SCORM-COMPLIANT COURSE IN E-LEARNING ENVIRONMENT FOR THE ARABIC LANGUAGE

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ABSTRACT

In e-learning environment standards, specifications and norms can be used as a protectionist tool or as a mean to democratize access to knowledge. The most widely used standard in the field of e-learning is SCORM. SCORM is a standard that has been a very great success in the e-learning industry since 1999 with increasing adoption curve throughout the year 2000. SCORM is a really powerful tool for anyone involved in distance education. All contents and tools can be created one time and used in many different systems and situations without modification because SCORM provides a form of compatibility between teaching content and Learning Management System (LMS). This research focuses on the importance and application of SCORM for the Arabic language. In this paper we will try to benefit from the advantages of SCORM to create a complete course for Arabic grammar which ensures the interoperability, adaptability, scalability, accessibility and reusability. The created content is integrated in e-learning environment for the Arabic language. This environment is based on the one hand on NLP tools and techniques and on the other hand on the IMS-QTI specification which is used to create interoperable assessment activities. The entire environment use the Moodle LMS.

Key words: Arabic Grammar, Interoperability, Moodle, Normalization, SCORM.
1. INTRODUCTION

The issue of quality is a current interest of those involved in training and education for both traditional classroom teaching and for distance education. However, it poses a greater way in open and distance learning, given its virtual nature and the distance between learners and teachers or trainers. Indeed, the variety of online or distance education offerings and the associated pedagogical models and technological tools adopted, require that one focuses on the quality of these offers, mainly in a competitive environment at the International scale.

However, the implementation of a quality approach in distance education is complicated by the fact that the concept of customer becomes multiple and the quality depends not only on the producer but also the customer's involvement. Especially since the application of quality models requires a certain flexibility in the field of training since it is not a linear and reproducible industrial process. In the context of distance education, the quality management is now essential for the exchange, management and archiving of courses, learning systems and services. Indeed, it is imperative to involve the different actors implicated in distance education: developers, administrators, governments, providers, teachers and learners to ensure that the information and communications technology adequately meet their needs.

Since the advent of the personal computer, digital technologies have of course become increasingly common in education both in distance and classroom education and training settings. However, these technologies have typically been applied in ad hoc and divergent forms: Innumerable courses, course components and systems for managing and delivering them have been developed independently of one another, often at great expense. Moreover, this content and these systems are often created in a manner that makes it very difficult, if not impossible, to support their interchange or their successful interoperation [1]. Standards in e-learning address these shortcomings by ensuring the interoperability, portability and reusability of this content and of these systems.

The standardization bodies are constantly working to develop and finalize quality standards that should be respected by institutions offering e-learning environment. Standardization have for purpose to identify generic specifications to overcome the monopoly major suppliers, with keywords portability, interoperability and reuse, coupled with international recognition. Today there are several standardization organizations and several standards have emerged especially at the beginning of this century. among the famous standards and norms we can mention : AICC, LOM. IMS-QTI and SCORM. The latter is widely used in e-learning. SCORM is a collection of standards and specifications for web-based e-learning. It defines communications between client side content and a host system called the run-time environment, which is commonly supported by a learning management system (LMS) [2]. SCORM also defines how content may be packaged into a transferable ZIP file called package interchange format (from Wikipedia). In this research paper we will show the importance of this standard, its main advantages, which SCORM version should be used. Then, we will give an idea about the course of Arabic grammar that will be
created in accordance with SCORM. Next, we present our whole e-learning environment for the Arabic language and the Moodle LMS [3]. Finally, we will close with a conclusion and the future works.

2. DEFINITION AND IMPORTANCE OF SCORM

According to ISO [4] Standard is defined as: "documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose".

SCORM stand for Sharable Content Object Reference Model. This standard was created by Advanced Distributed Learning (ADL) which is a United States government sponsored organization. This organization develops standards and specifications to encourage the adoption and advancement of e-learning. The main goal of ADL is to ensure access to high quality and training materials [5]. SCORM, the most widely ADL publication, is comprised of a collection of interrelated technical specifications and guidelines designed to meet DoD’s high-level requirements for creating interoperable, plug-n-play, browser-based e-learning content. It consists of three different technical specification “books” that collectively address challenges associated with interoperability, portability, reusability and the instructional sequencing of self-paced e-learning content [6]. So, the main advantages of SCORM are: Durability, Accessibility, Adaptability, Reusability, Accessibility and Interoperability as shown in Figure 1.

![Figure 1 Advantages of SCORM](image)

2.1. Reusability

Content or resource creation takes time and it has every reason to be reused in different learning contexts and technical environments, to make them independent and therefore able to fit in a variety of systems. SCORM is a standard that ensures you do not have to replace all your e-learning content. So, reusability means that the learning contents can be easily modified and used many times by different tools and platforms, so reducing costs.
2.2. Durability
It is the ability to resist in technology evolution and change without requiring a redesign, reconfiguration or costly recoding. Resources must stay used in a technical environment in constantly changing and must be independent as possible of software or technology.

2.3. Accessibility
It is the ability to locate and access learning content from anywhere and any time. It also means the advantage to locate and access instructional components from a remote location and deliver it to many other places. It concern the description or the distribution of resources.

2.4. Adaptability
The ability to adapt teaching to individual and organizational needs. This allows to customize the training to adapt to different profiles of learners.

2.5. Interoperability
It means that different tools and platforms can easily communicate and work efficiently together [6]. Interoperability ensures to online learning systems to find, import, share, reuse and export learning content in a standardized way.

3. LEARNING OBJECT IN SCORM
SCORM enables "granularity" of highly developed course content (courses -> lessons -> Educational grains (SCO) -> Resources). Figure 2 show the general architecture of SCORM.

![General architecture of SCORM](image)

**Figure 2** General architecture of SCORM
Figure 3 represent the contents of SCORM-compliant course.

Figure 3 SCORM-compliant course contents

SCORM defined the organization of a learning resource that can be concretely course, chapter, paragraph, etc.

"SCORM content aggregation model" presents a comprehensive model collecting several concepts:

- The "Assets" are atomic documents that do not have intrinsic educational value such as images, text, video.
- An "SCO" (Sharable Content Object) is a unit (or grain) of content that has a pedagogical sense, which can be reused in another course, and it will be recognizable by a SCORM platform.

SCO is an autonomous learning unit because it can be loaded in an execution environment (LMS).

SCORM evolution: Which version should be used

SCORM 1.1 is the first production version. This version was quickly replaced by SCORM 1.2.

The SCORM 1.2 includes

- The Content Packaging (or aggregation of content). It represents the XML files ("imsmanifest.xml") that depict the resources (information of the used files); navigation (between resources) and metadata.
- Runtime (or execution environment), which represent all the scripts (Javascript) which, when added to the resources allows to transmit the metadata to LMS platforms.
- The Metadata separated into two categories: those related to the course (described in the IMS Manifest) and those called "environments" which are exchanged with the course due to the runtime and tracking learner (progress in the course training, results, etc.).

SCORM 2004 1st: It has resolved many ambiguities of previous versions, Sequencing and Navigation is added. Sequencing specification is not fully implemented and has some problems. This version is not usable.
SCORM 2004 2nd: Defects in the 1st Edition are resolved. Adoption is not as wide as SCORM 1.2, to this point, but the number of LMS’s and content vendors supporting SCORM 2004 2nd is increasing greatly.

SCORM 2004 3rd: Enhance existing and add some new conformance requirements in sequencing specification to improve interoperability between content objects and the run-time environment. It has significant adoption like 2nd Edition.

SCORM 2004 4th: More stringent interoperability requirements, more flexible data persistence. The new features in 4th Edition make creating sequenced content much simpler. It’s also widely used [7].

Depends on the content, using SCORM 1.2 may be good enough unless we want extra capabilities in SCORM 2004 [7]. Figure 4 details all SCORM versions.

![SCORM Versions](image)

**Figure 4** Versions of SCORM

4. SCORM CONTENT CREATION

A SCORM course consists of "SCO" objects. It may be composed of HTML pages, animations, drawings, videos, etc. Several SCO will form a Learning Object (LO). One or more LO may form a course. SCORM content can be divided into several distinct parts: the "content aggregation model" which promotes consistent methods for storage, identification, exchange packaging and tracking of content. The "execution environment" describes the requirements of the learning management system necessary to manage the runtime environment. The "model of sequencing and navigation" allows dynamic content presentation. It describes how the system interprets the rules, ment sequence expressed by a content developer, and the navigation events initiated by the student or by the system. Figure 5 shows how these components and criteria on the form and content of e-learning are integrated in the SCORM model.
5. PROPOSED ARABIC GRAMMAR COURSE

In Arabic language there are two main types of sentences; nominal and verbal. The former is that sentence which effectively begins with a noun, and the latter is that which effectively begins with a verb [8]. The sentence that contains one proposition is called simple. The other are called complex sentences. In this section we will discuss the form of some simple Arabic sentences. Then, we will present some interfaces showing the organizations and resources of the SCORM-compliant course of the Arabic grammar (Figure6 and Figure7).

The created SCORM-compliant course contains:

- The simple sentence and its characteristics
- The essential forms of the simple verbal sentence
- The transitive verb and the intransitive verb
- Verb in the passive voice
- The essential forms of the simple nominal sentence
- A topic and attribute
- A nominal sentence starting with a verbal nasikh
- A nominal sentence starting with a nominal nasikh
- The simple sentence and complements

The typology of the simple Arabic sentence is detailed in [9]. Figure 6 shows the organization of the content package.

**Figure 5** Content integration in SCORM
Figure 6 Organization of the content package

Figure 7 shows the resources of the content package that contains the created SCORM-compliant course for the Arabic grammar.

Figure 7 Resources of the content package
The content package is next integrated in our environment [3] that is based in Moodle LMS. Moodle is software that deploys, manages, tracks and reports on interaction between learner & content and between learner & instructor [10]. In particular, this platform performs student registration, tracks learner progress, records test scores, and indicates course completions and finally it allows trainers to assess the performance of their learners.

6. CONCLUSION
The digital document is at the service of the educational field. Indeed, in the context of e-learning, the multiplication of software solutions and the exponential increase of digital documents available on the web have become major concerns. More than ever the interoperability problem and the need for characterization and description of common systems in the field of educational information become obvious and very necessary, for the purposes of ensuring interoperability, portability, accessibility, durability and reusability we discussed in this paper the importance and the goal of SCORM standard and we implemented a SCORM-compliant course that is integrated in an e-learning environment for the Arabic language.

REFERENCES