

FORMATIVE ASSESSMENT: TRANSFORMING EDUCATION IN THE LIBRARY

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INTRODUCTION

The present study developed from an ongoing project involving collaboration between a research education librarian, an associate professor of linguistics, and an associate professor of organizational behavior. The aim of this project was to develop a method of assessing students' competencies in library skills, and, in addition, to explore and evaluate the process of adjusting the content of research instruction sessions based on these assessments. The concept of formative assessment was not explicitly articulated during earlier stages of this project (e.g., Orblych, 2010). This essay describes the two most recent semesters of this ongoing effort to identify ways of providing effective research instruction to groups of students with widely varying information competencies, engaging students in the process of creating library instruction that responds to their individual learning needs, and measuring students' learning.

FORMATIVE ASSESSMENT

Formative assessment is a planned process in which assessment-elicited evidence of students' learning is used by instructors to adjust their instructional methods. Formative assessment is not a single assessment; rather, formative assessment involves a series of activities in which instructors

use assessment-based evidence of students' learning to adjust their teaching during an ongoing instruction session. Data from assessments conducted as part of the formative assessment process are used to make adjustments to instruction that is in progress. In-class assessment is the first part of the formative assessment process, and the second part of this process is the instructor's use of assessment results to adjust ongoing instruction activities.

THEORETICAL FRAMEWORK

The theoretical framework of this project is rooted in substantial research documenting the effectiveness of formative assessment in K-12 education (Black & William, 1998). Grassian and Kaplowitz (2009) suggest that formative assessment enhances students' learning by allowing students to examine their understanding of information literacy concepts and consciously develop more efficient and effective information literacy strategies and skills; similarly, Radcliff et al. (2007) describe the use of in-class information literacy assessments as a means of evaluating student performance.

Closely related to the concept of formative assessment is "assessment for learning" theory, which suggests that assessment benefits the learner by reinforcing the material that is the subject of the assessment, and that assessment can be a primary means of learning (Oakleaf, 2009). Assessment for learning, also referred to as "learner-centered assessment", provides feedback to learners during instruction in order to encourage them to reflect on their learning and enhance their understanding (Grassian & Kaplowitz, 2009, p. 206). Formative assessment can also be used by learners to understand how much they have learned, and the terms "assessment for learning" and "formative assessment" are sometimes used synonymously throughout existing literature.

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WHAT WE DID

Students enrolled in one section of a graduate level business course, and one section each of three undergraduate linguistics courses, participated in this study. The aim of this study was to assess students' information competencies and to explore and evaluate the process of adjusting the content of research instruction sessions based on these assessments. Formative assessment was accomplished through three in-class assessment questions, which were administered to the class using an audience response system. These questions provided the instructor with evidence of students' mastery of information literacy concepts, and allowed the instructor to adjust the content of the session accordingly.

Prior to each instruction session, each student completed a pre-assessment exercise that was administered as a course assignment approximately two weeks prior to the instruction session. These questions were designed to provide the instructor with evidence of students' information literacy skills that would be used to inform the content of the instruction session. The pre-assessment exercise required students to complete a search and to reflect on the effectiveness of their research strategies; in this way, the pre-assessment exercise was a learning activity. Although the pre-assessment exercise provided the instructor with evidence of students' existing information literacy skills in order to determine the extent to which each topic should be addressed during the instruction session, the pre-assessment exercise is not formative assessment because formative assessment involves instructional activities that are currently in progress. Instructors' modifications to instructional activities must focus on students' mastery of the skills or concepts *currently* being pursued (Popham, 2008).

The in-class assessment questions measured students' mastery of clearly defined instructional objectives, including evaluating information resources critically, selecting appropriate investigative methods or information retrieval systems for accessing needed information, and understanding the significance of the citation process and its role in evaluating credibility and relevance of search results. These skills were measured with multiple-choice questions answered using audience response units, or "clickers". The librarian read each question as it was displayed on a single projection screen at the front of the room. Students then selected a response from four choices and recorded their response by "clicking" their individual devices. The audience response system software includes functions that allow instructors to generate various reports that calculate statistics regarding responses to each question, identify each student's response to each question, and summarize the performance of the class as a whole. For each of the session assessment questions, the audience response system software generated a bar graph and percentages of the class that selected each multiple-choice option.

Students' responses to the session assessment questions were recorded with audience response system units that provided the librarian with immediate feedback relating to students' understanding of information literacy concepts. The

audience response system requires all members of the audience to participate, and participation was easily monitored because the system displays each response received.

A post-assessment exercise was administered to students as a course assignment several weeks following each of the instruction sessions. Each student's performance on the post-assessment exercise was compared to her or his performance on the pre-assessment exercise in order to evaluate the effectiveness of the instruction sessions. Like the pre-assessment exercise, the post-assessment exercise engaged students in the research process and thus was also a learning activity for students. Therefore, the pre-assessment exercise and the post assessment exercise can be characterized as assessment for learning exercises.

OUTCOMES

During instruction sessions, the in-class assessment questions provided the instructor with a measure of the effect of the pre-assessment exercise on students' information literacy abilities, and enabled the instructor to adjust the content of the instruction session appropriately for each group of students. This process resulted in instruction sessions that were considerably different, based on the existing skills of the students in each class. The use of formative assessment allowed the librarian to acknowledge students' varying information skills; also, the in-class formative assessment questions increased students' engagement in the instruction session. Although data was not gathered regarding the number of questions asked by students during the instruction session, the librarian noted that students' attention and engagement during the instruction session seemed markedly increased in comparison with past instruction sessions.

The purpose of the session assessment questions was to provide both the students and the librarian with evidence of students' learning that would impact adjustment of the instruction. This approach reflects the researcher's conscious presumption against pre-determined content of information literacy instruction sessions. Assessing existing skills prior to instruction allowed the librarian to determine the extent of students' existing information literacy, and to identify the information concepts in which students required substantial instruction; assessing students' skills during instruction provided a real time measure of students' mastery of information literacy concepts that could be used to inform the content of the instruction session.

Both the pre-assessment exercise and the in-session assessment questions offered students the opportunity to confront their misconceptions of their information literacy skills. When the class performed poorly on the session assessment items, the audience response software exposed shared misconceptions and created the opportunity for the librarian to respond directly to students' misunderstandings. The in-class assessment questions provided students with feedback regarding their mastery of the topics included in the pre-assessment exercise, and provided students with the opportunity to adjust their learning tactics.

The session assessment questions improved the effectiveness of the instruction session by allowing the librarian to ascertain whether students' knowledge had increased subsequent to the pre-assessment exercise, and to determine the extent to which the content of the instruction should be adjusted.

The post-assessment exercise is itself a learning activity that engaged students in the research process, thus providing them with another opportunity to improve their research skills. Additionally, the post-assessment exercise provides a means of assessing students' information skills following a library instruction session, and allowed the instruction librarian to evaluate the effectiveness of the formative assessment process.

DISCUSSION

Formative assessment provides a useful framework for addressing students' widely varying information literacy skills. Students in each instruction session possess varying levels of information literacy skills and information technology skills; in this way, each group of students represents a unique group that varies from other groups. It follows that instruction that is appropriate for some students is not appropriate for all students, and what is suited to one session is not suitable to all sessions.

The importance of information literacy requires that academic libraries develop methods of information literacy instruction that meet the needs of a diverse student body. If instructors' expectations regarding students' existing skills are too high, instruction may fail to cover areas of information literacy that are assumed to already be possessed by students. Similarly, teaching basic information literacy concepts may deprive more advanced students of the opportunity to improve their information skills. Formative assessment allows academic librarians to both identify methods of instruction that assess students' disparate proficiencies, and to adjust the form and substance of instruction accordingly. Formative assessment provides information that librarians can use to improve their instruction skills, examine their understanding of student learning, and evaluate their teaching. Librarians can use formative assessment to ascertain what to teach and how long to teach it (Popham, 2008).

FUTURE RESEARCH

The concepts of assessment for learning and formative assessment can be integrated into information literacy instruction in numerous ways, including:

1. Formative assessment on the web: How can formative assessment be used to improve online information literacy instruction?
2. Formative assessment and Web 2.0: How can we use Web 2.0 technologies in order to make differentiated instruction more accessible to students?
3. Formative assessment as used by students to adjust their learning tactics: How can we gain

insight into students' learning processes through in-class assessments?

4. Formative assessment and critical information literacy: Does the formative assessment process provide opportunities to encourage students to reflect upon the cultural, economic, and social contexts in which information exists?
 5. Formative assessment and students' experiences with libraries and librarians: Does the formative assessment process make library instruction feel more personalized for students?
 6. How can formative assessment help us acquaint students, and ourselves, with the changing information landscape?
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