

Use of formative classroom assessment techniques in a project management course

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ABSTRACT

Formative assessment is considered to be an evaluation technique that informs the instructor of the level of student learning, giving evidence when it may be necessary for the instructor to make a change in delivery based upon the results. Several theories of formative assessment exist, all which propound the importance of feedback to the student.

The theories discussed include a three-strand approach based on learning outcomes, student involvement, and feedback; a framework based upon shared learning expectations, questioning, feedback, self-assessment, and peer assessment, and the ideas of assessment of learning, assessment for learning, and assessment as learning. Methodologies of formative classroom assessment range from traditional methods research in the early 1990's to technology enabled methods such as blogs and classroom response systems.

Implementation of the formative assessment techniques at Holy Family University involved a Classroom Assessment Support Group which led the efforts. The facilitators of the group presented basic methodology, and the members of the group supported each other's efforts to implement assessment techniques in their courses.

Five techniques were found appropriate for the project management course, and three were implemented. The methodology, results, and recommendations indicate that formative assessment techniques are beneficial in a project management course, but care needs to be taken to implement properly in order for the assessment to be formative.

Keywords: Assessment techniques, formative assessment, assessment of learning, assessment as learning

INTRODUCTION

Michael Scriven used the terms formative and summative evaluation in discussing the role evaluation of learning played in student education (William, 2006). Scriven's work was complemented by Bloom who focused on formative evaluation used as an aid in teaching, rather than making judgment about work in the grading process, which is summative evaluation (William, 2006). While the same instrument could be used in both formative and summative evaluation, formative evaluation is best served by using an instrument solely for the purpose of making a change in the way the course is being delivered. Formative assessment is contingent upon an outcome, and information gathered by the formative assessment alters the course delivery in a manner that would not have occurred if the assessment were not performed (William, 2006).

SURVEY OF LITERATURE

The literature on formative assessment reviewed can be divided into two categories: formative assessment theories and formative assessment methods. There are several different theories pertaining to formative assessment defined as assessment that can be used to alter the course delivery. Methodologies of formative assessment include both traditional methods as well as more recent technology-enabled methods.

Researchers take slightly different but related tracks when examining formative assessment. Carless (2007) coined the term learning-oriented assessment, in which learning aspects are emphasized rather than the measurement of learning. Carless proposed a three-strand approach to learning-oriented assessment. The first strand is the assessment task as learning tasks based upon learning outcomes, in which the assessment tasks are grounded in real-world applications of the subject matter. The second strand is student involvement in assessment, leading students to a better understanding of learning goals, criteria and standards. The final strand is appropriate feedback to students, allowing the students to engage with the feedback and act upon the feedback, using it as "feedforward" in their learning (Carless, 2007).

Black and William proposed a framework defining formative assessment and relating other pedagogies to the framework (Black & William, 2009). The Educational Testing Services (ETS) developed the *Keeping Learning On Track*® (KLT) program, based in great part on Black and William's framework. The five strategies used in KLT are shared learning expectations, questioning, feedback, self-assessment, and peer assessment (Bennett, 2011). Bennett exemplifies shared learning expectations as students sharing their intentions for learning and their experiences. Questioning encompassed pertinent classroom discussions and learning tasks. Whereas feedback would come from the instructor, students are involved in self-assessment, in which each student is an owner of his or her learning, and peer assessment, in which students serve as "instructional resources" for each other (Bennett, 2011).

Lorna Earl (2013) differentiates among the terms assessment of learning, assessment for learning, and assessment as learning. Assessment of learning is the use of summative assessment techniques for assigning grades (Earl, 2013). Assessment for learning shifts from summative assessment to formative assessment, with the use of formative techniques to inform teachers when to modify teaching strategies to ensure that students are engaged in ways that meet their learning styles. Assessment as learning is considered a subset of assessment for learning in which students engage in metacognition. Metacognition is the action of a student reflecting upon

his or her learning (Earl, 2013). Metacognition is related to active learning, the use of classroom techniques that involved students in activities in which students think about what is it they are doing (Gerard & Lederman, 2012).

Overall, the literature pertaining to formative assessment points to a shift in emphasis in colleges and universities from teaching to learning (Barr & Tagg, 1995). The purpose of classroom assessment is the improvement of the quality of the student learning (Angelo & Cross, 1993). Angelo and Cross researched numerous techniques exist for formative classroom assessment, which included categorizing techniques and proposing a methodology for selecting the proper techniques for particular classes based upon course objectives. The broadest categories of classroom assessment techniques presented by Angelo and Cross and techniques for assessment of course-related knowledge and skills, assessment of learner attitudes, values, and self-awareness, and assessment of learner reactions to instruction. Each of the categories are broken into sub-categories carefully organizing the fifty techniques researched (Angelo & Cross, 1993).

Since Angelo and Cross's classic work on assessment, new technologies have emerged that supplement the assessment techniques, including blogging and classroom response systems (Chan, Tam, & Li; Tan, Ladyshewsky, & Gardner, 2010). An assessment technique related to journal-writing which is based in internet technology is blogging (Tan et al., 2010). A blog, or web-log, is a dynamic and interactive web-based document analogous to a journal which allows students not only to post entries but also to read and comment upon entries of classmates. Blogging allows the assessment of reasoning and fully involves students actively in the learning process (Tan et al., 2010). Classroom response systems, also known as "Clicker" technology, transforms multiple choice questions into an active learning classroom assessment technique (Chan et al.). Questions in classroom response systems are generally posed within a graphic presentation; when the slide with the question is presented, students use the clicker tool to interactively submit a response. Responses are tallied immediately by the software, and discussion ensues based upon the responses (Chan et al.).

In summary, three dominant theories of formative assessment were examined. The first theory has a three-strand approach based on learning outcomes, student involvement, and feedback (Carless, 2007). The second theory involves a framework based upon shared learning expectations, questioning, feedback, self-assessment, and peer assessment (Bennett, 2011; Black & William, 2009). The last theory distinguishes the ideas of assessment of learning, assessment for learning, and assessment as learning (Earl, 2013). Methodologies used for formative assessment include traditional methods initially researched by Angelo and Cross (1993) and technology enabled methods such as blogs and classroom response systems (Chan et al.; Tan et al., 2010).

PROCEDURE

Implementation of formative assessment techniques in the project management course at Holy Family University was performed in conjunction with the faculty member's participation in a Classroom Assessment Support Group. The Classroom Assessment Support Group was a group of faculty members from various disciplines across the university. At the initial meeting of the group, the facilitators introduced Angelo and Cross's (1993) classroom assessment techniques. During subsequent meetings, the facilitators and faculty worked as a group to go through Angelo and Cross's three step plan for assessment.

The first step in the plan for assessment was completing the Teaching Goals Inventory (Angelo & Cross, 1993). The purpose of the Teaching Goals Inventory is to determine which assessment techniques are appropriate for a course based upon the learning outcomes of the course (Angelo & Cross, 1993). The inventory is available on-line at http://fm.iowa.uiowa.edu/fmi/xsl/tgi/data_entry.xml?-db=tgi_data&-. Based upon the results of the inventory, faculty selected two or three techniques to use. The second step, implementation, was using one of the techniques in the classroom. The third step was feedback to the students (Angelo & Cross, 1993).

The Classroom Assessment Support Group worked to determine the assessment to be used in the semester early in the semester. After the faculty each selected appropriate techniques for the semester, each faculty member choose and shared with the group one technique that the faculty member would implement in the next class, and discussed how this would be performed. At the next meeting, each faculty member shared the experience with implementation and feedback to the class with regard to the first technique used. Meetings continued through the semester with the faculty using the planned assessment techniques and sharing experiences.

IMPLEMENTATION IN PROJECT MANAGEMENT COURSE

The project management course was a requirement for upper-level students in the Management Information Systems program. Three assessment techniques employed in the course were directed paraphrasing, student generated test questions, and group-work evaluations. Two techniques found appropriate for the course but not used were the minute paper and the muddiest point.

In the directed paraphrasing assessment technique, students take a concept and describe that concept in language that would be understood by a particular audience (Angelo & Cross, 1993). The students were given the situation in which the student was a project manager, and after a meeting one of the project team members was puzzled by the manager's attempt at the meeting to stir up dissent. The students were then directed to explain the concept of functional conflict to the project team member. Ten minutes of class time were devoted to having the students do the assessment, which was posted to the learning management system. The faculty member reviewed the assessments after class, with the result being that most students demonstrated the ability to explain functional conflict in their own terms, rather than repeating definitions from the book. Feedback to the students at the next class included a re-statement of the concept of functional conflict and verification that the students demonstrated the ability to describe this. A second directed paraphrasing exercise had the student again in the role of project manager, this time reporting to upper level management advantages and disadvantages of outsourcing. The assessments for the second exercise showed a little bias against outsourcing, so advantages of outsourcing were emphasized in the next class.

Student generated test questions involve the students in reviewing the material to choose the most important points and to generate the questions (Angelo & Cross, 1993). Both the mid-term exam and final exam used student generated test questions. The students were each assigned a chapter in the textbook that was to be tested, and were asked to submit three essay questions on the most important points in the chapter along with an outline of an acceptable answer. Questions and outlines that were not acceptable were returned to the student with comments. Many of the acceptable questions generated were used for the mid-term and final exams.

Due to the nature of the course, on the first day of class groups were self-formed by the students. Supporting theories of project management, exercises at the beginning of the course included selecting a group name and team-building activities (Larson & Gray, 2011). The teams stayed together through the semester, and each meeting had a team-based activity. At the end of the semester, students anonymously submitted evaluations of all members of the group rated on a Likert scale indicating level of participation and value of the contribution. Students ranked themselves as well. Evaluations substantiated expectations of the instructor and mirrored overall class and assignment performance of the students. The assessment would have more of a formative nature had it been performed twice, once at the middle of the semester and again at the end. The mid-semester assessment would give the faculty member a chance to give feedback to students who need to improve group performance.

RESULTS

The three techniques used for assessment in the project management course were directed paraphrasing, student generated test questions, and group evaluations. Directed paraphrasing and student generated test questions were each used at two points during the course, and enabled the faculty member to provide feedback to the students. The group evaluation technique was only used once at the end of the semester, leading to less of a formative use of the technique, since the student was not given feedback and the instructor did not make a change in the course to perhaps place more emphasis on the quality of the group interactions.

The two techniques found appropriate but not used were the minute paper and the muddiest point. The minute paper has a focus on understanding; the instructor gives a short time at the end of the class to ask the students to explain the important topics (Angelo & Cross, 1993). The muddiest point assessment involves students describing topics from the day's class that were not clear, with the intention that the instructor will review during the next class as needed (Angelo & Cross, 1993).

RECOMMENDATIONS

Directed paraphrasing and student generating test questions should be used in future project management courses in a similar method of administration. The group evaluations should be used in project management in the future, with the adjustment that the technique will be done at least one more time earlier in the semester to allow the instructor to emphasize to the class relevant findings, whether the findings are that more participation is needed or better quality participation is needed. The minute paper and muddiest point should be implemented and evaluated for the project management course.

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