

## Utilizing LMS tools to help with student assessment in an online course

Dudley B. Turner<sup>1,\*</sup>

<sup>1</sup>The University of Akron, Akron, OH, 44325-1003

### Abstract

In online learning, feedback to students is important in their progress. Assessments are often final or summative assessments that do not allow the student to adjust or improve their learning progress. Assessment, however, takes valuable time. This paper describes how using the tools available in a LMS can assist faculty in assessing student work and provide helpful feedback to students in an online course. The tools available for faculty to use can be set up to save time for the faculty during assessments. The assignments in this study were developed based on previous research indicating assessment can be an aid to student learning, and students who know how well they are doing can make needed adjustments. Students used the feedback from these LMS tools to decide whether or not to try again or move on. Students had the opportunity for multiple attempts at assignments and received feedback on each to help measure their learning. The rubric tool was used to not only grade student papers but also to provide appropriate feedback for student performance on the levels of achievement. Quizzes can be automatically graded. Any additional attempts are drawn from a bank of questions. Results from this pilot study show the benefits of multiple attempts at quizzes and assignments. Students who took advantage of multiple attempts did improve their scores. The paper also discusses further research that to help support this practice

**Keywords:** online learning, assessment, LMS, rubrics, feedback.

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### 1. Introduction

Many times in education the assessment is an examination or a written paper. The examinations tend to test students' recall of facts and basic information, or their knowledge of the subject area. Written papers allow students to illustrate how they can apply what they learned in the course or analyze information based on their subject learning. Typically, the student only has one attempt on tests and papers, and their grade is based on assessment of this one attempt. In distance learning or online learning these assessments are conducted electronically, typically utilizing a Learning Management System (LMS). Yet whether face-to-face or electronic,

these assessments often provide some measurement and feedback without a subsequent opportunity to improve.

The research reported here illustrates a different approach than "one-shot" assessments to incorporate additional chances. This involves utilizing the technology built into the LMS and including rubrics for assessing writing assignments to give students appropriate feedback for later use and improvement. In this case, the LMS is Desire2Learn, but nearly all LMS platforms have similar capabilities. Specifically, this paper explains the concept of assessment as feedback, describes the assessment for quizzes and for written papers, explains how multiple assessments were implemented in an online course, describes the subjects, reports results from the exploratory analysis of this approach, then discusses the limitations of this study and possible future research.

\*Corresponding author. Email: [dbturner@uakron.edu](mailto:dbturner@uakron.edu)

## 2. Assessment as Feedback

Instructors need to assess student learning. Assessments are classified or talked about in several ways. Lepi reports on six different types of assessments, for example [1]. But generally, the assessment can be considered formative or summative: formative in that it assists the student and instructor in knowing what type of progress is being made toward a goal, and summative as the ‘final’ measurement of student learning. Jones and Harmon emphasize that assessment can be an aid to student learning, and students who know how well they are doing can make needed adjustments [2]. One difficulty is trying to balance the ‘cognitive’ (learning the facts and basic information) and ‘application’ learning assessments. Often, instructors assess student learning by examinations to measure cognitive learning and by written papers, case studies or extended examples to measure application of learning.

Although assessment, or measuring student learning, sounds rather straightforward, there are problems with assessment. This paper does not focus on the problems related to development of quality assessments so much as the implementation of assessments. Specifically, one primary focus is how to deal with one of the biggest problems with assessment: time. Many instructors fear they ‘don’t have the time to provide the kind of feedback they would like to deliver’ [3]. This problem can be overwhelming when an instructor has a large class or teaches multiple classes, and when the course includes writing assignments. Although instructors may complain about the time needed, Lepi reminds us that assessments do have value and have an important place in our learning structure [1]. In the approach described here, the online class was set up with multiple trials for quizzes and multiple trials for written papers in the LMS by using the settings and tools in the LMS. First, we look at the cognitive assessment or quizzes then the application or written assessment.

### 2.1. Assessment by Quizzes

Creating and grading examinations or quizzes is a regular activity for instructors. With the benefit of the LMS tools, quizzes can become less time consuming, whether in an online or face-to-face class. Quizzes and examinations easily measure the students’ knowledge or comprehension levels, using Bloom’s categories.

In this case, the instructor developed a test bank of questions for each unit of the course. For multiple assessments of a unit, multiple quizzes can be given without redundancy. The LMS quiz tool allows random selection of questions from the test bank for that unit so each quiz has unique questions and students are not simply taking the same quiz repeatedly. The LMS can be set up to automatically grade the quiz and provide the score to the student. Students then can decide, based on the feedback from that assessment, whether or not they should take another quiz. If they received the score they

needed, even if not a perfect score, they may move on to the next unit. If their score is lower than they needed or wanted they may take another quiz over that unit.

According to Haskell, ‘In games, we experience a remarkable amount of failure. It is this ability to fail without long lasting penalties that serves as a central construct of the learning process. Moreover, mastery requires that we learn from this failure to move on’ [4]. Ideally, students would study before taking a subsequent quiz, but controls were not available to require that in this online course. Yet students are not ‘punished’ for failure, or their failure does not have long lasting penalties since that score does not have to be their final score or grade. They simply receive feedback about their progress. The student received feedback that helped the student, whether success or failure, which resulted in helping them know if they needed to correct or add to their knowledge and re-take the quiz.

### 2.1. Assessment of Written Assignments

Whereas the quizzes measured knowledge or comprehension of information and concepts, the papers assessed the application or analysis levels of learning. In this course, the written assignments were applications of the theory where students had to provide an extended example from their own experience illustrating the theory and its concepts. Any assessment of written work tends to be time consuming.

Grey says, ‘When assigning written projects, it is wise to require more than just the final product’ [5]. In this course, students had opportunity to write multiple papers, receive feedback on each that they could use to improve their subsequent papers. Using a rubric for the written assignment helps assure that the assignment is instructionally relevant and focuses on the learning outcomes. Rubrics are often used to grade student work but they can serve another, more important, role as well. According to Andrade:

Rubrics can teach as well as evaluate. When used as part of a formative, student-centered approach to assessment, rubrics have the potential to help students develop understanding and skill, as well as make dependable judgments about the quality of their own work. [6]

Students can use the rubric to clarify standards for quality and to guide their progress toward those standards. Basically, a rubric describes levels of achievement for stated objectives or standards of performance. For example, each objective or standard could have a description of identifiable performance characteristics reflecting a beginning level of performance, a developing level of performance and a mastery level of performance.

The LMS allows the instructor to develop a rubric with feedback for each level in every category, so students receive specific feedback instead of just a score or grade. In this course, students had the opportunity to write multiple, short papers (2-3 pages), receive feedback on

each through the rubric feedback, and improve their subsequent papers. Rubric categories included (1) writing style and mechanics, (2) accuracy of the theory explanation, and (3) specificity and accuracy of the example provided as an illustration of the theory. With these categories and various levels in each, students received specific feedback on their paper instead of simply an overall score or grade (see Table 1). The instructor simply clicked on the level of achievement for each category and the LMS calculated the score for the paper and provided the appropriate feedback to the student. Using this information from the assessment, the student would then know what areas do or do not need improvement for subsequent papers.

Table 1. Examples of rubric criteria and feedback

Criteria	Achievement Level	Description Feedback
Writing & Grammar	Good – one or no errors in spelling, grammar or punctuation	Well written
Writing & Grammar	OK – several errors in spelling, grammar or punctuation making it difficult to read due to these distractions	Many errors; you must proof read more closely; have someone else read it before turning it in
Theory Explanation	Good – theory and concepts explained well, use of text for details and used own wording	Nice explanations; clearly explained
Theory Explanation	OK – some explanation attempted; not clear or not accurately explained; too brief	You need to give more details of the theory; refer to the text to assure accuracy
Example Details	Good – accurate; explained well; sufficient details given	Good example; illustrated the theory well
Example Details	OK – some details provided; but not enough or not accurate	Too few details provided; make sure your explanation is accurate

### 3. Subjects

Subjects included two fully online sections (n=48) of the same communication theory class during 2012 and 2013 taught by the same instructor to help assure consistency of teaching styles, materials and assignments across sections. Students registered for classes on their own, so there is no randomization of students nor classes and no control group, limiting generalizability of the results. The majority of students were communication majors who needed a 'C' or better in the course (70% or higher) as a requirement for their major, so earning a particular grade was more important than simply passing the course (with a 60%, D- or better).

### 4. Results

This exploratory study tried to discover whether or not multiple assessments helped students, and if so, how much. Various statistical measures were employed, and the results for both assessments, quizzes and papers, are discussed next.

#### 4.1. Quizzes

There were 13 quizzes in the course, one for each unit, and students could repeat any quiz as many times as they liked. Only two students of the 47 did not repeat any quizzes. On average, students took 23 quizzes. The mode was 18 (14.9%). Of the 13 units, the average number of specific units in which quizzes were re-taken was 4 (23.4%). The average final quiz score (as opposed to the average first attempt score) was 89.64%. As seen in Table 2, the difference between the first attempt and the final quiz grade showed an improvement of over 10% on average. There was a significant difference between the grade on the students' first attempt and the students' final quiz grade ( $t = 9.707$ ;  $df = 46$ ;  $sig. = .000$ ).

Table 2. Quiz comparisons

	Final quiz grade	1 <sup>st</sup> attempt grade	Difference
average	89.64%	79.09%	10.55%
minimum	78%	46%	32%
maximum	100%	94%	6%

Did this have any relevance to the students' success in the course or final grade in the course? The results show a significant correlation between the students' course grade and the final quiz grade ( $r = .885$ ,  $sig. = .000$ ). It must be noted, however, that quizzes were not the only graded assignments in the course. Final grades for the course included the quizzes, papers, and participation in online discussions. There also was a significant correlation between the students' course grade and the score on the

lowest quiz that was not re-taken ( $r = .481$ ,  $sig. = .001$ ). This relationship signifies that the lower the score on a quiz not re-taken, the lower the student's grade in the course. This seems to suggest that it was advantageous to re-take quizzes. However, neither the number of quizzes taken nor the number of quizzes re-taken were significantly related to the final quiz grade or the course grade (see Table 3). It did not seem to matter how many quizzes the student took or re-took.

Table 3. Grade – Quiz correlations

		Course Grade	Final Quiz Grade
# quizzes taken	correlation	-.182	-.173
	sig.	.222	.224
# quizzes re-taken	correlation	-.090	-.031
	sig.	.547	.839

The students' GPA prior to this course was measured. There was some question as to the impact of a student's incoming GPA (or their prior academic success) on their success in this course. To try to determine if the better students (as measured by GPA) would get better grades or take advantage of the opportunity to re-take quizzes, Pearson Correlations were run (see Table 4). The students' prior GPA was significantly correlated to their Course Grade ( $r = .475$ ,  $sig. = .001$ ). However, neither the number of quizzes taken nor the number of quizzes re-taken were significantly correlated to the students' prior GPA. It seems that GPA is not an indicator of effort in this case.

Table 4. Number of quizzes taken correlations

		# quizzes taken	# quizzes re-taken
GPA	correlation	-.158	.148
	sig.	.290	.321

#### 4.2. Papers

The students were required to write at least four papers. They were able to write up to eight papers, and the top four grades were to be used in the calculation of their course grade. Only two students took advantage of this by writing more than the four minimum papers (see Table

5). For those two students, their average grade for papers rose 10-20%. Since only two students wrote more than the minimum number of papers required, no further statistical analysis was relevant.

Table 5. Comparison of papers

avg. no. of papers	4.1
avg. final score	88.9%
avg. low score	77.7%

#### 5. Conclusion

This study was about how to use LMS capabilities to help manage the time investment of instructors while still providing helpful, multiple assessments and feedback to students as they continue their learning in an online course, not just a single, final assessment.

Results indicate that students in the online class were able to take advantage of the feedback from assessments (grades on tests, and grades and rubric comments for papers) to decide if they needed (or wanted) to try again. This agrees with findings from Casey et al, who found that those students who 'submitted much more than the minimum criteria typically reaped the most benefit in terms of academic performance' [7]. There is evidence showing that providing students multiple attempts can benefit them. Those students who did multiple attempts showed increases in their scores. As Jones and Harmon stated about assessment aiding student learning, it appears that students who took advantage of their feedback and decided to try again were aided by the feedback and made needed adjustments [2]. In this study, however, there are some mixed results concerning the advantage of multiple attempts. While the results show that the final quiz score was significantly higher than the initial quiz attempt, and the lower the quiz score not re-taken is correlated to a lower course grade, the results also show that the number of quizzes re-taken or the total number of quizzes taken were not correlated with the final quiz grade nor the course grade. Further study is certainly warranted. Sims, Dobbs and Hand state that computer-based technology can 'respond meaningfully to user actions and manipulations' yet this is often not discovered nor used [8]. Educators need to take advantage of the improving capabilities of the various learning management systems to assist in meaningful and helpful assessments for their students, and to find ways to do so without increasing their own time commitments. This study was limited in that the classes measured were not randomly selected and there was no control group for comparisons. Ideally, establishing more stringent divisions of students would allow statistical comparisons,

but classes are rarely scheduled in such a manner to allow random groups to compare. There was also a limitation due to the format of the course offering. It was scheduled during a shorter summer term instead of a typical 15-week semester, so the students may not have felt they had the time to write more than the minimum number of papers. Future research should include a time frame that would allow students to feel they had appropriate time to write additional papers.

We see here that we can use motivation similar to game approaches, providing multiple attempts to achieve a goal and letting that motivation encourage students to try again to learn and better their scores. In the educational setting, rewards are a passing grade or score on a test or an assignment. Such approaches to education primarily focus on motivation to engage students and help them persist until 'winning' or 'success' – which is ultimately graduation, but more immediately is a passing grade or higher grade for the assignment than for the class. The approaches also allow more student choice or control of their learning path. Future research should also gather student perceptions of multiple attempts at assignments and quizzes.

This study assumes the assessments (the quiz questions) were good indicators of student learning or that the score on a quiz or paper is a valid measure of student learning. As stated earlier in this paper, this research does not focus on the problems related to development of quality assessments so much as the implementation of assessments using capabilities of the LMS. It provides ways that do not increase instructor workload. These results should help other online educators as they consider possible assessment approaches that are not final assessments but formative or developmental assessments to help students gauge their progress in the course and make decisions about their learning accordingly.

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