Adaptive Assessments using Open Specifications

Héctor Barbosa León, Technological Institute of Colima, Colima, Mexico
Francisco J. García-Peñalvo, Instituto Universitario de Ciencias de la Educación, University of Salamanca, Paseo de Canalejas, Salamanca, Spain
María José Rodríguez-Conde, Instituto Universitario de Ciencias de la Educación, University of Salamanca, Paseo de Canalejas, Salamanca, Spain
Erla M. Morales, Instituto Universitario de Ciencias de la Educación, University of Salamanca, Paseo de Canalejas, Salamanca, Spain
Patricia Ordóñez de Pablos, Department of Business Administration, University of Oviedo, Oviedo, Spain

ABSTRACT

Evaluation is a key element in formal education processes; it must be constructed in a way that the item questions within help students understand by adapting them to the learning style as well. The focus of the present research work specifically in the convenience to adapt an associated multimedia material in each single question besides the traditional adaptation process based on the level of difficulty established for an item; all this in order to increase the final test score of the student. The proposed approach tries to solve this by designing and constructing an authoring tool to construct adaptive objective tests and an a prototype test to evaluate if a test that looks to adapt a multimedia content to the learning style could help to increase cited score of the student. The results are significant because it is able to conclude that adapted test based on the student’s learning style slightly increased the final score.

Keywords: Metadata, Methods and Techniques of Content Adaptation, Online Assessments, Open Specifications, Semantic Web

1. INTRODUCTION

Nowadays, the process of reviewing and the subsequent evaluation of the academic knowledge acquired by students in the classroom is considered of vital importance in the teaching-learning process, because with these activities the teacher can obtain and compare the results of what the learner actually has learned, incorporating the new knowledge into the student’s learning baggage (Borrel, 1995).

There are several tools to evaluate the knowledge acquired by students. One of the most widely used are objective tests, which seeks to assess, on a uniform and standardized level the expected knowledge for a particular topic or subject. However, it is useful to con-
sider some factors that affect the student at the
time of an examination. Among them it may
be considered the lack of knowledge when he/
she are responding a test or the stress, which
naturally occurs in some users and the impact
reflected in the final scores of the students.

The classification of the tests, according
to their purpose, defines three basic types:
diagnostic, formative and summative. These
assessments can be combined in the process of
continuous assessment (Miller, Imrie, & Cox,
1998). The diagnostic type occurs before the
course starts, and is useful to recognize the skills
and current knowledge of the student, through
performing a diagnostic examination for the
purpose of locating the educational course
and also to identify learning needs to adjust
the course design.

The formative test (East, 2008) is an es-
sential part of the learning process because it is
a way to make a feedback loop to the student on
progress within the course. The summative test
is usually performed at the end of educational
course. In an educational setting, is engaged in
this type of tests to assign a rating to the student.

Another classification of tests is the objec-
tive and subjective test (Chester, 1974). The first
is a form of questioning in which there may be
questions with one correct answer or multiple
choice question. On the other hand, subjective
testing is a group of questions in which you may
have more than one correct answer (or more
than one way to express a correct answer). The
objective type questions (also called items in
the objective tests or multiple choice) include
true/false, multiple choice, multiple response,
matching responses. Subjective questions in-
clude extended response questions or essays.
The objective type of question is the best used
in the test included in the e-learning platforms,
as they are the best suited to a computer or
automate process of evaluation.

In this paper a new way to define and con-
struct adaptive test using open specifications
is introduced. Based on a previous research
(Berlanga & Garcia, 2008), the proposal asks
if a test with adaptation processes could be an
added characteristic that improve the final score
obtained by the students. As well as in adapted
content in adapted hypermedia systems, that
show information relevant to the user using
methods and techniques to adapt the presenta-
tion, in an objective test it is possible to show
relevant information to support a question,
using, in this case the learning style defined
for each student.

The main goal of this article is to present
an authoring tool to define questions with multi-
media content and complete tests incorporating
two adaptation processes: one in the level of
complexity of the question (set in the construc-
tion stage) and the other at runtime, based in
the learning style identified for each student,
by showing the correspondent multimedia file
(audio or video).

The sections are presented going from the
general to the specific description of concepts
and activities performed to define an adaptive
test, from this, a definition of a test is presented,
followed by the description of the methods and
techniques of adaptation, after that the defini-
tion of the Semantic Web will be introduced.

Then a section where the IMS QTI specifi-
cation is introduced is showed, followed by the
description of adaptive tests. In the next section
the research proposal is described, presenting
the process to define and construct and adaptive
test using open specifications, followed by the
description of an example of an adaptive test,
finally the conclusions close the paper.

2. EDUCATIVE TESTS
ON THE INTERNET

The process of assessment and the subsequent
evaluation is essential to motivate students to
apply the knowledge gained. This tool helps
them to understand their strengths and weak-
nesses and also helps teachers to measure the
effectiveness of their teaching methods and
to focus their efforts on areas where students
need more attention. Online surveys minimize
the time for the evaluation of the traditional
way and can provide immediate feedback to
students. Online assessment and evaluation