

# A Model for Quality Assessment of Electronic Learning Material

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**Abstract.** *A model for a quality assessment system of electronic learning material was developed by a group of e-learning experts established by the National Education Institute of the Republic of Slovenia. The model presented in this article is a contribution to the improvement of modern learning and educational processes. Standardization concepts and the specifics of the learning material have to be considered in the scope of the quality assessment procedure. The proposed model defines electronic learning material classification, its description and the criteria for its assessment.*

**Keywords.** Quality, learning objects, e-materials.

## 1. Introduction

After the initial years of development and use of electronic learning material (e-material) in Slovenia, when the only thing that mattered was the existence of such material, it soon became apparent that in order to assure successful use of e-material, the quality and assessment of material need to be considered as well. The point when there is an abundance of material (at least in some areas and some topics) has already been reached. However, not all material reaches the same level of quality. The analysis of the current situation regarding the quality of electronic

learning material in Slovenia and in the world shows that the development of a system of assessment as well as of an information portal of e-material for the teachers is necessary. The portal should not only incorporate the material, it should provide a framework which would enable material assessment as well as provide the possibility of searching and viewing the material according to quality criteria. The electronic material being developed, which is often of high quality, is not properly presented to its potential users. Teacher often face a very difficult decision of having to decide which of the many materials scattered around would be appropriate for their needs. Besides that, the lack of awareness about the quality of e-materials could negatively influence the use of e-materials in the teaching process and thus hinder the development of e-education itself, since the choice of low-quality or inappropriate material might deter the user from future attempts at using this kind of material. Interviews with teachers showed that teachers are often driven away by two facts:

- When searching for a certain school subject teachers are confronted with a tough decision what to choose. That means it is difficult to find and choose the ones to fulfil the request;
- The first experience with the digital resources in the class is important; an inadequate quality may discourage teachers.

Electronic learning material needs to be accumulated, described (the metadata transcribed), and evaluated with the help of an appropriate evaluation system. This would ensure a higher level of quality and promote the use of electronic learning material in Slovene schools. At the same time a system of quality assessment would motivate the authors of such material to use a standardized method of transcription and produce materials of higher technical and content quality based upon recommendations received through the assessment.

The development of a system with which quality electronic learning materials could be developed, would at the same time enable the development of a system of certification of learning materials. A group of qualified assessors and evaluators would use known and accepted criteria to assess the quality of the electronic learning material presented. Quality material would be awarded a certificate of quality. Such a certificate would have to incorporate several alternatives – a label meaning that the material meets certain basic standards regarding quality, a label meaning that the material is of high quality and its use recommended, a label meaning that the material is of the highest quality among the material assessed within a certain segment and a certain time span, ... An appropriate environment, e.g. a portal, would provide the teachers a clear and simple access to desired quality electronic material.

## **1.2. Development**

For this purpose a group of e-learning experts for the implementation of a quality assessment system for the evaluation of electronic learning material was established at the National Education Institute of the Republic of Slovenia. The basic objectives of the group were as follows:

- To collect the experience of home and foreign establishments that already use a quality assessment system to evaluate their electronic material
- To form an information access point in the form of a portal, where quality electronic material could be accessed
- To implement an appropriate evaluation system and then a certification system of electronic learning material

- To spread awareness of quality of electronic learning material.

On the basis of analysis of good practices and taking in account the existing standards in e-education the group has synthesized the findings and prepared recommendations for the descriptions of learning materials in Slovenia, prepared directions of assessment of electronic learning materials, prepared an assessment system for the establishment of quality of electronic learning materials and drawn up a proposal of a web service for the collection and evaluation of quality electronic learning material and the assessment of the same [1].

## **2. Findings**

### **2.1 Required collection of e-material**

The group has ascertained that a large number of electronic learning materials has already been collected and is available on different portals (e.g. the portal of Slovene educational network [2]). Unfortunately this material is not accompanied by uniform metadata, let alone do the data follow one of certified standards for the description of learning material. Therefore it is assumed that the existing materials should be reassessed or the tools developed with which their metadata could be appropriately transformed according to a standardized method of description chosen. It became apparent that it is first necessary to establish what kind of collection of learning materials is required in the Slovene educational area prior to the implementation of an appropriate material evaluation system itself. It has been ascertained that a large number of materials is desired and that the materials should be legalized, uniformly described and appropriately labelled according to their level of quality. The materials that have not been assessed yet should also be labelled. The labels themselves will of course only be significant if the recommendation carries value and is accepted by experts and users alike. Further development should include the opinions and evaluations of the users, but at least at the very beginning the assessment should only be conducted by known, specially chosen experts.

## **3. Hierarchical structure of the material**

It is interesting that at the beginning it took quite a long time to ascertain the criteria for the

hierarchical structure of the learning material. If the highest possible level of applicability is to be achieved, the hierarchical structure should primarily reflect the practical use of the materials and on the other hand encourage the use of the existing material as parts of newly produced material.

### 3.1. Types of material

For the use of the future electronic learning material assessment system three types of electronic learning material have been defined [1].

The following types of learning materials are proposed:

- Technical parts
- Learning units
- Learning entities

Technical parts consist of

- Text
- Picture
- Animation
- Video
- Sound record
- Programme supported presentation of the contents,

that is, of one of each of the components or of a desired combination of one or more types enumerated above. MIME [3,4] and ISO [5] standards have been applied.

If the technical unit is equipped with a description of the didactical aim it is called Learning Unit. This is the most useful material and usually made by an ICT expert teacher. Such units are usually available on the Internet. Many of them are not stored in a proper database and accompanied by relevant metadata. They are often used only by their authors.

Learning entity is a set of learning units with a proper description of the learning path that is a more complex learning material, usually made by a group of ICT professionals based on scenarios prepared by teachers. Such types of materials are usually used by advanced users in e-learning with or without help of a tutor for a longer period.

## 4. Description

Regarding the present solutions in similar projects and the possibilities of future connections with EUN Schoolnet [6] our solution followed SCORM / LOM [8], [9] and Dublin Core Metadata [10] and solutions based on them in the CELEBRATE [11] project. In spite of the fact that SCORM and LOM [8,9] are not defining the description of technical parts we still think that they should be described and evaluated. As we assume that most of the material will be free to use (under sort of Creative Commons licence [CC1 - 12]) So a lot of technical parts will be reused in several learning units – why to describe them many times. Also we think that adequate quality of technical parts is also necessary and should be evaluated separately.

The descriptions of the materials are comprised of essential and nonessential components. Each of the materials is gradually described; essential common data are required for each description: the name of the material, the title of the material, the applicant of the material, the author of the material, copyright, a short description, the date of the production of the material, the date of entering the material, the type of the material (technical, unit, entity). Further description of the material differs according to the type of the material. Technical parts are further described by naming of all of the comprising types, the size of the material, keywords, classification of the technical parts is awarded, and an annotation of the (non)existence of a technical evaluation added. Technical parts do not need to be evaluated for content. Learning units and entities are further described by the purpose of the material, the equipment necessary to use the material, the duration of the learning process, a list of technical part labels or unit labels, copyright, classification according to year plan, keywords, status of assessment, and two evaluations – of technical merit and of content and didactical merit.

Appropriate descriptions would provide a quality catalogue of electronic learning material, which should conform to the year plan. Regarding the proposed material hierarchical structure, the catalogue should enable the searching in several categories: year plan, type of material, and all other keys defined in accordance with the material description standards.

## 5. Quality and certification

On the basis of own experiences and potential users (experienced teachers, N=37) interview about their requirements we proposed the following evaluation levels of electronic learning material:

- **applied** – a user applies material that seems generally interesting
- **sifted** – electronic material that has appropriate content and is appropriately described and has been chosen on the basis of different indicators (statistics, polling, recommendations)
- **evaluated** – materials that have gone through the evaluation system and have thus been evaluated according to technical (computer, design, user) and content (factual credibility, expert, content, didactics) merits
- **certified** – materials that have gone through evaluation procedures and have proven to be of the quality demanded in electronic material. In general, electronic material has to undergo similar procedures as comparable classic material if it is to be certified as a learning aid, textbook, or supplementary material.

For the certification of the materials the following systems need to be implemented:

- Material description system
- Technical and content merit evaluation system

Later it would be sensible to upgrade the former with:

- User evaluation system
- Certification labels system

Such certification of material is necessary for the spreading of good practice and result implementation. For this process quality assessment of electronic materials is necessary. This is quite a complex procedure in itself. In the course of their work, the group did not come upon a similar system; therefore the following proposals are based on the results of their work.

It has to be determined who and of course when and how is to award certificates (website logo). The number of users of a certain site can be a criterion for the material evaluation, but at the very beginning it should primarily function as an indicator which materials need to be evaluated first. Materials could also be evaluated on the basis of a claim of the applicant. If the applicant already provides a suitable evaluation

system, the evaluation can be considered in the procedure and needs only to be appropriately adapted to the standards of the environment.

### 5.1. Evaluation procedure

The following phases are proposed:

- Defining acceptable materials
- Quality evaluation of the acceptable materials
- Incorporation of user evaluation in the evaluation process itself

In our opinion it is probable that the last two phases will be intertwined or the last phase might even precede the second one, since quality will thus be confirmed through the use and will also be reflected in the use of a certain electronic material itself. However, several issues need to be considered regarding user evaluation. They differ to a large extent and comprise such factors as the subjective value scale of a user, his or her experience, anonymity, as well as the number of comments directed towards a certain material.

In the first phase, when the actual acceptability of the materials is evaluated, the following scale of criteria for quality evaluation is suggested:

- The material is described with all the essential metadata originating in recognised standards and supplemented with the needs of the local environment
- A positive technical evaluation
- A positive evaluation of content and didactical merit.

### 5.2. Evaluation

In the course of evaluation two basic aims are followed:

- To assist the users of different materials treasuries in the selection of appropriate material
- To motivate authors for the production of higher quality materials through awarding quality labels

It is proposed that e-material be evaluated according to the following elements:

#### **Technical implementation and compatibility evaluation**

Those elements of e-materials are to be focused upon that specifically determine the quality of production, installation, upgrading, and uninstallation in different systems and environments: availability of learning materials, installation / use preparation, registration,

starting the programme / environment / use of material; uninstallation / end of use, interoperability;

### **Production quality evaluation**

The quality of the production of e-material is considered, not only regarding technical excellence, but also the use of techniques and technologies for reaching the aim of the e-material (text quality, graphics quality, quality of visual presentation, use of multimedia ...): legibility and clarity of the text, grammatical correctness of the text, consistent use of styles, clarity and organization of presentation on the screen, good use of frames, hyperlinks, lists;

### **User interface evaluation**

Planning a user interface is a demanding task and its quality is crucial to the success of e-material. E-education interface is specific in the fact that in order to ensure quality it has to enable both the view of the learner and the educator. Therefore the following points are evaluated separately: orientation, possibility of tracking, navigation, additional navigation / organization services, support.

### **Content and didactical merit evaluation**

Didactical quality is probably the most important point in the view of education. We are aware that this part of quality assessment is the least comprehensive and will have to be upgraded. Here the evaluation focuses upon learning content, that is, connections between learning aims, content, methods, and the learner. E.g. the description of the aim of use of learning material, definition of the learning aims, the conformity of learning aims and the content of the learning material, presentation and clarity of the topic regarding the support of the learning process, use of diverse learning methods, the possibilities of testing and implementing knowledge, possibilities for evaluation and high-quality self-evaluation of the newly acquired knowledge.

## **6. Conclusion**

The quality of electronic learning material is gaining in importance, since the production of e-material is increasingly becoming a teachers',

mentors', and learners' task. It is also true that the World Wide Web offers a huge mass of e-material in different languages, using different technologies and didactical approaches. Because of all the aforementioned, it is necessary to determine and implement criteria for the quality assessment of material, as well as to establish a national system for transparent evaluation. A publicly available quality evaluation would be an important guide for the teachers trying to decide upon the use of e-material. The proposed evaluation procedure is still in its pilot phase and only in the future will it be possible to assess its suitability.

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