
Methods for rubric inclusion into Moodle

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Abstract

The purpose of this paper is twofold. The first part discusses a method of embedding a rubric in Moodle using various methods – existing facilities, SCORM and a Moodle Module. The second part introduces a Moodle specific module suitable for including multi dimensional rubrics. The paper briefly revisits the pedagogy behind the rubric and how it was applied to the Moodle module.

Keywords

Moodle, Rubric, SCORM, Online course design

Introduction

Since as early as 1995 ("History of Virtual Learning," 2009; Freed, 1999) Learning Management Systems (LMS) have become a common feature in tertiary institutions. Moodle LMS has proven to be a great success as an internationally recognised LMS and as at June 2010 has 50741 installations across the globe. (www.moodle.org/sites). This figure only includes the registered installations with potentially more ad-hoc and private installations that are not recorded.

The LMS enabled the delivery of the online component of classroom-based or blended learning courses. However, to ensure a quality educational experience,

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care needed to be taken to ensure that learning activities and resources are appropriate for the online or blended environment. The materials used in a typical classroom were not always suitable or needed significant adaptation for use in an online delivery environment.

Many educators in institutes of higher learning could be considered subject matter experts first. They may have minimal to no course design, little experience working, teaching and learning in an online environment. An assessment instrument was selected for determining the completeness of an educator's online course offering to help alleviate the above problem. This instrument was a modified version of the Rubric for Online Instruction by the Centre for Excellence in Learning and Teaching rubric (CELT) (Rubric for online instruction, 2009). The goal of this rubric was to provide a mechanism to;

- a. aid teachers in the design of these courses,
- b. assess and evaluate the courses' level of completeness, and
- c. to help reviewing the course content.

The modified CELT rubric (Seitzinger, Jamieson & Forlong-Ford, 2009) was created and sent out to various teachers within the author's organisation for testing and evaluation. Rather than the hoped for comments on the rubric content, the teachers were more concerned with the form of the rubric. A comment like, "Do you have an electronic version?" was frequently ask whereby an electronic version of the rubric document was offered to them. Subsequently

the teachers came back with some questions like "...I mean is it part of Moodle?" and "Does Moodle have it as an activity?" The resulting answer to all these questions was "No". Hence an investigation was started in an attempt to identify a method of offering the rubric in a form suitable for use in an LMS other than the use of a simple electronic word processed document. The rest of the paper carries on with a brief look at the structure of the rubric followed by an investigation in methods of embedding the rubric, finishing off with an analysis of the proposed methods.

The CELT rubric revisited

The modified CELT rubric, just called the rubric for the rest of the document, takes a holistic approach to evaluating online course content though some aspects of the rubric include an analytical approach (Stevens & Levi, 2005). Some of the scoring criteria contain a range of specific items for measuring or evaluating the online course against.

It was important to understand the structure and composition the rubric so that the best method of implementation could be applied. The rubric had to be facilitated in such a way as to not destroy the ease of use and simplicity a rubric offers. A teacher should not have to find an excuse to not use technology owing to it being in the "too hard to use" category.

The literature described various technologies encouraging and facilitating interaction such as web-based resources (Hughes & Hewson, 1998) and the importance of taking full advantage of these technologies (Kimeldorf, 1995). The literature (Auvinen, 2009; Daniels, et al, 2004; Heinrich, 2009; Monpara, 2008) interestingly enough did not cover

many aspects regarding electronic versions or implementations of rubrics other than the electronic document versions.

The rubric can be considered 3 dimensional matrix with one dimension set for the categories and the other two for the elements and scoring criteria. The rubric consists of 5 broad categories that covering the online learning domain. The categories can be considered as groupings of similar elements and are as follows;

- a. Learner Support & Resources
- b. Online Organisation & Design.
- c. Instructional design & delivery.
- d. Assessment and Evaluation of Learning.
- e. Innovative Teaching with Technology.

For each of these broad categories there are one or more elements forming the vertical dimension. There was a case where elements, containing the analytical components, were to be separated depending on how the rubric was implemented. This becomes apparent later on in the paper. The horizontal dimension covered the three scoring levels in the horizontal dimension that offered a score ranging from 1-6 depending on the degree of completeness.

The complete rubric is available from the author or on <http://moourl.com/designbynumbers>

Rubric implementation approaches

Using Moodle as the preferred LMS an investigation was conducted into the Moodle technology identifying suitable strategies for the implementation of the rubric. The implementation had to provide a minimal impact on the Moodle installation and provide an interface that was easy and comprehensive enough for the teacher to use. Three features of Moodle suggested a method in which the rubric could be implemented;

- a. Use of existing Moodle features or functionality,
- b. As a SCORM package added to the respective course, and
- c. As a module or plug-in installed onto of the base/core Moodle installation.

There was a consideration for Adobe PDF document form as a potential technology candidate. A major drawback for this solution was the cost of purchasing the expensive proprietary tools in order to edit and create the Adobe PDF form. Once a form was created the results of the rubric were not readily usable. Each form was self contained with the rubric results embedded. This meant the results were not readily available to the teacher for inclusion in a spreadsheet or other means. It would have required additional expense and tools to extract the data into a suitable medium. Although there may be software available for editing and converting PDF documents the Moodle LMS does not have interactive support for PDF other than simple course content. The scope of this research did not include the PDF form was not considered further.

Moodle Quiz activity

Using the Moodle Quiz activity and the *Multiple Choice* question option it is possible to embed a rubric. Five question categories are created to reflect the 5 rubric categories. Within each question category the rubric elements become the “quiz questions” with the scoring criteria as the “multi choice answers”. To use the rubric, all of the questions from the categories are assigned to the quiz. Figure 1 shows a sample out of the attempted implementation

Links to information for online learner support and links to campus resources.	
<ul style="list-style-type: none">• Library, link• Ref to Learning Services• How to get help	
Choose one answer.	<input type="radio"/> a. Baseline - Little to no information
	<input type="radio"/> b. Effective - contains some information
	<input type="radio"/> c. Exemplary - contains extensive information
Programme & course specific resources are provided.	
<ul style="list-style-type: none">• Textbooks/ readings• Programme information• Learning objectives• Contact information: teacher, school, programme	
Choose one answer.	<input type="radio"/> a. Baseline - Little to no course-specific resources, and limited contact information.
	<input type="radio"/> b. Effective - Some course-specific resources, some contact information given
	<input type="radio"/> c. Exemplary - Variety of course-specific resources, contact information complete

Figure 1 Moodle Quiz as a rubric

The limitations of this method of implementing the rubric are as follows:

- The matrix or table view of a rubric is lost and there is no option for groupings/categories.

- Quiz requires specific setup process whenever it is used for the rubric. i.e. with regards to the score and weightings. A new quiz needs to be created each time for each course.
- A “correct” answer is always expected and since it’s an assessment it is handled as such by Moodle. Questions are assigned a % rather than allowing custom scoring.
- The quiz is very student centric and requires Moodle Gradebook access which would skew overall assessment results if the Gradebook was in use. This is fine if the Quiz was intended for the students or if students were requested to evaluation the course.

Moodle Workshop activity

The workshop module has a rubric grading strategy option for grading progress during the workshop activity. Figure 2 demonstrates a sample of the rubric as part of the workshop.

Assessment	
Thursday, 1 January 1970, 12:00 PM	
Element 1:	Links to information for online learner support and links to campus resources : • Library, link • Ref to Learning Services • How to get help Weight: 1.00
Select	Criterion
<input checked="" type="radio"/>	Little to no information
<input type="radio"/>	contains some information
<input type="radio"/>	contains extensive information
Feedback:	Your Feedback goes Here
Element 2:	Programme & course specific resources are provided. • Textbooks/ readings • Programme information • Learning objectives • Contact information: teacher, school, programme Weight: 1.00
Select	Criterion
<input checked="" type="radio"/>	Little to no course-specific resources, and limited contact information
<input type="radio"/>	Some course-specific resources, some contact information given.
<input type="radio"/>	Variety of course-specific resources, contact information complete.
Feedback:	Your Feedback goes Here

Figure 2 Moodle Workshop as a rubric

The limitations observed in this implementation are as follows:

- The matrix view of a rubric is lost but a single dimension table is retained. There is no provision for groupings/categories.
- Scoring is done per element not criterion with a -4 to 4 weighting range.
- Limited to 20 Elements.
- Workshop activity is student centric.

Online course evaluation as a course

Workarounds to the above included creating a Moodle course with the online teachers enrolled as students. Hereby creating an “assignment” for each course that was needed to be reviewed or checked. This only leads to confusion when the course ends up with multitudes of “assignments” and only a fraction belong to the “student”.

SCORM

“Sharable Content Object Reference Model” indicates that SCORM (SCORM 2004 4th Edition Version 1.1 Documentation 2009) is all about creating units of online course content that can be shared across systems. Specifically, SCORM governs how online course content and LMSs are able to communicate with each other. Essentially it is a set of technical standards used by programmers to write software products for e-learning software. One of the more important aspects of SCORM is that it does *not* involve or determine instructional design or any pedagogical concern. It did however provide a potential framework for implementing the rubric.

Moodle versions 1.9.5+ are certified SCORM 1.2 compliant with partial support for SCORM 2004. This means in order to use the SCORM method the rubric had to conform to the SCORM 1.1 or SCORM 1.2 set of standards in-order to produce a compatible package. The open source tool eXe, a New Zealand project funded by the New Zealand Government Tertiary Education Commission's eCollaboration Fund (eXe 2008), exports content in IMS Content Package, SCORM 1.2, or IMS Common Cartridge formats or as simple self-contained web pages. This tool and many commercial tools such as THESIS and Trident IDE can

produce the required SCORM content but none of them produce rubrics.

As it happens current literature did not provide much or any in way of examples of rubrics used or created in a SCORM package. This strongly indicated the possibility that SCORM did not yet have the functionality to support a rubric. Producing the much needed functionality into SCORM requires a basic understanding of the SCORM structure and standards.

The SCORM Content is made up of assets, sharable content objects (SCOs) and activities. Assets are the electronic media, such as text, images, sound, assessment objects or any other Web related content. Multiple assets can be collected together to build other assets. This indicates that the rubric can be constructed from various assets. The tools mentioned earlier did not readily support this yet.

Having to learn a new tool to build a one tool that is required to function in another tool could not be a considered a desirable learning experience by teachers not confident with technology.

Moodle rubric module

The default or core installation of Moodle does not provide immediate facilities for using rubrics in any

form other than as part of course content in the form of an electronic document or part of an existing assessment. Moodle however, did provide a mechanism whereby developers are able to write modules or plugins to add functionality to the LMS.

The Moodle module repository only offered two modules that could be utilized for the rubric creation. The first option is based on a commercial product from Waypoint Outcomes and details a proprietary implementation. The module was not available for general use which discounted this solution from testing.

The second option is a rubric module that showed development activity halted towards the end of 2008. Figure 3 shows a sample of the output produced by the rubric.

Given the lack of suitable rubric integration tools for Moodle this appeared the only and most suitable offering. Owing to the halted development there was no guaranteed this module would function in any of the later Moodle versions. Upon inspection of the module source files it was noted the module was embedded into the Moodle core assignment module which severely limits its use in later versions should the core files change.

Name	Notes	Points
Learner Support & Resources		
Links to information for online learner support and links to campus resources.	• Library, link • Ref to Learning Services • How to get help	
■ Little to no information		6
■ contains some information		4
■ contains extensive information		2
Programme & course specific resources are provided.		
	• Textbooks/ readings • Programme information • Learning objectives • Contact information: teacher, school, programme	
■ Little to no course-specific resources, and limited contact information.		6
■ Some course-specific resources, some contact information given.		4
■ Variety of course-specific resources, contact information complete		2
<i>Online Course Design</i>		24 pts

Figure 3 Sample view of the Moodle rubric module with part of the Online Course Design Rubric implemented.

The module was installed tested on sandboxed versions of Moodle 1.9.8+ and Moodle 2.0 preview on a Microsoft Windows Platform. Both installations accepted the module with no errors.

Figure 3 clearly shows it was possible to insert the Online Course Rubric into the rubric module. Once again the view is a 1 dimensional table with an outline structure. From a visual perspective it is not hard to understand. Upon further testing of the module with the rubric some limitations became apparent making the module in its current state unsuitable for implementing the rubric. The more noticeable limitations were:

- Scores for the criterion did not accept ranges only a mark-out-of value as reflected in Figure 4. This meant the original rubric would have to change. The rubric was not intended to work with the out-of type scoring.

- The rubric module is very much integrated into the Moodle assessment and gradebook hence making it student centric.
- The rubric cannot be updated once an "assessment" has been assigned of completed against the rubric. This makes further updating of the rubric problematic. The teacher would have to export a copy of the rubric and create a new assessment to be able to use the rubric again.

Using the rubric module in *the Online course evaluation as a course* option was a stronger candidate for implementing the rubric if a teacher was content with the results. It may have required some extra interpretation of the scores to make it meaningful. There was the possibility of teachers using different scoring methods owing to how they would apply the scoring to the Moodle rubric module which in-turn could

be counter-intuitive towards establishing a standard online course content evaluation process within an institute of higher learning.

Name	Notes	Points	Grade	Comments
Learner Support & Resources				
Links to information for online learner support and links to campus resources.	• Library, link • Ref to Learning Services • How to get help			
▪ Little to no information		4 / 6		
▪ contains some information		3 / 4		
▪ contains extensive information		1 / 2		
Programme & course specific resources are provided.				
▪ Little to no course-specific resources, and limited contact information.	• Textbooks/ readings • Programme information • Learning objectives • Contact information: teacher, school, programme	6 / 6		
▪ Some course-specific resources, some contact information given.		1 / 4		
▪ Variety of course-specific resources, contact information complete		2 / 2		
Online Course Design		Score 17 / 24 (70.8%)		

Figure 4 Rubric module showing grading in action

Based on the analysis of the Moodle rubric module it has been determined a revision of the module would have to take place to accommodate a more teacher centric approach.

Towards a New Moodle Rubric module

The new or updated rubric module had to be created with a number of features in mind as well as overcoming the various limitations. In saying that, the rubric module was to not totally remove the functionality of the existing rubric.

The new rubric module had to retain existing functionality but include the following changes:

- Able to switch rubrics from student centric to teacher centric as required. The centrality is

dependent on the rubric in use and is not as a either/or scenario.

- Accept variable scoring methods such as fixed value, range and out-of scores.
- Provide cleaner embedding with minimal or no modifications to the Moodle core source files.

The existing rubric module was dissemination into functional components to determine what had to be replaced and what could stay. Analysis of the module's code showed it had to be part of the assignment module if it was to retain its existing functionality. This implied the creation of a new module which was left for further research.

The rubric module remained student centric but the following changes were applied:

- changes were made to allow variation in the scoring methods,
- amendments could be made to "closed" rubrics under certain circumstances,
- addition of non score bearing "bands" were able to be included into a rubric - in the case of providing categories of questions, and
- visual changes to offer a more matrix appearance.

The updated module has been undergoing testing.

Conclusion

There are a number of ways to implement a rubric into Moodle, some shown to be possible but inaccurate in presentation. Other implementations demonstrated possibilities in implementing a rubric as it was intended but with limitations.

Despite its simplicity rubrics are assessment instruments that are scoring criteria which are summative, formative, evaluative and educative (Stevens, 2005). They will become an important tool when it comes to assessing 21st Century skills based assessments especially those submitted through Moodle.

This research will continue with the complete development of the Moodle rubric module to offer interoperability with ongoing projects such as *Lightwork* (Heinrich, 2009) from Massey University.

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