



## The role of standardization in the development of e-learning

Tomasz Prauzner<sup>1\*</sup>, Paweł Ptak<sup>2†</sup>

<sup>1</sup>*Institute of Technical Education and Safety Jan Długosz University  
Armii Krajowej 17, 42-218 Częstochowa, Poland*

<sup>2</sup>*Institute of Telecommunications and Electromagnetic Compatibility,  
Technical University of Czestochowa  
Armii Krajowej 13/15, 42-218 Częstochowa, Poland*

**Abstract** – This paper presents the essential issues of creating the educational content of e-learning platforms from the viewpoint of both didactic and technological standards. Although e-learning is currently the fastest developing method of distance learning based on the most advanced information technology, the problems of content standardization have not been sufficiently dealt with so far. Owing to that, this paper touches upon the most essential aspects of creating didactic materials employing advanced information technology.

### 1 General outline

I found a direct incentive for writing this paper after the analysis of materials on e-learning available in the internet. The idea of employing the computer in education is definitely known to the reader. It has been proved that the computer is the most valuable tool for supporting the educational process [1]. Access to the internet and appropriate software also provide the opportunity of experimenting in the field of didactics. Regardless of the details of new ideas, a common underlying principle is that all innovations should maximize the effectiveness of didactic work and ensure the high standard of education.

At present we witness changes taking place in Polish, and, in fact, not only Polish education. [2] In accordance with the education reform launched in 1999, the stages of education comprise the pre-school period, primary school, junior secondary school,

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\*matompra@poczta.onet.pl

†p.ptak@o2.pl

senior secondary school, and so on. The cycle of a teacher's work, or the educational content is determined by the regulations issued by the Ministry of Education. As far as educational standards are concerned, there are recommendations for all students to have equal chances in obtaining education and vocational qualifications. The didactic process is also unified by the existence of common standards concerning the educational content and teaching aids (the so called medial infrastructure). Theoretically, teaching standardization should guarantee a stable educational standard in all schools of the same type and level. In practice, however, there are visible differences in educational standards between various schools. A reliable indicator of the standard is the percentage of school types chosen by the school leavers as continuation of their education. Young people not only follow their own preferences and desires but also take into account the objective data about the average results of the final examinations, public opinion, etc.

The possibility of a personalized approach to every pupil is very limited indeed in everyday work of school based on group teaching. There are many reasons for that, mostly too numerous classes, overloaded curricula, a lack of teaching aids, insufficient qualifications of the teacher. A solution to this problem can be seen in Blended Learning, which offers a possibility of combining traditional methods with modern technology. Due to the limitation of financing, however, it is not possible to introduce new technology into Polish schools to the extent that would satisfy the needs. The EU membership has enabled participation in a number of projects and obtaining means to finance them, however, as practice shows, few schools do actually obtain financial support and it is hard for individual school to get it. Due to large demand for attractive educational materials a number of companies have been set up offering distance learning based on new information technology. Therefore, the question arises concerning the standard of such kind of educational offer. Needless to say, it is necessary to control the standard of e-learning as it is necessary to control the standard of stationary learning.

The most frequently observed problems of technical nature include:

- lack of presentation standards;
- frequent changes of tools on the author's side;
- lack of compatibility between the author's and the student's tools;
- changes of hardware platforms;
- applying different formats of data recording;
- being dependent on individual software producers;
- raising costs.

Contemporary civilization is not uniform. It comprises various ideas of sociological and political nature which are often mutually incompatible, or even contradictory. This is reflected also in the field of education. On one hand, there exists a trend to centralize management and to introduce common standards with respect to supervision, teacher's salary, curricula, teacher's qualifications and academic degrees, student assessment standards, common requirements, unified development of education within EU, and on

the other hand, there are indications that each human being should have a chance to develop at his/her own pace and should be able to choose the most suitable educational methods for him/herself.

## 2 Standardization in e-learning

It goes without saying that the education process has to be based on strictly defined principles and standards for each stage of learning. Only strict supervision can ensure high quality of education. The guidelines how to teach and learn are provided by general pedagogy and didactics, so the effectiveness of teaching depends on following these guidelines and principles. On the other hand, the personalization of the education process should be contained within the criteria, or standards accepted. Otherwise, the lack of stable standards would cause chaos and disturb the functioning of the school system.

As far as e-learning is concerned, the standardization brings about some didactic and organizational advantages, it does not, however, regulate all the factors affecting the final output. Standardization has the following advantages:

- it facilitates the assessment of the educational product;
- eliminates low-quality products, although here the price factor, not the quality factor may be decisive;
- enables the customer to choose a suitable product;
- enables better control over e-education (e-learning involves not only the transfer of the content to the learner, but also various tools for controlling the results of learning in various stages);
- guarantees the quality of e-education products;
- helps Poland meet the world standard.

It also has some disadvantages:

- it confines creativity and development of educational products;
- limits the optimization of educational processes;
- too detailed and too extensive standardization can lead to lowering the competitiveness of e-education products [3].

The most popular standard applied for the production of e learning courses is SCORM (Sharable Content Object Reference Model) developed by ADL (Advanced Distributed Learning Initiative) – an organization set up by the US Department of Defence.

The standard SCORM (Fig.1) describes the way in which the education process should be organized so that the content could be easily transferred between various learning management systems (LMS <sup>1</sup>). It also describes what the system has to do to

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<sup>1</sup>LMS – the system commonly referred to as an LMS platform or e-learning platform. It is a specialized software providing and managing electronic learning as well as planning and organizing the educational process.

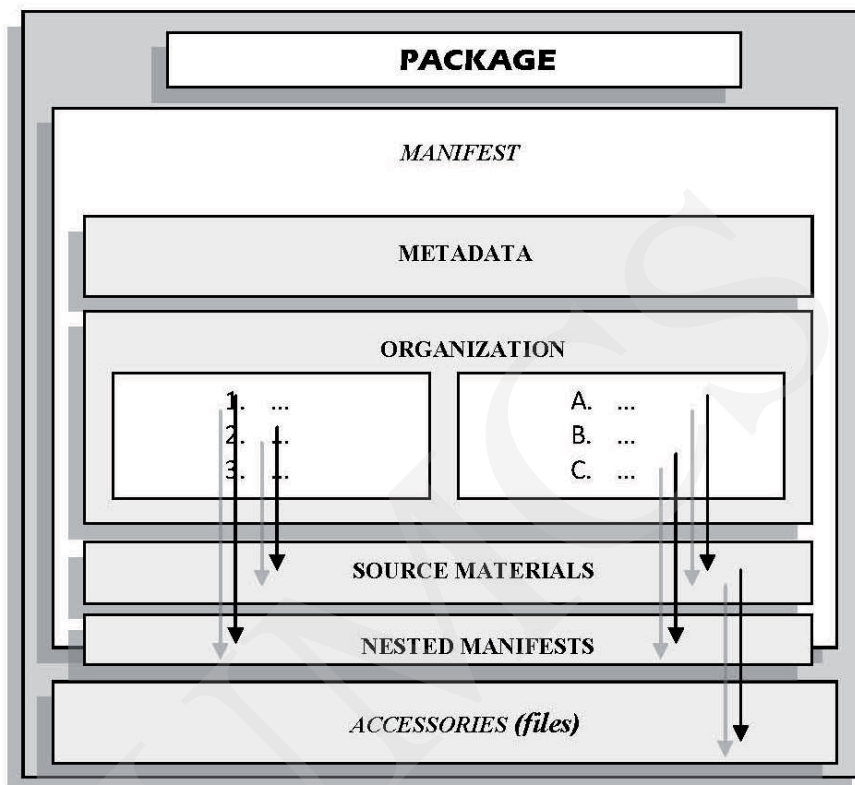


Fig. 1. IMS/SCORM package scheme. Source: [4].

transfer the course content to the learner in the SCORM package. The standard does not include description of all the aspects of a distant learning course. For example, there are no indications where and how the LMS is to store the teaching content, or what teaching model and materials are to be used in the SCORM package. The standard focuses on such a description of creating the course and using the LMS that the didactic content is presented to the learner in accordance with the author's intentions [4].

The SCORM standard divides the teaching content by topics into blocks, known in the system as Sharable Content Objects. Such blocks are individual units which are treated as universal and are therefore available through various teaching paths. Because of that the units should be as small as possible and represent the smallest thematic chunk, which would be applicable in many teaching scenarios. On the other hand, the greater the number and variation of such units, the more useful they are. Combining various blocks should enable constructing a teaching scenario within an e-learning course with the consideration of personalized approach to the learner as specified in teaching methodology and didactics. In this way, a number of teaching

scenarios can be created, which can be used as ultimate product, or can be further employed for creating other scenarios.

The SCORM package consists of a manifest and additional files. A manifest is a XML file including the following components:

- metadata – the data describing the module;
- organization – a set of one or more structural maps showing the relationships among the source materials used in the course;
- source materials – separate sets of didactic content, they can be used many times since many thematic groups can refer to the same source material;
- nested manifests – used for describing smaller modules functioning as constituent parts of larger structures [5].

### 3 Organizations dealing with e-learning standardization

To supervise and develop e-learning standardization a number of scientific organizations have been established. Among the most influential organizations working on new standards and controlling the existing ones, the following are to be mentioned:

- AICC (Aviation Industry CBT Community) – the standard defining communication between the LMS platform and the course;
- IEEE (Institute of Electrical and Electronics Engineers) – the standard LOM (Learning Object Metadata);
- ARIADNE (Alliance of Remote Instructional Authoring & Distribution Networks for Europe) is currently developing the LOM standard under the auspices of IEEE;
- ADL (Advanced Distributed Learning (ADL) Initiative) – the standard SCORM (Sharable Content Object Reference Model) [6].

### 4 Concluding remarks

The standardization in e-learning concerns mainly the regulations for the technology of creating didactic materials. Their unification with respect to the IT base is a basic requirement which has to be met to provide the possibility of creating knowledge modules. Such modules should be prepared in such a way that they are mutually compatible and it is possible to exchange them between various authors and courses. The standard defines what kind of information should be transferred between the managing system and the didactic unit and how such transfer should be accomplished. From the didactic viewpoint, standardization is the key indicator of course's compliance with the norms of pedagogy, or the key methodological factor in creating courses. It is pedagogy, and more specifically didactics which determines the 'what' and 'how' of teaching. The personalization of teaching by means of e-learning determines the choice of a particular didactic method as well as time and pace of learning in accordance with the learner's needs.

It has to be noted that further development of e-learning hinges upon the development of information technology, which, in fact, sets new trends in e-learning. In the view of this ongoing process, the present paper is but an incentive to encourage the discussion on the subject.

## References

- [1] Prauzner T., Wykorzystanie mediów elektronicznych w edukacji technicznej studentów, Warszawa: IBE (2006).
- [2] Conference Proceedings: 27nd International Scientific Conference:Technology Education as a Part of General Education, Wielka Łomnica, Słowacja (2011).
- [3] Kaczmarek K., Nauczanie na odległość a standaryzacja materiałów edukacyjnych, Conference Proceedings: Warsaw University of Technology (2011).
- [4] Chmielewski J. M., Waćkowski K., Rola standaryzacji platform w e-learningu, E-mentor 2(19) (2007).
- [5] Sudół P., Określenie wymagań klienta za pomocą analizy przedwdrożeniowej, <http://pawelsudol.com>; (2011.10.6).
- [6] Orzechowicz K., Standaryzacja w obszarze e-learningu, Serwis edukacyjny profesor.pl: <http://www.profesor.pl/>; (2011.10.3).