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The E-Governance Development in Educational Sector of Republic of Moldova

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Abstract. During the last years e-governance is being implemented in many countries. Within the same country, the level of achieved results can vary significantly between sectors. The implementation of e-governance in Republic of Moldova has had a good start, but some stagnation in the implementation of the e-governance agenda is registered. In the educational sector, the implementation is still at the low level. This practical paper surveys the e-tools in the educational sector of the Republic of Moldova, thus revealing the e-governance level of the sector. By comparing with the usage of IT tools in the Swedish educational system, and identifying the benefits and issues met during their development, it proposes a way for future implementation of the e-governance agenda in the educational sector in Moldova. While Moldova as a country has extensive Internet coverage, Sweden was chosen for the comparison because of its Internet coverage plus its focus on furthering the skills of its workforce and also the considerable efforts of e-governance agenda implementation.

Keywords: E-Governance, educational sector, EMIS

1 Introduction

Realizing the possibilities of building trust between governments and citizens by using internet-based strategies to involve citizens in the policy process, and thus demonstrating government transparency and accountability [1, p. 752], the Government of Republic of Moldova defined an e-governance agenda in 2005. The implementations were initialized in 2010 with a major project financed by the World Bank and administrated by the government. The Electronic Government Center (EGC) is responsible for developing and implementing the government technologic modernization agenda: 429 public services are described on the EGC platform www.servicii.gov.md; 102 of these services are available on-line. A large share of the developed services is implemented for the citizens and business sector (issuance and verification of registration documents, fiscal services etc.) [2, pp. 5-10]. Although there are good examples of e-services in Moldova, the educational system remains underserved.

The share of Internet users in the Republic of Moldova passed 66% in 2014 [3]. Many of them, including public employees, teachers, students, pupils and their parents are potential beneficiaries of e-governance in the educational sector. The aim of e-govern-

ance in education sectors would be to improve information and service delivery, encourage student participation in the decision making process, making administration transparent and effective, and give institutions a new channel of educational deployment [4]. With the start of big reforms in various levels of the educational sector to increase quality, equity and efficiency of the system, the implementation of the e-governance in this sector is mandatory according to a Governmental decision 2014 [5].

This paper has the aim to identify the available e-tools in the educational sector of Republic of Moldova. The results are compared with Sweden to propose the way for implementation of Moldova's e-governance agenda in the educational sector. The decision to use Sweden as an inspirational source was based on Sweden's focus on education and training skills of its workforce, and indeed being the country leading the top of the most competitive economies in Europe when this decision was made (2012) [6]. Later it has also held the top position in the E-Government UNDP Survey [7, p. 111].

The following section frames the present study in the discussion of e-government and e-governance. Section 3 describes the methods applied for data collection and data analysis. Section 4 presents the e-governance context of the educational sector in the Republic of Moldova, while Section 5 presents the results of a comparative analysis of e-governance in the educational sector of Moldova and Sweden. Finally, Sections 6 and 7 discuss conclusions and recommendations for future development of e-governance in the educational sector of the Republic of Moldova.

The paper is a result of the UNESCO Obuchi Fellowship 2015 and a part of the first author's PhD studies. The future aspects to be analysed are teachers, pupils and parents' perspective in Moldova. The final results of this research are envisaged to support the current development of the sector e-governance in the Republic of Moldova and to constitute a valuable case study for countries with similar profile.

2 E-governance and e-government in education

The literature is dealing with two distinct definitions: e-governance and e-government. Although some sources do not distinguish these two definitions, there is an increasing tendency to separate them [7, p. 75]. E-government provides better services to citizens by effective use of ICTs improving the system of government [8], while e-governance deals with the whole spectrum of the relationship and networks within government regarding the usage and application of. E-government is a narrower scope focusing the development of online services to the citizen, more the "E" on any particular government service – such as e-Tax, e-Transportation or e-Health [9, p. 3].

E-governance induces cost savings in the medium to the long term. In the short term, however, staffing and costs tend to increase, as government must offer multiple delivery platforms (both the traditional and e-government) during the initial transition [10]. According to Bhatnagar, a key trend in developing countries is to build for service delivery around tax collection, customs and procurement. This has been popular among governments and quickly embraced because it creates more efficient means to collect revenue; this being critical for governments that are cash constrained. Departments with

regulatory functions have been quick to embrace e-government, while developmental departments such as education and health have been slow [11, p. 34].

The fields of implementation of e-governance are [10]

- e-administration – refers to improving of government processes and of the internal workings of the public sector with new ICT (Information and communication technology) executed information processes;
- e-services – refers to improved delivery of public services to citizens. Some examples of interactive services are: requests for public documents, requests for legal documents and certificates, issuing permits and licenses;
- e-democracy – implies greater and more active citizen participation and involvement enabled by ICTs in the decision-making process.

The present study is connected to all three fields with its focus on the educational sector's IT infrastructure (however, in this paper we leave the field types implicit).

According to Bhatnagar, there are two ways to implement e-Governance in a country: bottom-up or top-down. Usually, big countries are more willing to have a bottom-up approach, leaving various institutions to develop their own projects. In this case, the biggest problem is of interconnection of these solutions. For small countries it is more common to have a top-down approach. A solution in both situations is the creation of a national agency, which assures the coordination of the solutions [11, pp. 74-75].

Governments establish national agencies responsible for implementing the e-government agenda nationwide. Agencies also measure the results of e-government principles application and use of ICTs to the fullest potential, to verify progress and planned performance improvement. This allows agencies to better manage their information resources including their investments in information technology [12, p. 7].

For a better management of the educational sector, it is not primarily e-services that should be developed but a platform with basic information about the sector: number of institutions, teachers, pupils etc. Good infrastructure is needed, as is obvious from countries where a system exists at the ministry without digital connection to all the places where input data is gathered or used [13].

An Education Management Information System (EMIS) is a Management Information System designed to manage information about an educational sector. An EMIS is a repository for data collection, processing, analysing and reporting of educational information including schools, students, teachers and staff. The EMIS information is used by the Ministries of Education, NGOs, researchers, donors and other education stakeholders for research; policy and planning; monitoring and evaluation; and decision making. EMIS information is specifically used to create indicators that monitor the performance of an education system and to manage the distribution and allocation of educational resources and services. The EMIS is expected to collect, process, utilize, and disseminate education data [13].

In the world there are many types of EMIS, some resources are open and can be adapted to the needs of the country, others are paid. Here should be mentioned the UNESCO initiative from 2010 to create an open solution database for the EMIS that provides all the necessary toolkits for data collection and analysis, and trainings for the responsible of data input and their analysis [14]. However, the authorities may opt to create their own system, depending on the specific country and indicators that wants to

collect. Organization of the data collection varies from country to country. Some countries collect data via the Internet, other have had to rely on manually and physical means, a fact which may severely hamper the efficiency of the EMIS [13].

3 Research Methods

For the analysis of the current situation regarding e-governance in the educational sector in Sweden and Moldova a secondary data analysis and a survey by interviews were done. Beside the secondary data analysis, a total number of 40 in-depth interviews were conducted. In Sweden, 25 interviews were performed in Karlstad Municipality with representatives from all educational levels. Previous experience of the Information Systems Department at Karlstad University in matter of the Education Management Information Systems research helped with choice of location in Sweden but interviews at the university level were conducted with educationalists and administrative staff outside the IS department. In Moldova, 15 interviews were conducted with representatives from all educational levels in the capital area. The technique of in-depth interviews rather than a massive employment of questionnaires was chosen as the longer discussions make it possible to better uncover presumptions among interviewees that the researcher did not imagine beforehand. To ensure the data accuracy, the interviews were conducted in both countries with the respondents representing central/local authorities and institutions from educational sector. The aim of the in-depth interview was to map available e-tools used by the educational sectors, their deployment, usage and benefits.

The comparative analysis of existing e-governance tools in the educational sectors of Moldova and Sweden was applied at the second step for data analysis. The aim of this method was to reveal:

- The countries way of applying e-governance at various tiers of the educational sector; and
- The future way of e-governance development in educational sector of Republic of Moldova, based on identified practices, issues and benefits.

4 E-Governance context of the Moldovan educational sector

Realizing the necessity to improve the quality of governance and to make the public service expenditure more efficient, the Moldovan government started the e-governance implementation in 2010. Some public e-services were already available, for example fiscal taxation, population documentation services, services of the Ministry of Internal Affairs. Other services, for example, open data, mobile digital signature etc. were introduced on-line by the EGC mentioned before.

Working in conditions of limited budgets, usually authorities must decide in which sectors to invest in e-governance as noted in Section 2. The situation is characteristic also for the Republic of Moldova, where the largest number of e-services was introduced in revenue-producing ministries.

The rate of citizens that require on-line public services increased from 9% in 2012, to 16% in 2014, according to EGC [15]. A barrier for increasing the share of on-line

public services access is the lack of publication of information about their availability on various sites. It is thus difficult to find them, and there is a lack of skills of people to use on-line services.

According to the Strategic Program for Governance Technological Modernization, all the public services will be available also electronically till 2020 [16]. Arguably, the started reforms in the educational sector to increase quality, equity and efficiency, provide the right ground to start implementation of the e-governance agenda in the sector. Along with implementation of e-governance it is necessary to consider a promotional strategy of e-services and a strategy for increasing user's skills of e-services [17, p. 6].

According to the Moldova Education Strategy 2020 [5, pp. 12-18], from *government's perspective*, the biggest problems in the educational sector of Republic of Moldova are:

- Demographic decline leads to continued decline in part of the population included in education;
- Investment in education does not ensure national economic competitiveness;
- The lack of connection between education and labour market.

The strategy identifies three main actors: Government (central and local public authorities), institutions and parents/pupil. These actors have different demands. A single solution cannot solve all actors' issues; a reform at each educational level is necessary. At various levels of educational sector of Moldova has started major reforms to increase the quality, equity and efficiency in education. E-governance implementation in the field is necessary to monitor the reform results. Moldova has an undeniable advantage of territorial and financial accessibility of the Internet [18, p. 24]. Although there are good examples of e-governance tools in the Moldovan educational sector, still the e-governance in this sector remain underdeveloped for the moment.

5 Comparative analysis of e-tools in Moldovan and Swedish educational sector

A detailed analysis of available e-governance tools in educational sectors reveal a relative low level of e-governance implemented in Moldova. The situation varies depending on the educational level. For example, in general school, high school and university level, the number of available e-governance tools are higher than in pre-school level and Vocational Education and Training (VET) level. The number of e-governance tools in educational sector of Sweden does not vary so much from one level to other. In Sweden, several e-tools are developed for each actor of educational sector.

1. **At preschool level** of Republic of Moldova websites are seldom available. These are most common in private kindergartens. Institutions or public authorities do not have any system for digital recording of pupils or employees from kindergartens. In Sweden, at the municipal level are available platforms that offer to the interested persons information about each kindergarten and group, provide forms for admission and information about kids menu and activities. Municipal administrators have access to the information regarding pupils and kindergarten employees. At the municipal level

is available an analytical tool which provides reports and possibilities for various data analysis. Institutions have access to the information regarding their pupils and their presence, employees and their presence, finances and teachers schedules. Teachers can access information regarding their schedule.

2. **At compulsory school level**, Moldova has some institutions websites and EMIS system based on which it was possible to create an open data platform. The implementation of the EMIS started in Moldova in 2007 with the Government Decision no. 270 of 13.04.2007 on approval of the “Concept of educational information system” [18]. The first pilot rounds of data collection took place in 2011-2012 [19]. Subsequently, in 2013 EMIS was adapted and implemented in all institutions of 1-12 grades. Currently, the EMIS system includes a spectrum of indicators on institutions, staff, and pupils [20]. The public authorities can manage the available information; the responsible from institutions have access to the system twice a year for updating the data. The representatives of schools need to introduce data on the platform, the main data being in paper based registers, which is the main source of information for schools decisions. Parents have access to some information on a website created by a NGO with the support of the World Bank. In Sweden, similar to preschools, the same type of e-governance tools are available to the actors in the compulsory schools, whether private or public.

3. **At lyceum level**, Moldova has similar e-governance tools as compulsory school. Additional, at the national level there is a diplomas issuing platform. The central authorities manage the information. Institutions introduce information once a year. When the system opens for a second time each year, teachers/officers have a tool for data verification and correction. Parents and pupils can verify on the website the authenticity of the documents. For Sweden, see VET below.

4. **At VET level**, some institutions from Moldova have websites. No other e-governance tools are available. In Sweden for institutions of this level (Gymnasium) there is available a municipal platform with information regarding all institutions, with services for admissions guiding and admission platform. The extension of institutions websites offers information regarding course schedules for each student, food menu, information regarding students free time activities. For institutions, information is available regarding pupils and employees, financial information and teacher schedule. At the municipal level, administrative employees have access to the information regarding students and employees and a tool which generates reports and helps to analyse data. The parents are provided with information regarding students’ presence at school and in case of absence, the system sends a message to the parents. Students have access to the library information and course learning platform.

5. **At Higher Education**, Moldovan institutions have websites; some have internal systems for employees’ and students’ information providing students information

regarding course schedule and marks. Several institutions use learning platforms. Integrated information is not available at national level. For interested persons are available information regarding diploma authenticity and there is a diploma issuing platform. In 2016 started a wide national project for library systems integration. Swedish institutions have also their own websites providing information regarding available faculties. For students there is a national platform for admission which also provides the institutions with information regarding students. The institutions' administration has access to a platform for diploma issues that is connected to the platform for admission. Students have web access to the libraries and to learning platforms with detailed information and with possibility to distance study. Teachers have a system for scheduling and publishing course activities.

Table 1: The available e-governance tools in educational sector of Republic of Moldova and Sweden

Levels of education	Moldova	Sweden
Preschool level	- Some institutions websites;	- Municipality platform; - Groups websites; - Platform with information about pupils; - Platform for pupils presence; - Admission forms for pupils; - Analytic tool for reports; - System for teachers – schedule; - Platform with financial information.
Compulsory school	- EMIS; - Open data platform; - Some institutions websites;	- Municipality platform; - Classes websites; - Platform with information about pupils; - Platform for pupils presence; - Admission platform for pupils; - Analytic tool for reports; - System for teachers – schedule; - Platform with financial information.
Lyceum	- EMIS; - Open data platform; - Some institutions websites; - Diplomas issues platform; - Diplomas verification platform;	- Municipality platform; - Institutions websites; - Platform with information about pupils; - System for aggregate data about pupils; - Platform for pupils presence;
VET Level	- Some institutions websites;	- Admission platform for pupils; - Analytic tool for reports; - System for teachers – schedule; - Courses, Learning platform; - Library platform; - Platform with financial information.
Higher education	- Institutions websites; - Courses schedule; - Information regarding grades; - Diplomas issues platform; - Diplomas verification platform; - Library System; - Learning platform;	- Institutions websites; - Platform with information about students; - Admission platform for students; - Information regarding grades; - Diplomas issues platform; - Teachers system (schedule); - Library platform; - Courses, Learning platform.

6 Discussion and Conclusion

Analysing the implementation of e-governance in educational sector in Moldova, it can be observed that the major achievement of the e-governance is implementation of EMIS system, thanks to which was possible the development of the open data platform. At VET level, similar to preschool level and higher education even this possibilities are not available. The university level has some e-governance tools as, diploma issue and verification, courses and learning platform, library system, but only the library system started to be integrated between institutions at the moment (spring 2016). Other systems are sporadic and there is no integrated system regarding the students at this education level. In Sweden the EMIS system is not available except for the admission and study results system, which are national, but at the level of institutions are available all necessary e-governance tools for obtain information about the education sector. For Sweden it is more a necessity to integrate available services than to develop new ones.

The EMIS system in Republic of Moldova brings definitive benefits. However, its existence only at the level of general education significantly reduce the availability of information necessary for decision making in the entire educational system. Thus, there are many cases where officials are in need of some information have to use the phone. This method is demanding for both the central authorities and institutions, making inevitable the duplication of effort and information.

The lack of e-services such as admission, absence information, marks information, or sometimes basic information regarding institutions, in on-line format for parents and their children limit the educational sector transparency, increase the service access time and the staff time to spend on service to parents, pupils and employers.

The aim of this paper was to to identify the available e-services, e-administration and e-democracy solutions in the educational sector of Republic of Moldova. The results of the conducted study reveal that in Moldovan educational sector the number of available e-governance tools varies from one educational level to another. Considering the fact that there are not many integrated e-service, the Government succeeded in implementation of EMIS that is mandatory to monitor the reforms results. A key factor of a successful EMIS is access and use by the institutions of the data that they have entered. The actual system offers a limited access for the school representatives. In this situations representatives of institutions are likely to abandon data entry or to input data in an erroneous form because of tools absence for data verification and a perception of existent IS unusefulness. The actual EMIS is more oriented to solve the needs of public authorities instead of institution management or citizens. The lack of availability of the EMIS in preschools, VET and Higher Education, reduces significantly the advantages offered by the system.

Moldova e-governance implementation has a top-down approach. The central public authorities remain the main actors responsible for the e-governance agenda implementation. The situation is explained by the absence of sufficient budgets for local authorities to develop their own e-tools. In comparison, e-governance in Sweden have a bottom-up approach. The institutions have their own e-governance tools. The local public authorities have several platforms that allow them to process data and to offer e-services to the population. The extent of the electronic support at various educational levels does

not vary very much. Here should be mentioned that the availability of some of the tools can vary from one municipality to another, as the country has a decentralized administration.

7 Recommendations

Considering the results, the future e-governance agenda in Moldova educational sector may have a combination of top-down approach and where is possible a bottom-up approach. The implementation of EMIS at all education levels will allow performing a comprehensive monitoring and evaluation of the implemented reforms impact. Each level should be approached individually, having the specific issues and needs. A wider access to the input data for institutions administrators will allow development of an institutions proactive marketing approach. The parents, students and pupils can benefit from published open data.

Simultaneously, central public authorities can select a sample of institutions where to develop, introduce, test and adjust new e-tools in educational sector. This way can help to improve the developed e-tools until they are ready to meet necessities requirement for implementation at the national level. The experience from Sweden show that developed e-tools should be developed near users for later integration. The responsibility of the Electronic Government Center in this case is to monitor and ensure the compatibility of developed new e-governance tools.

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