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# The Bridge Course Design: Formative Assessment and Student-Centered Learning in Cross-Course Classrooms

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## **Abstract**

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## **Keywords**

Active learning, Student-centered learning, Dialogue-based education, Collaborative learning, Critical thinking, Peer teaching, Formative assessment

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## The Bridge Course Design: Formative Assessment and Student-Centered Learning in Cross-Course Classrooms

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### Abstract

This paper reports on the effectiveness of an innovative course design that bridges classes from two different disciplines. The *Bridge* design creates assignments in two classes: a summary class and a panel class. The design encourages students to engage in teaching and interacting with their peers within and across disciplines, and provides instructors with unique opportunities for formative assessment. Relative to control groups, students in the summary class perceived greater opportunities to teach peers, participate in class discussions, think critically, and engage in collaborative learning. Students in the panel class showed gains in critical thinking. Both classes afforded multiple opportunities for formative assessment. Following a discussion of the results, recommendations for improving the *Bridge* design are presented.

**Keywords:** active learning; student-centered learning; dialogue-based education; collaborative learning; critical thinking; peer teaching; formative assessment

### Introduction

This paper describes learning outcomes and student reactions to an innovative course design that attempts to bridge classes from two different disciplines. The *Bridge* design allows students from two courses to teach students in their partner class in an effort to increase active and collaborative learning among students and provide instructors with opportunities for formative assessment.

In a previous article we have detailed exact procedures, challenges, benefits, and suggestions for implementing the Bridge design (Welch, Davies & Hargis, 2008), but before reporting on actual outcomes in this article, we include a brief summary of the project here.

The Bridge course design originated in a week-long pedagogical seminar in which two of the three authors were participating and the third author was facilitating. Early in the week, the two participant authors learned that they both were teaching media classes in different departments. The professors began to discuss (1) how the students from both classes would benefit from learning the information from the other class, (2) how their courses would

benefit from more student-to-student interaction; and (3) how they wanted to design courses to allow for more formative assessment.

Our hope in linking courses from two disciplines was to augment active learning among students from a junior/senior-level 16-week Communication course, *Media Theories and Effects*, and a senior-level Sociology course, *Media and Society*. Prior to the beginning of the semester, the first two authors met regularly to discuss how this goal could best be accomplished and this process ultimately yielded the *Bridge* course design. The interdisciplinary *Bridge* is structured so that students from one class, the *summary class*, read an assigned seminal article, discuss it with their professor, and type a summary and critique of the article, which is posted on Blackboard for all students in both classes to access. These written summaries become the teaching tools for their classmates: all students from both classes read and discuss them. In the summary class, the students who wrote the summary take the lead in teaching and explaining the article to their classmates. Meanwhile, students from the second class, the *panel class*, prepare for class by reading the summaries and posting comments about the article on Blackboard, which the professor then draws upon as a means to introduce a seminal area of research or theory, and to stimulate class discussion. Later, a panel of students from the panel class presents to the summary class concepts they have learned in their own discussions and studies that extend or otherwise critique the article. Following their presentations, a brief question and answer period affords opportunities for members of both classes to interact. Instructors from both classes then use the interaction within and between their respective classes as a formative assessment tool to gauge understanding of concepts and theories and to give feedback to students. This practice of summarizing articles and presenting as panelists is spread over ten weeks of a 16-week semester.

The first four weeks of the semester were conducted much the same as a regular class. We did, however, make an effort to explain in detail how the *Bridge* was going to be conducted. We required students to read descriptions of the project in our respective syllabi and devoted some class time to describing their responsibilities and our expectations. In the second week students signed up for one of the ten *Bridge* weeks; some chose based on time, others on the topics. The *Bridge* Project was conducted from the fourth to the thirteenth week.

Once the actual *Bridge* project was launched, a typical week started in the summary class with two students leading a class discussion on a seminal research article. The discussion leaders explained the article to their classmates and then led a discussion based upon classmates' questions and their own insights. The professor participated as a member of the class, providing guidance and clarification only when necessary. The next day, the panel class followed suit, but the professor led the discussion drawing upon comments that students posted on Blackboard to guide the discussion to problematic or interesting issues. Midweek, the two classes met during the summary class' regular class time. The entire summary class was present, but only the six students from the panel class and their professor attended. In the event that a student had an unwavering schedule conflict or public speaking anxiety, we provided an alternative assignment for this panel presentation. The panel began at the beginning of the scheduled class time with the communication professor serving as the moderator. Each student had 3-5 minutes to present her or his points of elaboration. After all the panelists gave their presentations, the panel takes questions, with the moderator calling on audience members when they raised their hands. During the question period, the professors took the role of audience members to allow panel students a teaching opportunity. The entire panel sessions were limited to 45 minutes, after

which the summary class debriefed with their professor. Debriefing for the panel class took place the next day during their regular class time.

Obviously, in addition to this procedure, some behind-the-scenes work has taken place. For instance, summary students have read and prepared a critique, panel students have researched and practiced a presentation, students from both classes have read the critiques, and professors from both classes have met with students to assist them in this undertaking. Furthermore, the actual preparation for the *Bridge*, required some collaboration between instructors. Mainly, we worked to coordinate the topics covered in our respective classes to ensure some inter-disciplinary coherence to the curriculum. This required us to streamline our course of study since some class time that we originally devoted to lecturing was being replaced with student-centered learning activities.

We implemented the *Bridge* design with five specific pedagogical objectives in mind. Specifically, we aimed to increase (1) discourse, (2) collaborative learning, (3) student-to-student teaching, (4) critical thinking about key concepts and theories, and (5) opportunities to continually monitor student progress and comprehension.

From the outset, our intention was to engender active learning among students from courses in two disciplines. In this approach, the student is placed directly in the center of learning.

Student-centered learning is a broad approach that includes such techniques as substituting active learning experiences for lectures, holding students responsible for material that has not been explicitly discussed in class, assigning open-ended problems and problems requiring critical or creative thinking that cannot be solved by following text examples, involving students in simulations and role-plays, assigning a variety of unconventional writing exercises, and using self-paced and/or cooperative learning (Felder & Brent, 1996).

Lev Vygotsky initially instigated dialogue-based education or the examination of opinions or ideas logically by question and answer (Bodrova & Leong, 1996). Building off the work of German philosopher G.W.F. Hegel, he developed a three step dialectical process, which included a thesis, or main idea; an antithesis, or the opposing idea; and the synthesis, or a resolution. This approach has the advantages of encouraging students to develop a central idea, then critiquing it (antithesis) and ultimately realizing there are common aspects to the themes (synthesis).

Our efforts to move towards a student-centered learning approach germinated with the practice of introducing each topic or theory with a *discussion* of a seminal article or current research, rather than a lecture. These discussions involved summary, critique, and inquiry-based learning, which "facilitates exploration and investigation of issues or scenarios that are open-ended enough for different responses and solutions to be possible" (Khan & O'Rourke, 2005).

A second goal of the project is to create collaborative-learning communities among students. Ideally, we were hoping to organize "groups of people engaged in intellectual interaction for the purpose of learning" or Learning Communities (Cross, 1998). In these environments, students could *collaborate* within and across disciplines. "Collaboration is a social structure in which two or more people interact with each other and, in some circumstances, some types of interaction occur that have a positive effect" (Dillenbourg,

Blaye, & O'Malley, 1996). Reviews and meta-analyses of the literature consistently show a positive impact of collaboration on learning outcomes relative to individual work (Johnson, Johnson & Smith, 1998a, 1998b; Springer, Stanne, & Donovan, 1999). Early in the semester, small groups of students in the summary class signed up to read, summarize, and teach their classmates about a scholarly article. These small groups functioned as the learning communities that we hoped to create.

Communication students in the panel class also signed up to serve as a panelist for a presentation to their counterparts in Sociology. The panel students also met with their professor to discuss and prepare for the presentation, but they were not required to work in groups to coordinate their presentation. In retrospect, we realize making group-work mandatory would have obliged students to collaborate and would have reduced redundancy in some of the panel presentations. We mistakenly assumed this would occur naturally. As will be shown, in most cases collaboration did not occur in the panel class to the same degree as the summary class. Nevertheless, this discrepancy in collaborative effort between the two classes yields a useful point of comparison demonstrating the value of collaborative interaction. We leave further discussion of this issue for the next section.

We also hoped to stimulate interaction across disciplines by setting aside time for a question-answer period following the panel presentations. This afforded students an opportunity, albeit a limited one, to create a student-centered learning community composed of students from differing disciplinary traditions.

Our third aim was to increase student-to-student teaching because evidence suggests that students who teach a topic learn the information better than their peers who learn the concept passively (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Based on the rationale that students will learn by doing, the Bridge was deliberately structured to afford students teaching opportunities. Research by the Oxford Centre for Staff and Learning Development at Oxford Brookes University confirms that experiential learning is a particularly potent method for promoting what is referred to as deeper learning; that is, learning that goes beyond superficial learning and rote memory that merely requires students to regurgitate information (as cited by Cross & Steadman, 1996). We reasoned that facilitating students teaching their peers about theories and important concepts would increase student exposure to this deep learning (Whitman, 1988).

Under the guidance of their professor, students in the summary class educated their peers by typing and posting a summary and critique and then leading a class discussion on one key reading. This task required the discussion leaders to be versed enough in the reading to be able to stimulate dialogue and to answer questions posed by classmates and their professor. Expertise in the reading was developed through preparation of the written summary, which was typically a four-page document consisting of two parts: one section devoted to explaining crucial concepts, theoretical framework, methodological issues, findings, theory, and so forth; and a second section critically analyzing the research. This summary then became required reading for students in both the summary class and the panel class.

Teaching opportunities for the panel class arose during their presentation to the summary class. In this portion of the Bridge, panelists were instructed to make a connection to the summary reading by developing two points of elaboration. They learned the concepts from classroom discussions, textbook readings, independent research, and conferences with their professor. According to modern theories of learning and memory, this process should

compel students to draw upon existing knowledge structures and thereby enhance their understanding and retention of new content, concepts, and theories (Kurfiss, 1988). Furthermore, panelists were explicitly encouraged to view their presentation as an opportunity to educate their audience about their points of elaboration.

A fourth goal of the Bridge project was to increase critical thinking about key concepts and theories. This was accomplished at multiple points in both classes, including through peer interaction, critical reading, conferencing with a professor, composition of a critique, preparation for a panel presentation, and in-class presentation and discourse. Peer interaction within and without the classroom cultivates an environment where critical thinking is likely to take place (Smith, 1977) and, as explained earlier, the Bridge encourages peer interaction through collaboration. In addition to these learning communities, however, the question-and-answer period of the panel presentations yielded a valuable testing ground for students to test the validity of ideas. During these inter-class sessions, panelists' elaborations were questioned, explored, and examined in light of the findings highlighted in the summary readings.

Students participating in the Bridge were also challenged to exercise critical thinking skills by their respective assignments. Condensing into a few pages and critiquing a scholarly research article requires comprehension of the content, the ability to discriminate core concepts from peripheral ones, and organizational skills to combine and compile important facts into a coherent structure. For students in the panel class, making connections from one content area to another requires the capacity to relate sometimes disparate concepts (Plucker, 1999), the ability to make predictive inferences, and to synthesize existing knowledge in meaningful ways. Bloom's well known hierarchy of cognitive thinking identifies many of the aforementioned higher-order thinking skills which we incorporated into the assignments (Bloom, Englehard, Furst, Hill, & Krathwohl, 1956). Of course, students varied in the degree to which they actually exploited these critical thinking opportunities, but the assignments encouraged them to do so.

Our final objective centered on the idea of formative assessment; that is, increasing opportunities to monitor student progress and comprehension prior to a final or summative assessment. The goal of formative assessment is to maximize what teachers know about student comprehension and encourage teachers to give back to the students in the form of more comprehensive and lucid content and more precise assessments. The Bridge design provides instructors with multiple opportunities for formative assessment. The key factor being that this project is five steps that recur weekly for ten weeks, which affords the logistical benefit of being able to meet with every student for one-on-one or small group consultation. In some cases, we were able to meet with students more than once. We provide a detailed account in a previous article (Welch et al., 2008), but outline the several layers of formative assessment below.

Formative assessment opportunities arise as instructors (1) meet weekly with summary students signed up to critique an article or panelists signed up to make a presentation, (2) read and discuss the critique of the summary articles with students in their respective class discussions, (3) read comments, questions and reflections about the summary articles that were posted to Blackboard by panel students prior to coming to class (4) observe the panel presentations and provide input and clarifications during the question-and-answer session (5) debrief their respective classes on the day following the panel presentations regarding strong or weak elaborations, unanswered questions, significant comments, etc., and (6)

meet one-on-one with the summary students and panelists to discuss their performance and grade.

In sum, we predict the Bridge course design will increase (1) discourse, (2) collaborative learning, (3) student-to-student teaching, (4) critical thinking about key concepts and theories, and (5) opportunities to continually monitor student progress and comprehension. Formalizing these objectives into hypotheses yields the following predictions.

- H1: The Bridge design will increase students' perceptions of opportunities to participate in class discussions, collaboration, student-to-student teaching, and critical thinking relative to control group(s).
- H2: The Bridge design will increase opportunities for formative assessment relative to control group(s).
- H3: In the panel class, the Bridge design will increase evidence of critical thinking about media theory in students' term papers relative to a control group.

### **Method**

The Bridge project was implemented into the media-related courses taught by the first two authors during the Fall semester of 2007. The class taught by the sociology professor served as the summary class, and the class taught by the communication professor served as the panel class. Approval from the University's Institutional Review Board for Human Subjects Protection was obtained before data was collected.

The summary class ( $n = 19$ ) consisted of 11 females and 7 males, with a mean age of 24 ( $SD = 3.5$ ) and a nearly equal split between seniors ( $n = 9$ ) and juniors ( $n = 8$ ). The panel class was heavily skewed female ( $n = 31$ ; males,  $n = 12$ ) and was somewhat younger than the summary class, with an average age of 20.9 ( $SD = 1.6$ ). It was populated mainly with juniors ( $n = 33$ ), some seniors ( $n = 8$ ) and one freshman.

An ideal test of the hypotheses would compare two sections of the same course taught by the same instructor with students randomly assigned to attend one section or the other. However, teaching schedules did not permit this option. Therefore, we compared the Bridge classes to courses taught by the same instructor. Thus, we compared the Bridge classes to similar lecture classes taught by the same instructors in the semester prior to the implementation of the Bridge project and in the same semester. These courses constitute the control group. We also kept the data disaggregated such that we compared data from communication students to communication students and likewise compared sociology students to sociology students. This method of analyzing data per instructor eliminated confounds created by different teaching styles, experience, personalities, etc. of the two professors and confounds created by comparing students in different disciplines. In other words, we have two sets of controls--one for each instructor.

For the summary class, three lecture-style courses taught by the sociology professor served as a control group. These were two sections of a *Sexuality and Marriage* course ( $n = 30$ ,



and  $n = 31$ ) with similar demographic make-up as the Bridge class, and a large section of a sophomore-level course in *Sex, Race, and Social Class* ( $n = 93$ ).

The control group for the panel class, which was taught by the communication professor, was a section of the same media class taught in the previous semester (spring 2007). Both sections of the class covered the same content, had the same instructor and textbook, and had exactly the same assignments except that the Bridge project assignment took the place of a multiple-choice exam in the Bridge panel class.

Surveys were administered during class time to both Bridge classes and to the three control classes for the summary class in the second-last week of the semester. The survey for the control group for the panel class was administered via a secure, online Web survey during Summer 2007, prior to the beginning of Fall 2007 semester. This control group was contacted via e-mail using University-assigned e-mail addresses and asked to participate in the survey. An initial e-mail blast resulted in 13 completed surveys for a response rate of 30%. A subsequent e-mail blast failed to boost the response rate further. Data for the panel class ( $N = 55$ ) was collected from 43 students for a response rate of 78%. The survey response rate for the summary class was 95% and for the three control courses it was 77%, 80%, and 78%, respectively.

The survey instrument itself consisted of 15 close-ended items measuring students' perception of the class, 4 demographic items, and 6 open-ended questions soliciting student reactions to various aspects of their classroom experience.<sup>1</sup> Furthermore, an informed consent statement was included on the title page of the survey. Approval from the University's Institutional Review Board for Human Subjects Protection was obtained before any surveys were administered.

The close-ended items were 11-point, Likert-type scales anchored by the terms "strongly disagree" and "strongly agree." These items were designed to measure student perceptions of the degree to which they engaged in class discussions, collaboration, student-to-student teaching, and critical thinking. Table 1 lists the close-ended survey items and the respective constructs that they measure. The open-ended questions asked respondents to comment on the most beneficial, least beneficial, most enjoyable, and least enjoyable aspects of the Bridge project, as well as suggestions for the future.

**Table 1:** Measures of Key Learning Constructs

Construct	Survey Items
Collaboration	I worked with classmates outside of class on projects or assignments
	The instructor helped me learn the material
	I talked with my instructor outside of the classroom more in this class than I usually do in my other classes
Peer teaching	I feel like I learned new things from my classmates
	This course provided me with opportunities to teach or tutor other students

Critical thinking	<p>This course increased my confidence in my ability to critique academic material (such as articles, theories, etc.)</p> <p>The assignments in this course helped me to see connections between concepts taught in the course and concepts in other disciplines</p> <p>This course encouraged me to analyze the thinking, arguments, or conclusions that others make about media</p> <p>This course helped me to apply theories or concepts to practical problems or to new situations</p>
Discourse	I participated during class discussions

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Testing the hypothesis that the Bridge design will increase formative assessment was accomplished by comparing course structures and activities in the Bridge class to control classes through qualitative observations by both instructors, who discussed and recorded their observations in weekly meetings. In doing so, we attempted to identify those pedagogical features unique to the Bridge classes that allowed us to assess student understanding and also provide them with feedback.

To test the hypothesis (H3) that evidence of critical thinking will surface in students' papers as a result of the Bridge design, term papers written by control group students were compared to term papers written by participants in the Bridge project. A random sample of papers from the control class and the panel class were selected for evaluation. The papers were independently evaluated as part of an annual assessment process conducted by a committee in the communication professor's department. Thus, the judges were experts in the field of communication. Moreover, the papers were masked to protect the identity of the writers, and the judges were unaware of the writers' involvement in the Bridge project. The assessment process involved randomly selecting a sample of papers written by communication students and grading them on five<sup>2</sup> criteria related to critical thinking: (1) identifies and explains main issue, (2) distinguishes types of claims, (3) recognizes stakeholders and contexts, (4) considers methodology of sources, and (5) frames personal responses and acknowledges other perspectives. Student writing was scored in each subcomponent as achieving one of four levels (beginning=1, developing=2, accomplished=3, or exemplary=4).

## Results

### Collaborative Learning

Analysis of variance (ANOVA) and t-tests were used to test the hypothesis that classes that incorporated the Bridge design increased collaboration. For the summary class, the results indicate that the Bridge design significantly increased collaboration,  $F(3, 151) = 24.65, p < .001$ . Post hoc tests confirm that the Bridge class perceived greater opportunities to collaborate with classmates and the instructor than the three control classes, respectively. Table 2 summarizes the mean scores and standard deviations for Bridge classes and controls on measures of collaboration (in addition to peer teaching, critical thinking, and participation). Analysis of the comments from summary students suggests that collaboration and group work was both useful and beneficial. For instance, one student wrote, "I liked the

interaction between the classmates. I think that helped in the way the discussions went. I really enjoyed the class as a whole. I feel like I learned a lot from this course.”

**Table 2.** Mean Scores on Collaboration, Peer Teaching, Critical Thinking and Discourse for Bridge Classes and Control Classes

Measure	Class			
	Bridge	Control 1	Control 2	Control 3
<b>Summary</b>				
Collaboration	25.1 <sup>a</sup> (3.8)	11.4 <sup>b</sup> (6.4)	14.1 <sup>b</sup> (6.7)	12.6 <sup>b</sup> (5.4)
Peer Teaching	15.4 <sup>a</sup> (2.1)	8.6 <sup>b</sup> (5.1)	10.2 <sup>b</sup> (4.0)	8.8 <sup>b</sup> (4.4)
Critical Thinking	35.0 <sup>a</sup> (4.5)	27.1 <sup>b</sup> (8.2)	30.5 <sup>ab</sup> (7.2)	28.6 <sup>b</sup> (8.9)
Discourse	7.5 <sup>ab</sup> (2.5)	5.3 <sup>bc</sup> (3.1)	5.0 <sup>bc</sup> (3.7)	4.6 <sup>c</sup> (3.1)
<b>Pane</b>				
<b>I</b>				
Collaboration	4.4 <sup>a</sup> (3.4)	3.5 <sup>a</sup> (2.9)	--	--
Peer Teaching	10.6 <sup>a</sup> (4.2)	9.5 <sup>a</sup> (3.6)	--	--
Critical Thinking	20.2 <sup>a</sup> (5.2)	21.0 <sup>a</sup> (3.32)	--	--
Discourse	6.2 <sup>a</sup> (2.5)	7.1 <sup>a</sup> (3.0)	--	--

Note. Standard deviations are in parentheses. For horizontal comparisons, means having no letter in their superscripts in common differ significantly at  $p < .05$ .

Collaboration<sup>3</sup> in the panel class did not increase significantly compared to a control class, as revealed by a  $t$ -test,  $t = .90$ ,  $df = 54$ ,  $p = .37$ , although the means were in the hypothesized direction. Indeed, analysis of the open-ended responses highlights the potential that the Bridge design has for collaboration. It is particularly noteworthy that the students themselves perceived the benefit of collaborative learning, even though they did not appear to actively participate with other students in preparing their presentations. We assumed, mistakenly, that this would occur; it did not. A common suggestion among panel students was that making collaboration mandatory would have improved their performance. As one student noted, “It would work out better if panels discussed more ahead of time and lined up what they wanted to discuss.” Some students lamented that working individually was a lost opportunity. As another student reported, the least beneficial aspect of the projects was the “teams doing everything individually.”

### Peer Teaching

An ANOVA shows the Bridge design impacted student-to-student teaching in the summary class,  $F(3, 166) = 14.00$ ,  $p < .001$ . Students in the Bridge summary class reported increased opportunities to teach and learn from classmates compared to students in the three control classes (see Table 2).

The open-ended responses by the summary students captured some of the feelings regarding student-to-student teaching. One summary student indicated that “Having two people summarize and the rest of the class read summaries was very beneficial (emphasis in original).” Some explicitly noted that this aspect of the project was challenging, but worthwhile. For instance, “[The most enjoyable aspect of the Bridge project was] allowing

me to take an article and relate it [to] what was going on in class. It was nice being able to attempt to educate others on something we put a lot of work into." Another summary student reported that the most enjoyable part of the project was teaching the assigned article to her classmates. Some students noted the benefits of the inter-class discussions: "[The most beneficial aspect of the Bridge project was] that we got to learn other theories from [the other professor's] class." However, most summary students were critical of the panel class and reported that the presentations offered little utility, mainly because they were too redundant and not sufficiently prepared. From the perspective of the summary students, the most consistently identified weakness with the course design was the inter-course dialogue.

Students in the panel class also reported increased opportunities to teach and learn from classmates relative to a control class. However, this difference was not significant,  $t = .85$ ,  $df = 54$ ,  $p = .36$ . Nonetheless, the open-ended responses suggest that student-to-student teaching did occur, at least for some students. Several students noted that the project helped them see connections between the two disciplines. For instance one respondent noted that the most beneficial aspect of the project was "hearing the other class shed light and perspective on the issue discussed." Another panel student wrote that "[it was] good to compare different views from students in [the] sociology and communication departments." This sentiment was reflected in the comments of a different panel student who noted that the most enjoyable aspect of the project was "hearing feedback from the students who were in the other class."

### Critical Thinking

Critical thinking was measured using evaluation of term papers for the panel class and close-ended questions for both the summary and panel classes. Evidence that the Bridge design encouraged critical thinking is found in the comparison of term papers written by the panel and control classes. The panel class scored higher than the control class on evaluations of critical thinking in term papers, and these differences were significant,  $t = 4.09$ ,  $df = 13$ ,  $p = .001$ .

Critical thinking was also measured by four Likert-style questions (see Table 1). Once again, students in the summary class appeared to benefit from the Bridge design. Their self-reported perceptions of critical thinking abilities and opportunities was greater than their counterparts in control classes (see Table 2), and these differences were significant  $F(3, 152) = .3.48$ ,  $p = .02$ . Likewise, comments from the summary students reflected these gains. Referring to benefits of the Bridge, one student wrote, "The critical analysis and debating on different topics with other students. It shows you different ways people think about various topic[s] and how they think. It was a wonderful idea." Similarly, another student noted, "Analyzing and critiquing the other classes' presentations [was the most beneficial aspect of the Bridge]."

However, according to an analysis of the close-ended questions, the Bridge design apparently failed to influence self-reported critical thinking abilities and opportunities in the panel class relative to a control group,  $t = .70$ ,  $df = 54$ ,  $p = .49$ . Nevertheless, somewhat paradoxically, many panel participants ( $n = 20$ ) noted the most beneficial aspect of the project was that it required them to think critically. For instance, one student wrote, "It [the Bridge project] helped me think analytically about studies and theories. It also helped with learning the material." Another student felt the benefits of the project included "the possibility and ability to critique theories and to teach and learn things." Critical thinking can involve making connections between concepts and a few students explicitly mentioned this

skill: "I enjoyed researching the topic and linking several different theories and studies," and "It helped me think outside the box." Indeed, slightly more than one-third (35%) of the panel respondents mentioned critical thinking in some form or another as a benefit of participating in the Bridge project. So although the survey data did not appear to reflect gains in critical thinking for the panel class, the open-ended responses clearly suggest that many participants felt the Bridge was beneficial in stimulating critical thought.

### **Discourse**

Similar to previous analyses, the Bridge design impacted perceived participation in discussions,  $F(3, 156) = 4.07, p = .008$  in the summary class. However this difference may also be a function of class size since the only significant difference between groups was between the Bridge summary class and the largest control class (Control 3 in Table 2), as determined by Bonferroni post hoc analyses. Many summary students noted in the open-ended questions the beneficial aspects of the intra-class discussions, open exchanges, and debates. "I felt that we had some very good discussions from the work that we did on the articles, which led to a better understanding of the course material." Another student noted the benefits of the class discussions, in which "we were able to ask questions, critique, and learn about the studies, theories, and ideas relating to media and society."

In the panel class, no significant differences were found between the control group and the Bridge class,  $t = 1.01, df = 54, p = .32$ . Some students indicated in open-ended questions that a benefit of the Bridge project was "The fact that we had class discussions about the assigned articles" and a few mentioned the benefits of the inter-class discussions that took place in the panel presentation itself. Thus, the discussion-based nature of the Bridge project apparently appealed to some learners in the panel class, although as a whole, no significant differences were found between the panel class and a control.

### **Formative Assessment**

We predicted that the Bridge design would afford numerous opportunities to assess student understanding of theories and concepts throughout the semester, provide them with feedback when the professors identified material the students did not seem to grasp, and modify teaching strategies when they were not successful at communicating important information. This is known as formative assessment because it generates information that is used to monitor and guide the development of student understanding and instructional success. This contrasts summative assessment, which measures comprehension at a single moment in time and is focused on issuing a grade, and was the assessment technique most frequently used by the authors prior to this project. Qualitative data--observations, focused meetings, and informal student feedback--strongly indicates that the Bridge design succeeds in creating myriad points where formative assessment information can be gathered.

The summary class yielded multiple opportunities for formative assessment. The first tool was the weekly meetings with the summary students during which the sociology professor assisted small groups of students in preparing their summary and critique. This meeting presented the chance to receive both subtle feedback about what was confusing students and thoughtful explicit feedback about the course design and content. The second layer of assessment was the summary class discussion of the articles. The only persons receiving a grade at this time were the students who wrote the summary, but the sociology professor was able to hear what all the students had to say so he was able to point out shortcomings, ambiguities, or errors in the summary and critiques as well as the in-class discussions. The next formative assessment tool was the discussion of the panel presentations after the

panelists left. During this debriefing session, the summary students assessed their own performance and that of the panelists, and disclosed what continued to confuse them. Finally, the sociology professor met one-on-one with summary students to discuss their performance as teachers and their grade.

The large size of the panel class ( $n = 55$ ) required some adjustment in formative assessment. It was accomplished primarily in four ways. First, each week the panel students were required to read the summary articles and make some comment, connection, or critique of the article. Students posted these comments to Blackboard, and the communication professor was able to gain a feel for how the class as whole reacted to the articles. Often, it was clear from comments that students had misunderstood a concept or idea. Often, a particularly thoughtful response was used as a springboard to get others to think critically about theory. Second the communication professor would meet the panelists the day before the panel presentation. This proved a valuable opportunity to formatively assess them, although not all students availed themselves of this opportunity, as it was not mandatory. The third means of formative assessment was the panel presentations *per se*. During the panel presentation and the question-and-answer session that followed, the communication professor noted concepts that were used incorrectly, questions from the audience that were not answered clearly, and panelist behaviors that distracted from the goal of sharing knowledge. These notes were then used in a debriefing session in the following class meeting. Also, during the question-and-answer period both professors would sparingly offer comments or pose questions in order to promote clarity *ibidem* for all the students. In this way, misunderstandings, inaccuracies, and fallacies could be corrected. The fourth primary tool for formative assessment was a feedback sheet distributed to panelists following their presentation. This form indicated how well they performed as a panelist according to a grading rubric. This feedback constituted summative assessment since it announced the student's grade on the presentation. Students were also able to see the quality of their points of elaboration and discuss their shortcomings with their professor, and in turn use this assignment as a formative stage which they could then build upon in writing their final paper--indeed, as noted below, some students took advantage of this opportunity. From the instructor's side, he was able to use these weekly formalized assessments to adjust his instruction to improve student comprehension and performance.

### Other Findings

An analysis of the open-ended responses also reveals some useful information about how students perceived the Bridge project, although these responses were not associated with any formal hypotheses. Positive student assessment centered on the learning of theories and skills in giving presentations. Panel students praised certain aspects of the Bridge project, particularly the fact that the project obliged them to learn a theory or concept in detail. A typical example of this sentiment is reflected in the comments of one panel student: "It gave me the opportunity to thoroughly research different theories and ideas." Others noted it helped them in writing their term paper or preparing for exams. Likewise summary students also appreciated the project for various reasons. For instance some students reported that it supplied them with the confidence and tools to present difficult material to their classmates.

The single most common complaint from panelists was a perceived lack of direction regarding the panel presentation itself. We did provide a detailed set of step-by-step instructions for the panelists and discussed the presentations in the weeks prior to the start of the project, but this was apparently insufficient. One panel student commented that he felt the least enjoyable aspect of the project was "not knowing what was expected of us." Another student complained that she was "forced to present without a clear knowledge of what was expected." Some students also reported anxiety about having to present to a group of strangers. For instance, "[The least enjoyable aspect of the Bridge project was] presenting to a class that we are not familiar with was nerve- wracking." Another panel student said she felt intimidated by the people in the other class when she walked in. Indeed, our own perceptions were that a subtle "us-them" mentality seemed to exist among the students in our respective classes.

Another common complaint from the panel students was that they felt they did not have sufficient time to prepare for the presentation. Students signed-up for the project in the second week, and the first presentations did not start until the fourth week so some of the angst about lack of preparation time can be attributed to poor time-management and procrastination; a common problem among students in any class. Nevertheless, the time between when the summary students posted their critique and the time when panelists made their presentations was only five days. In retrospect, a staggered schedule that gave panel students an extra week to prepare would likely have alleviated some of these concerns. The lack of preparation by the panel students was evident in several of the comments made by their counterparts in the summary class. "The other [class] did not seem as prepared for the bridge project as our class." The summary class also expressed frustration in the discrepancy in the requirements for the assignments between the two classes, "The least beneficial part was the way the other class participated. I felt like we did more work than they put into this project so they seemed less prepared when they came to teach us." The summary class also suggested that requiring the panelists to coordinate as a group would have alleviated some of the redundancy in their presentations--something the panelists themselves pointed out.

### Discussion

The Bridge course design is an innovative tool for linking courses across or within disciplines. It is designed to facilitate an active, student-centered model of teaching and learning. In a Bridge, the assignments in two different courses are structured in such a way as to provide students with increased opportunities for (1) discourse, (2) collaborative learning, (3) student-to-student teaching, and (4) critical thinking about key concepts and

theories. It also has a primary purpose of maximizing formative assessment opportunities for instructors. As it is presently constituted, a Bridge design requires one class to serve as a summary class and another to act as a panel class. In brief, the students in the summary class read, summarize and teach their classmates about an original research article. Students in the panel class read and discuss the summaries and attempt to make connections from their own class to the article. Periodically throughout the semester, small groups of panel students present their ideas in panel presentation to the summary class. This presentation is followed by a question-and-answer session where both classes debate, discuss, and explore the relative merits of the ideas presented by the panel.

The results indicate the Bridge design was particularly beneficial for summary students. Several possibilities may account for the apparent failure of the Bridge design to significantly impact the panel class. One possibility is that the Bridge design really is not an effective tool to improve the perceived experience of participants in the panel class. If this is truly the case, then the Bridge should be significantly re-structured to make the assignments in the panel class more effective. However, other possibilities also warrant consideration.

One alternative explanation is that anxiety about the panel presentation among students in the panel class primed negative feelings for the project as a whole, and it is this dissatisfaction that biased student responses to other aspects of the project. Indeed, many students reported that they felt under-prepared and unsure of expectations for the presentation. This negative bias in responses is a distinct possibility given that other measures of critical thinking (i.e., analysis of critical thinking in student papers and student narratives) showed increases relative to the control group. Furthermore, the most common benefit of the project cited by panel students was the fact that it compelled them to think critically. It is possible that students in the panel class responded to the survey items having been primed by a reminder of this negative experience.

A second possibility is that students in the panel class may have misread the survey instrument with the idea in mind that the Bridge project referred to only their experience as a panelist, and not other aspects of the project. In other words, the failure to find support for the hypotheses among this population was a function of the measurement device.

Another possibility that would explain a lack of difference in the control group compared to the panel class is the timing of the survey given to the control class and the small sample size of respondents in the control class. The control class took the survey approximately two months after the class ended, whereas the panel students were surveyed two weeks prior to the end of the class. Ideally, the surveys would have been administered at the same time in each semester; however, the entire project was conceived after the control class had ended so an ideal test was not possible. Perhaps, the passage of time caused the control students to perceive their classroom experiences more favorably--the proverbial rose-colored glasses phenomenon. Alternatively, only students who had overly positive perceptions of the class or professor were willing to respond to the survey. Indeed the control group only had a response rate of 30%.

It is unfortunate that an ideal test and sample from the control group could not be utilized in this study. Therefore, we took pains to provide alternative measures of the impact of the Bridge on the panel class. As noted earlier, the Bridge did appear to improve critical thinking as evidenced in student papers, and in open-ended responses. At the very least, the Bridge



did not appear to hamper class participation, student-to-student teaching, or collaboration, and apparently improved critical thinking in the panel class.

The problems that emerged from the experiences of the panel class provide useful guidance for implementing a Bridge design in the future. Primarily, future iterations of the Bridge should ensure that the panel portion of the project is strengthened. With the aid of hindsight, we can make several simple recommendations to accomplish this. First, panelists need to be fully informed as to what to expect during their presentation. We recommend modeling a presentation for students to observe. We also recommend that some of the “us-them” mentality that may exist between classes can be reduced by providing an opportunity for the two classes to interact prior to the panel presentations. We further recommend that the panelists be required to work as a group in preparing and presenting their presentations to maximize collaborative opportunities, and to reduce redundancy and increase quality of the presentations. Finally, we recommend that instructors attempt to tie together the presentations at their conclusion. This could be done by taking the role of discussant, or taking the last five minutes to proffer an encapsulating summation along with a few points of correction or clarification.

For both the summary class and the panel class, we recommend that a preliminary meeting with the instructor be made mandatory and incorporated explicitly into the grading rubric such that students attend and are prepared when they arrive. Originally, we did not make a meeting mandatory simply because we did not foresee its value. Once we realized their value we did not want to change the grading standards midway through. However, because of the great benefits to the students--better understanding of the material, assistance with concept mapping of ideas, the opportunity to talk with the professor and express frustrations and accolades, etc.--and the professors--better rapport with students, increased knowledge about student impressions of the course design and content, etc.--we recommend making these preliminary meetings mandatory.

## **Conclusions**

In sum, the Bridge design was largely successful in achieving its goals, especially in the summary class and especially in terms of formative assessment. Some limited success was seen in the panel class in terms of critical thinking. In both classes, the Bridge design was extremely successful in increasing formative assessment opportunities. With some minor adjustments to improve the panel class, the current Bridge design could easily be adapted for capstone programs, paired courses in which all students take the same courses, and courses within the same college or between colleges. It can be transposed onto a wide variety of existing courses with varying enrollment without the courses being cross-listed or otherwise manipulated at the administrative level. A final point to note is that though the Bridge project was designed expressly to integrate classes from different departments, part of the design can be extracted and used piecemeal within a single class. We have already experienced some success with this strategy in our current teaching assignments.

Our own feelings regarding the project were expressed by one summary student when she wrote, “Definitely conduct this project again. I think it was a good experience for all involved. There were definitely kinks to be worked out, but I think the bridge project was a great idea. I really enjoyed taking this class.”

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## Endnotes

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<sup>1</sup> The survey for the control groups replaced the open ended questions regarding the Bridge project with course-specific open-ended questions. Some minor changes in wording were also made to the close-ended items to make them relevant to the class in which they were administered.

<sup>2</sup> The assessment also included evaluation of discipline specific content and writing skills. However, only the data for critical thinking skills are reported here.

<sup>3</sup> Only a single item measured collaboration in the control group for the panel class and the panel class: "I worked with classmates outside of class on projects or assignments." This discrepancy occurred because we did not include all three items in the version of the survey originally administered to the control group for the panel class.