

Draft of Standards and Specifications for E-Learning in the Section of Ministry of Education, Science, Research and Sport of the Slovak Republic and in the Operational Programme of Education funded by ESF

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Abstract - This paper presents the draft of Standards and Specifications for E-Learning in the Section of Ministry of Education, Science, Research and Sport of the Slovak Republic and in the Operational Programme of Education funded by ESF.

I. INTRODUCTION

Draft of standards and specifications for electronic learning (e-Learning) is a result of an initiative working group composed of academic and business representatives and established under the authority of the Minister of Education of the Slovak Republic, Mr. Ing. Eugen Jurzyca.

The initiative of the group is based on the knowledge of a feasibility study “Digital Content of the National Programme of Education” (DONPVV), which, along with other documents relating to DONPVV, do not define standards and specifications for e-Learning and as such, it may lead to further encouragement of the current situation, that is, creation of incompatible e-Learning systems causing possible operational problems and economic losses in the section of the Ministry of Education.

II. VISION

To build e-Learning systems in the Section of the Ministry of Education and outside it within the framework of ESF – the Operational Programme of Education – on the basis of a united standard so that it is possible to create, share and link objects with the educational content in the open environment of educational content creators and suppliers of learning management system (LMS, LCMS – Learning Content Management Systems) and thus exploit the synergy between teachers, national and international suppliers of the content, and providers of e-Learning systems.

III. OBJECTIVES

To approve standards and specifications for e-Learning in the section of the Ministry of Education and other sections that implement e-Learning within the

framework of the ESF programme - OP of Education - in which the Ministry serves as the managing authority. To approve these standards and specifications also for the activities funded by current and capital resources of the state budget and other financial resources within the framework of the Ministry of Education and within other areas of social and economic life in which the Ministry serves as legislative and normative state authority (system of formal education, system of informal education, linking the science and research to education, sport and to economic practise, etc.). To recommend the use of these standards and specifications in other sections.

The standards must:

- Be opened, technologically independent and stable in terms of future development of IT infrastructure
- Be adaptable to different requirements of educational institutions (primary schools, secondary schools, lifelong learning, etc.)
- Ensure interoperability of different objects of educational content with different LMS (Learning Management Systems)
- Ensure reusability in different contexts and different applications
- Ensure availability of e-Learning objects in accordance with the intentions of DONPVV, that is, e-Learning system must be provided as a web service.

Application of the standards should include:

- Raising an adequate level of information and awareness in professional and general public in relation to the benefits of standardization; providing free tools for sectors, which will help with standardization (if a teacher decides to use a software tool for creation and publishing of e-Learning content from the day of the adoption of the standard and in accordance with it, and the tool is not available, he shall be granted obtaining the tool in a short period of time and without the necessary current and capital investments of his institution)

- Development and adoption of legal and procedural rules governing the course and score of the process, organization and documentation of e-Learning in relation to the various systems of education (formal education, informal education).

IV. RECOMMENDED STANDARDS FOR E-LEARNING

The working group have considered a number of e-Learning standards and it pronounce the SCORM (Sharable Content Object Reference Model) standards drafted within the framework of ADL (Advanced Distributed Learning Initiative) by the Office of the United States Secretary of Defence in 1997, to best meet the objectives of e-Learning as defined in Art. 3 and objectives defined in the feasibility study DONPVV.

SCORM is a referential model harmonizing partial standards of a number of standardizing bodies:

- Alliance of Remote Instructional Authoring and Distribution Network for Europe (ARIADNE)
- Aviation Industry CBT Committee (AICC)
- IEEE Learning Technology Standards Committee (LTSC)
- IMS Global Learning Consortium, Inc.

SCORM is a world wide spread standard for e-Learning. Using SCORM standard in e-Learning content development has proven to save from 50 to 80%.

A. SCORM

SCORM defines SCO (Sharable Content Object) as a basic element of educational content which enables sharing and reuse of the content in a different context and in different e-Learning courses according to the needs of users. SCO may contain various forms of information – text, image, photo, and video. Each SCO contains metadata enabling the search and sharing of SCO by various LMS (Learning Management System) systems conforming to SCORM.

SCORM is focused on the Interface between educational content and LMS; but it does not address specific features and capabilities of LMS.

SCORM CAM (Content Aggregation Model) defines the way of elementary SCO grouping into more complex units; how to store, locate and manage a single SCO.

SCORM Content Package groups SCO or their aggregations into units representing a specific course, lecture or learning module.

SCORM RTE (Run-time and Environment) describes the requirements for LMS ensuring the interoperability of SCO and various LMS systems. These are the defined processes of location and delivery of educational content to learner, the way of communication of SCO with LMS using API (Application Program Interface) and a defined data model for data exchange between SCO and LMS during the implementation of educational process.

SCORM SN (Sequencing and Navigation) defines a method of achieving desirable behaviour of learner so that each LMS gradually sequences the learning activities according to the planned “activity tree” which allows individual access to each learner based on his ability to absorb the educational content.

SCORM defines what must be tested to ensure the conformity of educational content and LMS systems and it provides user tool for LMS, SCO and Content Package testing. In addition to testing of SCORM conformity with provider’s own capacity or creator’s e-Learning system, ADL also provides certification of e-Learning in their laboratories.

B. SCORM Development

In its development, SCORM has reached a number of generally recognized versions:

- SCORM 1.2., 2001.
It is still the most commercially used version but it does not offer sequencing. ADL does not work on its development anymore.
- SCORM 2004, 2nd Edition, 2004.
It enhances original features of version 1.2., integrates IEEE and IMS results and implements sequencing.
- SCORM 2004, 3rd Edition, 2006.
This version has improved definitions of the 2nd Edition with regard to the development of IEEE and IMS standards. It is spread comparably to SCORM 1.2.
- SCORM 2004, 4th Edition, 2009.
The version continues to develop SCORM 2004, but it has not been significantly spread, yet.
All SCORM 2004 versions are compatible bottom-up. E-Learning products created on the basis of SCORM 1.2., can be upgraded to SCORM 2004 using relatively simple conversion ADL tools.

C. Methodology of SCORM Standards and Specifications Implementation

The working group recommends that the Ministry of Education, Science, Research and Sport of the Slovak Republic declared SCORM 2004 a mandatory standard for all newly-procured e-Learning systems and for the purchased and created educational content for these systems within the framework of the Ministry of Education and The Operational Programme of Education in which the Ministry of Education serves as the Managing Authority. It is recommended that the Ministry of Education confirms SCORM 1.2. as a temporary standard which is going to be used for the period of 3 years in previously implemented e-Learning systems based on this standard (e.g.: Planet of the Knowledge). After the 3-year period, the systems based on SCORM 1.2. should be converted to conform SCORM 2004. Moreover, it is recommended that the standard is adopted for all newly-procured e-Learning systems and for the

purchased and created educational content for these systems financed by resources other than OP of Education within the framework of the Education section and subjects belonging under the legislative body of the Ministry of Education within the framework of the system of formal and informal education, linking the science and research to educational systems and linking education to economic practise and systems of sport education.

All SCO and LMS can be used in the section of the Ministry of Education until after the test of compliance with SCORM 2004. The test will be provided by an entrusted departmental organization. It is recommended to grant a time-limited exception of this rule in cases specified in Art. 4.4.

D. Use of Existing Educational Content

The working group is aware of the presence and extend of the existing educational content, which has been long formed by various authors and is currently available from various resources. The content is valuable in many cases and it is used in practise but its universal applicability is limited due to the absence of a unified creational standard. After the standard is adopted, the content should be revised and preserved.

Help can be provided in several forms:

- Creating software tools for conversion,
- Conversion assistance,
- Creating own LMS and LCMS compliant with SCORM 2004, which will be able to work simultaneously with several standards,

The working group recommends this educational content to be converted into SCORM 2004 standard within the period of 3 years after introduction of the standard. For financing, it is recommended to consider the use of ESF and ERDF funds designated to finance projects on informatization of schools, development of e-Learning content and also for support of e-Learning content transformation to the recommended standard.

V. OPERATING THE E-LEARNING SYSTEMS

The working group sees very different abilities of particular schools to ensure operation of e-Learning systems; therefore it clearly supports a system with centrally managed repository of approved curriculum which will be available in real time and accessible for all educational institutions in Data centre of the Ministry of Education.

Once approved educational content and other pedagogical aspects by an organization authorized by the Ministry of Education, Data centre of the Ministry of Education should be authorized to provide tests of conformity with the new content in the form of SCO with SCORM 2004 standard as well as approval of LMS and LCMS systems based on the tests of conformity with the standard and compliance check with procedural

operational standards of Data centre of the Ministry of Education. Educational organizations should be allowed to use only LMS and LCMS systems in e-Learning approved by the body authorized by the Ministry of Education on the test basis of conformity with the standards.

VI. E-LEARNING AND FUTURE PROJECTS OF OP OF EDUCATION CALLS FOR 2011 – 2013

The working group recommends the following steps to ensure e-Learning systems to be based on the approved standards:

- Purchase of finished educational content with LMS and LCMS delivered as a part of purchased educational content (it is a condition that they are based on the proposed standard and thus are independent of the original software platform).
- The licence model will be applied in order to meet the ESF price constraints for single person module or class module.
- To provide a complex education, in addition to purchasing the educational content in electronic form it is appropriate:
- To provide simultaneously the training for using of the content in the form of full-time education (service).
- To provide simultaneously printed textbooks to compliment the educational content because it is crucial for learners to revise their knowledge even when they are not online. Acquisition of textbooks as educational aids supports the effect of e-Learning and so it is necessary to link the books with the provided educational product. The reason is that the ESF funds are not designated for purchase of common textbook collections – these should be purchased from current budget, and so it is highly probable that ESF would identify such purchase as a violation of additionally and overlapping of expenditures due to which the resources should be returned. It is therefore appropriate to systematically prevent the purchase of common textbooks on the level of calls by indicating in the call that the resource is not designated for purchase of textbooks used in national curriculum as stated in editorial plans or in school educational programme at involved schools (as these are commonly used textbooks commonly available on the market and they are not modern educational aids nor they comprise modern educational content and so the EFS resources are not designated for their purchase.

VII. CONCLUSION

The current state is defined by the presence of a great number of educational systems and educational content of different quality that is deployed only locally with no possibility to be shared among the schools and educational institutions. Moreover, the central administration is not possible, which prevents obtaining an overview of the extent of its use and quality. The lack

of measurable indicators makes it impossible to set requirements for newly purchased content and to focus on its further improvement. Ultimately, the section of Education loses the opportunity to control and make use of innovative methods of education and improve the quality of education.

The introduction of standardization of e-Learning educational content affects several levels. The fastest benefit will be the procurement cost reduction. Formulation of content standardization requirement will open the competition for Slovak and foreign suppliers and will allow the use of market mechanisms to control the price.

Taking the long term view, SCORM will rapidly reduce operating costs, as it enables reusability of educational content elements (SCO) in creation of new classes. At the same time, a multiple use of SCO will be possible due to their inclusion into multiple modules, classes or subjects.

As the e-Learning systems will be based on an internationally used standard, platforms and suppliers will

be no more limited; the base of suppliers will be extended and opportunities of creative involvement of teachers and schools will be increased. Automated tools for creating and conversion of content into SCORM format will allow the teachers to create new educational content. Thus, it will be possible to obtain the feedback of needs of learners and educators. Engaging university students with educational focus may lead to better understanding of the needs and processes of e-Learning.

The central provision of the standardized educational content will, at the same time, enable the monitoring the extensive use of the content and evaluation of its quality from the perspective of learners and educators in the real-time. It will provide feedback for specialized departmental organizations such as National Institute for Education, UIPŠ, ŠIOV, etc. on real operation of e-Learning. Thus, the Ministry of Education will obtain a powerful tool for management and modernization of the Slovak educational system.