Using Internet Applications to Enhance Formative Assessment and Soft Scaffolding in the Social Studies Classroom

Face-to-face discussion is a significant part of many courses and often suffers from a lack of preparation on the student’s part. While there are many ways to provide accountability for reading, these approaches can result in extra grading and are not necessarily leveraged by the instructor in guiding and structuring the in-class discussion. In this paper, I discuss the initial implementation of an open source platform that provides the opportunity to utilize reading quizzes in a formative manner through color-coded displays.

Key Words: Internet Applications, Formative Assessment, Scaffolding

Introduction

Class discussion is a critical part of the learning experience in many, if not all, social studies education courses. Whether pre-service teachers are reading Levstik and Barton’s Doing History (2001), Delpit’s Other People’s Children (1995), or Tomlinson’s The Differentiated Classroom (1999), social studies methods instructors want their students to read their chosen texts and debate, analyze, synthesize, and evaluate. From a social constructivist perspective, learning environments that are dialogically rich can result in critical thinking and deep conceptual understanding in students (Vygotsky, 1978). However, getting students to read and contribute to class discussions can be a challenging task. Burchfield and Sappington (2000) documented a significant drop in
the completion of reading assignments over the period from 1981-1997 with undergraduate populations. More recently, Clump and Doll (2007) found reading completions among graduate students to be 54.21% of the assigned material before class and 84.14% before a test. While the problem of getting students to read and prepare for class discussions persists, researchers have found ways to increase the level of accountability through the use of quizzes, reading reactions, and other reflective mechanisms which have shown a positive impact on students’ reading (Carney, Winstead Fry, Gabriele, & Ballard, 2008; Ruscio, 2001).

While these measures increase the accountability to read, the instructor does not necessarily use student responses to enhance the class discussion or to clarify misunderstandings, especially when grading and analysis takes place after the class discussion has occurred. Moreover, more assignments mean extra grading — further adding to the overhead associated with preparing for class. In this paper, I discuss the initial implementation of an open source platform, CaseMate, which provides the opportunity to utilize assessments in a formative manner through color-coded displays, enabling the instructor to integrate student responses from assignments such as reading responses or journals in a more seamless manner. While the tool described in this paper is applicable in any content area, the use of it in social studies seems particularly germane because of the increased attention that online primary sources have received over the past decade. Lee (2008) specifically mentions “making use of historical source materials available through online sources” (p. 131) as an example of pedagogical enhancement in the social studies classroom. In addition to selecting, packaging, and delivering these resources for students to use, teachers must create ways to “invite active engagement and constructive interpretation” among students (p. 137). A robust implementation of formative assessment can assist teachers as they help students navigate through knowledge construction processes.

Formative Assessment

The term, formative assessment, can have different interpretations for administrators, K-12 teachers, and methods faculty. For the development of this project, the term formative assessment assumes two characteristics: results of assessment should shape instruction, and such assessments should occur on a regular basis. If a quiz is given to students and the instruction that follows is the same, regardless of how students perform on the assessment, it is not formative assessment. Guskey (2007) points out, “Formative assessments alone do little to improve student learning or teaching quality. What really counts is what happens after the assessments” (p. 1). Secondly, formative assessment should occur frequently. A midterm exam, while more formative in nature than the final exam, often occurs too late for students or teachers to employ corrective actions. This underscores the need to have formative assessment interwoven in the day-to-day practice of teaching. However, one of the factors preventing formative uses of assessment is that “the results may not be communicated in ways that teachers and students can easily interpret and work with” (Chappuis & Chappuis, 2008, p. 2).

The description of the pilot for the CaseMate software presented in this paper works toward solving the problem of providing teachers with better tools, which must be part of the process of for helping students learn (Brush & Saye, 2002; Stiggins, 2004). To this end, two methods instructors used an online tool called Casemate in an attempt to make their assessments more formative in nature. Both instructors, in the fall of 2008, asked their methods students to read an assigned article and answer questions on the reading using the CaseMate platform, and then they facilitated the class discussion using the student responses.
**CaseMate: A tool for Formative Assessment**

*CaseMate* is an online environment for creating media-rich instructional cases while reducing the overhead associated with assembling and publishing web-based materials. The tool uses an interface that is different from data displays found in traditional online homework systems, such as BlackBoard. The current framework uses a module development metaphor of *categories* and *elements*. *Categories* are used to organize the module according to an instructor’s instructional framework. For example, the *elements* associated with each category would be comprised of various media components and attachments and multiple-choice, true-false, and open-response items and can be embedded within the elements. Figure 1 shows a sample case interface as seen by a student. In this example, two historical photographs of coal mining in Harlan County, Kentucky, have been embedded in an element. Below the images are three assessment items related to the images (e.g., “What time of day was the first photograph taken?” “In the second photograph, are the workman locked from going to work?” “Are the armed men local policemen?”). Each element can have up to 15 assessment items attached to it. Text, video, or flash widgets can be used instead of images. Limits are placed on the amount of media and assessment items that could be embedded in an element to encourage scaffolding of the material.

*Figure 1: Module presentation layout*
While the software can be used to construct robust multimedia environments, the pilot presented in this case focused on the use of embedded assessment items for classroom readings. This required the instructor to enter the questions into a web form along with the correct answer as well as feedback that would be displayed when the students completed the assessment. While the pilot did not implement the full capabilities of the tool, having a low threshold example for potential users seemed to be more important than showcasing an implementation that might take weeks of planning and development. Figure 2 shows a screen shot of the assessment builder page. An instructor would select the response type (multiple-choice, true-false, or open) and then enter the question text, the correct answer, and any feedback that would be displayed once the student submitted the assessment. The instructor would also specify which element in the case the assessment would be embedded in. A user who has web design skills could paste in custom HTML to customize the assessment, such as embedded video from YouTube or other streaming media sites.

![Assessment builder screen](image)

*Figure 2: Assessment builder screen*

Within seconds of students submitting their responses associated with a case, the instructor is able to generate a person-by-item matrix that allows him to view the class responses as a group. Figure 3 shows a person-by-item matrix generated in *CaseMate*. Forced response items are color coded to show whether the correct choice was selected. Using green and red backgrounds, the color of the cell indicates whether responses are correct or incorrect, allowing the actual responses to be displayed simultaneously (e.g., green indicates a correct response and red indicates an incorrect response). The end of each row shows a cumulative score for each student with red indicating a score less than 60%, yellow a score between 60% and 80%, and green indicating a score of 80% or higher. The rows are ordered from lowest to highest score. The bottom row of the matrix shows the difficulty of the question while the ordering of the students by performance allows the discrimination of an item to be estimated visually. In the example in Figure 3, items numbered two and six had the same level of difficulty, but item two had a higher level of discrimination.
Figure 3: Person by item matrix generated in CaseMate. Formative assessment is visualized as an informative display that indicates student performance. Item difficulty and discrimination can be deduced.

For this pilot, the Casemate tool was used five times during the fall 2008 semester to capture students’ mastery of the assigned readings. The first instructor administered a quiz on the assigned readings during the first 15 minutes of class — this course was taught in a computer lab, which allowed him to do so easily. The second instructor had students complete the questions outside of class, prior to the class meeting. The examples presented in this paper focused on the use of vignette based true/false items. In the following section, two scenarios are described to illustrate the potential of the CaseMate tool. For each scenario, the person-by-item matrices are provided as well as a description of how the tool was used and general impressions from the instructors. Scenario one also includes comments from students taken during a group discussion of how they perceived the use of the tool and both scenarios provide reflective feedback from the instructor.

Scenario 1: Using CaseMate Synchronously

The methods instructor in the first scenario employed CaseMate in a synchronous manner. When students arrived to class, they were asked to login to the tool and complete a series of questions in CaseMate that the instructor had created (Trials 1, 2, and 3). After completing the assignment, the instructor projected the matrix on the screen and used it to drive the class discussion. It is important to note that the instructor had the ability to make students responses anonymous when displaying the matrix. More discussion time was spent on items with a higher level of difficulty and included asking students to share why they chose a particular answer. In addition to discussing the content of the questions, the validity of each item was discussed. For the third trial with the software, the students in the class were asked to generate questions from the readings, which were sent to the instructor before class, which he loaded into CaseMate. Figures 4 - 6 show the matrixes generated for the three trials. In the first trial, the number of respondents is greater than the second and third because students from another course covering similar material took the assessment as well.
When asked during a group reflection session whether the students would rather go back to reading reactions for future assignments or generate true-false items, six of the seven graduate education students said they strongly preferred the questions within the CaseMate environment. The remaining student did not feel strongly either way. When asked what was different about using CaseMate, students offered several reasons including the following: (a) feeling more accountable and motivated.
because other students were going to be taking the quiz, (b) having ownership of leading the discussion, (c) reading with greater purpose, and (d) having to generate less writing. While these are anecdotal, they were compelling enough for the instructor to want to continue using the tool in the future. After sharing the responses of his students, the instructor shared that he also enjoyed using the Case-Mate environment noting he felt that he talked less during the discussion compared with other classes and that the distribution of comments among students was more even. Also, he felt that there was greater ability to hold students accountable, but, more importantly, he had “on the spot data” to support his intuitions about students’ misconceptions of the reading. He also noted that with the third trial he felt he was able to create buy-in among the students as well as provide an opportunity for them to demonstrate their understanding of material by having their responses generate the discussion.

Scenario 2: Using CaseMate Asynchronously

In the second usage scenario with two groups of students (Trials 4 and 5), the instructor had the students complete the assessment as part of an out-of-class assignment. The instructor created a case with several elements that contained web links to resources on the web that students were to review. An assessment was embedded in an element called “checking your understanding,” and all of the items on the assessment were application-based vignettes on copyright and “fair use” in K-12 settings, for example:

At a local electronics show, a teacher buys a machine that defeats the copy protection on DVDs, CD-ROMs, and just about everything else. She lets her students use it so they can incorporate clips from rented DVDs into their film genre projects. This is fair use.

Before the next class, he reviewed the results to determine what aspects of the material he needed to revisit. This instructor did not share Figures 7 and 8 with the students as did the other instructor in Scenario 1 but spent most of the discussion time on the items that were most misunderstood — for example, items 4, 7, 8, and 10 (See Figure 7). While this use of the tool was more teacher-centered, it still represented a shift to a more formative use of assessment in that the results drove the instruction.

![Figure 7: Person-by-item matrix for Trial 4](image)
After completing the two trials, the instructor indicated that he felt like the CaseMate tool aided his preparation and that the work associated with generating the items was preferable to reading journals post hoc. In particular, he liked that he could quickly view the data and identify students’ confusion and that the process of building the matrix was entirely automated. When interviewed, he reported, “Once a class has occurred, reading and grading of journals becomes a more tedious process.” He plans to expand his use of the tool in the upcoming semester and liked the idea of projecting or distributing the scores to students, but he was not sure of exactly how to implement it. For example, would he print out the results and have students work in small groups to discuss the results? And if he did this, should he assign students to groups based on their performance? He indicated that thinking through the ramifications of how these decisions would affect preparation time and in-class time was needed.

Discussion

The scenarios described in this paper provide vignettes of how technology can be used to support in-class discussion. In all five scenarios, the participation in the assessments was mandatory, but the scores were not used to affect the final grade. The two instructors who participated in the pilot used the feedback to shape the in-class discussion and decide what aspects of the material to spend more time on. It is this use of results to drive instruction that makes the use of these assessments formative. Just as important is that both the instructors in the pilot felt it was easy to do. Neither would consider taking the time to do the analysis by hand, so the importance of the having the program perform the analysis and display the data should not be understated.

Scaffolding has been long recognized as a critical element in facilitating inquiry-based instruction and understanding of complex relationships (Brush & Saye, 2000; Hannafin, Land, & Oliver, 1999). Hard scaffolds are sup-
port mechanisms that can be anticipated and planned in advance based upon student difficulties with a task (Brush & Saye, 2002). Graphic organizers, partially solved problems, and reading prompts are all examples of hard scaffolds that an instructor might employ. Soft scaffolds are rooted in social interactions, whether student-to-student or student-to-teacher (Vygotsky, 1978). An example of soft scaffolding is when a teacher provides prompts that are generated just-in-time according to specific student needs. Additionally, when facilitating class discussions, a teacher’s role as facilitator requires him or her to use soft scaffolding to redirect, to clarify, and to moderate the experience. Researchers have examined the uses of embedded scaffolding in a multimedia environment called Decision Point!, a hypermedia database program designed to examine the African-American Civil Rights Movement (Brush & Saye, 2000; Saye & Brush, 1999). In one of their findings, the researchers noted the difficulty with a teacher’s soft scaffolding even after multiple implementations of an instructional module. The authors suggest that “Some hard scaffolds may serve as intermediate structures that support teachers in the task of soft scaffolding by creating time for reflection before their response is required” (Brush & Saye, 2002, p. 10). Although the discussion of scaffolding is usually in reference to helping students engage in open-ended learning assignments, the same principles may be applied to helping teachers provide better soft scaffolding. In addition to describing scaffolds as hard or soft, one can describe scaffolds as being conceptual, metacognitive, procedural, or strategic (Hannafin, Land, & Oliver, 1999). Strategic scaffolds, in particular, are targeted in facilitating interpretation of data. The information that was most useful for the teacher in the Brush and Saye study (2002) was packaged and presented information, suggesting that strategic scaffolds are of benefit to supporting soft scaffolding. Similarly, the summarizing interface of CaseMate presented in this paper is a tool for developing strategic, hard scaffolds that can be used to bolster soft scaffolding in synchronous or asynchronous instructional environments. The CaseMate interface is intended to present the assessment results in a manner that allows the instructor not only to focus students on key ideas in a reading but also to make efficient decisions using the collected assessment data. By providing a hard, strategic scaffold, the instructors perceived an enhancement of their ability to manage the class discussion. This is not to say that the other types of scaffolds are not needed, but in these initial pilots, the dominant characteristics of the interface are that of a strategic scaffold.

Next Steps

As more instructors begin to use the CaseMate platform and the feature set matures, there will be opportunities to examine the impact of the tool using both subjective measures, such as self-reported efficacy and more objective measures, such as distribution of teacher-student conversation time. Juxtaposing actual usage data extracted from the system and other performance metrics, such as instructor and student perceptions, will serve as a next step in determining the effectiveness of the tool. A tool like CaseMate could lower the administrative or conceptual barriers for instructors to engage in practices that have been shown to impact student learning. For example, guided practice, an instructional practice that could be facilitated by CaseMate, intersects both formative assessment and soft scaffolding in that it requires looking at all students’ performance and providing feedback to correct misconceptions. If correctly administered, guided practice facilitates the cognitive processes of organizing, reviewing, rehearsing, summarizing, comparing, and contrasting (Rosenshine, 1997; Rosenshine & Stevens, 1986). But how often does one see an instructor checking for understanding among all students, especially in higher education? In the forthcoming work with the tool, the research will focus on what type of instructional behaviors the CaseMate
tool affords.

Conclusion

CaseMate is an evolving tool developed for educators. As such, faculty input is critical in building a more robust application. CaseMate is a free, open source tool and will be made available to both postsecondary and K-12 instructors. In the spirit of the open source movement, faculty will be able to set up their own versions of the software. My hope is that readers of this article might be interested in piloting CaseMate with their students in either a methods class or in a K-12 setting. I invite readers who are interested in partnering in this endeavor to contact me, so we can begin investigating how this software might support educators wanting to create better classroom discussions.

References


