Training with Technology: Evaluating Learning Objects

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Introduction

New technology used in business and education is rapidly changing; therefore the need for technology training is ever increasing. North Carolina State University's DELTA division strives to satisfy the faculty, staff and student population's need for training and support in the area of educational technology. DELTA was established in 2000, corresponding with what ASTD notes as a new era of growth for e-learning. (as cited in Strother, 2002, p.2). The growth in popularity is attributed to many reasons. E-learning and the use of educational technology for technology training can increase convenience, reduce costs, reduce employee time on training and allows for a broader distribution of education. This is accomplished in part by standardizing delivery, allowing for self-paced study, and allowing for reusability of educational assets.

Technology education takes on many forms at DELTA, including but not limited to, face-to-face or recorded workshops, seminars and online training. This evaluation will explore the online training category entitled 'Quick Training'. This category of online training is defined by DELTA as short tutorials about instructional technology tools. The quick training category is broken down into groups according to specific learning technologies. Quick training groups include the following technologies: Moodle, Blackboard Collaborate, Elluminate Publish and general development tools. Each quick training technology group consists of 2-9 short modules of training. All modules in the groups are brief, asynchronous learning units. Each module focuses on one aspect or objective pertaining to the functions and operation of the technology.

DELTA has termed this category 'quick training' but they are more appropriately defined as multimedia learning objects. Beck (2010) defines learning objects as self-contained and reusable objects ranging from 2-15 minutes that focus on one learning objective. They may be aggregated into larger collections. Nesbit, Belfer and Leacock (2004) extend the definition to include any online informational resource. Examples can include: images, pages of text, learning activities, simulations, or short, single objective based courses. Learning objects have many benefits, first, the breakdown of larger learning experiences into smaller chunks can ease cognitive overload. Second, these smaller objective specific objects can be tagged with metadata to ease the search for relevant information. Third, they are self-contained and reusable, allowing a learner to view and review the information or objective they find most relevant.

The audience information beyond the evaluator is unavailable; however, the target audience is any faculty, staff or student motivated to acquire information or tutorials in the use of North Carolina State University's learning technologies. DELTA's quick trainings or learning objects can also be defined as open educational resources (OER). OER are any "teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others." ("Defining OER", n.d.). DELTA's 'quick trainings' are free and available on their website to the public, making them a useful open educational resource. Given the free and open nature of the quick trainings, an extra audience is any interested party searching for or linked to the resource.

Method

Learning objects, by definition, are short and strive to meet a single objective (Beck, 2010; Nesbit et al, 2004). They may encompass many forms ranging from a singular illustration to a small learning course. Traditional methods of learning evaluation do not fully accommodate the needs of consumers or designers of these shorter, reusable objects. For example, Kilpatricks four-level model focuses on the reaction, learning and application of knowledge and

organizational impact. Any consumer review of learning objects with Kilpatricks model will not reach past level two. A specialized tool was needed to standardize evaluation among shorter learning objects and to serve the community of learners using the objects. For this purpose the Learning Object Review Instrument was developed by Nesbit et al (2004)

Leacock and Nesbit (2007) offer three reasons for needing a specialized tool to evaluate multimedia learning objects: First, to ease the process of determining quality resources, second, to promote the use of quality ratings and third, to drive improvements in the design process. The focus on evaluating quality is echoed by Vargo et al. (2003), when posing the question "How can educators be assured that the learning objects they find in online repositories are of high quality and can fulfill their objectives?" (p.1). He answers by stating the need for valued systematic evaluation. Both authors promote the use of the Learning Object Review Instrument (LORI).

The LORI is a tool for summative evaluation. It uses rating scales and comment fields to review multimedia learning objects (Leacock & Nesbit, 2007). The most current version of the LORI (1.5) consists of nine criteria for rating and comment (Nesbit et al, 2004). Those criteria are briefly described in Table 1. Each criterion is rated using a five point scale from 1, not meeting the criteria to 5, meets or exceeds criteria. A "not applicable" option is also included allowing the evaluator to skip criteria when there is no information or basis for evaluation. Comment fields are presented as a means to provide feedback, support and evidence for the assigned ratings. For this evaluation, an instrument was crafted based on only seven of the criteria outlined in the LORI user manual (See Appendix A). Two criteria were eliminated due to the evaluators lacked the necessary knowledge to evaluate. This follows more closely with the Krauss and Ally (2005) modification of the LORI tool. Through the research of each criterion, questions were constructed and populated into the comment field to assist and focus the evaluation.

Table 1. LORI evaluation criteria (adapted from Leacock and Nesbit, 2007, p 45)

Item	Description
Content Quality	Veracity, accuracy, balanced presentation of ideas, and appropriate level of detail
Learning goal alignment	Alignment among learning goals, activities, assessments and learner characteristics
Feedback and adaption	Adaptive content or feedback driven by differential learner input or learner modeling
Motivation	Ability to motivate and interest an identified population of learners
Presentation design	Design of visual and auditory information for enhanced learning and efficient mental processing
Interaction usability	Ease of navigation, predictability of the user interface, and the quality of the interface help features
*Accessibility	Design of controls and presentation formats to accommodate disabled and mobile learners
Reusability	Ability to use in varying learning contexts and with learners from different backgrounds
*Standards Compliance	Adherence to international standards and specifications

* LORI criteria, but not included in this evaluation.

LORI use has been published numerous times in peer reviewed journals and thus validating its use as an instrument for evaluation (Akpinar, 2008; Krauss and Ally, 2005).

Krauss and Ally (2005) modified the criteria slightly to explore the design and evaluation process for learning objects. The authors used it as a summative tool for the qualitative measurement of a learning object's effectiveness. Ultimately they endorsed its use as it "represents a marked improvement over existing evaluation practices for learning objects" (p. 17). Akpinar (2008) also confirmed the LORI tool by conducting a validation study. The study employed subject matter experts, instructional designers and learners to review learning objects with the LORI tool. He found a "high level of consistency" concerning the use of the LORI (p. 299).

This evaluation will concentrate on only one grouping in the DELTA's quick training category. The Blackboard Collaborate, henceforth referred to as Collaborate, group was selected. This group contains eight quick trainings or learning objects to introduce the various functions and procedures for using Collaborate. Four of the objects were developed by DELTA and facilitated by Rebecca Burgner, Instructional Technologist. The remaining four objects, offered via hyperlink, are direct from the developers of Collaborate. This evaluation will only consider the four objects developed by DELTA. The objects consist of creating a new Collaborate session, creating a new Collaborate session in Moodle, using PowerPoint in Collaborate and joining Collaborate session. All four objects are similar in style and length with narrated slides, screen captures and animations highlighting the given objective.

Analysis

All four DELTA designed learning objects are similar in nature and length with the same narrator and delivery method. All four are narrated presentations with screen captures of the processes involved. They will be addressed and evaluated in each criterion as a group. Differences between individual objects will be identified as such within each section. When addressing the differences, the objects will be referred to by number. Number assignment and individual session information is outlined below (taken directly from DELTA website):

1. Creating a New Blackboard Collaborate Session: How to create a Blackboard collaborate session. Duration 5 minutes 39 seconds.
2. Creating a Blackboard Collaborate Session in Moodle: How to create a Blackboard Collaborate session in Moodle. Duration 5 minutes 14 seconds.
3. Using PowerPoint in Blackboard Collaborate: Learn how to upload a PowerPoint slideshow to Blackboard Collaborate whiteboard. Duration 3 minutes 16 seconds.
4. Joining a Blackboard Collaborate Session: Participants learn how to join a Blackboard Collaborate session. Duration 4 minutes 20 seconds.

Content Quality

Nesbit et al (2004) define content quality as: (1) content free from errors and bias, (2) having an appropriate level of detail, (3) emphasizing key points and ideas, (4) backing all claims with evidence or logic. Leacock and Nesbit (2007) maintain content quality is the most important aspect of a learning objects quality. It is also the most dependent on the subject matter expert's knowledge. An object must first and foremost be populated with reliable, unbiased, evenly presented content. Any organization compiling or producing learning objects has that responsibility if their offerings are to be trusted resources. A learner must have confidence in a resource in order to gain meaningful knowledge.

With the proliferation of information online, determining if an online resource delivers reliable content can be difficult. Peer review is one good indicator; through a process of self-regulation, information is reviewed by qualified experts in the applicable subject. Branch, Kim and Koenecke (1999) provide another route to resource reliability with a checklist. The checklist outlines seven topics with a selection of questions to evaluate online educational materials. One popular example of an unreliable source is Wikipedia, a collaborative resource where information is presented by volunteer contributors. The APA style guide from the Purdue online writing lab (OWL) warns against the use of wiki pages as resources because content quality is unverified.

The evaluation of content quality is based on the following questions:
- Is the content accurate?
- Are there any omissions of content or details?
- Does the presentation emphasize key points?
- Is the level of detail appropriate?

The DELTA objects were assigned a content quality rating of 5. The content is accurate and not misleading. All four objects contained guided screen captures outlining Collaborate procedures. Demonstrating the techniques in this manner makes accuracy a moot point. Omissions of content details are not obviously apparent; the narrator explores all the relevant options during the presentation. Key points, pointed out and are addressed and discussed with an appropriate level of detail. Optional features and features with multiple options are described without bias. Options and outcomes from different choices are explained with context.

Learning Goal Alignment

Learning goal alignment evaluates the presence of learning goals, either embedded in the learning object or in its metadata. It also evaluates whether the activities, assessments and goals are appropriate for the learner and what the learner anticipates taking away. Last, it evaluates the ability of the learning object to reach the learning goal (Nesbit et al, 2004). Identifying the learning goal enables the learner to focus on the specific learning object that meets their needs. Misalignment of learning goals will effectively render an object unusable, leading to distrust in your learner. Learning objects should not focus solely on the content delivered or the technology used to design and distribute the object. They should promote active learning by focusing on a learner centered experience. Parrish (2004) supports this idea, "solutions lie in more effective instructional practice that includes active and adaptive learning strategies, not simply access to more content" (p 65). The key is to match activities, information and assessments on achieving learning goals.

The evaluation of learning goal alignment is based on the following questions:
- Does the learning object teach the objective?
- Is the objective apparent and obvious?
- Does the content match the learning goal?
- Is the learning goal appropriate for the intended learner?

The DELTA objects were assigned a learning goal alignment rating of 5. Objectives were obvious and stated in the objects' titles. The objectives were further reinforced by the narrator in the introductions of the presentations. The content does not stray from the objective. In all four objects the desired outcome is achieved, the screen captures accurately teach and

demonstrate the objective. When considering the appropriateness for the intended learner, one has to specify the intended learner. For a novice Collaborate user or a user in need of remediation, yes the goals of the objects are appropriate. In learning object 2 the objectives were more clearly identified with a table of contents. Learners are able to actively choose by clicking the item to review the objectives. This option was not available in objects 1, 3 and 4.

Feedback and Adaption

Feedback and adaption evaluates most obviously the ability and effectiveness of feedback mechanisms. It also evaluates the object's ability to adapt to different learner characteristics and needs. This criterion focuses mainly on formative evaluation. Formative evaluation is timely and specific and can be presented in a number of ways including verifying correctness, examples and answer explanation. Shute (2008) maintains that this type of feedback is dependent on three things (1) a student's motivation (2) timely presentation for use and (3) usability and willingness to use. Formative feedback is important to a learning object as this is the mechanism to adapt responses and behaviors to fulfill a learner's need.

The evaluation of feedback and adaption is based on the following questions:
- Can the learning object adapt output or feedback according to user's needs?
- Are there opportunities for feedback?

The DELTA objects were assigned a feedback and Adaption rating of 1. There were no opportunities for learner input, thus, there is no opportunity for feedback. The only opportunities for feedback are through further exploration of the support mechanisms identified. Help websites and numbers were supplied for DELTA and Blackboard Collaborate. Contact with those resources is the only route to feedback.

Motivation

"What is in it for me?" a question that plagues educators on any level. Motivating learners to partake in a course or learning object is broken down into five steps by Kuhlman (2008). First is to reward your learners, intrinsic rewards like positive feedback can achieve this. Second, make sure your course has real value. This ties in to the first criterion of quality content. Make sure the learning object has meaningful information to communicate. Third, help your learner perform better; provide activities and assessments that help the learner apply the material to themselves or their situation. Fourth, set clear expectations; make sure your learner knows what to expect from the education and how to navigate it. Last, tell them they are wrong; challenge learners to keep them engaged.

In the traditional classroom, an exemplary teacher can influence motivation by challenging, affirming and influencing (Edwards, Perry & Jansen, 2011). The qualities of an exemplary teacher must be carried forward into the design of asynchronous learning objects to motivate learners to participate and learn. The learning object must challenge a learner to reach a new level of understanding, affirm the learners to heighten confidence and influence by presenting expert knowledge. While these qualities improve motivation, there are factors that de-motivate. For instance, the over use of technology or poor multimedia design. These will be further explored in the presentation design evaluation, but it is important to note the potential of poor design to de-motivate a learner.

The evaluation of motivation is based on the following questions:
- Is the content applicable to the intended learner?

- Is the material represented too easy or too complex?
- Are the features appropriate or do they distract from learning?
- Does the object motivate further exploration?

The DELTA objects were assigned motivation rating of 5. The content is extremely applicable to the intended learner. The intended learner is a novice user of Collaborate, these short object specific objects are easy to navigate and understand. A larger program involving more detail than necessary may deter a learner; this is not the case here. The ease of use, length of object and amount of content covered motivates exploration of the resource.   The objects are simple video type learning objects, they are not weighed down by excessive use of other technology, they do not distract from the intended purpose of the learning object. The aggregation of the objects into a larger group concentrated on the features of Collaborate motivates the learner to explore all the other options and features.

Presentation Design

Before evaluating presentation design, it is essential to understand how the mind processes information, Mayer and Moreno (2003) present three assumptions. First, visual and verbal materials are processed in separate channels. This is referred to as dual processing. Second, each channel has a limited capacity for processing. This assumption is based in Sweller's cognitive load theory (as cited in Mayer & Moreno, 2003). Third, there must be active processing in the channels. Integrating and organizing material to create meaningful learning. These assumptions together form the cognitive theory of multimedia learning illustrated in Figure 1. Nesbit et al (2004) support this theory in the LORI tool by evaluating the design of auditory and visual information for learning and mental processing.
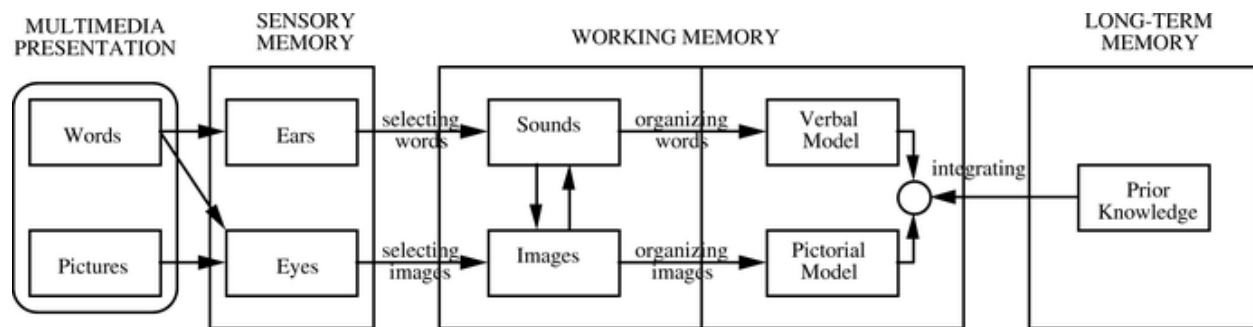

Figure 1 Cognitive theory of multimedia learning. (Mayer & Moreno, 2003)

To achieve superior presentation design and to enhance meaningful learning, Clark and Mayer (2008) promote the use of multimedia learning principles as it pertains to e-learning. The following list is adapted from Clark and Mayer (2008)

- Multimedia principle: use of words and graphics together
- Contiguity principle: Align words with graphics
- Modality principle: Present audio rather than text
- Redundancy principle: Explain with text or audio not both
- Coherence principle: Adding extraneous material can harm learning
- Personalization principle: Use conversational language
- Segmenting principle: Break up the lesson into parts

For content to make sense a learning course or object should follow a logical sequence. Posner and Strike introduce three sequencing schemes as a means to organize instructive materials (1) Learning related, sequencing material based on learner characteristics; (2) World related, sequencing material by how it relates to the world; (3) Concept related or sequencing material based on how we organize the world logically (Morrison, Ross, Kalman & Kemp, 2011).   Organizing material well ensures the most efficient cognitive route to learning.

The evaluation of presentation design is based on the following questions:
- What is the quality of audio and visual items?
- Is the information legible and accessible?
- Does the presentation subscribe to the principles of multimedia learning
- Is the information offered in a logical sequence that the learner can follow?
- Are there clues to navigation and how to proceed?

The DELTA objects were assigned a presentation design rating of 4. The audio was at an appropriate volume and adjustable without extraneous background noise. The visual items were small but the option to enlarge the window to full screen was present. Once enlarged the visual items were still small, probably too small for learners with any sort of visual impairment. The video quality was slightly blurry when enlarged to full screen size.

All modules followed the multimedia principle, presenting text with graphics. They all also followed the modality principle of presenting information as audio instead of text. The redundancy principle was violated in object 1 when audio and text were presented together. The text was also available in modules 2, 3, and 4 but the option to view the text or not view the text was presented. The coherence principle was followed as there was no extraneous information presented to confuse a learner. The segmenting principle was followed on two levels. First, in each presentation a table of contents was presented to allow a learner to navigate to sections in the object. Second, the learning objects themselves were segments in a larger group of Collaborate specific objects.

The information within each learning object was presented in a logical temporal sequence starting at the beginning of a task and following it through to completion. An item not usually taken into consideration with the LORI is how the object is sequenced into the larger group. This entire group of Collaborate specific objects was also sequenced in a logical manner. They follow a logical prerequisite sequence from creating a session to adding information to a session to sharing the session to joining the session.   Navigation was clear to the evaluator however a learner lacking confidence in computer use may be confused.

Interaction Usability

Interaction Usability targets the user interface of the learning object. Leacock and Nesbit (2007) point out the important of distinguishing between the two types of interaction within a learning object. The learner has interaction with the content and interaction with the interface. This criterion only assesses the interaction with the interface. When considering the learners activities in the learning object, designers will draw on the prerequisite knowledge of those learners. Understandably, if a learner can operate a computer, navigate to the web and link to or find a learning object, certain assumptions are made regarding the learners prior knowledge. This prior knowledge is the key when designing and evaluating interaction navigation and usability. When navigation is not intuitive, instructions should be given.   When navigation is predictable or sufficiently instructed, usability can still be crippled. Inactive hyperlinks, action

buttons that do not function, simulations that do not operate properly or navigation that takes too long all hinder the effectiveness of a learning object. When considering timing of navigation, Mayhew proposes that it should take no more than two seconds (as cited in Leacock & Nesbit, 2007).

The evaluation of interaction usability is based on the following questions:
- Is the user interface predictable and consistent?
- Is the navigation intuitive or is instruction provided?
- Do hyperlinks and action items function properly?
- Is navigation is timely?

The DELTA objects were assigned an interaction usability rating of 2. While options for navigation and customization were present, they were not obvious or instructed. A confident, experienced computer user or multimedia learner may have no problems with navigation but a novice may lack the confidence required to click on unknown icons. Prerequisite knowledge of mouse over signals, hyperlinks and customization icons are required to navigate this object without instructions. There was predictability over all four objects evaluated. All four objects were somewhat consistent in function. Learning object 1 was the only one that did not allow for closed captioning. All objects had a table of contents, object 2 had an option to show or not show it. When the table of contents was being shown, it encroached on the presentation making it hard to view.

The hyperlinks were not immediately obvious. Each object's table of contents also served as hyperlinks to different points in each object. This navigation is a helpful user feature, but there were no instructions or indications for its use given. In the presentation, information about contact emails, support websites and the Collaborate website was given. The information was on the screen and underlined like hyperlinked text but they were not active hyperlinks. The navigation was quick once the options were determined.

Reusability

The very nature of a learning object is reusability (Beck, 2010; Alonso, Lopez, Manrique & Vines, 2008) and one of the driving principles for their development is cost. Educational resources are costly to produce, reusability makes sense financially. For optimal reusability they should be standalone objects without any reference to a singular source like class names or dates. Nesbit et al (2004) promote the need of adapting content or adjunct content like glossaries and summaries to further enhance the reusability of learning objects. Context, background knowledge and key terminology definitions help learning objects adapt to a broader audience.

Effective learning objects can be reused in a number of ways. When considering the reasons for use, they may be used for reference material in a class, as an instructional segment in a distance education course and as a resource for blended learning. Creating one resource for all of these functions reduces costs and development and design time. Learning objects can be used by learners with different objectives. The same object may be used by novice learners to gain information or an experienced learner looking for remediation or reference.

The evaluation of reusability is based on the following questions:
- Is the learning object transferrable to other contexts?
- Does the learning object serve a broad range of learners?
- Are there any adaptive content strategies or adjunct content?

The DELTA objects were assigned a reusability rating of 3. This object could be used by a variety of situations. While it is tagged with DELTA and North Carolina State logos, it can be used widely for any instance when a learner needs assistance with the features of Collaborate. These learning objects serve a broad range of learners; undergraduates, Graduate students, faculty and staff can all benefit from the course as learners or provide links to the objects as instructive material in the context of their job duties. There are no adaptive strategies in these objects to serve differing ability levels and there are no summaries or glossaries to present adjunct content or context to other types of learners.

Discussion

The learning objects scored high in the areas of content quality, learning goal alignment, motivation, presentation design and reusability (see table 2). The content was presented without any obvious bias or imbalance. The content was presented in an accurate, succinct manner. Learning goals were clearly stated in the object's title and then repeated by the narrator in the presentation. The learning object accomplished the learning goals with appropriate content for the intended learner. The learning object was highly motivating and relevant to the intended learner. The object motivated with a true to life presentation simulation. Presentation design had minimal deductions as the principles of multimedia design and sequencing were employed in an effective manner. Deductions were made for legibility, the presentation window was small and when enlarged was slightly blurry. The object is highly reusable within the university system. The logos and dates embedded in the presentation limit wide use. The object does not have any adaptive material to suit various levels of learners but size and limited content allow for broad application to many different situations.

Table 2: Scoring Results

Criteria	Score	Comments
Content Quality	5	Accurate, balanced presentation with an appropriate level of detail
Learning goal alignment	5	Learning goals matched to learning object
Feedback and adaption	1	No feedback or adaption mechanisms
Motivation	5	Content highly relevant and motivating to learner
Presentation design	4	Good design with only slight modifications needed
Interaction usability	2	Usability is not ideal for inexperienced learner
Reusability	3	Highly reusable within the University, not ideal for outside users

Poor scores were generated in the areas of interaction usability and feedback and adaption. The user interface is quite predictable for a user with experience. The quality of the interface varied between the four objects. Future improvements could be a labeled help button where a novice could go for navigation assistance. There were no mechanisms for feedback or adaptive response. Huang (2002) promotes interactivity as a way to motivate learners and stimulate deeper learning. While traditional interactivity between teacher and student is not within the realm of a learning object, the opportunity for real time feedback is possible. Providing opportunities for interaction through assessment would be a beneficial strategy to measure understanding or provide remediation where necessary.

Alternative strategies for teaching this technology would include synchronous opportunities like webinars; this is particularly advantageous as feedback is in real time. However, this was an evaluation of learning objects. It is apropos to consider other strategies that would also be termed learning objects. A learning object is intended to be asynchronous, short and reused. A short page of text presented as a quick guide would be a suitable alternative and could be linked or attached in various situations to meet the need of a learner. Another strategy is the automated help desk, providing real time help structures when users are accessing and using the technology. There are many commercial packages available to assist in such endeavors. One example is Oracle's contribution of the User Productivity Kit or UPK. It allows developers to create learning objects and make them available in real time when users are accessing technology.

The Learning Object Review Instrument has been used, reviewed, evaluated and validated many times since its first version in the early 2000's (Akpinar, 2008; Kay & Knaack, 2007; Krauss & Ally, 2005; Leacock & Nesbit, 2007; Vargo et al, 2003) It serves as a tool for consumers and evaluators of learning objects but produces better results when used in conjunction with the convergent participation model (Leacock & Nesbit, 2007; Nesbit & Li, 2004; Vargo et al, 2003). The convergent participation model was developed by Nesbit, Belfor and Vargas (2002). A two pronged approach to learning object evaluation beginning with a group of evaluators utilizing the LORI to assess objects individually and asynchronously. The evaluators then come together with a moderator to discuss and formulate a team review of the object. A suitable sample size would be necessary to produce reliable results. Kay and Knaack (2007) indicate that sample size for object review is many times too small to be representative of a larger audience.

The LORI tool only focuses on evaluating individual learning object. However, learning objects are commonly aggregated into larger collections. Evaluation of single objects does not provide information or evaluation about their function within a larger unit. Kay and Knaack agree stating "using an evaluation tool to compare a range of learning object can provide useful insights" (p. 8). The addition of criteria to evaluate interaction among a group or collection would provide a deeper more meaningful evaluation.

In summary, there is a need for a specialized tool to evaluate educational resources known as learning objects. Traditional methods of evaluation either take too long or are not sufficient to evaluate the unique nature of a learning object (Leacock & Nesbit, 2007). Learning objects are a fairly new category of educational material and the LORI serves as a practical instrument for their evaluation. Evaluation results can be enriched through the convergent participation model. Going forward, the LORI may also serve as a set of guidelines to improve the design of learning objects.

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Appendix A

Object Evaluated:									
Item	Content Quality								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Is the content accurate? • Are there any omissions of content or details? • Does the presentation emphasize key points? • Is the level of detail appropriate?								
Item	Learning Goal Alignment								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Does the learning object teach the objective? • Is the objective apparent and obvious? • Does the content match the learning goal? • Is the learning goal appropriate for the intended learner?								
Item	Feedback and Adaption								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Can the learning object adapt output and feedback according to different user's needs? • Are there opportunities for feedback?								
Item	Motivation								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Is the content applicable to the intended learner? • Is the material represented too easy or too complex? • Are the features appropriate or do they distract from learning? • Does the object motivate further exploration?								
Item	Presentation Design								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• What is the quality of audio and visual items? • Is the information legible and accessible? • Does the presentation subscribe to the principles of multimedia learning • Is the information offered in a logical sequence that the learner can follow? • Are there clues to navigation and how to proceed?								
Item	Interaction Usability								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Is the user interface predictable and consistent? • Is the navigation intuitive or is instruction provided? • Do hyperlinks and action items function properly? • Is navigation is timely?								
Item	Reusability								
Rating	☐ 1		☐ 2		☐ 3		☐ 4		☐ 5
Comment	• Is the learning object transferrable to other contexts? • Does the learning object serve a broad range of learners? • Are there any adaptive content strategies or adjunct content?								