crucial for tracking changes, ensuring data quality and timely reporting of information, and facilitating the utilization of information in decision-making.

12 UNESCO, *Working Papers on Education Policy Re-orienting Education Management Information Systems (EMIS) towards inclusive and equitable quality education and lifelong learning*, (Working Paper 5, 2018)
13 Abdul-Hamid, H, *SABER EMIS Framework Paper*, (World Bank, 2014).
14 UNESCO. *Education for All by 2015: will we make it? EFA global monitoring report*, (Paris: UNESCO, 2008).
15 Abdul-Hamid, H, *SABER EMIS Framework Paper,* (World Bank, 2014).

A management information system (MIS) is designed to assist managerial and professional workers by processing and disseminating vast amounts of information to managers organization-wide.[16] An MIS provides information for management activities carried out within an organization. The information is selected and presented in a form suitable for managerial decision-making and for the planning and monitoring of the organization's activities. MIS in the education sector (EMIS) can be used to support education managers to make strategic, tactical and operational decisions.

EMIS can help provide accurate, comprehensive and timely data collection which can promote more rational and effective education policy-making. This can result in improved decision-making regarding: the volume and allocation of public financing, the best way to reach children most in need (due to socioeconomic circumstances, special needs, etc), staff recruitment and training and quality and adherence to standards.[17]

## 1.4 The Sustainable Development Agenda and the Expanded Vision of EMIS

The post-2015 Sustainable Development Agenda marks a substantial shift from the preceding Millennium Development Era. This is also true for the overall Education agenda. The main focus for the education sector under the Millennium Development Goals (MDGs) was on ensuring access, participation and completion of primary education as well as achieving gender parity in primary, secondary and tertiary education.[18] In contrast to this, the three main focus areas for the education sector under the Sustainable Development Goals (SDGs) are measurement of learning outcomes, improved measurement of equity in education[19] and a focus on lifelong and alternative means of learning.[20]The explicit focus on **equity in education** implies that in addition to reporting national averages, the selected education indicators should also be reported across different sections of the population, such as wealth, religion, gender, ethnicity, and disability status amongst others.[21] EMIS should be dynamic to enable the monitoring of groups often overlooked in administrative systems such as street children, refugees, stateless children and children of migrant workers.

The indicators measuring progress towards the education goals specified in the SDGs are reported at four different levels[22] : the global, thematic, regional and national. Given the priorities stated in the SDG, as well as the multiple levels of monitoring and evaluation, it is necessary to invest in better data and M&E systems. Currently there are two main issues with data globally. Firstly, there is not enough high-quality data available and secondly, much of the data that is produced is either not used or is not in a format/state that allows it to be used.[23]

Many countries are adopting the 'expanded vision of education' which incorporates the vision encapsulated in Sustainable Development Goal 4 (SDG 4) for 'Quality education and lifelong learning opportunities for all are central to ensuring a full and productive life to all individuals and to the realization of sustainable development'.[24] It is therefore important that EMIS manage information on all sub-sectors of education ranging from early

16 Alavi, M., & Leidner, D, *Knowledge management systems: Issues, challenges, and benefits*, (Communications of the Association for Information Systems, 1(7), 1999).

17 Ishimine K., Tayler C., Bennett J., *Quality and Early Childhood Education and Care: A Policy Initiative for the 21st Century,* (International Journal of Child Care and Education Policy, November 2010, Volume 4, Issue 2, pp 67–80)

18 UIS (2016), *Sustainable Development Data Digest, Laying the Foundation to Measure Sustainable Development Goal 4*, (UIS UNESCO, 2016)

19 Ibid..

20 Such as Non-Formal Education and Technical and Vocational Education and Training.

21 UIS, *Country readiness to monitor SDG 4 education targets Regional survey for the Arab States,* (UNESCO Institute for Statistics, 2016)
UIS, *Country readiness to monitor SDG 4 education targets Regional survey for the Asia and Pacific region,* (UNESCO Institute for Statistics, 2016)

22 Sustainable Development Solutions Network (SDSN), *Indicators and a Monitoring Framework for the Sustainable Development Goals Launching a data revolution for the SDGs,* (A report by the Leadership Council of the SDSN Revised working draft (Version 6), February 18, 2015)

23 UN, *Report on data gaps A world that counts: mobilising the data revolution for sustainable development,* (The United Nations Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, 2014), http://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf,

24 https://unstats.un.org/sdgs/report/2017/goal-04/ accessed 28th March 2018

childhood education, vocational education and non-formal education. Detailed information should be accessible to enable predictions concerning the potential workforce and to ensure that all people have access to education at any age. This places an increasing requirement on EMIS to be able to track an individual's progress through the whole education system and emphasizes the need for systems to be able to report on data longitudinally. The resulting design of EMIS is likely to be more complex and more integrated in terms of sub-sector data.

The drive to achieve global targets and participate in education in global initiatives such as the International Standard Classification of Education (ISCED) has helped enforce SDG 4 as an international standard. SDG 4 has influenced both the structure of plans, the use of key concepts and targets and goals by which a plan is measured. Global goals and targets help illustrate how far from a global target a country is, and national indicator standards, to provide a frame of reference for progress at the country level. This places increasing requirements on EMIS to be developed to respond to local planning, budgeting, monitoring, evaluation and administrative needs whilst at the same time conforming to international standards so as to enable comparison of data obtained through the EMIS with other regions and countries through globally recognized education indicators. EMIS should conform with international standards for data and education indicators such as internationally recognized definitions of indicators,[25] the education data standards of ISCED[26] and the requirement to monitor core SDG4 indicators.

Emerging evidence shows that large numbers of children are in school, but are not learning (ACER 2016), despite considerable investment on school infrastructure, training teachers, and learning materials. The new SDG 4, presents huge opportunities to meet this challenge through a strategic shift towards equitable quality education for all. This shift is essential. There has already been substantial work undertaken in determining how SDG 4 can be measured and which countries are prepared and able to effectively monitor against indicators required as part of SDG 4.[27]

25 OEDC. (2015). Indicators database. Available at http://www.oecd.org/education/database.htm

26 The International Standard Classification of Education (ISCED) belongs to the United Nations International Family of Economic and Social Classifications, which are applied in statistics worldwide with the purpose of assembling, compiling and analysing cross-nationally comparable data. ISCED is the reference classification for organizing education programmes and related qualifications by education levels and fields. ISCED is a product of international agreement and adopted formally by the General Conference of UNESCO Member States

27 UNESCO UIS, *Country readiness to monitor SDG 4 education targets Regional survey for the Arab States*, (UNESCO Institute for Statistics, 2016)

UNESCO UIS, *Country readiness to monitor SDG 4 education targets Regional survey for the Asia and Pacific region*, (UNESCO Institute for Statistics, 2016)

There is also greater recognition that a complex interplay of socio-economic factors influences learning outcomes. These include but are not limited to: individual and family characteristics of students, such as gender, age, language spoken at home, preschool attendance, activities prior to attending school, student engagement in school activities and out-of-school tuition, parental literacy and local governance, School management, community engagement and social accountability. In addition, the type of school, the location of the school and the resourcing available to the school that the student attends also contributes to child learning outcomes.[28] Also important to the broader scope of child learning is information concerning child nutrition, clean water and sanitation.[29]

The SDG agenda has also focused on the need to view social development holistically. For example, many countries are now starting to monitor Early Childhood Development, which includes indicators derived from child protection, health, education, water, and sanitation and other sectors.[30]This emphasizes the need for a coordinated and rationalized approach to data and emphasizes inter-sectorial coordination and cooperation. Schools can play a focal role in supporting services for other ministries[31] and also report on key indicators relevant to other ministries.[32]

Therefore, in order to properly monitor child learning and address barriers preventing effective child learning, analysis of detailed information concerning the child and their family, the learning environment as well as the national and regional socio-economic factors is required. According to the Organisation for Economic Co-operation and Development (OECD), better data can help reduce inequity in education, including early childhood education, in multiple ways, including:[33]

- Identifying and providing systematic help to children at risk of not meeting academic and social goals;
- Directing resources to the schools, students and teachers with the greatest needs;
- Setting concrete targets for more equity in education, not only in access but also in quality and learning outcomes.

These requirements are placing increasing demands on systems to track individual children as they progress through the education system. Systems should enable disaggregation of data to allow for analysis of complex socio-economic factors affecting a child's progress through the education system or exclusion from it.

UIS recently reported the availability of global and thematic indicators across all countries reporting in the UIS database in 2017.[34]They noted that 10 of the 43 indicators were unavailable in all countries, while 8 global indicators and 11 thematic indicators are reported in 50% or fewer countries. Only one global indicator and six other thematic indicators have more than 75% coverage. UIS concluded that countries are struggling to report and, in many cases, even to collect the data needed for calculating key indicators for the follow up and review of SDG 4.

28 ASER, *Improving Quality Education and Children's Learning Outcomes and Effective Practices in the Eastern and Southern Africa Region Report,* (UNICEF ESARO, Australian Council for Education Research (ASER), 2016)

Grantham-McGregor S.M, Powell C.A, Walker S.P, Himes J.H (1991) Nutritional supplementation, psychosocial stimulation, and mental development of stunted children: the Jamaican Study, Lancet. 1991 Jul 6;338(8758):1-5.

29 Ibid…

30 Examples include Chile, Belize and Uganda. UNICEF (2017a, 2017b) has developed a framework of ECD indicators derived from SDG indicators and other research to help guide and focus countries on the monitoring of ECD.

31 Examples include reporting deworming and vaccination programmes to the Ministry of Health and reporting incidences of violence against children to authorities monitoring child protection.

32 For example, reporting the quality and source of water supplies in schools to the Ministry of Water and Sanitation.

33 OECD, *Equity and Quality in Education: Supporting Disadvantaged Students and Schools,* (OECD Publishing, 2012). http://dx.doi.org/10.1787/9789264130852-en, Referenced on 31st March 2019

34 UNESCO. *SDG 4 Data Digest 2017. The Quality Factor: Strengthening National Data to Monitor* (UNESCO 2017)

## 1.5 Country Overview

Mongolia lies in the northern part of the Central Asian Plateau and borders the Russian Federation and the People's Republic of China. It has the territory of 1.5 million square kms and the total population of 3,238,479[35] people. Mongolia has one of the lowest density of population. Population growth rate is 1.11% (2018 est.).[36] The capital city, Ulaanbaatar, accounts for half of the total population. Administratively, Mongolia is divided into 21 aimags (provinces) and the capital city of Ulaanbaatar. Aimags are divided into 330 soums (counties or rural districts) which are further divided into 1613 bags (villages). Ulaanbaatar has 9 districts, which in turn are comprised of 152 khoroos (sub-districts).[37]

GDP real growth rate is 12.7% (2012 est.), education expenditure is 5.1% of GDP (2017 est.), and the literacy rate is 98.4% (2015 est.).[38]

Between 1924 and 1990, Mongolia was a one-party state and had a centrally planned economy. Its first democratic election was held in July 1990, which established a parliamentary republic. The political system of Mongolia is parliamentary, with elections held every four years for the 76 seats. The current State Great Hural (the Parliament) was elected in 2016, and its Government (the Cabinet) is in the process of implementing the 2016-2020 Action Plan. Parliamentary and presidential elections are held every four years. The Human Development Index (HDI) reached 0.741 ranking it 92nd out of 189 countries, the medium level development stratum.[39] By achieving 52.7 out of 100 in Global Competitiveness Index 4.0 2018 - Rankings, Mongolia ranked 99th out of 140 countries.[40]

Ethnic Mongols consist of Khalkha and other groups, all distinguished primarily by dialects of the Mongol language. The Khalkha make up 90% of the ethnic Mongol population. The remaining 10% include Buryats, Durvud, Bayad, Zahchin Mongols and others in the north and Dariganga Mongols in the east. Turkic peoples (Kazakhs, Tuvans, and Chantuu (Uzbek) constitute 7% of Mongolia's population, and the rest are Tungusic peoples, Chinese, and Russians. The official language of Mongolia is Khalkha Mongolian, which uses the Cyrillic alphabet, and is spoken by 90% of the population. Although approximately 20 ethnic groups reside in Mongolia as Khalkha, Kazakh, Durvud, Bayad, Buriad, they speak same language, and use same writing, with the exception of the Kazakh people. The Kazakh people who take 4.2 per cent of population are bilingual of Mongolian and Kazakh, and use Kazakh Cyrillic alphabet.[41]

ICT has penetrated into almost all sectors of the economy and society of Mongolia. More increased effort and attention has now been given to integration of ICT into the public sector and government service delivery. The current government reforms have a large component related to ICT, which includes the development of a Master plan for ICT, addressing the issues of ICT policy, infrastructure, hardware, software, Internet and communication, human resource development and capacity building, content development etc. Mongolia's ICT infrastructure has changed extensively in the last ten years. In Mongolia, internet connectivity through 3G and 4G are close to universal.[42]

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35 National Statistics Information, http://www.nso.mn/index.php, accessed 6th June 2019

36 Factbook, *CIA-The World Factbook: Mongolia,* https://www.cia.gov/library/publications/the-world-factbook/geos/mg.html, erferenced on 6th June 2019

37 National Statistics Information. http://www.1212.mn/tables.aspx?TBL_ID=DT_NSO_0100_001V1, referenced on 5 June 2019

38 Factbook, *CIA-The World Factbook: Mongolia*

39 UNDP, *Human Development Indices and Indicators: 2018 Statistical update* (UNDP, 2018), http://hdr.undp.org/en/2018-update, referenced 12 April 2019

40 World Economic Forum, *The Global Competitiveness Report* (WEF, 2018), http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf, accessed 5 June 2019

41 NCNFDE, *National Report on the Situation of Adult Learning and Education – Mongolia,* National Centre for Non Formal and Distance Education (NCNFDE, 2008)

42 90% of the population is connected to 3G and 4G mobile networks resulting on a number of internet subscribers reach 2,6 million people which are an increase of 10% in comparison with the previous year. 2.4 million People or 91,5% are subscribers of mobile communications and 226.1 thousand people are subscribers of fixed communications. At the global level, the total Internet bandwidth is 185,000 Gbit/sec. In Mongolia, the total Internet bandwidth reached 100 Gbit/sec, which indicates an increase of 62.6% in comparison with 2015. 1.5% of fixed Internet subscribers in Mongolia are connected with speed over 10 Mb/sec, and 98.4% - 256 Kb/sec-10 Mb/sec. The telecommunications backbone network of Mongolia covers 299 soums in 21 aimags and is comprised of 36,760 km of the fiber optic network, totaling more than 3,000 km and 86 stations of analogy radio relay network and 249 stations of digital technology radio relay lines and VSAT satellite network. (ICT white book Mongolia, 2017).

All Mongolian citizens have a personal ID number. According to the Government resolution No 338 it has been agreed to issue an electronic card to every Mongolian citizen over 18, who had been registered in renewed registration that was held in 2010-2011. The issuance of the new electronic ID card started in 2012. The new ID card includes embedded microprocessor containing all personal data with biometric facial and fingerprint ID systems linked to secure database serving government agencies.

# 1.6 Overview of the Education System

## 1.6.1 Education Sector Overview

The national and central education authority in Mongolia is MECSS. The function of MECSS is defined by law as the promotion and dissemination of education, science and culture. It followed by subsequent administrative bodies, such as aimag (provincial) education boards, soum (district) education offices, and school councils. The MECSS[43] provides guidance and advice for the operation of local public and private educational institutions, as well as financial assistance. It defines policies with regard to education, science and culture and it is responsible for the implementation of these policies.

In every aimag, there is an Education and Culture Department, which oversees the educational and financial performance of schools and kindergartens in their areas, and mentor teachers on classroom management, teaching methods and student assessment.

TVET is administered under the purview of the MECSS and the Ministry of Labor and Social Protection (MLSP). The Mongolian education system consists of pre-primary education (kindergarten and nursery school), general education (primary, lower secondary, and upper secondary), and higher education (universities), TVET and non-formal education. Primary and secondary education is legally free to all. The academic year starts on September 1. According to the Education Law, the MECSS defines the duration and completion of the academic year. The country has made significant reforms and structural changes to the education system.[44]

**Table 3. Structure of General Education System**

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | | | | | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Level | Pre-Primary | | | | Primary | | | | | Lower Secondary | | | | Upper Secondary | | |
| Access | Voluntary | | | | Compulsory | | | | | | | | | Voluntary | | |
| Cost | Free (only in public schools) | | | | | | | | | | | | | | | |

In the 2017-18 academic year, 256,720 students (126,610 are female) were studying at 1,416 (878 state-owned, 538 private) kindergartens nationwide[45] (refer Annex D: Five year data tables).

The gross enrollment ratio of students was 99.1% in primary schools, 101.7% in lower secondary schools, and 98.4% in upper secondary schools during 2017-18 academic year. 572,752 students (269,384 are female) were

43 The MECSS is headed by the Minister who is a member of the Prime Minister's Cabinet. He is assisted by the State Secretary. The Ministry is divided into three main departments which are the main providers of policy and planning guidelines and public administration and civil service management of education, namely: the Higher Education Policy Department, the General Education Policy Department, and the Pre-School Education Policy Department.

44 In 2004, the Government of Mongolia implemented a change from a 10-year education system to an 11-year education system and in 2008, again made an amendment to the Education Law, changing the 11-year education system to a 12-year education system. The transition to 12-year education system was completed in 2016.

45 MECSS, *Pre-School Education Statistics 2018-2019* (MECSS, 2019a), https://mecss.gov.mn/media/uploads/66823122-0f00-466a-96bc-a0baa8711af5.pdf, accessed 15 April 2019

studying at 798 (652 state-owned schools, 146 private schools) general education schools nationwide[46] (refer Annex D: Five year data tables). 35,196 students lived in dorms.[47]

Vocational education[48] is generally accessed after completing lower secondary and upper secondary education. In the 2018-19 academic year, 37,039 students (14,589 are female) are studying at 86 (51 state-owned, 35 private) TVET schools nationwide (refer Annex D: Five year data tables).

There are three types of higher education institutions (HEIs) in Mongolia, university, institute and college as specified by Education Law.[49] In the 2017-18 academic year, 155,248 students (14,589 are female) were studying at 96 (18 state-owned, 75 private) HEIs nationwide[50] (refer Annex D: Five year data tables).

## 1.6.2 Educational Funding

The main educational funding source for general education, TVET, and non-formal education is the central government. The Education Law[51] (article 39.1) stipulates that at least 20 percent of the government budget is to be allocated to education. The Law also permits education delivery through both for-profit and not-for-profit institutions. The government's educational financing mechanism is the application of per-student based allocation and funding formula. The funding formula separates variable costs[52] and fixed costs.[53]

**Table 4. Expenditures on the Education Sector, adjusted for inflation:[54]**

| Indicator | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Expenditure of General government budget, million MNT | 6,164,685 | 7,144,568 | 7,137,974 | 9,519,906 | 6,759,170 |
| Expenditure on education, million MNT | 936,504 | 1,190,093 | 1,000,712 | 1,215,573 | 1,218,349 |
| Expenditure on education as percent to total expenditure of General government budget | 15.2 | 16.7 | 14.0 | 12.8 | 18.0 |
| Per capita educational expenditure, thousand MNT | 326.2 | 405.1 | 336.2 | 396.8 | 382.9 |

46 MECSS, *General Education Statistics 2018-19* (MECSS, 2019b), https://mecss.gov.mn/media/uploads/4667d4ae-37e0-443c-9cd3-02ab323da156.pdf, accessed 10 April 2019
47 MECSS, *General Education Statistics,* 2017-2018
48 In TVET institutions, aside from getting vocational and technical training, students also study general secondary courses. Students graduating from the combined TVE and upper secondary school receive both a vocational certificate and an upper secondary certificate. Therefore, graduates from these schools can transfer to universities and colleges.
49 At the higher education level, bachelor programs last four years (six years in case of medicine). Masters programs usually require two years and doctorate programs require three to four years to complete. Total minimal credit hours for diploma, undergraduate, master's and doctor's degree course students are equal to 90, 120, and 30 and 60 respectively.
50 MECSS, *Higher Education Statistics 2018-19* (MECSS, 2019c), https://mecss.gov.mn/media/uploads/b6b39554-2af4-4d43-bddf-c04e1efaa5ab.pdf, accessed 10 April 2019
51 *Law on Education* (2002), https://www.legalinfo.mn/law/details/9020, accessed 25 March 2019
52 Variable costs include salaries, supplements, bonuses, insurances, taxes and pension plans.
53 Fixed costs include heating, water, electricity and sewage which are estimated from past expenses. In Mongolia, resource allocation also reflects the country's particularity as well. Mongolia's long and cold winter inevitably brings higher expenditure for fuel costs, and the remote location of schools in addition to low population density require many schools to invest in school dormitories, which increases the cost for food and administration. Whereas at the kindergarten level, the funding is used more for meals, staff salaries and administrative costs, at the primary and secondary levels, funding is spent more on students' scholarships and heating (IBE, 2006).
54 Source: *Budget packet for Minister of Education,* Culture, Science and Sports, Ministry of Finance

# 1.7 Overview of Education Legislative and Policy Framework

The education legislation is defined in the Constitution of Mongolia[55] (1992), Law on Pre-primary Education[56] (2008), Primary and Secondary Education Law[57] (2002), Higher Education Law[58] (2002), The Law on Technical and Vocational Education and Training[59] (2009) and other acts of legislation enacted in conformity thereof. The core principals of these laws include: democratization and openness in educational administrative structures; decentralized the administration and financing of all public schools; transferred the management of schools to local governments in the aimags; increased the autonomy of colleges and universities; and enabled the establishment of private educational institutions.

Key main supporting policies are: Mongolia Sustainable Development Vision-2030,[60] Education Sector Master Plan 2006 – 2015, National Education Program for 2010-2021, National Program of Non-Formal Education Development, State Policy on Development of ICT for 2017-2025.

Since 2015, there has been not been an active Education Sector Plan and no mechanism for education stakeholders to gather, jointly review, and discuss progress and issues in the education sector.

# 1.8 EMIS in Mongolia

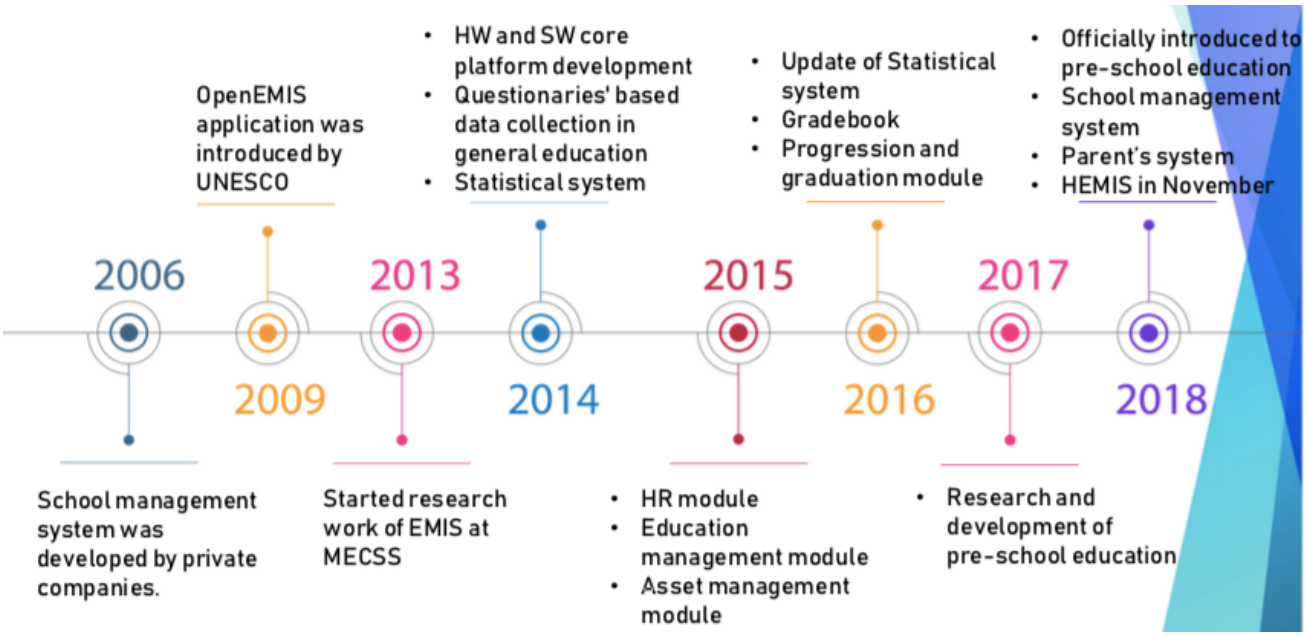
## 1.8.1 History of EMIS in Country

The first school management system for primary and secondary education was developed by private IT companies in 2006. The Open EMIS application was introduced by the UNESCO in 2009.[61] The system was piloted in Bulgan aimag/province and Songino-Khairkhan district of Ulaanbaatar. This system was not fully compatible with the specifics of Mongolian educational system and therefore the MECSS came up with decision to develop new EMIS system locally. The current EMIS, which cover pre-primary, primary and secondary education namely Education Sector Information System (ESIS) was launched from year 2013. Since then, the following key activities were carried out, which is also captured in the Figure 5

- In 2014, the software core platform and statistics module were developed and conducted questionaries' based data collection in general education.
- In 2015, the education management, human resource, and asset management modules were developed.
- In 2016, the statistics module was updated and progression and graduation modules were developed.
- In 2017 research and development of the pre-primary education system were conducted. An organization, training resources, human resources and statistical report modules were fully implemented and utilized in admission, graduation, testing, and student migration processes for pre-primary.
- In 2018, the pre-primary education system, school management system, and parent's system were officially introduced.

55 In Article 16 of the current Constitution of Mongolia (1992), it stipulates the state's provision of free basic general education. The constitution also allows citizens to establish and operate private schools with the condition that state requirements are fulfilled.
56 *Law on Pre-School Education* (2008), https://www.legalinfo.mn/law/details/462, accessed 25 March 2019
57 *Law on Primary and Secondary Education Law* (2002), https://www.legalinfo.mn/law/details/72, accessed 25 March 2019
58 *Law on Higher Education* (2002), https://www.legalinfo.mn/law/details/251, accessed 25 March 2019
59 *Law on TVET* (2009), https://www.legalinfo.mn/law/details/376, accessed 25 March 2019
60 *National Sustainable Development Vision-2030,* http://www.un-page.org/files/public/20160205_mongolia_sdv_2030.pdf, ISBN 978-99973-3-546-3, accessed 25 March 2019
61 https://www.openemis.org/

**Figure 5. Historical timeline of EMIS development in Mongolia (MECSS, 2018)**




## 1.8.2 EMIS for Pre-Primary, Primary and Secondary Education

The MECSS aims to develop systems based on information technology, that can support education sector management, optimal planning, decision making process and delivering better education services in Mongolia through creating an integrated database. The main goals of ESIS development are:

- Developing core platforms of the ESIS;
- Introducing the EMIS to all levels of educational institutions;
- Delivering evidence based information for analytical research and planning;
- Ensuring system upgrades and improvements and sustainable operations of the ESIS.

The ESIS supports pre-primary, primary, and secondary education sector management, monitoring, planning, decision making processes, and delivering better education services in Mongolia. The ESIS was developed as a single centralized communication solution. It is an integrated information system, introduced to all educational levels, and encourages users and stakeholders to use that system in day-to-day work and generate required reports at any time. The single integrated database enables all users and stakeholders to enter relevant data and access to information. The ESIS is responsible for collecting, storing, processing, delivering, reporting, and transmitting educational data to the its users. Table 4 shows the modular structure of ESIS for pre-primary, primary and secondary education.

**Table 5. ESIS Structure**

| # | Module | Coverage/Functionality | Application/Sector |
|---|---|---|---|
| 1 | Core Platform | Configuration and maintenance, notification management etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |
| 2 | Questionnaire Management System | Questionnaire management, dashboard and reports, book order form etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |
| 3 | Statistics Management System | Dashboard and indicators, summary and lists, reports; data verification and validation; questionnaire (estate, budget revenue and expenditure, learning environment, water and sanitary, employee movement, etc); search engine etc. | Pre-primary Education |
| | | Reports (dashboard and indicators, summary and lists, reports); Data Verification and Validation (list of students, review/approval of state exams, A, B forms, graduation and progression, school-out children); Search and Infographics (organization, construction, employee, payroll, teacher, group, student, state exams, graduation, progression, transcript, uniform, textbook, out-of-school, transfer, lesson, reports); Questionnaire (estate, budget revenue and expenditure); Dashboard and Indicators etc. | Primary Education<br>Secondary Education |
| 4 | Human Resource Management System | Core human resource, payroll, employee's information, dashboard and indicators etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |
| 5 | Education Management System | Education Structure (structure and organization, school year structure, education degree configuration, learning environment configuration, validation); Curriculum Management (subject management, lesson management, teacher management configuration, curriculum management, timetable); Student Administration (student administration configuration, student management, student profile, class and group management, gradebook, assessment, student graduation, student progression, transcript); Dashboard and Reports; school management (parents, attendance, assessment, lesson, lesson selection, gradebook, absence management) etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |
| 6 | Financial Management System | Asset management, dashboard and reports etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |
| 7 | Reference | Reference for secondary and complete secondary education; integration with KHUR system etc. | Primary Education<br>Secondary Education |
| 8 | Education Data Center | Infrastructure monitoring and management etc. | Pre-Primary Education<br>Primary Education<br>Secondary Education |

The table below highlights the sub-systems of ESIS.

**Table 6. ESIS Structure: Other Systems**

| # | Module | Sub-modules |
|---|---|---|
| 1 | Awards management system | Settings, dashboard and indicators, report |
| 2 | Scholarship management | Scholarship settings, Scholarship management |
| 3 | E-Learning portal | Content Database Web portal, mobile version |
| 4 | Timetable system | Timetable |
| 5 | Communication system | Communication management, chat settings |
| 6 | Exam system | Exam settings, dashboard and indicators, report |

Web based access portals are:

- Educational News Portal - portal.esis.edu.mn
- Scholarship announcement and application process - scholarship.esis.edu.mn
- Online User Guides of ESIS - help.esis.edu.mn
- Parents Portal and mobile application - parent.esis.edu.mn
- E-Content Portal - econtent.edu.mn
- Electronic Textbook mobile application

**Table 7. Number of users of ESIS, by 30 October 2018[62]**

| User Level | User Type | Number of Users |
|---|---|---|
| MECSS | Officer | 30+ |
| Local authorities* | Statistical officer (General education) | 30+ |
| Local authorities* | Statistical officer (Pre-primary education) | 30+ |
| Local authorities* | Officer | 150+ |
| Local authorities* | Budget and financial officer | 90+ |
| School | Director/Manager | 830+ |
| School | Teacher | 31,200+ (19,600+) |
| Kindergarten | Director/Manager | 1,440+ |
| Kindergarten | Teacher | 6,700+ |
| Scholarship system | Users | 3,500+ |
| Parent portal system | Parent | 2,400+ |

*Education, Culture, and Art Office; Ulaanbaatar Metropolitan Education Department; Institute of Education

62 Source: ESIS Development Team Report

### 1.8.3 EMIS for TVET

The TVET sector has no integrated EMIS. Instead there are several stand-alone applications for recording student test results, graduation and attendance. As those are stand-alone and independently operating applications, each application requires the entering of basic registration data including key details of students. It is therefore common for student records to be duplicated resulting in inconsistency of data because of inability to automatically crosscheck and validate the students' data in the application.

Career Mart Co, LLC developed TVET EMIS named eTVET and implemented nationwide from 2015-2016. However, the eTVET system development and implementation stopped due to financial constraints faced by the Ministry of Labor and Social Protection (MLSP) to provide further funding for development and deployment of the system. Registered data in that system are stored on the Career Mart Co. computers and the system was not handed over to the Ministry. Reasons for this include the repeated changes in the MLSP's structure and unclear roles and resposnibilties for ownership and operation of the system. Despite of current attempts of the TVET Policy Implementation and Coordination Department of the MLSP to receive the system and registered data from the Career Mart Co,.LLC, the effort has not been successful yet. Currently, the HR-TVET system of the General Office of Labour and Welfare Service stores information of more than 3000 TVET teacher and staffs.

Required Information is not able to be presented in timely and accurate manner because of the absence of an EMIS in the form of a centralized database for TVET. TVET data at the school and ministry level is stored in responsible staff's computer in the MS Excel file. As a result, TVET colleges either don't have systems for data storage or are using different systems because of the absence of the integrated nationwide EMIS for TVET.

However, good examples exist at the institutional level. For example, the Polytechnic College of Construction was using Uniface system that is customized for TVET education organization since 2005. Since then it moved its system to eve in 2010. Since 2017, they are using Uniface system only for recording graduations. TVET student detailed information is stored as MS Excel spread sheets and in printed form at the Education departments of the colleges. Student's bank account information is included in the student registration data after the 100,000 MNT scholarships are available for all full-time students according to the Government Decree No12 in 2019. TVET students can access their own attendance and grade information as an MS Excel file which is shared in the Local area network. Additionally, student information is shared with parents in the printed form during the parental meeting quarterly.

There is no documentation such as system requirement specifications for TVET EMIS and a TVET EMIS is not specified in policy documents.

### 1.8.4 EMIS for Higher Education

To increase the number of Mongolia's globally competitive higher education graduates and to be responsive to labor market demands, the MECSS is realizing the Higher Education Reform Project[63] in 2012-2019, with financial assistance from the Asian Development Bank (ADB). The total fund of the project is 20 million USD, 10 percent of which is contributed by the Government of Mongolia. A key objective of the project is the Strengthening Higher Education Management Information System (HEMIS) for higher eduction sector.

Under the project, ECM LLC, a Software Provider Company completed a consultancy service of "Higher Education Management Information System development" in 2017. The consultant firm conducted assessment on the current status of Mongolian EMIS, conducted surveys on higher education institute management and higher education institution management information system architecture; defined business processes of Mongolian higher education institutes based on the internal workflow analysis of the National University of Mongolia, and provided recommendation designs and activity requirements for higher education institute management information system.

The HEMIS system for higher education is currently under development. The HEMIS system will register and manage the activities of the higher education institution (HEI), its structure, education programs, curriculum, education content, student information, enrollment, graduation, transfer, lecturer information, product development, research and development, and project. It has following modules:

1) Higher Education Institution: HEIs' activities (registration of new HEI, registration changes, registration of reorganized HEI, registration of merger of HEIs, registration of HEI separated as an independent HEIs, registration of liquidated HEI); branch/school activities (foundation of new branch/school, restructure and deregistration); and education entity's operational processes (establishment, change and liquidation of entity) etc.
2) Student: student registration, student's status, student transfer between curriculum and program, deregistration from curriculum (school), student transfer between branch/school and HEIs etc.
3) Lecturer and Staff: registration, registraton change; registration of detailed information, deregistration of lecturer and staff etc.
4) License: license issuance, extention, license changes, suspension, restoration, cancellation, deactivation etc.
5) Reference
6) Curriculum: Creation, change, deletion and archive of curriculum and education program etc.
7) Education Content: Creation, change, and deletion of lesson, exam, and practical works;
8) Scholarship and Loan;
9) Graduation;
10) Graduate Student.

The contract of developer's team expires in June 2019 and the ESIS development team is expected to remain responsible for its further development and implementation.

### 1.8.5 EMIS for Non-Formal Education

The need for Non-Formal Education (NFE) Mongolia was initially officially recognised in the Education Law of 1991. In 1997, the Ministry of Education established the Non-Formal Education Centre. Each of Aimag's Education and Culture Department administers non-formal education programs. For non-formal distance education, there are two country-wide programs: "The National Program of Non-Formal Education Development" and the "National Program for Distance Education".

63 HERP, Loan No: 2766-MON (SF)

The MECSS uses the sheets with codes BDB-12, BDB-12a, BDB-7.1, BDB-7.1a and BDB-20.1 for compiling the NFE data. The data through above mentioned sheets or questionnaires are compiled and processed by the ESIS. Currently the ESIS contains data of 344 NFE centers, 340 teachers, 339 staff, and 1769 (621 of them are female) students aged 7-55 years old. It also has an information on NFE student's citizenship (all 1769 are mongolians), disability (there are 193 students with disabilities); orphan and type of orphans (163 orphans, 26 of them are full orphans), guardian of the child etc.

# 1.9 Legal and Policy Framework for EMIS

## 1.9.1 Policy Framework for EMIS

There are two key strategic policy documents for EMIS which both are now expired but still serve as guiding documents in the absence of updated plans. These are "The Education Sector Master Plan" (Sub-section 1.7) and "Policy on Information and Communication Technology in Education Sector 2012-2016". The education sector enterprise architecture and plans are developed in accordance with the "Policy on Information and Communication Technology in Education Sector 2012-2016". The policy document and its action plan were approved by the Resolution No.A-29 of the Minister of Education and Science, September 20th 2012. It defines activities under main objectives and outlines development of the software and hardware requirements and approved the system sustainability plan. The development of EMIS is defined under objective "Introduce ICT in education management". The policy expired in 2016 and there are no specific policies or strategies which support of the EMIS.

Educational statistics are implemented in the line with the following laws and legal framework. These include: Law on Statistics (1997, 1999, 2004, 2008, 2012, 2015, and 2016), Law on Vocational education (2009), and Law on Higher Education (2002), Law on the Rights of Disabled Citizens (2016), The Law on State and Local Property (1996), and the Law on Violations (2017). Education statistical indicators are considered part of the population and social statistics indicators and therefore the MECSS and the MLSP provide educational statistical data which is submitted to the NSO.

The **Law on Statistics of Mongolia (1997)** supports the collection, processing, distributing, reporting and use of education statistics. The purpose of this law is to establish a unified statistical data system of Mongolia and action principles, determine the full rights of statistical organizations and respondents and regulate the relations that arise between them and during the process of providing the users with statistical information.[64] The law defines principles of statistical activities, types of statistical data, Indicators of official statistics and justifications for their production, and rights and obligations of statistical respondents etc. Educational data and information are collected from kindergartens and all levels of schools through ESIS and the NSO and MECSS disseminate the statistical information through their information dissemination channels to users directly or is been provided through the local statistical authorities as well.

## 1.9.2 EMIS Organizational Structure and Institutionalized Processes

According to the Education Law of Mongolia, the educational management system shall consist of the central administrative organization in charge of education matters and local organizations, administration and territorial authorities, educational institutes and their management team. As a central administrative organization in charge of education, the MECSS is responsible for development and implementation of the EMIS for pre-primary, general, non-formal and higher education except for TVET which is under responsibility of the Ministry of Labor and Social Protection (MLSP). MECSS set up ESIS Development Team under the state budget of MECSS. MECSS contracted with individual consultants for developing the ESIS (www.esis.edu.mn). Table 7 shows the budget spent for the ESIS system for year 2013-2017.

64 Law on Statistics of Mongolia, https://www.legalinfo.mn/law/details/461

**Table 8. Budget spent for the ESIS, year 2013-2017**

| | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
|---|---|---|---|---|---|---|
| Development cost (mil, MNT) | 412.4 | 739.1 | 823.4 | 879.2 | 773.9 | 3,628 |

Source: D.Tsedevsuren, Country Background Report of Mongolia, 2018

ESIS Development Team consists of following staff/consultants:

- Team Leader -1;
- System Architect -1;
- Senior Business Analyst -1;
- Business Analyst -1;
- Visual Designer -1;
- IT Engineer -1;
- System Analyst -4;
- Developer (Java) -4;
- System Service Analyst -1;
- Developer (Java Script) - 9;
- Mobile Application Developer (Android Platform) -1;
- Mobile Application Developer (iOS Platform) -1;
- Database Developer -2;
- Machine Learning/Data Mining Specialist -1;
- Data warehouse Analyst -1;

The ESIS Development Team is managed by the Department of Public Administration of MECSS.

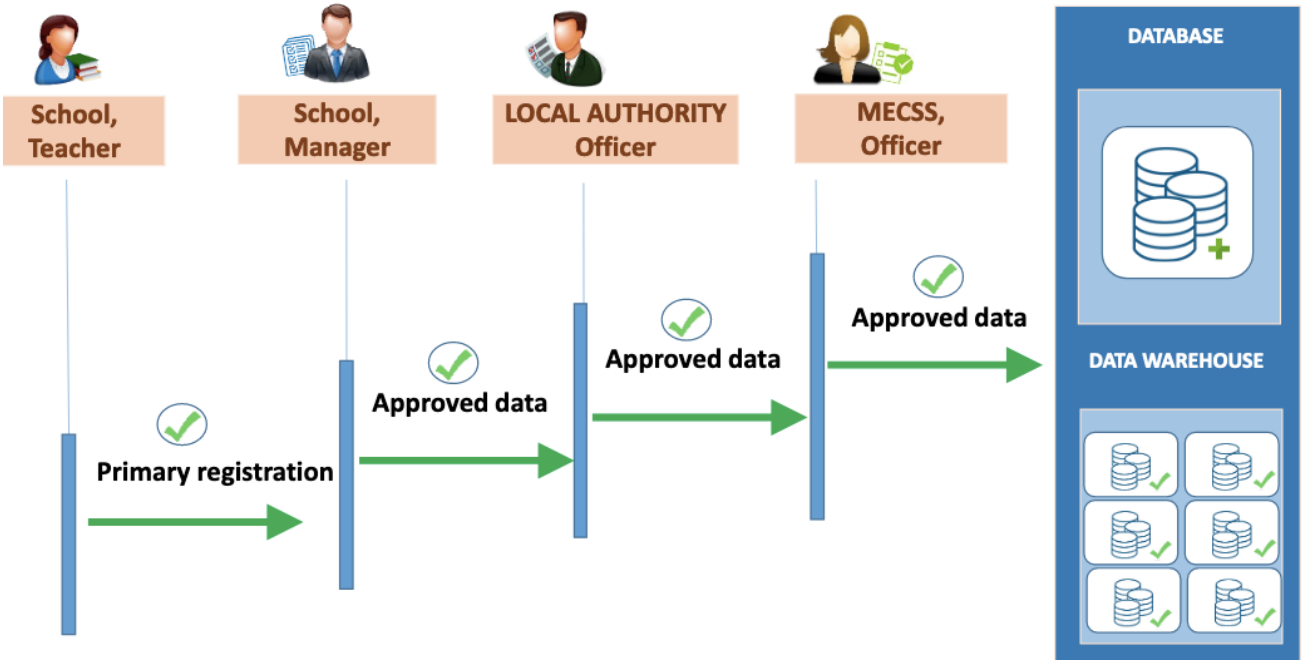
All contracts of 25 staff/consultants will expire in December 2019.

The ESIS development team uses Prince 2, world's most widely-adopted project management method. Its principles are proven and increase the success rate of the project by ensuring successful delivery of the project.

ESIS currently collects data in pre-primary education, primary and secondary education. There is no special position for a staff member to be responsible for ESIS at the school level. School teachers are responsible[65] to enter data to the ESIS and managers are assigned to oversee the collection and data verification in schools (Figure 7). Local authority and MECSS officers are assigned to review and approve school data.

65 The teachers' job description has a clause on the timely generation and report of the statistical information; it however does not have a clause on the data input to the ESIS. Some school administration have stipulated special duty in the teacher labour contract regarding the entering the accurate and timely data to ESIS.

**Figure 6. ESIS Statistical Data Flow**




Source: D.Unenbat, ICT Contributions to EMIS Sustainability and Data Quality, MECSS, 2018

## 1.9.3 System Architecture

The ESIS architecture was developed based on the Open Group Architecture Framework (TOGAF[66]). The justifications for selecting the TOGAF framework are:

- TOGAF helps organize the development process through a systematic approach aimed at reducing errors, maintaining timelines, staying on budget and aligning IT with business units to produce quality results.
- TOGAF helps organizations implement software technology in a structured and organized way, with a focus on governance and meeting business objectives.
- Some government agencies in Mongolia are developing system architecture using the TOGAF.

The ESIS also conforms to following standards:

- ISO/IEC 27001 Information security management;
- MNS ISO 8072:2010 Requirements of government web sites;
- MNS 5552:2005 Unicode standard.

System development technologies are:

- Programming language Java;
- Oracle JDeveloper 12c;
- Oracle ADF 12c;
- Oracle Database.

Oracle JDeveloper 12c is used in the system development, which supports the complete development life cycle with features for modeling, coding, debugging, testing, profiling, tuning, and deploying applications. Also, it enables developers to use the latest standards to develop applications that can operate across multiple hardware and software platforms.

66 https://www.opengroup.org/togaf

Oracle Real Application Security is used for database security. This database authorization model:

- Supports declarative security policies;
- Enables end-to-end security for multitier applications;
- Provides an integrated solution to secure database and application resources;
- Advances the security architecture of Oracle Database to meet existing and emerging demands of applications developed for the Internet.

### 1.9.4 EMIS Data

The methodology for calculating Educational Statistics adopted in 2013.[67] At the NSO level, one specialist in the Population and Social Statistics Department responsible for statistical data. In addition, one specialist in the MECSS is responsible for all educational statistical policies and their implementation. The structure also shows that the technical and vocational education sector should be integrated under MECSS.

**Table 9.Management and Human Resource of Education Statistics**

| Pre-primary, Primary and Secondary Education | Technical and Vocational Education | Higher Education |
|---|---|---|
| 1. At the Government level: The central administrative authority in charge of education, culture, science and sports (MECSS) is responsible for education statistics. One specialist at the Public Administration Department at the MECSS in charge of statistics of pre-primary to higher education level, excluding TVET which belongs to MLSP.<br>2. At the local level: The Education and Culture Department under the Governor is responsible for collecting, processing, and consolidating information and data as required under the statistical law for pre-primary, primary and secondary education and with providing schools and kindergartens with professional and methodological guidance.<br>3. At the soum and district level: Soum kindergartens and schools are responsible for the collecting and processing, information and providing information in accordance with the Law on Statistics and Law on Education. At the district level, local public and private schools and kindergartens are responsible for collecting processing, and providing information through the Education Departments. Due to the absence of appointed specialists in kindergartens and elementary schools, school managers, methodologists or administrators are responsible for collecting, compiling, analyzing, and disseminating statistical information. | 4. At the Government level: The Government central administrative authority in charge of labor and social welfare issues (MLSP) is responsible for statistical issues of technical and vocational education. One specialist at the Implementation and coordination department of the MLSP is in charge of statistical issues.<br>5. At the college, vocational training and production center level: Schools are responsible for the collecting and processing information and providing information in accordance with the Law on Statistics, Law on Education and the Law on Technical education and vocational training. At the school levels, the school administration is responsible for all types of educational information, and professionals in charge of enrollment, graduation, and finance are responsible for providing statistical information for their own specific fields. | 6. At the Government level: The Government central administrative authority in charge of education, culture, science and sports (MECSS) is responsible for education statistics. One specialist at the Public Administration Department at the MECSS in charge of statistics of pre-primary to higher education level, excluding TVET which belongs to MLSP.<br>7. At the university and higher education institute level: Universities are responsible for the collecting and procesing information and providing information in accordance with the Law on Statistics, Law on Education and the Law on Higher Education. At the school levels, the school administration is responsible for all types of educational information, and professionals in charge of enrollment, graduation, and finance are responsible for providing statistical information for their own specific fields. |

67 Order No1/145 of the Chairman of NSO, 2013

The sources are used in the provision of educational statistics are presented in Table 9.

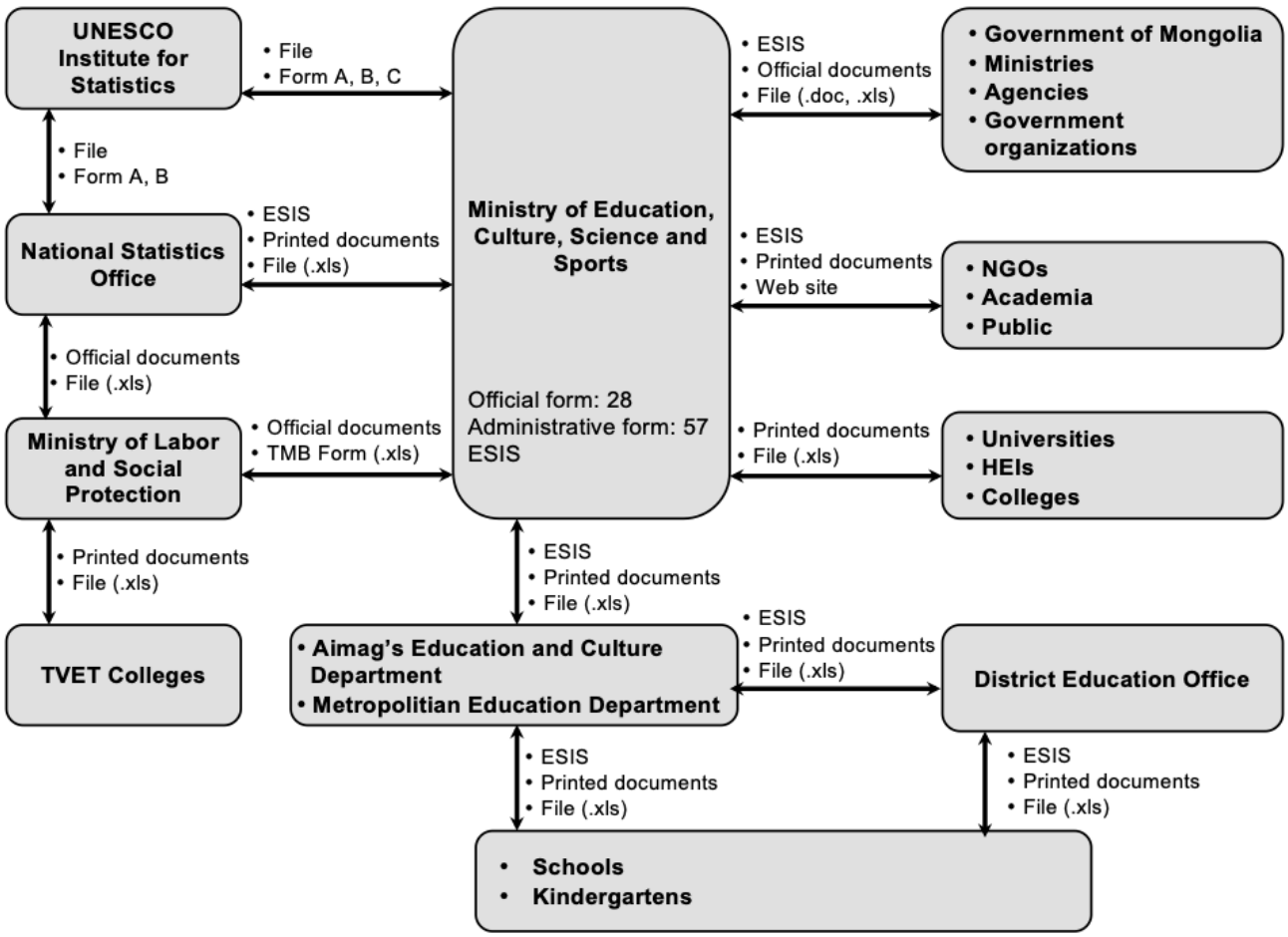
**Table 10. Source and Frequency of Statistical Information**

| Source | Name of Information | Frequency | Data points |
|---|---|---|---|
| MECSS | Official and administrative information | Annually | 2217 data points |
| NSO | Official information | | 1002 data points |
| | Population data,[67] Household-based surveys (labor force survey, household socio-economic survey, social sample survey) | Once every 5 years | Education level, enrollment and education expenditure information |
| | Population and housing census, state census of business entities | Once every 10 years | The level of education and literacy rate of the population, information of business entities engaged in the education sector |

Source: MECSS

The main source of educational statistics is the administrative data of the MECSS. Education statistics data flows are shown in Figure 8.

**Figure 7. Education Statistics Data Flow[69]**




68 Once every 10 years
69 Source: MECSS

As indicated in the figure above, Statistics on pre-primary, primary, secondary and tertiary education are collected by the MECSS, and the TVET statistics are provided by the MLSP. A total of 111 forms (36 of them are official statistics forms) and 2958 data points are used in educational statistics (Table 10). These forms have been updated based on education reforms and policy and regulation changes (Table 11). The official statistic forms, methodology, and guidelines are approved by the NSO and is collected by MECSS and disbursed to the NSO. The administrative statistic forms, methodology, and guideline are approved by the Chairman of NSO and ratified by the Minister of MECSS. Administrative statistics information refers to the information collected by ministries, agencies, and local administrations, using the methodology and indicators approved by the NSO

**Table 11. Statistics Forms and Data Points of Education**

| Education Sector | Total forms | Of which: | | Number of Data | |
|---|---|---|---|---|---|
| | | Official statistics forms | Administrative statistics forms | Total | Official statistics total number of data points |
| Pre-primary education | 28 | 6 (2017, NoA/207) | 22 (2018, No A/009) | 941 | 385 |
| Primary and Secondary education | 53 | 14 (2008, No1/548) | 39 (2008, No431; 2014, No A/351) | 1225 | 590 |
| TVET | 15 | 10 | 5 | 395 | 254 |
| Higher education | 15 | 6 (2003, No114) | 9 (2003, No221) | 397 | 212 |
| Total | 111 | 36 | 75 | 2958 | 1441 |

Source: MECSS

**Table 12. Updates of Statistical Forms of Education**

| # | Education sector | Year of approval | Rational |
|---|---|---|---|
| 1 | Pre-primary education | 2008 | Law on Pre-primary education |
| | | 2017, 2018 | SDGs, major reforms in laws and regulations |
| 2 | Primary and Secondary education | 1998, 2008 | Major reforms in laws and regulations. |
| | | 2014 | School uniforms |
| 3 | TVET | 2002, 2010, 2012, 2013 | Law on technical and vocational education |
| 4 | Higher education | 1999, 2002 | Major reforms in laws and regulations |

Source: MECSS

**Table 13. Type of Data Collected Annually**

| Sub-sector | Standard data collection | Extent of Data Coverage, % | |
|---|---|---|---|
| | | Public | Private |
| Pre-primary Education | Yes | 100% | 100% |
| Primary Education | Yes | 100% | 100% |
| Secondary Education | Yes | 100% | 100% |
| Higher Education | Yes | NA | NA |
| TVET | Yes | NA | NA |
| Non-Formal Education | Yes | 100% | 100% |

Source: MECSS

In order to strengthen human resources, specialists and national and district specialists in charge of information about, and the monitoring of, pre-primary and elementary school education have been organised annually in national vocational training.

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# 2 Policy and Data Gaps

## 2.1 (1.01) Does the country have a strategic plan to strengthen the EMIS?

### 2.1.1 Main Findings (1.01)

As noted in section 1.9.1, there are two key strategic policy documents to develop and strengthen the EMIS. The Education Sector Master Plan (ESMP) is the main document but expired in 2015. Since then, there has been no ESMP developed based on solid assessments and broad consultations with development partners, and no mechanism for education stakeholders to gather, jointly review, and discuss progress and issues in the education sector. The EMIS, including education sector infrastructure and hardware is not supported by a dedicated strategic plan or a policy. Further, there is evidence that coordination of data management and information sharing between the different Ministries responsible for education could be improved.

Currently, the ADB supports a development of ESMP 2020–2030. The "Policy on Information and Communication Technology in Education Sector 2012-2016" has expired (Please refer sub-section 1.9.2). The Ministry of Education Culture Science and Sports (MECSS) is developing ICT policy in education (2018-2024).

The TVET policy has shifted from MECSS to MLSP in 2010. The MECSS contributes to the study programs and educational certification. The TVET policy is divided between 2 ministries which causes issues. Over the last years, the TVET information and statistics has not been considered in TVET policy. Ideally the technical and vocational education EMIS should be integrated under MECSS to ensure proper integration with existing systems development and support.

Development budget for current ESIS is determined and allocated from the state budget as described in the "Policy on Information and Communication Technology in Education Sector 2012-2016" whereas funding for HEMIS is financed by the ADB project. As for TVET, it has neither policy nor budget.

To date there exist no long and med-term policy documents and plans for strengthening education sector IT infrastructure and hardware, and no budget is allocated for the maintenance of existing equipment.

### 2.1.2 Recommendations (1.01)

- **Recommendation 1.01.1:** There is need to develop a comprehensive EMIS Strategic Plan and an ICT Implementation Plan for EMIS for MECSS and its attached agencies (e.g. the strategy for backup, disaster recovery and risk management, long-term plan for capacity building). It should be developed and integrated with the existing education and ICT policies. The strategic plan should specify the development budget required for reform of systems and the changes to operational budget and requirements for each sub-sector.
- **Recommendation 1.01.2:** Establish a working group or steering committee which consists of representatives from relevant stakeholders such as; governmental authorities, schools, universities, NGO`s and private sector to develop long term plan of EMIS. The steering committee should be charged with responsibility for approving and coordinating EMIS development.
- **Recommendation 1.01.3:** Strengthen the capacity of policy makers, high level managers and key staff by conducting a workshop to develop a common understanding of current trend in the use of ICTs in education, its costs and benefits and use in education planning, monitoring and administration.

- **Recommendation 1.01.4:** Improve delivery of EMIS services through strengthening education sector IT infrastructure and hardware and facilitate private sector participation in development, maintenance and utilization of the EMIS .
- **Recommendation 1.01.5:** Develop a dedicated EMIS policy document to support the strategic plan and further development and integration of EMIS. The dedicated EMIS policy document should be developed specifying the overall architectural target state for EMIS as well as the roles and responsibilities of all parties in the further development and operation of EMIS.

## 2.2 (1.02) Does the EMIS collect and analyse data that is necessary and sufficient to monitor and develop the national education policy framework and sector plan (ESP)?

### 2.2.1 Main Findings (1.02)

The EMIS can play pivotal role in formulation of new national education policy framework and sector plan as it collects and analyses data required for analysis of the sector and monitoring of the plan. The EMIS data is used for defining strategy, policy and regulation; planning; resource allocation; monitoring; and education sector planning and analysis. It has currently been used for developing the new education sector master plan. The ESIS contains large amounts of data useful for planning, however its utilization for the purposes of policy-making and planning remains inadequite. For example, even though the planning needs of each school can be determined based on ESISs' data, some policy-makers make decisions without referencing ESISs' data.

ESIS stores detailed data on government teaching staff including working years, profession, education history, age and sex, however the information is not fully utilized in teacher preparation or in identifying and addressing deficiencies in their competences and skills. Such data should enable teacher flow planning based on subject specialisation but this is not done using EMIS sytem data. To help encourage data use, a sector-wide policy concerning the use of ESIS information for decision making should be established.

The MECSS, NSO, and ESIS publish education statistics on their websites. Ministries, agencies, and stakeholders can access ESISs' statistical data and indicators. Stakeholders such as UNICEF use this data for planning, R&D, monitoring and evaluation.

Data for the TVET sector is not readily available as the systems function independently in each institution. There is no interoperation with other systems or the national government. Developing the TVET IT system based on the existing IT systems will be cost-effective and enable data to be accessed and used.

### 2.2.2 Recommendations (1.02)

- **Recommendation 1.02.1:** The EMIS policy document should articulate wider utilization of EMIS data in monitoring of education targets and goals data exchange between government agencies relating to EMIS data.
- **Recommendation 1.02.2:** Facilitate generation and monitoring of the education implementation plan and budget by using EMIS generated data for developing the national education policies and ESMP.
- **Recommendation 1.02.3:** Integrate EMIS for TVET with ESIS and HEMIS systems. There is a need to access and analyse all type of EMIS related information in the integrated manner to enable reporting on different aspects of the education system to help monitor policies and plans.

# 2.3 (1.03) Does the EMIS collect and analyse data required for SDG targets and indicators monitoring?

## 2.3.1 Main Findings (1.03)

Mongolia Sustainable Development Vision-2030[70] was presented to the Parliament of Mongolia in February, 2016. It has 17 goals comprising 169 targets aligned with the 4 priorities, and 44 targets. It sets out broad directions and goals for the education sector until 2030 in line with the SDG 4.

The National Development Agency[71] has mapped the selected SDG Indicators at the national level against available data sources in Mongolia. The National Statistical Office (NSO) of Mongolia conducted the review of national data availability and data gaps in regard to indicators for reporting against the proposed SDG targets in 2015-2018. The 2018 review assessed the data availability of 244 global indicators under SDGs in Mongolia. Out of 244 mapped indicators, 45 indicators are readily available in Mongolia, 118 indicators are partially available and 115 are not available. Mongolian SDG 4 indicators are shown in Annex E.

The ESIS collects and processes some data required for SDG 4 targets and indicators which is mapped in Table 13. The ESIS capture data and information that allow for equity analysis, such as enrolment/attendance of children with disabilities, children from ethnic minority communities, children from poor households, and children from poor herders.[72] Administrative forms used for collecting and processing data through ESIS data in the areas of pre-primary, secondary and tertiary education are insufficient to monitoring SDG 4 targets and hence are required to be revised.

**Table 14. Availability of SDG 4 Education Indicators[73]**

| Target area | Total number of indicators | Number of available indicators | Source | Number of indicators | Currently not available indicators | Potential indicators | Notes |
|---|---|---|---|---|---|---|---|
| 4.1 | 18[73] | 12 | ESIS<br>BDB-1, BDB-3, BDB-4, BDB-20<br>UIS_ED_A /A2-A8/ | 6 | Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex | 6 | Participate in the international surveys (ERCE5, PASEC1, PIRLS2, PISA3, SACMEQ4 and TIMSS6) |
| 4.2 | 5 | 4 | SUB-1, 1a<br>UIS_ED_A /A2, A3/<br>MICS,[74] DHS[75] and UNICEF. Social Indicator Sample Survey. | 1 | Proportion of children under 5 years of age who are learning pre-primary eductaion in family environment | | |

70 Approved by the Parliament of Mongolia in February, 2016 (Annex to State Great Hural Resolution No19, 2016).
71 MECCS (2017), *Roadmap for Achieving SDGs in Mongolia*
72 a person who looks after a herd of livestock or makes a living from keeping livestock
73 Altantuya Yu. (2019), *Current State of Mongolian Education Statistics and Its Linkages with SDG*, Presentation
74 number of sub-indicators, by urban and rural area and by social group. Refer Annex E
75 Multiple Indicator Cluster Survey, http://mics.unicef.org/, accessed on 05th August 2019
76 Demographic and Health Surveys

| Target area | Total number of indicators | Number of available indicators | Source | Number of indicators | Currently not available indicators | Potential indicators | Notes |
|---|---|---|---|---|---|---|---|
| 4.3 | 3 | 2 | TMB-1<br>UIS_ED_A /A2, A3/ | 1 | Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex | | |
| 4.4 | 2 | 2 | | 0 | Proportion of youth and adults with ICT skills, by type of skill | 2 | By additional surveys |
| 4.5 | 13 | 9 | ESIS<br>SUB-3, 3a<br>BDB-1, BDB-10, 10a, 10b<br>UIS_ED_A /A2-A4, A9-A12/<br>UIS_ED_B<br>Ministry of Finance | 4 | Proportion of children and young people in (i) grades 2/3 achieving at least a minimum proficiency level in reading, by sex | 4 | Participate in the international surveys (ERCE5, PASEC1, PIRLS2, PISA3, SACMEQ4 and TIMSS6) |
| 4.6 | 4 | 1 | | 3 | By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy | | By additional surveys |
| 4.7 | 5 | 0 | | 5 | By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development | | By additional surveys |
| 4.a | 12 | 8 | ESIS;<br>BDB-18 | 4 | Proportion of children affected in bullies, physical punishment, abuse, violence, sex discrimination | 2 | By additional surveys |
| 4.b | 2 | 2 | Education Loan Foundation | 0 | | | |
| 4.c | 19 | 15 | ESIS<br>SUB-3, SUB-3a<br>BDB-1, BDB-10, 10a, 10b<br>USI_ED_A /A3, A9-A12/ | 4 | Comparison of the teachers' average salary with other professions, after obtaining the same level of degree of education | 3 | By additional surveys |
| **Total** | **83** | **55** | | **28** | | **17** | **0** |
| **Percentage** | | **66.3** | | **33.7** | | **20.5** | **86.7** |

### 2.3.2 Recommendations (1.03)

- **Recommendation 1.03.1:** Update the existing "Methodologies for measuring education indicators" by adding methodologies used for measuring SDG 4 (10 targets and 43 indicators).
- **Recommendation 1.03.2:** Review data for SDG 4 indicators of primary, secondary and higher education against existing statistics and forms, and update existing forms to ensure and create new forms if required.
- **Recommendation 1.03.3:** The additional data required for monitoring of remaining SDG indicators should be incorporated into the software systems, collected and reported using ESIS and HEMIS where feasilble. Modifications to the software will be required to ensure data storage and reporting of SDG indicators.
- **Recommendation 1.03.4:** Update the forms for TVET in line with the requirements of SDG4 indicators and modify data tools to ensure data is collected and reported.

## 2.4 (1.04) to what extent does the EMIS capture data and information in ways that allow for equity analysis?

### 2.4.1 Main Findings

The ESIS downloads the following individual data from the Civil Registration System of the *General Authority for State Registration:*[77] family name, surname, given name, sex, date of birth, number of birth certificate. ESIS calculates student and staff age using personal identification number. This information is obtained by referencing the personal identification number of the student. The class teacher registers the following additional data in ESIS: citizenship, blood type, mother tongue, orphan and type of orphans, disability status, guardian of the child and guardian's information, including work status, organization and position. Usually, parents are asked to verify information through relevant documents. ESIS therefore captures data on each pupil required for equity analysis including disability status, nationality/ethnic minority, living condition. For example, the MECSS uses ESIS generated reports (BDB 14-2 and BDB 14_2.1) of kazakh students for publication and distribution of texbook in kazakh language.

Even though ESIS disagregates SDG indicators according to SDG 4.5 concerning disagregation, in some cases data on individual students is missing. For example, The ESIS has functionality to register disability status as physical, visual, hearing, speech and language, and mental health and to generate infographics (Refer Annex F). School teachers are responsible for collecting data on disability when a child enrols into schools. The registration of children with disabilities is based on medical references, but teachers collect and register the information provided by parents on a voluntary basis. In 2018-19 academic year, there are 6,518 students identified with disabilities registered in the ESIS. Parents of the children with disability have sometimes been reluctant to identify the child as having disabilities as they may want their child to attend a regular school rather than a special school. Therefore, this information is not always provided or accurate. Further, parents and teachers[78] are not fully aware of the importance of providing children's disability details on true and accurate manner.

Schools and other local administrative organizations often conduct detailed surveys on students to ensure ESIS information is complete and to verify data. For example, local administrative organisations reported having conducted surveys on pupils' registration details, pupil's school transportation, pupils' socio-economic background, vulnerable group assessment and a survey on family background. Usually these surveys include some data that cannot be generated from the ESIS, such as household income, route and type of vehicles commuiting from home to school, child labor, housing conditions, personal behavioural characteristics, risks in school environment (discrimination and tensions by teachers etc.,) and risks in family environment (family violence, divorce, alcoholism, living in basement floors etc). Analysis can be undertaken using this data which cannot be fully undertaken using ESIS data such as the identificaiton of vulnerable children at risk of dropping out of school.

77 The Implementing Agency of the Government of Mongolia, which provides public services for state Civil registration, Property right's registration and Legal entitles registration to public and business organization and citizens http://burtgel.gov.mn/eng/
78 Interviewed for this research

### 2.4.2 Recommendations:

- **Recommendation 1.04.1:** Develop a Module for registering data of children with disability independently as stand-alone module in ESIS. Capture the data from the Social welfare IT system.
- **Recommendation 1.04.2:** Increase the awareness among teachers and parents of importance of entering the accurate information of students with disabilities. This will ensure the accuracy of the primary registration information.
- **Recommendation 1.04.3:** Ensure EMIS data required for equity analysis and other related analysis is comprehensive. Include data in ESIS on school transportation (distance from school, mode of transportation), pupils' socio-economic background (housing condition), vulnerable group assessment (social risks such as PC game addiction and safety of way from school to home, risks in school and family) and family background (parents's contacts, divorce, alcoholism, family income).
- **Recommendation 1.04.4:** Register the children in the ESIS system whose data does not exist in the civil registry with assistance from organizations including administrative, social welfare, child right protection organizations and NGOs.

## 2.5 (1.05) How, if at all, does the EMIS address issues around out-of school children (incl. children at risk of dropping out)?

### 2.5.1 Main Findings (1.05)

The Mongolian Education Alliance conducted Mongolian drop-out study in 2005, which investigated the drop out rate in Mongolia and the reasons for dropout. According to this study, herdsmen, especially poor families, some not poor families with large numbers of livestock, and families with few adults tend to take their boys out from school. Children in Mongolia dropout of school to help herd the family livestock but also for other reasons.[79] A Mongolian Adolescents Needs Assessment Survey conducted by the Mongolian United Nations Development Programme (UNDP) Organization and the Mongolian Ministry of Health and Social Services in 2000 revealed that 65.7% of the NGO employees and teachers identified poverty and unemployment as the main reasons for dropout; 21% cited lack of interest and, 15.8%, the need for increased manpower on farms. The results also point to the lack of attention from teachers, the discontinuation of programs to prevent drop out and the absence of penalties for parents.[80] ESIS registers herder's children. It also has an information about 758 drop-out children (Table 14). ESIS collects and generates following two reports on school drop-out among children:

1. BDB15: Report on school drop-out among children aged 6 to 14 (by age, sex, and reason);
2. BDB15A: Report on school drop-out among children aged 6 to 14 (by school, age, sex, and class).

79 Mongolian Education Alliance, *The Mongolian drop-out study* (Mongolian Education Alliance, 2005)
80 Mongolian Education Alliance, *The Mongolian drop-out study* (Mongolian Education Alliance, 2005)

**Table 15. Number of School Drop-outs, 2018-19, BDB15 report generated by ESIS**

| Indicator | Total | Female | Out-of school, by age | | | | School drop-out, by age | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Age: 6-11 | | Age: 12-14 | | Age: 6-11 | | Age: 12-14 | |
| | | | Total | Female | Total | Female | Total | Female | Total | Female |
| Reasons: | 758 | 269 | 465 | 194 | 87 | 38 | 77 | 19 | 129 | 18 |
| 1. Living hardships | 118 | 38 | 32 | 18 | 7 | 5 | 25 | 5 | 54 | 10 |
| 2. Reluctance to study | 50 | 10 | 7 | 3 | 2 | | 17 | 5 | 24 | 2 |
| 3. Due to being employed | 9 | 0 | 1 | | | | 3 | | 5 | |
| 4. Due to illness | 273 | 97 | 154 | 61 | 66 | 25 | 23 | 7 | 30 | 4 |
| 5. Others | 308 | 124 | 271 | 112 | 12 | 8 | 9 | 2 | 16 | 2 |
| Children with disabilities | 208 | 71 | 117 | 47 | 52 | 19 | 17 | 1 | 22 | 4 |
| 1. Visual | 10 | 0 | 3 | | 2 | | 3 | | 2 | |
| 2. Hearing | 2 | 1 | 2 | 1 | | | | | | |
| 3. Speech and language | 13 | 3 | 7 | 1 | 3 | 2 | | | 3 | |
| 4. Physical | 21 | 7 | 8 | 4 | 5 | 3 | 4 | | 4 | |
| 5. Mental health | 54 | 18 | 38 | 14 | 11 | 3 | 3 | | 2 | 1 |
| 6. Plurastic type | 108 | 42 | 59 | 27 | 31 | 11 | 7 | 1 | 11 | 3 |

ESIS records the students' attendance and transfer between schools and can help schools and teachers to prevent from school drop-outs by identifying students with low attendance rates. However, teachers do not use the system effectively. Rather teachers determine risks to individual student dropout based on observation, practice and personal feelings. ESIS is able to monitor the mobility and attendance of students but many teachers are not willing to use it.

Student transfer is managed through ESIS by the school responsible for sending the transferred student which must de-register that student from the system. The school accepting the transferred student then re-registers the child as attending. This allows helps reduce the likelihood of duplicate records. In the Ulaanbaatar city level, pupils migration is monitored through ESIS. However, there is a complexity in enabling and controlling the mobility between different regions. It is difficult to monitor the transfer of a student who has been removed from registration of the school and the system does not flag these children as unregistered.

Assessing children at risk of dropping out is also undertaken by analysing data from the Intergrated household information database (it is used as an Inter-Sectorial Database).

### 2.5.2 Recommendations (1.05)

- **Recommendation 1.05.1:** Indentify children at risk of dropping out based on the ESIS system and this information should be sent to the head teacher and teacher who should follow a process of action.
- **Recommendation 1.05.2:** Connect EMIS with the integrated household information database (it is used as an Inter-Sectorial Database) and using its data to address issues around school drop-out among children, including children at risk of dropping out. Connect the ESIS to other system and databases (household database etc) and facilitate registration of children who arrived from overseas, dual cultured families, children with special needs, national minorities, status of household income, and children with risks of drop-outs, and use such data for purposes of resolving drop-out matters.
- **Recommendation 1.05.3:** Register children living overseas in order to help improve supervision and support services to those students.
- **Recommendation 1.05.4:** Register children having no registration number in the system.
- **Recommendation 1.05.5:** Register children studying or otherwise attending monasteries.

## 2.6 (1.06) What are the various aspects of the quality of EMIS?

### 2.6.1 Main Findings (1.06)

The ESIS contains all public and private pre-primary and secondary school information and collects relevant individual student data that can potentially be used for equity analysis in education sector. The ESIS uses student's personal identification number and downloads individual data from the Civil Registration System of the General Authority for State Registration.[81] Therefore, there is no duplicated registration of pupils and teachers. However, there are no standards or methodology in place to verify that the other data teachers enter is correct.

ESIS Development Team conducts information security studies and performs regular server checks. Those are:

- Report generated by the OpenVAS tool is examined and improved.
- Kali Linux system in the form of the virtual machine is downloaded from the internet, moved to vSphere server and operated as a virtual machine. OpenVAS tool is installed in addition to examine the system vulnerability on the Kali Linux server.
- OpenVAS tool checks the Transaction, Warehouse, Infrastructure 3 test database server.
- OpenVAS tool checks the Oracle Web Logic Clustered Domain (AdminServer-1, ManagedServer-2) 3 applications servers.

Some of existing ESIS's modules and applications don't have technical documentation.[82] This negatively impacts the quality of system development and its operations.

### 2.6.2 Recommendations (1.06)

- **Recommendation 1.06.1:** Analyse the current ESIS to ensure quality and readiness of the application architecture, data architecture, technology architecture, and business architecture, and its linkage with other systems and conduct assessment of hardware and infrastructure of the EMIS.
- **Recommendation 1.06.2:** Develop all technical documentation for ESIS's existing modules and applications.
- **Recommendation 1.06.3:** Conduct studies on data quality assessment and develop necessary standard requirements and criteria.

81 http://burtgel.gov.mn/eng/
82 As reported in interviews with ESIS Development Team

# 2.7 (1.07) What are the (Data) quality assurance processes in place and how effective are they?

## 2.7.1 Main Findings (1.07)

The MECSS and NSO use several methods for data quality assurance. For example, data mapping that verifies ESIS data against previous registration data, civil registration data and other available information; time limitation that verifies ESIS data by setting specific timeframe; cascade monitoring that verifies and validates ESIS data at school, soum/district, aimag/city, and state levels respectively; and registration updates involving retrieving updated information from the civil registration in a timely manner, conducting an annual update of school-level records, and updating information relating to student migration or transfer, as necessary.

The pupils' registration is completed using the State General Registration Authority's personal information data based on the register number. Therefore, the initial registration data ensures each child's data matches the registration database and that each child is registered once. Student data is verified by the teacher and school administration and validated for completeness by soum/district, national/ministerial levels. School teachers are responsible for entering and checking complete, accurate and timely data. The data accuracy and completeness are dependent on the initial entry of data. If a mistake is made when data is entered then it is difficult to identify and correct.

The School director is responsible for checking the coverage and accuracy of data, and ensuring that required data is entered on time to the ESIS. Similarly, at the sub-national and national levels, designated staff is responsible for checking the coverage and accuracy of data, and ensuring that new data is submitted on time to the system.

The teachers' job description has a clause to ensure the timely generation and reporting of the statistical information; however, it does not have a clause concerning data entry to the ESIS. Some school administrations have stipulated a special duty in the teacher labour contract regarding the entering the accurate and timely data to ESIS. This duty is reflected in the teacher's work evaluation. However, this is not universally applied.

The ESIS Development Team is closely collaborating with the MECSS and educational institutions on system quality assurance. The MECSS and NSO conducted a joint monitoring on ESIS data and its usage in 2018 (10 aimags) and 2019 (11 aimags). The ESIS Development Team developed user manuals regarding the system functionalities, including data entry, verification and approval of data. The ESIS Development Team and MECSS organize trainings for pre-primary and secondary school directors and managers. Following the trainings, schools organize cascaded trainings for teachers.

TVET has no integrated system and databases, and therefore quality assurance issues have completely been omitted. The HEMIS system for higher education is currently under development and has not fully been implemented nationwide yet. Therefore, there is no specific information on the data quality assurance of the system and no policy documents and procedures are available. Higher education institutions conduct a quality assurance of their data and information systems on their own.

### 2.7.2 Recommendations (1.07)

- **Recommendation 1.07.1:** Strengthen capacity of human resources in areas of education statistics, monitoring and planning. In particular, Strengthen teacher capacity and improve the quality of the primary registration by incorporating ESIS use into the contents of in-service and pre-service teacher trainings.
- **Recommendation 1.07.2:** Develop trainings for managers and planners in the use of EMIS reports data analysis at all levels of educational institutions.
- **Recommendation 1.07.3:** Modify teachers and staff job descriptions and teacher labour contracts to include the ESIS data entry responsibility. This will ensure the entrance of accurate and timely data to ESIS and provide pupils' information security at the initial data entry.
- **Recommendation 1.07.4:** Conduct quality assessment studies based on the ESIS data, and upgrate quality assurance.
- **Recommendation 1.07.5:** Ensure that the MECSS in conjunction with NSO conduct an audit of the data completeness and quality of the EMIS data on regular basis.

## 2.8 (1.08) How does the EMIS protect data privacy of students and teachers?

### 2.8.1 Main Findings (1.08)

The Law on Personal Secrecy (Privacy Law) of Mongolia (1995) defines personal privacy in detail, and categorises it as the following five types: secrecy of correspondence; secrecy of health information; secrecy of property; secrecy of family; and other secrecy, which is defined by laws.[83] Aimed at protecting human rights, honor and dignity, this law seeks to uphold personal secrecy of information, documentation and material object defined by the pertinent laws of Mongolia as secret. According to the Privacy Law, the government should also protect citizens' secrets in accordance with procedures and on grounds determined by law. Therefore, all information and reports generated and distributed by the EMIS to public, researchers, and stakeholders are summarised data and do not contain any personal information. Non personalised individual data is not available to researchers.

Only authorized officials of MECSS have access to the personal data of teachers and student that is stored in the ESIS. For example, there are six authorised users with access to the ESIS data at the Capital city Metropolitan Education Department and five of them have access to the personal data of staff. All users exect class teachers are not able to view the personal information. School teachers, who enter data at school level, can see private information when entering data into the system. School teachers still recorded the data in paper before entering it into the ESIS. No procedure on how the record paper is stored or destroyed.

83 Privacy Law of Mongolia, https://www.legalinfo.mn/law/details/537

The General Intelligence Agency[84] signed a data confidentiality agreement with the team leader and data analyst of the ESIS development team. Other team members do not have data confidentiality agreements.

The ESIS has own data centre, with 30 servers. Data servers are protected by Oracle Database security. Due to the absence of the back-up server, the data is backed–up on storage tape regularly and delivered to the relevant unit of the MECSS. There is no offsite backup solution such as cloud backup, online backup that enable to store ESIS data at facilities that are geographically and logically external. If the database becomes corrupted or a fire breaks out then MECSS would be incapable of restoring the latest information.

The ESIS has a user log registration function based on Oracle Audit Log which can track data changes and map them to users. Due to the limited server capacity, the user access log registration is not stored.

Due to absence of integrated and centralized information EMIS for TVET, data accuracy and completeness and information security is compromised.

### 2.8.2 Recommendations (1.08)

- **Recommendation 1.08.1:** Conclude a confidentiality agreement with every member of the ESIS and HEMIS Development Team for data protection and privacy.
- **Recommendation 1.08.2:** Establish a proper technical environment for storing the ESIS user access and activity log data for the specified time and develop guidelines for storage.
- **Recommendation 1.08.3:** Develop and implement EMIS data storage and backup procedures.
- **Recommendation 1.08.4:** Procure back-up servers and locate them in the National Data Centre.
- **Recommendation 1.08.5:** Conclude a confidentiality agreement with officers and include appropriate clauses on data accuracy and data completeness and data security to TVET employee job description.

## 2.9 (1.09) How does the EMIS interact, if at all, with other administrative data systems (e.g. health, social welfare, civil registry, labour etc.)?

### 2.9.1 Main Findings (1.09)

The ESIS is connected with the Civil Registration System of the General Authority for State Registration.[85] The system uses the personal identification number for teachers, staff and students. The ESIS is not connected with other systems, e.g. health, social welfare, social insurance, and other government systems. The ESIS covers all public and private schools and has own registration code for schools.

Among the education sector, ESIS exchanges information through the Education Evaluation Center (EEC) service. While the ESIS provides the EEC system with information on the graduates of the school, the EEC system provides the results of the general entrance examination to university to the ESIS. This facilitates the registration of the general entrance examination at the national level and ensures the accuracy of the graduates' information.

84 http://gia.gov.mn/#
85 http://burtgel.gov.mn/eng/

### 2.9.2 Recommendations (1.09)

- **Recommendation 1.09.1:** Connect the ESIS with other systems, such as immigration, health and social welfare. This can help ESIS address issues concerning school drop-out including children at risk of dropping out using data of the integrated household information database (it is used as an Inter-Sectorial Database). This could be achieved by creating a shared data repository between ministry groups storing key national data on individuals which could then be refenced by staff at the service delivery points (schools, hospitals etc.) to ensure children were properly referenced and receiving services.
- **Recommendation 1.09.2:** Generate flags for each student as to whether they have received essential services and make this information available to teachers, managers and staff at other service delivery points to increase referral between services. This will help ensure that all children participate in all essential services.
- **Recommendation 1.09.3:** Improve inter-sectoral legal framework and coordination of technological solutions thereof.

## 2.10 (1.10) How is the EMIS managed and where is it situated in the data architecture or statistical systems of the country?

### 2.10.1 Main Findings (1.10)

The ESIS is managed by the Department of Public Administration of MECSS and ESIS Development Team develops ESIS under its supervision. The ESIS Development Team is also responsible for system implemention. There are no specific procedures for managing and scheduling changes to the ESIS. Requests for changes are made on an ad-hoc basis which results in changes to the system made without any written change requests.

A total of 111 forms (36 of them are official statistics forms) containing 2958 data points are used to produce educational statistics (Table 9). The official statistics forms, methodology, and guidelines are approved by the NSO and is collected by MECSS and disbursed to the NSO. The administrative statistics forms, methodology, and guidelines are approved by the Chairmen of NSO and ratified by the Minister of MECSS. Administrative statistics information refers to information collected by ministries, agencies, and local administrations, using the methodology and indicators approved by the NSO. NSO staff that is responsible for education statistics has access to the ESIS. NSO approves the required forms for gathering educational data and collects it through the ESIS.

The ESIS has a dedicated data centre, which is located at the Teachers' Development Palace. Currently there are over 30 servers. The number and capacity of the current servers is not sufficient to store educational documents and teachers and pupils' photos, and for data back-up.

ESIS has a system of managing user rights which provides access to functions and data based on levels of classification of educational institutions and user's based on their roles and responsibilities. Therefore, educational and other relevant organizations' user/staff use the system within the bounds of their specified user rights. As noted, the system currently exchanges information with the Civil Registration System by retrieving, mapping and validating the teacher's and student's registration basic data.

Lack of internet network and hardware in educational institutions particularly local schools negatively affects the use of the system.

### 2.10.2 Recommendations (1.10)

- **Recommendation 1.10.1:** Delineate roles, responsibility and work schedules of MECSS and EMIS Development teams.
- **Recommendation 1.10.2:** Implement change management and risk management functions in the ESIS and perform any changes based on change requests.
- **Recommendation 1.10.3:** Ensure that the MECSS improves cooperation and coordination among the government, non-government and private organizations in the area of accumulation and utilization of the ESIS, and approves regulations on exchange of information.
- **Recommendation 1.10.4:** Connect EMIS to IT system of the Ministry of Finance to monitor financial and budget performance of educational institutions.
- **Recommendation 1.10.5:** Employ full-time staff who will be in charge of the ESIS in schools, education and cultural departments, and education departments.
- **Recommendation 1.10.6:** Conduct assessment of hardware and infrastructure of the EMIS.
- **Recommendation 1.10.7:** Distinguish the use of EMIS and school information systems according to scope and type of activities of the higher educational, professional education institutions and schools.

## 2.11 (1.11) Are there sufficient resources (human and financial) available for the EMIS?

### 2.11.1 Main Findings (1.11)

The MECSS has only one specialist, who is responsible for all education sectors' statistical data related issues and one ICT specialist, who is responsible for all IT related issues. It is unlikely that a single specialist can manage responsibility for sector-wide statistics processing and IT issues. It is likely that separate specialists may be required for policy-making, development, enhancement of the ESIS, its daily maintenance and operation, sector-wide statistical processing, system utilization and training. This implies a lack of required personnel. Further, it is very risky that the development team is legally not empowered to make these decisions and the expected status and budget of the team is highly uncertain.

The education sector's budget for 2018 and 2019 includes line items for the ESIS, which are sufficient only for development and not operation of ESIS. For further implementation and ensuring sustainable use of the ESIS nationwide, the technical infrastructure, staff recurrent capacity development and opaertional funds for activities such as data verification, is needed. A review of resources required annually for ESIS is required.

Users reported facing problems in working with the system resulting from reliability, safety and speed of internet connectivity to schools and educational institutions, and low specifications of the computers or old computers. Many schools have increased their network speed with support from graduates and the business community.[86]

### 2.11.2 Recommendations (1.11)

- **Recommendation 1.11.1:** Re-organize the unit responsible for the ICT, EMIS, and educational statistics at the MECSS and increase the number of positions required to support EMIS. Specialists are required to coordinate the EMIS system development, application and operations to ensure the effectiveness.
- **Recommendation 1.11.2:** Re-organise the structure and status of current ESIS Development Team as a specific unit or affiliated agency of the MECSS by clearly defining its responsibility and functions.

86 As reported in interviews

- **Recommendation 1.11.3:** Review the budget required for the full EMIS operation and allocate budget provision annually.
- **Recommendation 1.11.4:** Improve the Internet connectivity, speed and infrastructure required to support EMIS, particularly the internet connectivity to institutions such as schools.

## 2.12 (1.12) Is there annual budget allocation to improve the EMIS?

### 2.12.1 Main Findings (1.12)

The total budget for ESIS development is 8,760 million MNT or app. 3.3 million USD[87] per annum. The MECSS hired individual national consultants to work on development of ESIS (pre-primary and secondary education) system under the state budget. In 2018, 70 per cent was allocated for system development, 30 per cent was allocated for training. In 2019 budget, 87 per cent was allocated for system development, 3 per cent was allocated for training and 10 per cent was allocated for operational costs. The current budget is sufficient to develop and sustain current operations and is mainly used for covering the salary. Remuneration paid to consultants is higher than those of the civil servants and closer to market rates paid to IT specialists. It is uncertain whether or not the MECSS can offer the consultants sufficient renumeration as wage. The consultants are highly likely to terminate their contract if their pay is reduced than the current rate.[88]

Due to unallocation of budget in the state budget for the development of EMIS for TVET, no development is being undertaken.

The development HEMIS system for higher education is financed by the ADB L2766: Higher education reform Project. The project expires by June 2019. It is recommended that funding should be allocated from the state budget in a same way as of ESIS.

### 2.12.2 Recommendations (1.12)

- **Recommendation 1.12.1:** Allocate sufficient budget for the system development team to ensure sustainable operations and capacity building of the users and to immediately establish IT Center/office in the MECSS. Increase the capacity of the Center during project period to ensure the ability to undertake system development and operation of EMIS as required.
- **Recommendation 1.12.2:** Allocate software, hardware, human resource expenses for development and operation of EMIS for TVET and tertiary education in annual state budget.
- **Recommendation 1.12.3:** Incorporate the costs necessary for financing activities related to developing and ensuring use of ESIS system by kindergartens and schools into state budgets.

87 MES, *Policy on Information and Communication Technology in Education Sector 2012-2016* (MES, 2012), Resolution No.A-29 of the Minister of Education and Science, September 20th 2012

88 As reported in interviews

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# 2.13 (1.13) Do parents and teachers have access to EMIS data and does it result in improved pedagogical outcomes?

## 2.13.1 Main Findings (1.13)

The MECSS launched the Parent Portal System[89] and mobile application for Android and iOS in October, 2018. The sub-system enables parents to check their children's attendance, exam dates, homework, marks etc. The system also decreases paper works for teachers. ESIS mobile application for parents (Refer Annex G) is available at the Google Play and AppStore. Commencing in year 2018-19, pre-primary and secondary school teachers are able to communicate with parents through this sub-system.

There is a two step verification and validation process before the person is granted access the child's information via parents web portal and mobile application: 1) Parents input a registration data (guardian type, child's personal ID number, family name, mother/father's name, child's name, sex and birthday) via web portal and mobile application. The ESIS verifies registration data with the Civil Registration System of the General Authority for State Registration[90] to ensure that he/she is a main guardian of the child. 2) If he/she is a main guardian of the child, the ESIS send a notification to the child's class teacher for approval to ensure that he/she is a main guardian of the child. After class teachers's approval, parents can access their pupil's attendance, curriculum, schedule, textbook allocation information, disciplinary, marks, home works, school information and activities, and communicate with teachers and other parents via web portal and mobile application.

Introduction of this application was expected to result in parents increasing engagement in their child's academic progress and in enabling parents to increase their focus on and understanding of their children's study. It was expected that this would be achieved by ensuring close collaboration with teachers and the school community, and by reducing non-attendance and dropouts. However, some parents and teachers do not have a solid

89 parent.esis.edu.mn
90 http://burtgel.gov.mn/eng/

understanding of this system.[91] As a result, the speed of applications to this system in practice has been slow due to limited awareness of parents, lack of promotion of the system, and the failure of schools to impose mandatory requirements on parents to use the system. At present there are approximately 6,000 users of the system. If the parental system is fully deployed, the user number will be increased dramatically and there is a strong risk that the system will be overloaded.[92]

There are no progress reports to track school performance, data on student learning objectives, school financial data, and data on teacher quality. It is therefore essential to provide to these capabilities to ESIS to help assess the activities of schools, teachers and training, and obtain information related to school plans.

### 2.13.2 Recommendations (1.13)

- **Recommendation 1.13.1:** Enter the teacher data, photo and graduation certificate to the ESIS.[93]
- **Recommendation 1.13.2:** Increase the servers and upgrade the current ones with the higher capacity servers.

## 2.14 (1.14) What were the key drivers, Process, challenges and costs for transition from aggregate data systems to individual child systems?

### 2.14.1 Main Findings (1.14)

The ESIS is the first system that integrates the collection and storage of all administrative routine data on the Secondary Education sector such as data on teachers', students' and facilities. Previous initiatives to introduce IT systems in education sector via multiple projects were unsuccessful. For instance, under UNESCO Open EMIS Project, individual data of students in one aimag and one district was input into the system on a pilot basis. This implementation was directly affected by the absence of a long-term sector-wide policy to support EMIS and closely linked to this, a lack of ongoing funding. Prior to 2010 the MECSS used to collect data on an aggregated basis. Between 2010 and 2013 the students' registration data was collected and aggregated at each level using MS Excel spreadsheets. This resulted in a large number of duplicate student records and the validity and accuracy of the data was questionable. In order to address these issues the ESIS was introduced.

As noted above, ESIS has obtained individual data from the Civil Registration System of the General Authority for State Registration since 2013. There have been no issues in the implementation of this process. The MECSS also undertook this change to align help plan for the future in which data validity and completeness can be improved by obtaining information not only from Civil Registration System but also from other systems of health and social welfare IT systems to collect necessary data with respect to the children with disability, household income, workplace of parents and living environment etc.

### 2.14.2 Recommendations (1.14)

- **Recommendation 1.14.1:** Reduce level of direct dependence on policy-makers (especially politicians) in developing and implementing the long-term policy towards utilization of IT systems in education sector.

91 As reported in interviews.
92 As reported in interviews with ESIS Development Team.
93 Server storage capacity is presently too limited.

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# 3 Data analysis and utilization

## 3.1 (2.01) To what extent are the EMIS data accessible to intended ministries and the public?

### 3.1.1 Main Findings (2.01)

The ESIS data accessibility for intended ministries and public is regulated in accordance with procedures and on grounds determined by law. Authorized officers of NSO have direct access to the ESIS. Authorized officials of MECSS have access to ESIS information. The ESIS is used by the Metropolitan Education Office, Aimag Education and Cultural Office, District Education Office, schools (via school director and managers), and kindergartens (via managers), teachers, and parents. Authorized users can download statistics information in PDF or/and MS Excel spread sheets, Infographics (Refer Annex F) and statistical books.[94] Statistical data of the education sector is publicly available to other government and non-government organizations, private sector, public community organizations as well as to citizens. However, due to lack of information dissemination and awareness activities, the utilization of data is insufficient.

At present the ESIS general reports and ESIS statistical consolidated reports can meet the needs of the community, academia, and other government organizations, and educational institutions to the sufficient extent, but their use still remains unsatisfactory. In order to improve the quality of ESIS data and its usage, the connection to health, social protection and social welfare systems is necessary.

### 3.1.2 Recommendations (2.01)

- **Recommendation 2.01.1:** Disseminate information through all means of channels including TV, radio, web site, social media, printed publications etc., for purposes of providing the organizations and citizens with open access to ESIS data.
- **Recommendation 2.01.2:** Analyse the education data requirements of different government organisations such as the Ministry of Finance, and ensure reports are produced and disseminated relevant to their functions.

## 3.2 (2.02) How are the EMIS data interpreted, analysed, presented and consumed for decision making and policy implementation?

### 3.2.1 Main Findings (2.02)

The current ESIS provides up-to-date data for pre-primary and general education institution's daily activities, decision making and policy implementation. ESIS data is presented and distributed by web sites[95] and publication.[96]

94 Refer Annex F. Infographics produced from the ESIS are available at https://esis.edu.mn/hr/index.html#/infographic
95 NSO website www.nso.mn, Integrated Statistical Database www.1212.mn, MECSS website www.mecss.gov.mn, Website of the education sector statistics https://www.esis.edu.mn/
96 Electronic version is available at https://esis.edu.mn/hr/index.html#/statistic

A brochure is produced whtih has pre-primary, primary and secondary, and higher education sectors' detailed data presented as infographics, including number of schools (location), students (by sex, class, dormitory, students with disabilities etc), number of teachers (by age, sex, specialization etc) and other education indicators by national, sub-national, and school levels.

Academic year's statistics are available at:

- MECSS: Pre-primary education statistics (https://mecss.gov.mn/news/1386/)
- MECSS: Secondary school education statistics (https://mecss.gov.mn/category/39/)
- MECSS: Tertiary education statistics (https://mecss.gov.mn/category/40/)
- ESIS: Pre-primary and secondary education statistics from 2014 (https://esis.edu.mn/hr/index.html#/statistic)

Users can download statistics information in PDF or/and MS Excel spreadsheets from MECSS website. Infographics (Refer Annex F) and statistical brochure (Refer Annes G) produced from the ESIS are available at https://esis.edu.mn/hr/index.html#/infographic.

Data in the ESIS can be filtered, searched and prioritized using various critera, so the policy-makers and decision-makers have full potential to process the necessary information or data through the system, whenever it is needed.

### 3.2.2 Recommendations (2.02)

- **Recommendation 2.02.1:** Enhance the policy or decision-makers the understanding on functionalities or capabilities of the system and support them in their use of the system
- **Recommendation 2.02.2:** Provide pre-service training, in-service training programmes for teachers and staff on EMIS and conduct annual surveys for data use, self evaluation surveys etc.

## 3.3 (2.03) How are the EMIS data used to improve/ influence implementation of sub-national education plan at district and school levels?

### 3.3.1 Main Findings (2.03)

ESIS data is used to improve and influence implementation of education plans in all levels including school, e.g. teacher development, resource planning and allocation etc.

Resources are not allocated at the level of city and districts. The MECSS allocates the budget, computers and necessary hardware, and books directly on an integrated basis. At district level, the ESIS is used only for purposes of consolidating the data received from schools and reporting the data to the capital city, but not used for purposes of tracking the performance and monitoring of the education plans. There is large capacity to use ESIS for planning and monitoring. For example the system is capable of determining the number of teachers and number of students by subject in a classroom and yet govonors of districts do not use the ESIS data but rather approve the number of school teachers based on guidance given by the MECSS.

At school level, ESIS is used for teacher appointment to class; teacher training; timetable organization; support children with disabilities, children from ethnic minority communities, children from poor households and poor herders; textbook distribution; classroom allocation etc, that support the school plan implementation. However, the degree of using the system data is different in different schools depending on the capacity of the individuals at the school level to use the system.

### 3.3.2 Recommendations (2.03)

- **Recommendation 2.03.1:** Increase use of the system through regular measures aimed at providing awareness among all levels of educational organizations on potentials, needs and significance of using the EMIS in order to support the implementation of sectoral policy and regulation and through delivering pre-service training and in-service training programmes, annual surveys for data use, and self-evaluation surveys.
- **Recommendation 2.03.2:** Enhance capacity of human resources to use the EMIS at all levels of educational sector through in-service training of staff in the use of the system.

## 3.4 (2.04) How does the EMIS facilitate daily transactions for operational requirements?

### 3.4.1 Main Findings (2.04)

At the school level, the ESIS can be used not only for registration and reporting purposes, but also for student tracking (student's movement, transition, transfer etc.), monitoring (attendance, academic progress, homework etc.), and decision making. For instance, ESIS can track allocation of social and health assistance and the granting and remittance of scholarships for individual children.

The system reportedly causes complications to the daily operations of teachers through increased work load.[97] For instance, there exist two journals in the paper form at the school level. Each teacher is keeping a teacher's journal and each class teacher is keeping a class journal. Therefore, keeping an e-journal in ESIS is time consuming activity which duplicates the work for teachers. The teacher's paper journal has an A4 size 128 pages and class journal has an A4 size 48 pages. The elimination of the paper journal will significantly free the teacher from duplicated activities and be economically effective. For example, in the 2017-18 academic year, there were 30,411 teachers and 22,084 classes.

**Table 16. Paper cost estimation for the elimination of paper journal**

| Journal type | Journal's page, A4 size | | | Paper volume and cost estimation | | | |
|---|---|---|---|---|---|---|---|
| | Total number journals | Number of pages | Number of pages | Total number of A4 size pages | Number of packs, A4, 500 sheets, 80 grs | App.cost for A4 pack*, MNT | App. cost, USD |
| Teacher | 30,411 | 128 | 64 | 1,946,304 | 3,893 | 34,254,950 | 13,020 |
| Class | 22,084 | 48 | 24 | 530,016 | 1,060 | 9,328,282 | 3,546 |

Where: *8,800 MNT per pack; ** 1USD=2,631MNT

The teachers are overloaded with tasks because of some schools use school management application software such as "Dnevnic", "Nomch", "Avdar". In some cases ESIS is viewed as an unnecessary increase in workload.

The ESIS supports and facilitates activities, such as teacher transfer, student transfer, texbook distribution, timetable, student attendance etc.

97 Reported in interviews with teachers

### 3.4.2 Recommendations (2.04)

- **Recommendation 2.04.1:** Undertake business analysis of ESIS to ensure ESIS supports the daily tasks of teachers. For example, by eliminating the paper journal, it should be possible to reduce teachers' workload and also reduce costs for publication and distribution of paper forms.
- **Recommendation 2.04.2:** Integrate ESIS with the school management application software such as "Dnevnik", "Nomch", "Avdar" that are used by some schools for registering school and teachers' daily activities, student's attendance, and communicating with parents in order to decrease the teacher workload in manually performed activities.
- **Recommendation 2.04.3:** Store and report data on day-care and school lunch through ESIS system.

## 3.5 (2.05) How does the EMIS operate with various systems and functions, e.g. student tracking (student's movement, transition, transfer etc.), real time monitoring (attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), automated reporting with data visualization, feedback loop (e.g. school report card)?

### 3.5.1 Main Findings (2.05)

The current ESIS has been under development based on the premise that education related details of individuals would be registered in the system starting from their kindergarden until graduation from universities on an integrated basis. Therefore, ESIS has functionality for this purpose such as student tracking (student's movement, transition, transfer etc.), monitoring (attendance, academic progress, homework etc.), early warning (dropout prevention, learning improvement etc.), automated reporting and data visualization. At present, the systems for pre-primary and general education have been developed (Table 4. ESIS Structure) while HEMIS system for tertiary education are scheduled to be part of ESIS in the future.

As noted previously, ESIS can help identify students likely to drop out but it is under-ultilised in this capacity. The use of ESIS in facilitating learning improvement is also limited. The parent teacher portal interface may help address this and help facilitate improved learning.

### 3.5.2 Recommendations (2.05)

- **Recommendation 2.05.1:** Develop Higher Education Management Information System (HEMIS) and TVET EMIS. Facilitate connection of both systems to the ESIS.
- **Recommendation 2.05.2:** Develop, implement, and integrate the TVET EMIS with the ESIS. As priority, the 9, 12 grade pupils information shall be retrieved automatically from ESIS to TVET EMIS.
- **Recommendation 2.05.3:** Set up a simplified system where the government and non-government organizations submits their request or needs to obtain reports and statements from the EMIS and such requests are responded in accordance with established legislation and procedure.

# 3.6 (2.06) How is the EMIS used, if at all, to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers etc.)?

## 3.6.1 Main Findings (2.06)

The pre-primary and general education budget allocation is based on the ESIS and resources to schools are determined using ESIS data. For instance, teacher staffing requirements in schools are based on school capacity and the number of students. ESIS is used to help make many decisions concerning the school such as whether to extend school premises practicing three shift classes, and build up new schools at optimal locations. However, at the decision-making level the resources cannot still be equally allocated based soley on the ESIS data and other forms of verification are required prior to finalizing any decision.

Kindergarten resources are allocated accurately and realistically based on the system data. In addition pre-primary planning is calculated by the system to ensure the 100 per cent kindergarten enrollment. New kindergartens are presently planned in the 23 khoroos.[98]

The ESIS is also utilized for purposes of distributing books and textbooks to target group students at the school level, giving out school utensils, bags and uniforms to poor household children, rehabilitating the children with health problems or children with disability into treatment, and collecting donations and extending support etc.

However, the use of the system still remains unsatisfactory in some instances. For example, in case of allocating school textbooks, the data related to children from poor household is incomplete in the system, and teachers distribute them on the basis of their living condition since the allocation is not carried out by higher level organizations based on the system. Only after such distribution, the records are entered into the system. Sometimes the books cannot be reached to target students as the teachers do their allocation at their discretionary decision.

Starting from 2017-18 academic year, UNESCO has been collecting requests for books from teachers of general education schools and distributing the books through ESIS. For this purpose, the functionality that enables the teachers to provide their proposals of necessary books was added in the system.

The ESIS has a scholarship portal[99] (Refer Annex G). This portal provides comprehensive information scholarships, including government regulation related to the selection of grants, statistical data for the last three years, information about the Education Loan Fund, teacher and student exchange, scholarship and grant related FAQ, etc.

## 3.6.2 Recommendations (2.06)

- **Recommendation 2.06.1:** Calculate cost per child for education based on ESIS data
- **Recommendation 2.06.2:** Improve efficiency of budget execution/expenditure by eliminating of duplicates based on increased use of the EMIS.
- **Recommendation 2.06.3:** Develop a module for ESIS to ehnace the management of staff. Develop training in the use the ESIS for staff management, and conduct training in cooperation with the Institute of Teacher's Professional Development.
- **Recommendation 2.06.4:** Estimate a different rate of meal cost of kindergarten children based on living standard of population using the data on household income maintained by the Ministry of Labor and Social Protection.

98 Administrative subdivision of the capital city of Mongolia. The term is often translated as subdistrict or microdistrict. A khoroo is below the level of a district.
99 scholarship.esis.edu.mn

# 3.7 (2.07) What are some key requirements and issues to consider in order to ensure better collection, analysis and utilization of the EMIS data?

## 3.7.1 Main Findings (2.07)

**Policy and Regulation**

There two key strategic policy documents to develop and strengthen the EMIS: The Education Sector Master Plan (ESMP)[100] and The "Policy on Information and Communication Technology in Education Sector 2012-2016"[101] expired in 2015. The EMIS, including education sector infrastructure and hardware is not supported by a dedicated strategic plan or a policy. Refer section 1.1 and 1.2.

**EMIS Development and Implementation**

The ESIS was developed as a single centralized system solution to education data. It is an integrated information system, introduced to all educational levels. The ESIS is responsible for collecting, storing, processing, delivering, reporting, and transmitting educational data to the its users. The TVET sector has no integrated EMIS system. The HEMIS system for higher education is currently under development and has not fully been implemented nationwide yet.

**EMIS, Education Data Utilization**

The ESIS contains large amounts of data useful for planning, however its utilization for the purposes of policy and planning remains inadequite. Although decisions can be made based on ESIS data, some policy-makers such as politicians, do not utalise data strongly. Simple Statistical data aggregated at sub-national level of the education sector is publicly available to other government and non-government organizations, private sector, public community organizations as well as to citizens. However, due to lack of information dissemination and awareness, the utilization of data is insufficient. Refer Section 3.

100 Government of Mongolia, *Master Plan to develop Education of Mongolia in 2006-2015* (GOM, 2006). https://www.globalpartnership.org/content/master-plan-develop-education-mongolia-2006-2015, accessed 12 April 2019

101 MES, *"Policy on Information and Communication Technology in Education Sector 2012-2016"* (MES, 2012). Resolution No.A29 of the Minister of Education and Science, 20 September 2012

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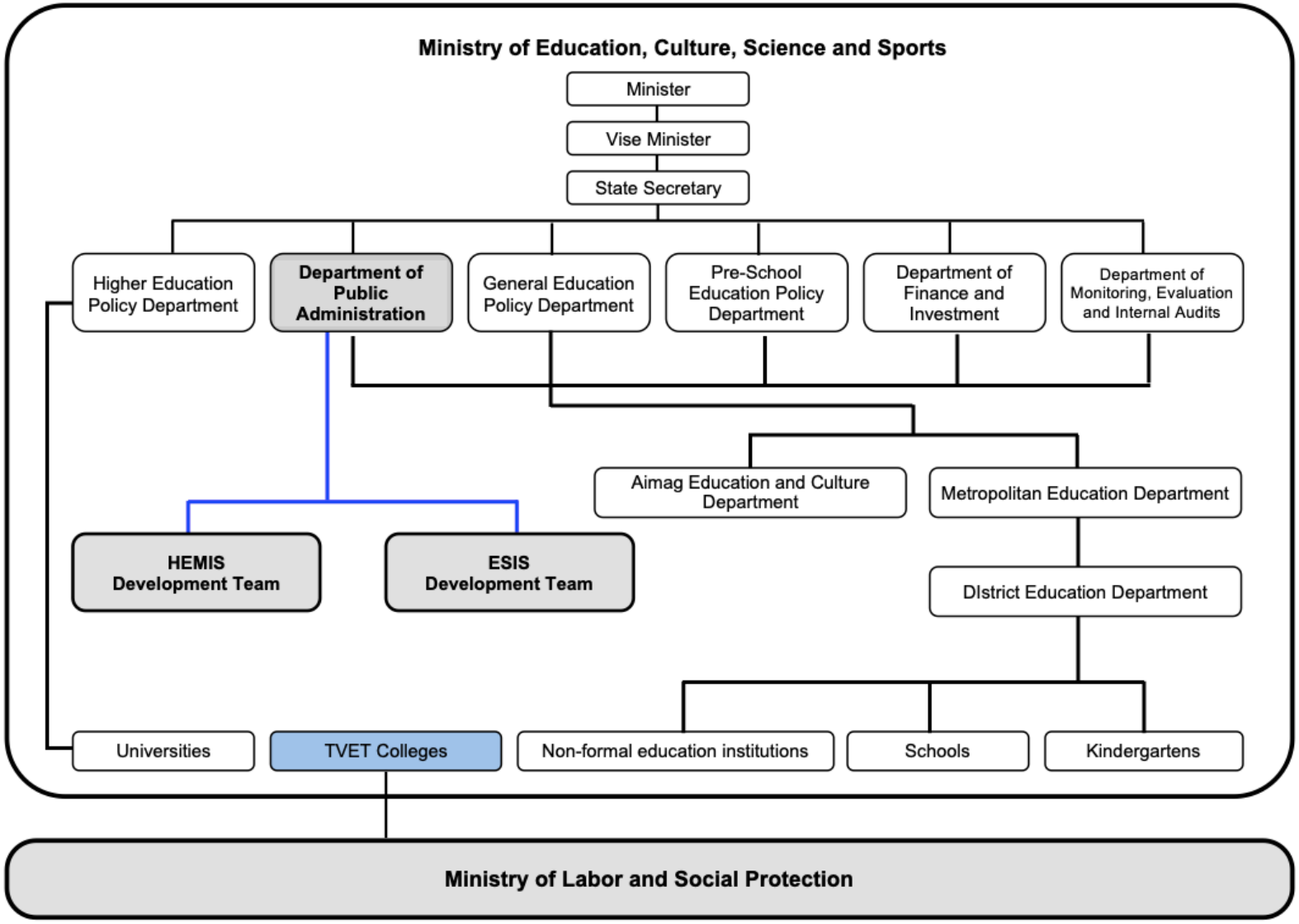
# Annex B Persons interviewed

The following persons were consulted as part of this research.

| Name | Position | Department/Institution/ Organisation |
|---|---|---|
| N.Oyunbyamba | Senior Engineer | Construction Polytechnic College |
| P.Zolzaya | Manager | Manufacturing Arts Polytechnic College |
| Yu.Altantuya | Specialist | MECSS |
| O.Dunjinnamdag | IT Specialist | MECSS |
| E.Tserentsoodol | Team leader | MECSS, EMIS development team |
| M.Mendbayar | Data Analyst | MECSS, EMIS development team |
| D.Unenbat | Business Analyst | MECSS, EMIS development team |
| Ts.Todgerel | System Architect | MECSS, EMIS development team |
| Lkhagvasuren | Team leader | MECSS, HEMIS development team |
| D.Munkhbileg | Education Officer | Metropolitan Education Office |
| N.Amarbayasgalan | Specialist | NSO |
| O.Odonchimeg | Manager | Pre-primary |
| Ts.Manakhuu | School Director | School #28 |
| Ts.Myagmarjav | High School Manager | School #28 |
| S.Jargalmaa, | Pre-primary Manager | School #28 |
| E.Ankhbayar | School Teacher | School #28 |
| S.Munkh-Erdene | School Teacher | School #28 |
| T.Undral | Internal Audit Officer | School #35 |
| N.Gendensuren | School Director | School #5 |
| D.Battogtokh | School Manager | School #5 |
| Ts.Battestseg | School Manager | School #5 |
| A.Zolzaya | Father | School #52, grade 4a-Egshiglen |
| E.Oyunbileg | Mother | School #73, grade 2a-Bayandalai; 4b-Buyantogtokh |
| P.Bolormaa | Specialist | TVET Policy implementation and coordination department, Ministry of Labor and Social Protection |
| D.Khurelmaa | M&E Officer | UNICEF Country Office |
| T.Tsendsuren | ECD consultant | UNICEF Country Office |

# Annex C Organizational structure in relation to EMIS



# Annex D Research Rubric

A research rubric is below to enable scaled comparisons between countries along different research themes and is presented below.

**Table 17. Rubric for summary comparison of the review**

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.0 | Strategic area: policy and data gaps | | | | | |
| 1.01 | Does the country have a strategic plan to strengthen the EMIS? | No Strategic Plan currently exists. There two key strategic policy documents to strengthen the EMIS are expired. | Strategic plans exist but they are fragmented between different agencies, lacking in quality or are not being implemented. | Strategic plans exist and are being followed but there are areas of quality, coordination or implementation requiring improvement. | Strategic plans exist and guide EMIS | The Ministry of Education Culture Science and Sports (MECSS) is developing the ESMP (possibly, 2019–2030) and the "Policy on Information and Communication Technology in Education Sector 2018-2024". |
| 1.02 | Does the EMIS collect and analyse data that is necessary and sufficient to monitor and develop the national education policy framework and sector plan? | EMIS collect and analyse data for monitoring and development of the national education policy framework and sector plan. | The EMIS collects and analyses data that is necessary and sufficient for the formulation of new national education policy framework and sector plan. However, its utilization for the purposes of policy-making and planning remains inadequite. | EMIS does collect and analyse data for most monitoring and development of the national education policy framework and sector plan but there are some gaps and issues (quality, sector etc.). | EMIS does collect and analyse data for all monitoring and development of the national education policy framework and sector plan and facilitates timely and quality monitoring and analysis. | None |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.03 | Does the EMIS collect and analyse data required for SDG targets and indicators monitoring? | EMIS does not collect and analyse data for SDG targets and indicators and there is presently no mapping. | The EMIS to some extent collects and processes data required for SDG 4 targets and indicators. | EMIS does collect and analyse data for most SDG targets for which EMIS can inform and indicators and there is and there is mapping and a plan to ensure full coverage. | EMIS does collect and analyse data for all SDG targets for which EMIS can inform and indicators and there is presently mapping. | Review data for SDG 4 indicators against existing statistics and forms, and update existing forms to modify and create new forms if required. |
| 1.04 | To what extent does the EMIS capture data and information in ways that allow for equity analysis, such as enrolment/ attendance of children with disabilities, children from ethnic minority communities, and children from poor households etc.? | EMIS does not disaggregate by equity parameters: regional, ethnicity, wealth, gender, disability, language etc. | EMIS does disaggregate by some parameters of equity parameters: regional, ethnicity, wealth, gender, disability, language etc. | EMIS does disaggregate by most equity parameters, including regional, ethnicity, gender, disability status, blood type, mother tongue, orphan and type of orphans, guardian of the child and guardian's information, and some information on wealth. | EMIS does disaggregate by all parameters of equity parameters: regional, ethnicity, wealth, gender, disability, language etc. | None |
| 1.05 | How, if at all, does the EMIS address issues around school out-of school children (incl. children at risk of dropping out)? | EMIS is not used to address issues of OOSC or risk of dropping out. | EMIS can be used to address issues of OOSC or risk of dropping out. It to some extent allows schools and teachers to prevent from school drop-outs however it is underutalised in this regard. | EMIS is used to address issues of OOSC or risk of dropping out but there are some gaps, disaggregation and quality issues. | EMIS is used to address issues of OOSC or risk of dropping out on a regular basis. | None |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.06 | What are the various aspects of the quality of EMIS? | EMIS data fitness for analysis: relevance, accuracy, completeness, regency and cleanliness are poor. | EMIS data fitness for analysis: relevance, accuracy, completeness, recency and cleanliness have significant issues. | EMIS data fitness for analysis: relevance, accuracy, completeness, recency and cleanliness is robust. The ESIS downloads individual data from the Civil Registration System of the General Authority for State Registration by using personal identification number. Therefore, there is no duplicated registration. | EMIS data fitness for analysis: relevance, accuracy, completeness, recency and cleanliness are good. | None |
| 1.07 | What are the quality assurance processes in place and how effective are they? | Few or no quality control processes such as validation, triangulation and verification. | Some quality control processes such as validation, triangulation and verification but applied inconsistently. | Good quality control processes are implemented such as validation and verification applied consistently and transparently. | Good quality control processes are implemented such as validation, triangulation and verification applied consistently and transparently. | TVET has no integrated system and databases, so quality assurance issues have completely been omitted. The HEMIS system is currently under development. Higher education institutions conduct a quality assurance of their data and information systems on their own. |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.08 | How does the EMIS protect data privacy of students and teachers? | There are no policies or legislation concerning privacy and privacy is not enforced for data on individuals. | There are is a policies or legislation concerning privacy but it is not enforced for data on individuals. | According to the Privacy Law of Mongolia, all information and reports generated and distributed by the ESIS to public, researchers, and stakeholders are summarized data and do not contain any personal information. | There are is a policies or legislation concerning privacy which is enforced for data on individuals however and this does not affect required analysis and publication. | The Law on Personal Secrecy (Privacy Law) of Mongolia (1995) |
| 1.09 | How does the EMIS interact, if at all, with other administrative data systems (e.g. health, social welfare, civil registry, labour)? | EMIS stands alone and does not derive any information from any other systems. | EMIS interoperability with other data systems is limited. It is connected with the Civil Registration System and Education Evaluation Center service. There are no standards which govern information entities such as individuals. | EMIS has some interoperability with other systems based on common data standards for entities such as individuals. | Interoperability between EMIS and other government data systems is extensive and based on common data standards. | None |
| 1.10 | How is the EMIS managed and where is it situated in the data architecture or statistical systems of the country? | Centralised and isolated in an EMIS department or equivalent. | EMIS is centralized and has a dedicated data centre, and some access granted to national stakeholders but limited access outside the central Ministry of Education. Some aggregated data and indicators is publicly accessible through the Ministry's and NSO's website. | Access and data management at the provincial and district levels. | Fully decentralised for data entry and management at the school level. | None |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.11 | Are there sufficient resources (human and financial) available for the EMIS? | EMIS is allocated few resources with affects the quality of data, reporting, dissemination and development. | EMIS is operational but lacks human and financial resource. The education sector's budget for 2018 and 2019 includes line items for the EMIS, which are sufficient only for development. | EMIS is well resourced but there are some areas which could be better resourced for development and some aspects of operation. | EMIS is well resourced with adequate funds for operation and further development to address any issues. | None |
| 1.12 | Is there annual budget allocation to improve the EMIS? | There is no budget allocation to the improvement of EMIS | The current budget is sufficient to develop and sustain current operations of ESIS which is mainly used for covering the salary. | Budget is allocated and ensures most improvements required to EMIS are undertaken. | Budget is allocated consistently through a systematic process of analysis of requirements and costing on an annual basis. | None |
| 1.13 | ADDED<br>Do parents and teachers have access to EMIS data and does it result in improved pedagogical outcomes? | Parents and Teachers have no access to EMIS data and there is little evidence that EMIS data contributes to pedagogical outcomes. | Parents and Teachers have access to EMIS data through the school to a limited extent such as through raw examination results for key exam points. | Teachers have access to EMIS data through system. The Parent Portal System and mobile application for Android and iOS enable parents to check their children's attendance, exam dates, homework, marks and to communicate with teachers. There are no progress reports to track school performance, data on student learning objectives, school financial data, and data on teacher quality. | Parents and Teachers have extensive access to EMIS data and are able to feedback comments. EMIS facilitates communication between teachers and parents and students. | Interviews with parents and teachers.<br>Access portals and reports from the system. |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 1.14 | **ADDED**<br>What were the key drivers, Process, challenges and costs for transition from aggregate data systems to individual child systems? | There were significant barriers to transition. Funding may have been difficult, and / or budget was significantly exceeded. There were many issues encountered during the transition. | There were some barriers to transition: absence of a long-term sector-wide policy to support EMIS; lack of ongoing funding; process, challenges and costs of moving from aggregate to MS Excel to the centralsied database. | There were few barriers to transition. Transition was planned and budgeted however there were still some challenges encountered during transition. | Transition was carefully planned, budgeted and capacity developed appropriately. Very few issues were encountered and these were managed with contingency planning or rapid action. | Interviews<br>Documents |
| 2.0 | Strategic Area: Data analysis & utilisation | | | | | |
| 2.01 | To what extent are the EMIS data accessible to intended ministries and the public? | EMIS data is inaccessible to external stakeholders and only published in aggregate regional or national figures. | The public and other stakeholders have access to EMIS data at regional and national level but not at individual institution level. | EMIS data accessibility for intended ministries and public. Authorized officers have access to EMIS information. Statistics information, aggregated data, indicators and inforgraphics are available on EMIS portal and Ministry's web site. | The public and other stakeholders have access to EMIS data at regional, national and individual institution level in all sectors and in formats which help inform as to the progress of individual institutions. | None |
| 2.02 | How are the EMIS data interpreted, analysed, presented and consumed for decision making and policy implementation? | EMIS data is only published in raw or aggregate format. It is not analysed. Its use in policy implementation is limited. | EMIS data is analysed and presented as indicators, infographs and figures and can be filtered, searched and prioritized using various critera but is not used extensively at all levels of government. | EMIS data is analysed and narrated and used extensively in policy implementation at all levels of government. | EMIS data is analysed, in innovative ways to the school level. It is narrated in publications and used extensively in policy implementation at all levels of government to institution level. | None |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 2.03 | How are the EMIS data used to improve/influence implementation of sub-national education plans at district and school levels? | EMIS data is not used for sub-national planning or in schools. | EMIS data is used for some sub-national planning but not in schools. | EMIS data is used for sub-national planning and in schools (teacher appointment to class; timetable organization; support children with disabilities; textbook distribution; classroom allocation etc) | EMIS data is used for extensively in sub-national planning and in schools including school development planning and access by the School Committee or equivalent. | None |
| 2.04 | How does the EMIS facilitate (i) daily transactions for operational requirements? | EMIS is not used for daily transactions and operational requirements. It simply reports statistics. | The EMIS supports and facilitates activities, such as teacher transfer, student transfer, texbook distribution, timetable, student attendance etc | EMIS encompasses operational systems such as a Human Resources Information System and they are integrated with EMIS and used often. | The EMIS ecosystem of systems is well integrated and contains little data redundancy and operational systems are used extensively. | None |
| 2.05 | How does the EMIS operate with various systems and functions, e.g. student tracking (student's movement, transition, transfer etc.), real time monitoring (attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), automated reporting with data visualization, feedback loop (e.g. school report card)? | EMIS does not operate with system functions .g. student tracking (student's movement, transition, transfer etc.), real time monitoring (attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), automated reporting with data visualization, feedback loop (e.g. school report card) | EMIS has limited operation with system functions .g. student tracking (student's movement, transition, transfer etc.), real time monitoring (attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), automated reporting with data visualization, feedback loop (e.g. school report card) | EMIS has good operation with system functions .g. student tracking (student's movement, transition, transfer, attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), and automated reporting with data visualization, feedback loop (e.g. school report card). | EMIS has extensive operation with system functions .g. student tracking (student's movement, transition, transfer etc.), real time monitoring (attendance, academic progress etc.), early warning (dropout prevention, learning improvement etc.), and automated reporting with data visualization, feedback loop (e.g. school report card). | None |

| SN | Research question | Latent | Emerging | Established | Advanced | Comment |
|---|---|---|---|---|---|---|
| 2.06 | How is the EMIS used, if at all, to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers)? | EMIS is not used to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers etc.). | EMIS is sometimes used to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers etc.) through non-routine analysis. | EMIS is often used to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers etc.) through non-routine analysis and routine use. | EMIS is used extensively to help ensure equitable distribution and allocation of resources (e.g. school grants, teachers etc.) through non-routine analysis and routine use. | None |
| 2.07 | What are some key requirements and issues to consider in order ensuring better collection, analysis and utilization of the EMIS data? | Extensive requirements to consider improving EMIS. | Some requirements to consider improving EMIS. There is a potential need to process, analyse all type of EMIS related information in the integrated manner to enable reporting on different aspects of the education system to help monitor policies and plans. | A few requirements to consider improving EMIS but EMIS are used at all levels. | EMIS is optimally deployed. Data is presented in an appropriate format and used routinely at all levels. | None |

# Annex E Five year data tables

**Table H.1. Pre-primary Education Statistics, 2013-2018**

| School year | Number of kindergartens | | | Number of kids | | Number of teachers and staff |
|---|---|---|---|---|---|---|
| | Total | State-owned | Private | Total | Female | |
| 2013-2014 | 1,067 | 764 | 303 | 193,672 | 95,548 | 21,019 |
| 2014-2015 | 1,177 | 777 | 394 | 206,636 | 102,146 | 21,962 |
| 2015-2016 | 1,288 | 826 | 462 | 225,388 | 111,178 | 24,179 |
| 2016-2017 | 1,354 | 854 | 500 | 243,432 | 119,935 | 25,639 |
| 2017-2018 | 1,416 | 878 | 538 | 256,720 | 126,610 | 27,172 |

Source: Pre-primary Education Statistics, 2018-2019, MECSS (in Mongolian).

**Table H.2. General Education Statistics, 2013-2018**

| Academic year | Number of Schools | | | | | | | Number of Students | | Number of teachers and staff |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | State-owned | Private | Primary Schools | Secondary Schools | High Schools | Complex Schools | Total | Female | |
| 2013-2014 | 756 | 628 | 128 | 61 | 130 | 522 | 43 | 497,022 | 248,960 | 45,367 |
| 2014-2015 | 762 | 628 | 134 | 62 | 136 | 514 | 50 | 505,816 | 253,505 | 45,882 |
| 2015-2016 | 768 | 636 | 132 | 62 | 118 | 538 | 50 | 535,055 | 269,384 | 46,791 |
| 2016-2017 | 778 | 645 | 133 | 69 | 117 | 542 | 50 | 551,953 | 277,047 | 47,168 |
| 2017-2018[101] | 798 | 652 | 146 | 74 | 116 | 562 | 46 | 572,752 | 286,014 | 47,991 |

Source: General Education Statistics, 2018-2019, MECSS (in Mongolian).

**Table H.3. TVET Statistics, 2014-2019**

| Academic year | Number of Schools | | | Number of Leaners | | Number of new entrants | | | Number of graduates | | Number of employees |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | State-owned | Private | Total | Female | Total | Grade 9 graduates | Grade 11/12 graduates | Total | in employ-ment | |
| 2014-2015 | 76 | 52 | 24 | 42,797 | 18,252 | 20,804 | 10,928 | 5,130 | 18,978 | 10,759 | 4,409 |
| 2015-2016 | 81 | 49 | 32 | 42,675 | 17,286 | 20,961 | 10,388 | 3,195 | 19,488 | 7,665 | 4,520 |
| 2016-2017 | 86 | 50 | 36 | 40,134 | 15,900 | 18,769 | 5,455 | 4,416 | 19,531 | 9.034 | 4714 |
| 2017-2018* | - | - | - | - | - | - | - | - | - | - | - |
| 2018-2019* | 86 | 51 | 35 | 37,039 | 14,589 | 23,512 | 7,521 | 4905 | 20,599 | - | - |

Source: Statistical data on vocational education and training, 2015-2016.

* TVET Statistics, MLSP

102 Rural schools accounted for 61.4% while 38.6% are in the capital. There were 572,752 students (49.9% are female) and a total of 35,196 students lived in dorms. 461 students attended evening classes and 7,947 attended compulsory education (MECSS, General Education Statistics, 2017-2018).

**Table H.4. Higher Education Statistics, 2013-2018**

| Academic year | Number of HEIs | | | | Number of Students, by degree | | | | | Number of staff |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | State-owned | Private | Foreign Branch | Total | Diploma | Bachelor | Master | Doctor | |
| 2013-2014 | 100 | 16 | 79 | 5 | 174,071 | - | 152,708 | 18,063 | 3,304 | 13,212 |
| 2014-2015 | 101 | 16 | 80 | 5 | 178,295 | - | 155,839 | 19,065 | 3,391 | 13,360 |
| 2015-2016 | 100 | 17 | 78 | 5 | 162,626 | - | 140,296 | 19,005 | 3,325 | 13,057 |
| 2016-2017 | 95 | 17 | 74 | 4 | 157,138 | - | 133,223 | 20,066 | 3,849 | 12,740 |
| 2017-2018 | 96 | 18 | 75 | 3 | 155,248 | 124 | 130,484 | 20,345 | 4,295 | 12.705 |

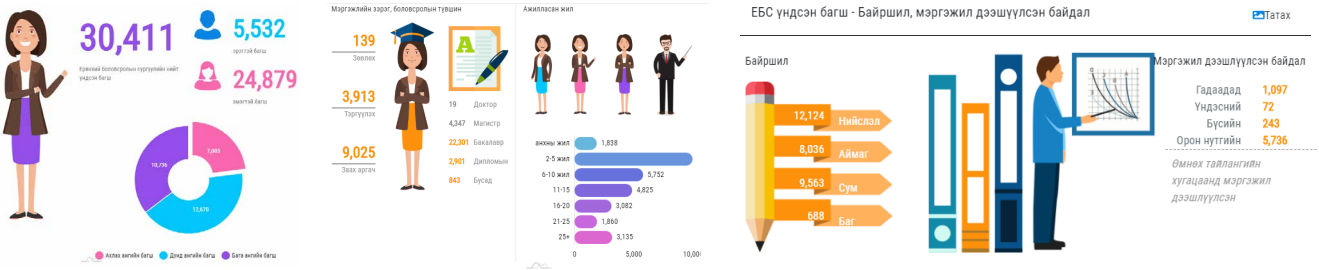
Source: Higher Education Statistics, 2018-2019, MECSS (in Mongolian).

# Annex F SDG 4 Indicators in Mongolia

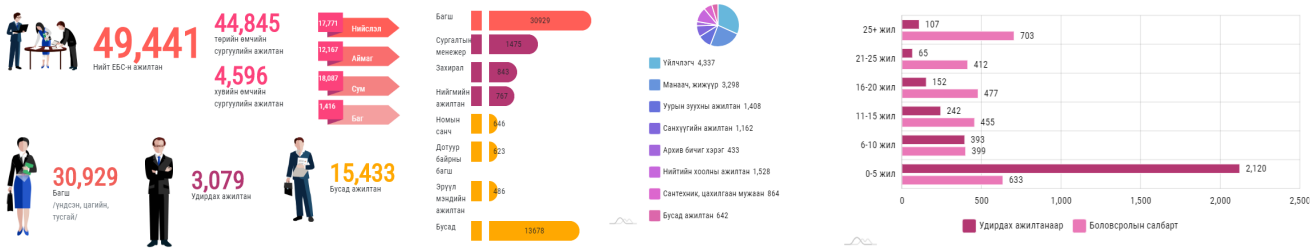
| # | Indicators | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| 1 | 4.2.1 Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex | 76 (2013) | | |
| 2 | 4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex | 66.2 | 68.3 | 64.6 |
| 3 | 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex | 61.5 (2013) | | |
| 4 | 4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated | | | |
| | Parity indices, by sex | | | |
| | Female | | | |
| | Primary | 98.5 (2013) | | |
| | Complete secondary | 95.0 (2013) | | |
| | High | 90.4 (2013) | | |
| | Male | | | |
| | Primary | 97.7 (2013) | | |
| | Complete secondary | 90.8 (2013) | | |
| | High | 79.7 (2013) | | |
| | Parity indices, by social group | | | |
| | Bottom wealth quintile | | | |
| | Primary | 96.2 (2013) | | |
| | Complete secondary | 85.4 (2013) | | |
| | High | 68.8 (2013) | | |
| | Top wealth quintile | | | |
| | Primary | 99.1 (2013) | | |
| | Complete secondary | 98.0 (2013) | | |
| | High | 96.6 (2013) | | |
| | Parity indices, by urban and rural | | | |
| | Urban | | | |
| | Primary | 98.5 (2013) | | |
| | Complete secondary | 94.3 (2013) | | |
| | High | 89.4 (2013) | | |
| | Rural | | | |
| | Primary | 97.5 (2013) | | |
| | Complete secondary | 90.7 (2013) | | |
| | High | 76.8 (2013) | | |
| 5 | 4.6.1 Percentage of literacy in a 15-24 age group of population, by gender | | | |
| | Male | 95.2 (2013) | | |
| | Female | 97.5 (2013) | | |
| 6 | 4.a.1 Proportion of schools with access to: (a) electricity; (b) Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic hand washing facilities (as per the WASH indicator definitions) | | | |
| | (a) Proportion of schools with access to electricity | 96.6 | 96.6 | 96.6 |
| | (b) Proportion of schools with access to the Internet for pedagogical purposes | 67.8 | 68.4 | 68.4 |
| | (c) Proportion of schools with access to computers for pedagogical purposes | 94.8 | 95.4 | 95.4 |
| 7 | 4.b.1 Volume of official development assistance flows for scholarships by sector and type of study, by thousand USD | 9.3 | 11.9 | |
| 8 | 4.c.1 Proportion of teachers in: (a) pre-primary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country | | | |
| | Proportion of teachers in pre-primary | 95.7 | 94.8 | 95.0 |
| | Proportion of teachers in primary | 92.7 | 98.8 | 98.8 |
| | Proportion of teachers in lower secondary and upper secondary | 82.4 | 98.1 | 99.2 |

Source: www.1212.mn

# Annex G Infographics generated by the ESIS

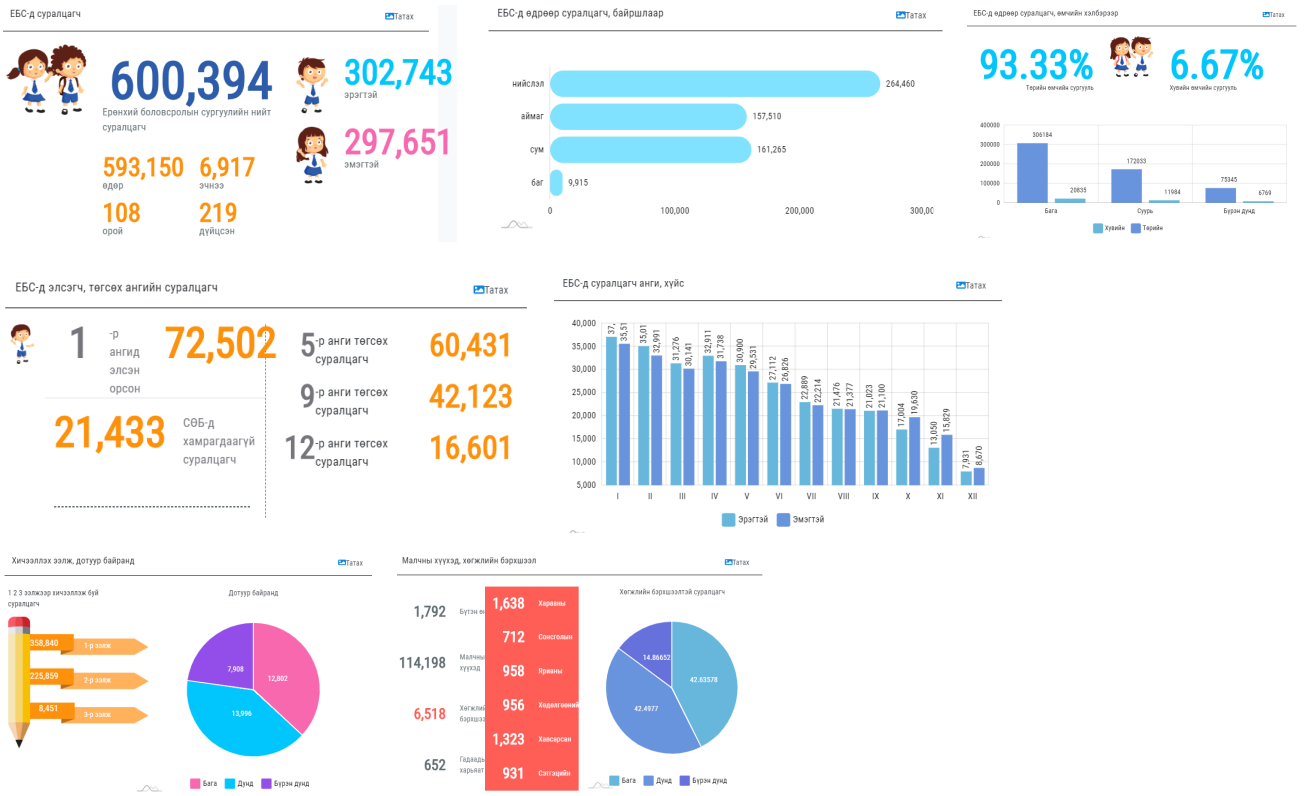



A.Secondary education – Teachers

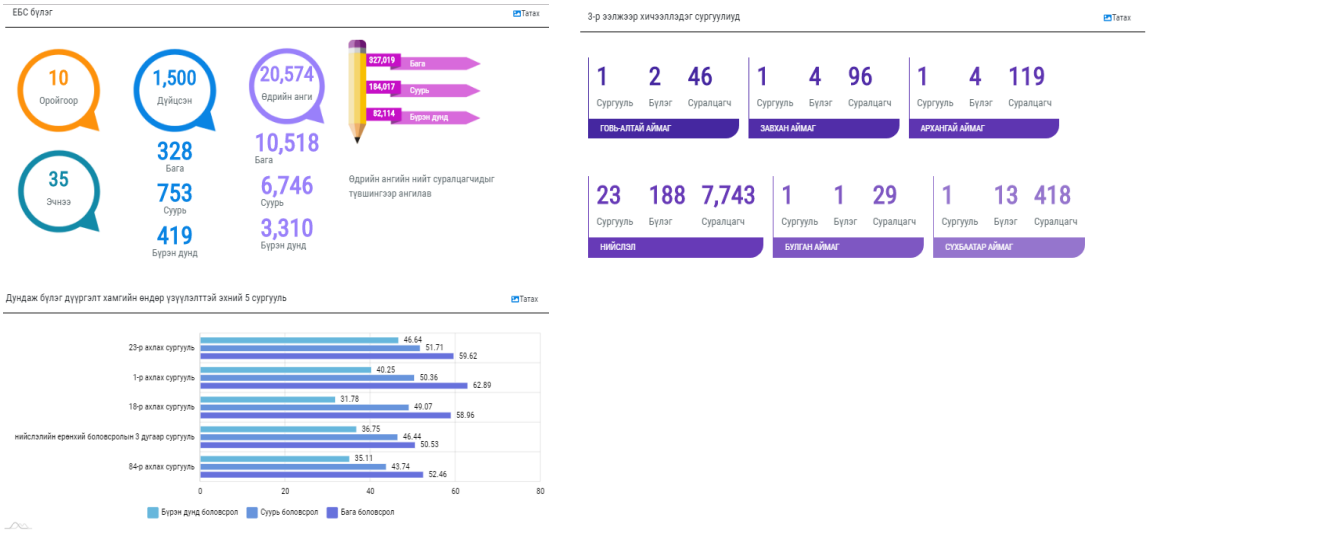



B. Secondary education – Human resource

C. Secondary education – School environment

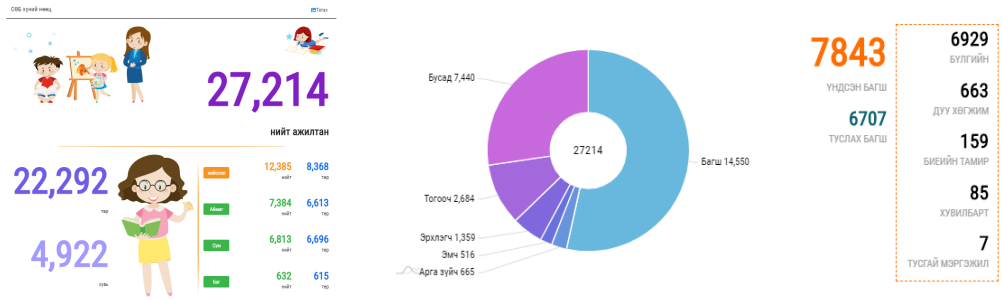



D. Secondary education – Students

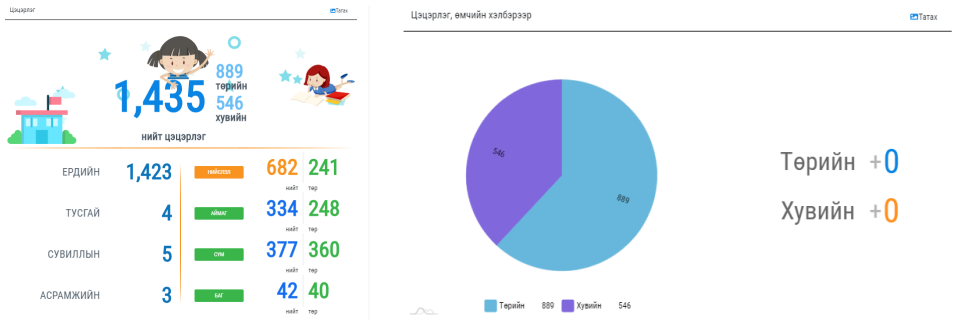



E. Secondary education – Group

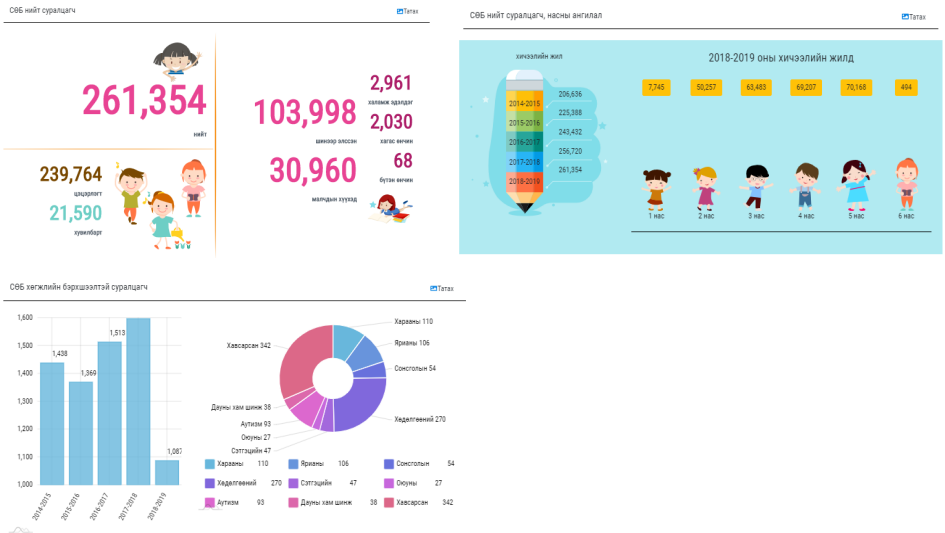
F. Pre-primary education – Teachers



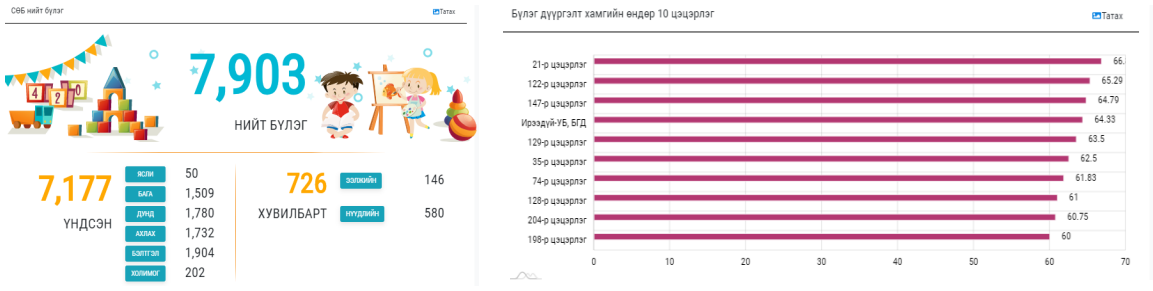

G. Pre-primary education – Human resource




H. Pre-primary education - Environment



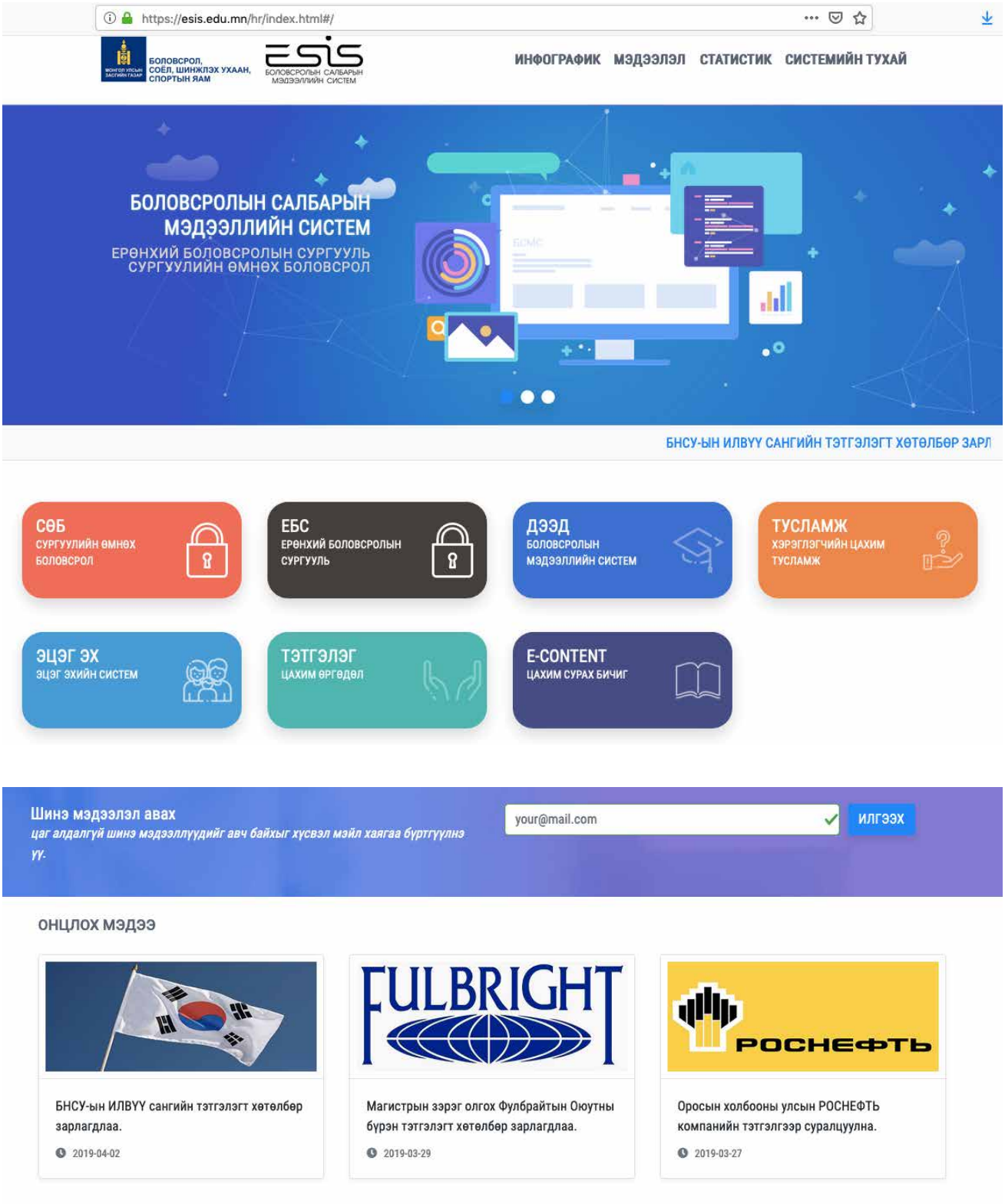

I. Pre-primary education – Students



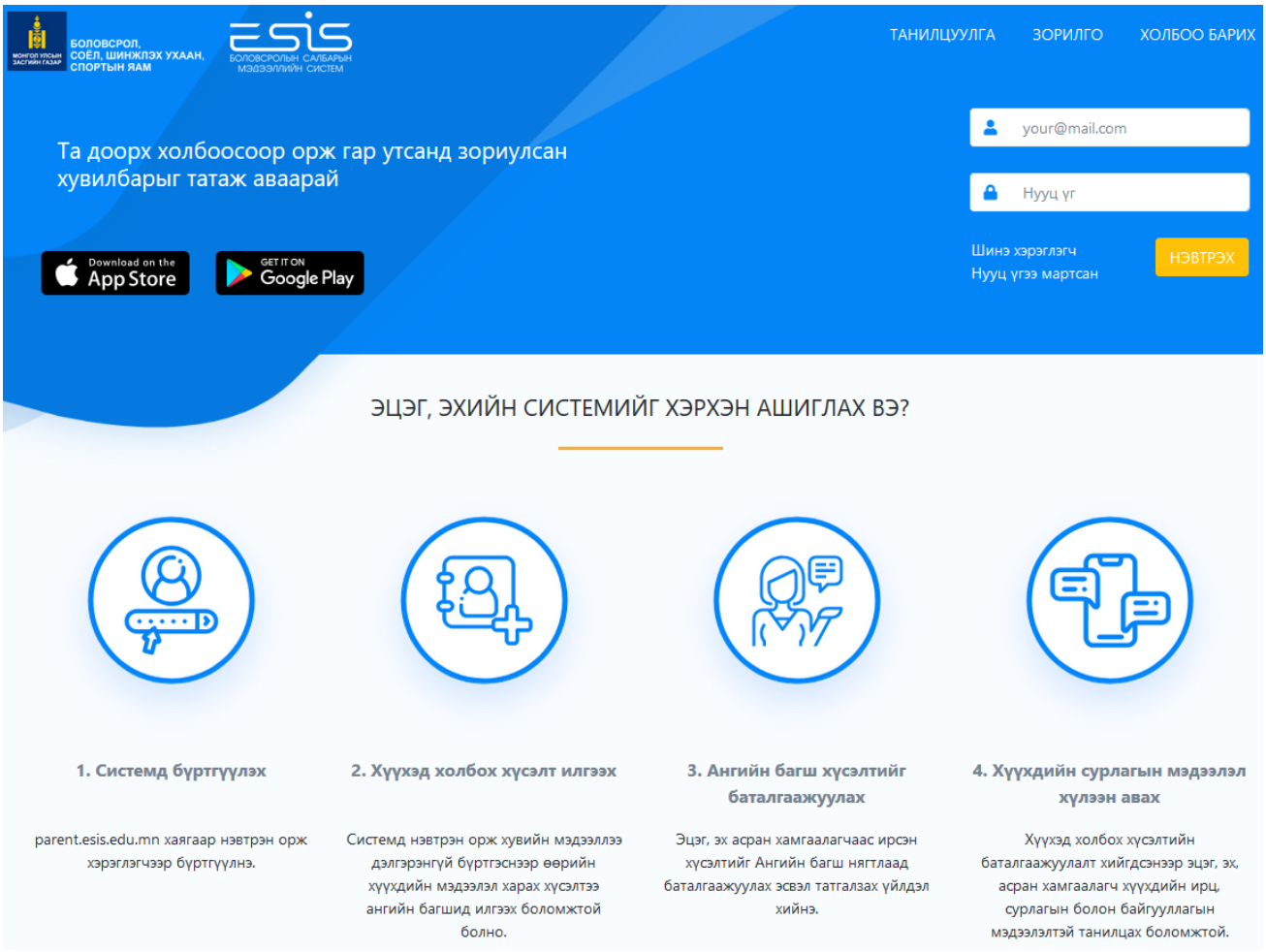

J. Pre-primary education – Group

# Annex H ESIS Interfaces

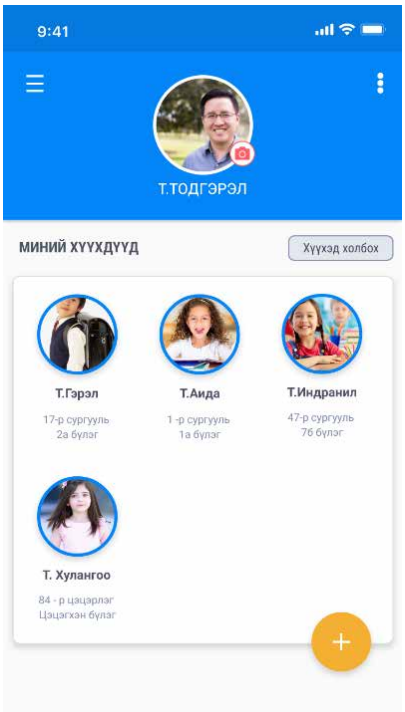
ESIS - Education Sector Information System's Home Page

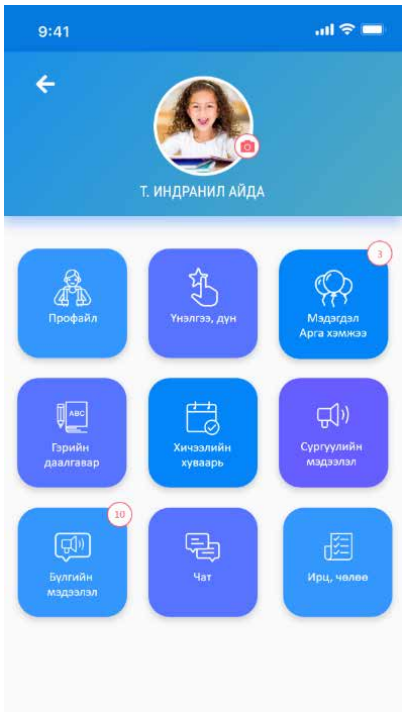


Parent Portal System - parent.esis.edu.mn

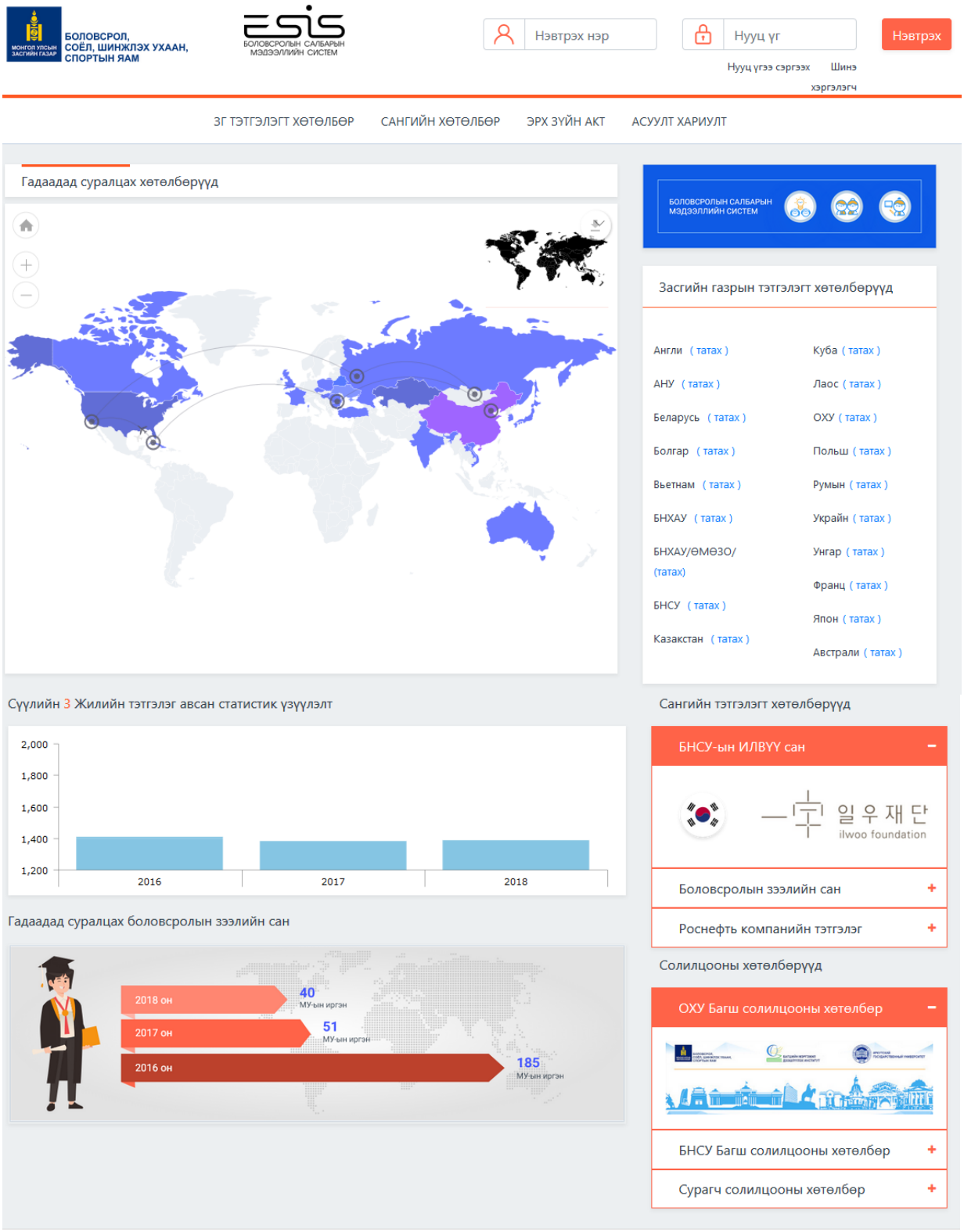



Mobile Application for Parents



## Scholarship Portal - scholarship.esis.edu.mn




Засгийн газрын хөтөлбөр

Сангийн хөтөлбөр

Эрх зүйн акт

Асуулт хариулт

Онлайн өргөдлийн системтэй холбоотой мэдээлэл авах

Утас: 7577-8080

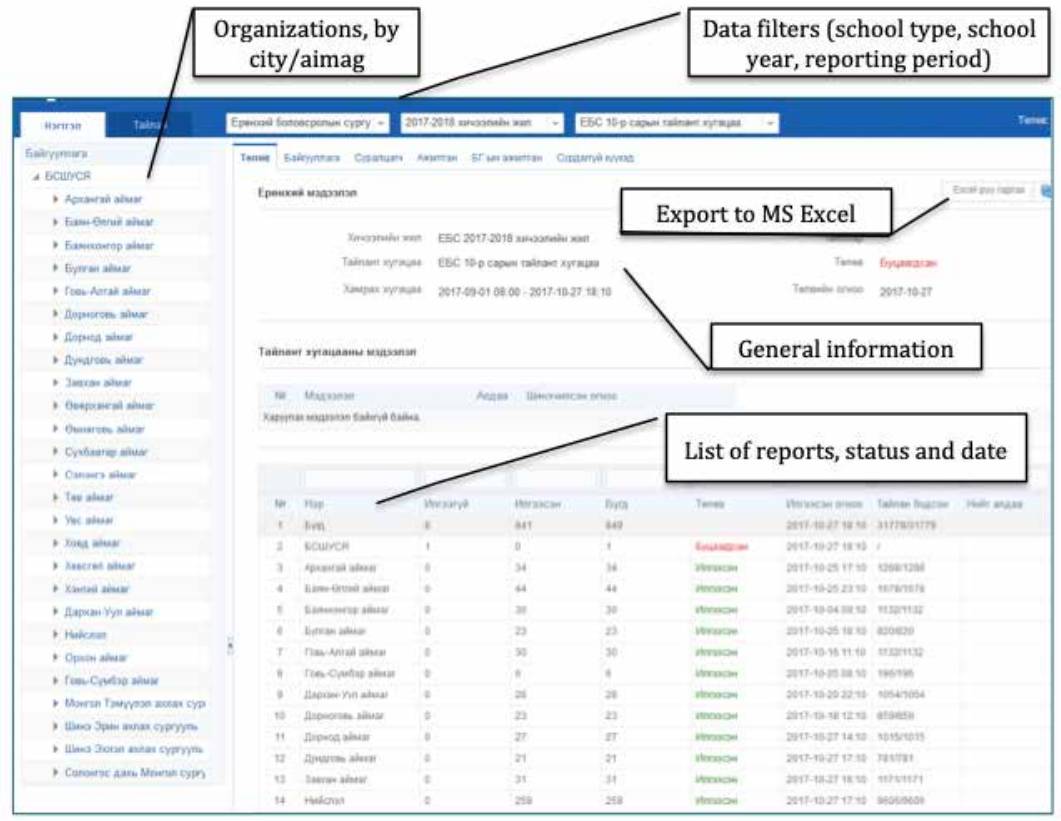
Мэйл хаяг: Esis@mecs.gov.mn

Тэтгэлэгтэй холбоотой мэдээлэл авах

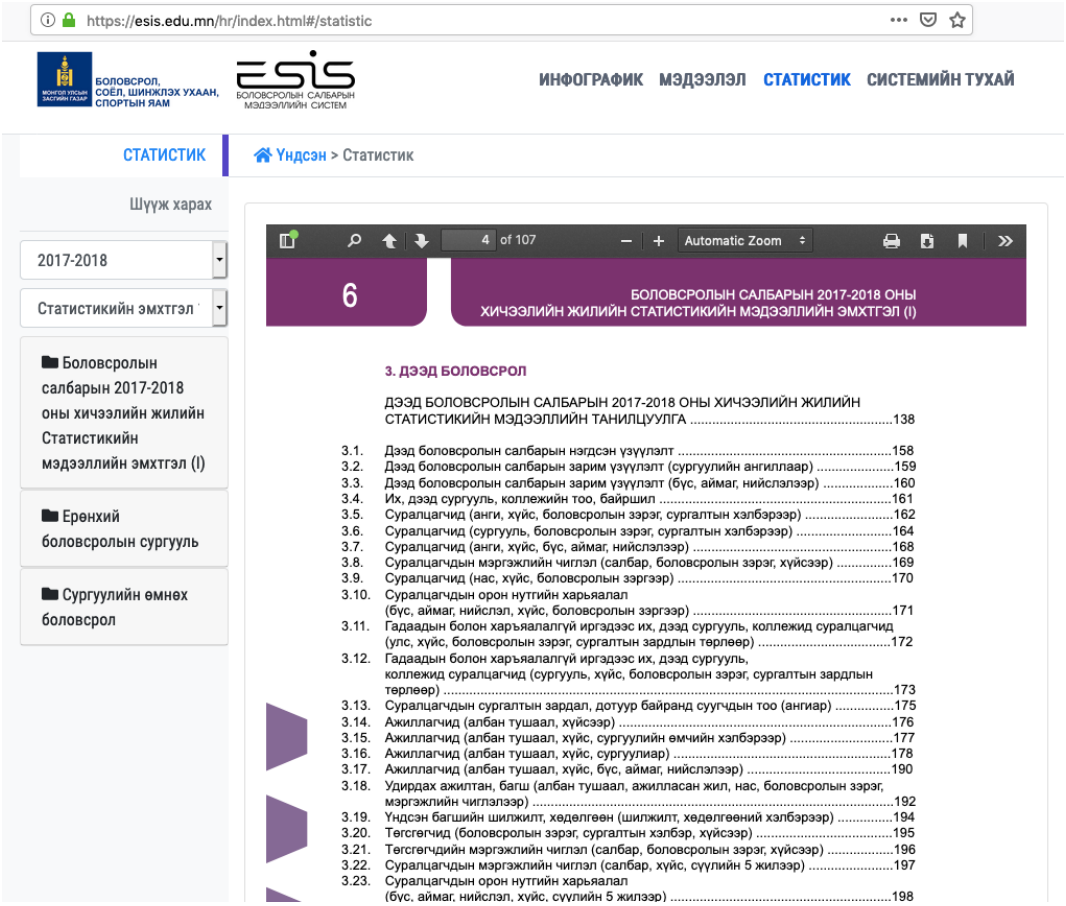
Утас: 51-266428

Мэйл хаяг: scholarship@mecs.gov.mn

List of Primary and Secondary Education Reports, ESIS




Statistical Brochure (full version, from year 2014)



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