E-Learning Quality Evaluation Instrument for SPADA Indonesia

Hari Wibawanto[1]

[1]Departement of Electrical Engineering, Universitas Negeri Semarang, Semarang, Indonesia

hariwibawanto@mail.unnes.ac.id

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Abstract: Evaluation of the quality of online learning needs to be done before the learning process is carried out by the instructor. The intrinsic quality and some contextual quality are evaluated to ensure the quality of the learning object itself and its pedagogical foundation in an online learning environment. This research deals with the quality of online learning preparation, consist of quality of learning object itself, its placement and integration with Learning Management System. The measurement system consists of the items to measure the intrinsic quality of learning objects and items to measure their relation to the pedagogical aspect. Pedagogical aspect of learning objects can be seen partially by its placement and integration with Learning Management System. There were 4 (four) steps in developing the instrument: (1) evaluating the existing e-learning instrument, (2) focus group discussion to determine instrument dimension, (3) instrument try out, and (4) instrument revision. As a result, two kinds of instrument for SPADA Indonesia had been developed in this research: (1) instrument to measure the quality of learning objects and its' placement and assembly in Learning Management System, and (2) check list the availability of elements forming the face validity of e-learning.

1   INTRODUCTION

SPADA Indonesia is a MOOC's pilot program of the Directorate General of Learning and Student Affairs of the Ministry of Research, Technology and Higher Education to improve equitable access to quality learning for Indonesian's student. Through online learning, SPADA Indonesia provides opportunities for students from one particular university to take part in quality courses from other universities and their learning outcomes are recognized by the college where the student is registered.

To get quality online learning, instruments for evaluating teaching materials and online learning processes are needed. Evaluation of online teaching materials is needed to ensure the quality of teaching materials managed in SPADA Indonesia prior to learning process.

Evaluation of the quality of online learning (online learning or e-learning) need to be conducted in at least two stages, that is: (1) in the stage when teaching materials or content are planned and implemented in the learning management system (LMS), and (2) immediately after the learning is completed. Between the two kinds of evaluation, a formative evaluation can be conducted to provide an information of the implementation in ongoing process.

In online learning, the content and its presentation in the LMS should be finished before the learning activities begin. Content in online learning, commonly called a learning object, can be evaluated separately to get an idea of the intrinsic quality of learning objects, that is when the learning object is judged "on its own" outside the context of its use, and contextual quality, that is when the learning object is assessed in relation to learning activities as a whole. In this case, the learning object and its arrangement in the LMS are evaluated in relation to its suitability with the learning outcomes and pedagogical considerations in the selection, development and arrangement those learning objects in LMS.

This paper focuses on evaluating intrinsic quality and contextual quality when a learning program is prepared in LMS and is ready for use in learning activities. This evaluation is carried out before learning process.

1.1   Quality Assurance in SPADA Indonesia

SPADA (Sistem Pembelajaran Daring) Indonesia, or the Indonesian Online Learning System, is a

portal owned by the Ministry of Research, Technology, and Higher Education (MORTHE) for manage online learning courses organized by various universities in Indonesia. The Ministry of Research, Technology and Higher Education is not an operator that can organize learning, so all it can do is to provide facilities for higher education institution to place and conducting their courses in SPADA Indonesia. As a facility provider, MORTHE has the role in ensuring that the courses in SPADA Indonesia are courses that have guaranteed quality. The procedure for submitting courses to be placed in the SPADA Indonesia is shown in the following workflow (Kemenristekdikti, 2016):

a. Proposers of e-Learning course develop learning objects and arrange them in the form of online courses in LMS (Learning Management System) manage by SPADA Indonesia portals or in their own universities LMS.

b. Reviewer evaluates learning objects in the proposed online course, it's placement in the context of learning strategies, it's learning methods, order of presentation, and other pedagogical aspects.

c. The evaluation results are informed to the manager of the SPADA Indonesia in making decision to accept or reject the proposed online courses or request revision to the proposer

So, what was prepared by the proposer is the learning objects and it's placement in the LMS. As an online learning plan, structuring learning objects in LMS has to be accompanied by learning messages and learning paths. Thus, in addition to evaluating the intrinsic quality of learning objects, only a limited contextual quality evaluation can be carried out because the course has not been implemented.

Reviewer who get the task of evaluating online courses will look at and trace learning path and structured learning objects within the LMS. In addition to assessing the intrinsic quality of each learning object, reviewers also evaluate the contextual quality of learning objects in the form of learning messages and learning paths provide by the proposer. Learning messages can be in the form of greetings, learning directives, statements about

learning objectives, and similar messages intended to provide direction on what learning participants should do with in online learning activities. The flow of learning is generally depicted in the form of a competency map, which explains what competencies are prerequisites or which are mastered earlier than other competencies.

1.2 Framework for Evaluating Learning Objects

Online learning is assumed to be effective if the learning object contains only material related to the learning outcomes and the order of presentation based on pedagogical principles. Additional information (i.e. descriptive illustrations that broadening insights, kind of examples and non-examples, etc.), are only used if they can deepen understanding and longer retention of the knowledge provided.

The intrinsic quality of learning objects can be evaluated independently by considering the qualitative features of the content itself such as readability, clarity of image resolution, clarity of audio, smoothness of video resolution, compatibility with viewer devices and so on. The contextual quality of learning objects is evaluated in relation to pedagogical aspects, such as their suitability with learning outcomes, accuracy of content, breadth and depth of information, suitability of learning objects with type of delivered information, sequences or order of presentation, conformity with planned learning activities, cognitive overload, and so on (El Mhouti, Abderrahim & Nasseh, Azeddine & Erradi, Mohamed, 2013).

Among instruments for evaluating the quality of learning objects is LORI (Learning Object Review Instrument) developed by Nesbit, Belfer, & Leacock (2004). LORI is designed as an instrument to assess the quality of multimedia learning objects. Although in its evaluation it also relates to learning objectives, LORI is generally used as an evaluation tool for learning objects, not an evaluation tool for the entire program in which this learning object is utilized. The items in the LORI are grouped into 9 criteria as tabulated in the following table:

Table 1. Criteria of LORI

Category	Description
Content Quality	The learning object content is free of error and presented without bias. Claims are supported by logical arguments, and presentations highlight significant ideas
Learning Goal Alignment	Appropriate learning goals are stated. The learning activities, content, and assessments provided by the learning object align with the declared goals
Feedback and Adaptation	The learning object provides feedback driven by differing

	learner inputs or learner modelling
Motivation	The learning object content is relevant to the personal goals and interests of the intended learners
Presentation Design	The style of information design in the learning object enables users to learn efficiently. The presentations of the learning object minimize visual search; text and graphics are clear, concise and free of errors. Screen components do not interfere with learning goals.
Interaction Usability	The user interface design implicitly informs learners about how to interact with the learning object. Navigation through the learning object is simple. The behaviour of the user interface is consistent and predictable
Accessibility	The design of controls and presentation formats in the learning object may accommodate learners with sensory and motor disabilities. The learning object can be accessed through different electronic means including assistive and highly portable devices.
Reusability	The learning object is a stand-alone resource that can be readily transferred to different courses, learning designs, and contexts.
Standards Compliance	The LO conforms to relevant international standards and specifications. Sufficient metadata is provided in tagged codes and made available to users.

Merlot, Multimedia Educational Resources for Learning and Online Teaching, (http://www.merlot.org) uses criteria that have many similarities with LORI to evaluate learning objects that meet the requirements to be stored in their repositories. The evaluation process carried out by the Merlot is to use individual evaluations (peer review) and refer to the standards of learning objects. The criteria used by Merlot reviewers are categorized into 3 (three) criteria or dimensions (Nesbit, Belfer & Vargo, 2002), namely:

a. Quality of Content, encompasses both the educational significance of the content and its accuracy or validity.
b. Ease of Use, encompasses usability for first-time users, aesthetic value, and provision of feedback to user responses, and
c. Potential Effectiveness as a Teaching Tool

According to the MERLOT site, Potential Effectiveness as a Teaching Tool is the most difficult dimension to assess. This dimension encompasses pedagogically appropriate use of media and interactivity, and clarity of learning goals. There is an emphasis on the importance of context, which is defined in terms of learning outcomes, characteristics of the learner, and placement of the materials within a learning strategy.

NHS Shared Learning (2009) develops two types of check lists to evaluate: (1) the quality of learning objects, and (2) the quality of courses online. Evaluation of the quality of learning objects is carried out through the establishment of 8 (eight) standards, which consist of A-H standards that have similarities with LORI, i.e.:

a. Content Quality - The content is accurate and grammatically correct, and the scope is sufficient for the intended use.
b. Learning objective alignment - Learning goals and objectives are provided to outline learning expectations and are applicable and relevant to the subject matter and the audience.
c. Feedback - Learners are provided with constructive, relevant and frequent feedback based on their activities within the learning object.
d. Motivation - The learning environment is engaging, interactive and relevant to the intended learner
e. Design and Usability – Design is clear, consistent, and predictable
f. Accessibility - The learning object provides accommodation for learners with sensory and/or motor disabilities
g. Reusability and standards compliance - The learning object can be used in varying learning contexts with learners from diverse backgrounds and supports international standards and specifications.
h. Intellectual property and copyright - The learning object metadata address the rights of the owner and the conditions for use

2 RESEARCH METHOD

The research was carried out in 3 (three) stages: (1) examining 3 (three) existing instrument for evaluating learning objects by conducting focus group discussions to determine the dimensions of

the instrument, (2) testing instruments, (3) finalizing instruments

3   RESULT AND DISCUSSION

3.1   Examining Existing Instrument

Focused Group Discussion was conducted by 6 experts to determine the appropriate criteria for SPADA Indonesia content evaluation instruments. There are 3 (three) existing instruments examined: (1) LORI (Nesbit, Belfer, & Leacock, 2004); (2) NHS Shared Learning for evaluating learning objects (2009), and (3) MERLOT instruments, which are used to evaluate learning objects to be stored in their repositories.

Of the 9 criteria developed in LORI, 3 (three) criteria cannot be immediately used as evaluation criteria for the intrinsic quality of learning objects and contextual quality related to their structuring in LMS. The criteria for "feedback and adaptation" for example, can only be evaluated when learning activities has taken place. That is, the items in the criteria can only be scored only if the learning object has been used in learning activities and the lecturer or instructor has provided feedback to their student. For learning object installed in the LMS before learning activities occur, what can be evaluated by reviewer are the presence of automatic feedback attached to quizzes. Meanwhile, feedback provided when responding to assignments and when interacting in forums, does not yet exist and therefore cannot be evaluated.

The criteria for "Usability of interaction" and "Accessibility" are evaluation criteria that are more appropriate for LMS than for learning objects. In online learning that does not use LMS but is implemented in special applications, these two criteria can indeed be evaluated because the learning object was implemented in integration with the learning management application. For learning objects installed in the LMS, the navigation behaviour and user interface are fully determined by the design of the LMS.

Of the 3 criteria used by MERLOT to evaluate learning objects, the criteria for "Potential Effectiveness as a Teaching Tool" are the most difficult to assess. This dimension includes the use of media and interactivity which is pedagogically appropriate, and the clarity of learning objectives. That dimension implies contextuality, which is associated with learning outcomes, learning characteristics, and placement of learning objects in LMS by considering the learning strategies used.

The contextuality of learning objects associated with learning outcomes is of course not compatible, and may even be contrary to characteristics of reusability or reuse of those learning object in other learning situations and learning outcomes. The more contextual learning object, the less reusability for other learning situations and learning outcomes (Nesbit, Belfer & Vargo, 2002).

NHS Shared Learning (2009) develops two types of check lists to evaluate: (1) the quality of learning objects, and (2) the quality of online course. Evaluation of the quality of learning objects is carried out through the establishment of 8 (eight) standards or criteria, consisting of A-H that have some similarities with LORI. Regarding the criteria for each standard, evaluators simply assess the fulfilment of criteria in 3 (three) levels, i.e.: (1) fully fulfilling the criteria, (2) partially according to the criteria, and (3) not meeting the criteria. Besides evaluating closed options, evaluators can also add notes to each criterion.

NHS Shared Learning limits that objects that can be evaluated with 8 standards include, among others: simple text documents, photos, video clips, 2 or 3-dimensional imagery, single topics equipped with learning objectives, and online learning packages. Criteria for Learning objective alignment, Feedback, Motivation and Design and Usability are not appropriate when forced to evaluate simple files, such as images.

Content Quality Instrument for SPADA Indonesia

Name of Course : _____
Course URL : _____
Name of Proposer(s) : _____
Institution : _____
Name of Reviewer : _____

Give a check mark (V) in the score cell according to your rating

1 = Poor
2 = Fair
3 = Good
4 = Excellent

No	Indicator	Score			
		1	2	3	4
1.	The learning structure is clear, the topics and the sub-topics are clear, each topics or sub-topics has an introduction, an explanation and a summary				
2.	Content is presented in communicative way, completed, and there are links to sites or documents to enrich the content				
3.	The types of learning objects (text, images, audio, videos, animations, simulations) are selected according to the needs and characteristics of learning outcomes				
4.	All references used are listed, for online references there are links to facilitate learners				
5.	Glossaries are available for terms and their meaning, list of notations, and list of symbols, especially if they are often referred				
6.	Clear visual display, text are easy to read, charts appropriately labeled and free of visual interference				

General Comments:

Figure 1. Content Quality Instrument for SPADA Indonesia

By considering various inputs from participants of focused group discussion, an instrument was developed to evaluate the quality of SPADA Indonesia's learning content consisting of 6 indicators with a score scale of 1-4. Figure 1 below shows the items for evaluating SPADA Indonesia's learning content. Of the 6 indicators on the instrument items for evaluating SPADA learning content, 2 indicators that are indicator number 3 (i.e. "Variety of learning objects (text, images, audio, video, animation, simulations) are chosen exactly according to the needs and characteristics of learning outcomes") and indicator number 6 (i.e. "clear visual display, easy to read text, graphs and charts labelled adequate and free of visual disturbances") illustrate the intrinsic quality of learning objects.

3.2 Inter rater reliability of instruments

To test the instrument, inter rater reliability tests were carried out with 15 courses and the following scores were obtained.

Course No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Rater 1	12	14	16	20	22	10	21	20	10	8	12	13	13	10	8
Rater 2	13	14	16	22	22	12	20	20	12	8	12	13	13	10	8

According to calculations performed on the Social Science Statistics page (https://www.socscistatistics.com/tests/spearman/Default2.aspx), the correlation between Rater 1 and Rater 2 is 0.97366 statistically significant. This means that the instrument is quite reliable to use.

4 CONCLUSION

Learning object evaluation instruments have been developed for courses that will be placed in the SPADA Indonesia portal. The instrument consists of 6 items which include assessment of intrinsic quality and contextual quality of learning objects. Inter rater reliability evaluation results show that there is a high correlation (0.97366) which means the instrument is reliable enough to use.

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