2016

Blended and Asynchronous Course Effectiveness in First-Year Composition: A Case Study

Daniel Reardon

Missouri University of Science and Technology, reardond@mst.edu

Follow this and additional works at: http://scholars.fhsu.edu/ts

Recommended Citation

Reardon, Daniel (2016) "Blended and Asynchronous Course Effectiveness in First-Year Composition: A Case Study," Teacher-Scholar: The Journal of the State Comprehensive University; Vol. 7, Article 3.

Available at: http://scholars.fhsu.edu/ts/vol7/iss1/3

This Article is brought to you for free and open access by FHSU Scholars Repository. It has been accepted for inclusion in Teacher-Scholar: The Journal of the State Comprehensive University by an authorized administrator of FHSU Scholars Repository.
Blended and Asynchronous Course Effectiveness in First-Year Composition: A Case Study

Daniel Reardon
Missouri University of Science and Technology

As one campus of a four-campus state system, Missouri University of Science and Technology has been searching for ways to effectively integrate online courses across the curriculum. This search originally came in the form of a directive from higher administration, on both the university and system levels. Therein lay the first difficulty for us with online instruction. Specifically, online instruction’s value may be very different for university system administration than it is for each campus, each department, and each instructor. For many SCUs facing drastically reduced state funding, greater competition for student enrollment, and increased operating costs, online instruction may be viewed as something of a revenue panacea. Through online course offerings, campuses can reach far-flung populations of students unable to commute for face-to-face (F2F) instruction. Online courses may carry additional fees, thus producing another potential revenue source. Lastly, physical classroom space is often at a premium in SCUs; limited resources and limited space often conflict with a need to increase enrollments. Blended delivery methods can therefore relieve scheduling difficulties during peak course hours.

Given what blended courses offer in an era of nearly universal budget challenges for state institutions, VanDerLinden (2014) underscores the attractiveness of online course options: “it is hard to imagine a college or university that can afford to not take a strategic approach to blended learning” (p. 78). In a 2013 special issue of The Internet and Higher Education, in which VanDerLinden’s article appeared, scholars discussed how to effectively implement blended learning across the curriculum. For example, in “Blended Learning: A Dangerous Idea?”, Moskel, Dziuban, and Hartman suggest that blended learning’s dangers exist not in the delivery method’s ability to provide effective learning, but in its subversive ability to transform institutional ideas about the physical space of a college or university. Such transformations may indeed be appealing for urban campuses with largely commuter student populations.

But online instruction is something of mixed bag, especially for mid-sized SCUs. Missouri S&T, a mid-sized institution in a Midwest United States town of 20,000 located 80 miles from the nearest major city, is an almost wholly residential campus. Although we are a com-
prehensive university that offers degrees in the humanities and social sciences, in 2007 our institution’s name was changed from The University of Missouri-Rolla to Missouri University of Science and Technology as a branding tool to promote our university’s dominant STEM student population. While enrollment continues to climb, our university’s ranking in many profiles has diminished because of the name change. We are still a state comprehensive university, but our marketing rarely reflects that. Additionally, we aggressively market our low instructor-student ratio, and the multiple opportunities students have at Missouri S&T to work directly with faculty. In our freshman survey profile, completed during on-campus enrollment, 98% of our students plan on working directly with faculty and believe that faculty should be actively involved in their educational and career development (“Freshman Profile,” 2013).

Nevertheless, a directive to increase online course offerings came to our department from the administration. My task as composition director was to research best practices in online delivery methods and pilot a series of online courses in our composition program. My concern, frankly, had nothing to do with increasing revenue streams. I wanted to know if online delivery methods enhance instruction. Could online instruction improve outcomes achieved in our F2F writing courses? As I discovered, data regarding online instruction’s ability to improve outcomes is almost nonexistent. As online courses have become fixtures in curricula across the United States, current scholarship in online instruction has shifted from online instruction’s value to best practices (Warden et. al. 2013; Fish and Wickersham 2009; Boyd, 2008; Almala, 2007). As if in acceptance of a fait accompli, scholars over the last ten years have examined various delivery methods of online instruction—asynchronous, synchronous, and blended (DiRienzo and Lilly, 2014; Westover and Westover, 2014, Driscoll et. al., 2012; Hoskins, 2012, Leach, 2010, Boyd, 2008, Chyung and Vachon, 2005). Relatively few studies, however, have assessed the quality of instruction, student satisfaction, and learning outcomes. Studies examining foundation courses are also lacking. This dearth of research comes as no great surprise; assessing learning, either through outcomes assessment or examination of student perceptions in First-Year Composition (FYC), is a challenging problem.

In both F2F and online environments, learning assessment in FYC is difficult in part because the progression of writing skills resists quantitative assessments. Because of the diasporic nature of FYC objectives and outcomes across institutions, the training, education, and sometimes uncertain motivation of FYC instructors (Wardle 2013), and the course’s diverse functions, little if any standardization exists across FYC sections at many institutions. Second, no clear agreement exists
on what is considered “learning” or “effectiveness” in FYC. And since FYC curricula vary significantly from institution to institution and even from section to section within a department’s writing program, effective learning outcomes and course assessment are further confounded. These issues exacerbate the difficulties in assessing course effectiveness—perhaps more so for online and blended courses, as technology use further complicates the assessment process.

In this article, I will address these difficulties in assessing online and blended FYC instruction through assessments of three asynchronous online and three blended FYC taught at Missouri S&T during fall 2013. These were among the first online FYC courses offered at Missouri S&T and were the culmination of a year-long grant-funded course re-design initiative, undertaken with the assistance and under the supervision of Missouri S&T educational development technology staff. What this study has to offer within the realm of online and blended FYC is not only the assessment methods I used to gain as clear a sense as possible of the courses’ effectiveness, but also my reflection on whether or not either online or blended FYC is a desirable method of course delivery. For many WPAs, administrators, and practitioners at SCUs, online courses are already an entrenched reality, so this study can still offer models for implementing assessment methods for online course delivery. Many institutions, however, have not yet implemented widespread online or blended FYC instruction. For such institutions, consideration of online instruction may be far less a matter of finding additional revenue and more a matter of determining if online instruction is an effective instructional delivery method.

In recent research comparing online course outcomes to F2F instruction, Driscoll et al (2012) echo the sentiments of much previous research when they assert that “student satisfaction does not significantly differ across the two settings” (p. 312). Some scholars have gone a step further in their discussion of online instruction, however. In a meta-review of 50 online courses across several institutions, Means et al (2010) find that students in online courses performed somewhat better than their counterparts in F2F courses, particularly in blended delivery methods (p. 18-20). The authors note, however, that several instructional aids that were available to students in the blended students were not available to the students in the F2F sections. Hoskins (2012) suggests that because many students enter college with a high level of engagement with electronic technology, particularly through cell phone and computer use, instruction through online delivery methods may enhance instruction. While Hoskins presents a reasonable case, she does not offer evidence to corroborate her theory of effective learning through online delivery.
There is the rub for WPAs, administrators, and practitioners: if provided the option to implement online instruction rather than the compulsion to do so, convincing evidence should exist that online delivery will enhance learning; a mere “comparable” experience for our students is not reason enough. Online instruction generally requires a substantially larger time and effort commitment than F2F delivery, and instructors need proficiencies in several online instructional tools. This time commitment may be particularly onerous for faculty at mid-size comprehensive institutions, where teaching, research, and service loads may be substantially larger than for faculty at larger institutions. Indeed, my study reveals some compelling arguments that online delivery methods may impede some learning outcomes, and does not provide even a comparable experience to F2F methods.

I will begin by providing a brief profile of our university to place the study in context, then I will detail the assessment methods I used to gain a sense of our students’ reading comprehension skills at the beginning of English 1120, and profile other data regarding English 1120 students to establish that students in English 1120 online, blended, and F2F courses were demographically and scholastically similar. Next, I will discuss the quantitative and qualitative assessments I used to measure the effectiveness of our online and blended English 1120 sections, and detail whether the online and blended formats appeared to enhance student learning. Finally, I will offer some closing thoughts for either implementation or re-consideration of online instruction as a delivery method for FYC.

FYC: The Close Reading and Textual Criticism Approach

In 2011, the composition faculty and I began a systematic examination of English 1120 and revised it according to principles of reading and critical thinking development. We did so because, simply put, reading drives the learning experience; without reading skills, instructors are at a loss to proceed with our students. Allen (2011) argues that despite progress in developing strategies to improve students’ reading skills, far more effort needs to be committed in creating activities and assignments that improve students’ reading comprehension abilities. While a writing center peer tutor, Allen realized that some students he worked with “found that difficulties with academic reading prevented them from writing coherent, academic-style texts themselves” (p. 98). He calls for a re-investment of reading’s power in FYC and negotiation between faculty and students in developing students’ reading comprehension and strategies. Only after they have committed themselves to improving their reading skills will students have the intellectual tools to invest in their writing development. Graham and Hebert (2010) also argues that literacy skills can be best achieved through an integrated reading/writing approach.
To be sure, most if not all FYC courses typically include close reading of texts in some way. But little scholarship is available regarding how instructors’ FYC courses emphasize close reading skills. Understanding English 1120’s structure of building reading skills and practicing those skills through writing is important for understanding the quantitative assessments I used to gauge the effectiveness of our online and blended courses. Our program’s approach gave us benchmarks that allowed us to better understand our students’ reading skill levels when beginning English 1120 and gave us an indication of how the course assisted the development of their reading skills. In short, I chose to emphasize close reading and textual criticism because FYC faced a fundamental rhetorical question: how can our students hope to achieve the outcomes for English 1120 if they struggle to comprehend what they read? Manarin (2012) answers this question for me in her observation that “if indeed reading comprehension skills are eroding, we need to do something about it, even if we think students should know this material before they reach the postsecondary classroom” (p. 295). Additionally, reading and writing instruction should occur simultaneously, so, as Bunn (2013) puts it, “there is a far greater chance that we will be aware of connections between the two and be able to articulate those connections to students” (p. 498).

Reading Diagnostic Assessment

Before we could generate ways to address our FYC students’ literacy needs, we needed to know what those needs were. I, therefore, created a reading comprehension diagnostic, based on the Depth of Knowledge (DOK) scale developed in 1997 and revised in 2002 by Norman L. Webb of the Wisconsin Center for Education Research. Webb DOK provides a framework for aligning course content, objectives, outcomes, and assessment tools and offers a way to categorize the intellectual skills necessary for accomplishing tasks. Widely used by K-12 state education departments (NYC Dept. of Ed., 2014), Webb DOK can be used to indicate what cognitive skill a student most uses to accomplish a reading task, such as answering a study or discussion question. Webb DOK has four levels of reading skills; the first two are:

- **Level One—Locate/Recall:** the ability to find a word, phrase, sentence, or short passage in the text. Requires only surface-level understanding of the text, such as the ability to make simple meaning of a sentence. *Examples:* Where does the author state [x] idea? How many times does the author use [x] word/phrase in the passage?
- **Level Two—Skill/Concept:** the ability to make a simple inference based on understanding that is achieved through Level I skills. Students often use information obtained through Level I
tasks and apply them to answer a Level II question. Rudimentary concept understanding is required. Examples: What is the main idea of this passage? How does the information you found help us better understand how something works?

My diagnostic assessed students’ competencies in these two reading levels, and was comprised of twenty passages, with one multiple-choice question about each passage. One correct answer and three distractors were provided for each question. To approximate both students’ prior knowledge and our assumptions about what genres students should be able to read and understand, passages came from history, science, business, engineering, literature, and psychology. The diagnostic also contained two sentences in which readers were asked to define a word based on context clues in a sentence. Ten Level I and ten Level II questions made up the diagnostic.

Asynchronous online environments by their very nature preclude controlled-conditions assessments, so students in the asynchronous online sections did not complete the reading diagnostic. All three blended sections did, however. The following table displays the diagnostic results of the blended sections, in comparison to students in all other sections.²

**Blended Sections**

<table>
<thead>
<tr>
<th>Number Tested = 57</th>
<th>Overall Score/20</th>
<th>Locate/Recall</th>
<th>Skill/Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>13.97</td>
<td>7.68</td>
<td>6.12</td>
</tr>
<tr>
<td>Median</td>
<td>14</td>
<td>7.68</td>
<td>6.15</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.63</td>
<td>1.55</td>
<td>1.57</td>
</tr>
</tbody>
</table>

**All F2F Sections**

<table>
<thead>
<tr>
<th>Number Tested=377</th>
<th>Overall Score/20</th>
<th>Locate/Recall</th>
<th>Skill/Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>13.44</td>
<td>7.43</td>
<td>6.01</td>
</tr>
<tr>
<td>Median</td>
<td>14</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.75</td>
<td>1.68</td>
<td>1.72</td>
</tr>
</tbody>
</table>

Diagnostic results indicate no significant statistical difference between the blended and F2F sections. Demographically, students’ scores in the online and blended sections were correlated with those in the F2F sections. ACT scores were similar as well, averaging 27.8 (New Student Profile). In nearly every respect, student demographics were analogous in the online/blended sections when compared with those in the F2F sections.

**Online and Blended English 1120 Delivery Methods**

The online and blended courses were taught by four instructors: myself, two full-time faculty, and one adjunct faculty member. One of the instructors who participated in this study had taught English 1120
as an asynchronous online course during the summer (and once in the fall semester 2011), but those had been our department’s only online writing courses. The course instructors were:

- Olivia—three asynchronous online sections
- Kelly, Jossalyn, and me—one blended section each/three total blended course sections.

Demographics for the asynchronous and blended sections were as follows:

**Pilot Course Demographics**

<table>
<thead>
<tr>
<th>Section</th>
<th>Freshmen</th>
<th>Soph</th>
<th>Juniors</th>
<th>Seniors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asynchronous A (Olivia)</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Asynchronous B (Olivia)</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asynchronous C (Olivia)</td>
<td>18</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blended A (Kelly)</td>
<td>15</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Blended B (Myself)</td>
<td>15</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Blended C (Jossalyn)</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

The asynchronous and online sections were homogeneous, therefore, and representative of English 1120 in all sections, whether online or F2F.

In addition to our focus on reading and the reading/writing connection in English 1120, we have also adopted Hrastinski’s (2008) theoretical model that online participation with the instructor and with peers is crucial for a student’s success in online courses. According to Hrastinski’s model, “online learner participation is (1) a complex process of taking part and maintaining relations with others, (2) supported by physical and psychological tools, (3) not synonymous with talking or writing, and (4) supported by all kinds of engaging activities” (p. 81). Hrastinski also argues that reading and reflection during and after reading should be considered “participation.” Hence, I have assessed student reading progression through the reading comprehension diagnostic and post-test. In the blended sections, instructors met once per week with their students in a computer classroom. The rest of the course time was conducted in an asynchronous online format using Blackboard, our campus learning management system.

Using Hrastinski’s model, we agreed to adopt six pedagogical methods to assist in student engagement and course success:

- Complete course schedules with all assigned activities and writing assignments for the entire semester
- Email reminders 48 hours before each assignment due date
- Prompt replies to all email queries from students—no more than a one-hour delay during regular university hours, and replies by 9 am for all queries sent after 5 pm
• Use of the Blackboard discussion boards to replace traditional instruction: at least one Blackboard discussion assignment per two reading assignments
• Privileging of written interaction and instructor response over verbal responses
• Elimination of traditional quizzes in favor of study questions and online discussions

Using Blackboard, the other instructors and I created four learning modules (LMs) for the course, in which students practiced Webb DOK reading skills and engaged in writing through activities designed to improve those reading skills. Instructors all used the same essay assignments, and all four of us adhered to the same skills progression model.

In LM One, students practiced DOK Level One (Locate/Recall) reading skills and sentence/paragraph construction methods through online activities. Reading assignments were short, argumentative essays. In weekly discussion board forums, we asked students basic locate/recall questions such as:
• Where does the author make her argument? What words does she use?
• How does the author use transitions between sentences and paragraphs?
• How does the author begin/end the essay?

Students were given credit for an initial response, then additional credit for responding to another student’s post. Through the discussion board, we hoped that students would interact with one another, and learn from each other’s observations about an author’s writing choices. During LM One, we guided students towards DOK Level Two (Skill/Concept) skills. In LM Two, students practiced DOK Level Two skills, as the questions we asked in discussion board activities led to inferences about and evaluations of an author’s craft:
• What is the author’s overall argument?
• Why do you think the author chose the method she did for beginning her essay?
• Why do you think the author chose the argumentative methods (anecdotes, use of expert testimony, empirical evidence, etc.) she did to make her point?

In the other two learning modules students practiced Level Three (Strategic Thinking) skills as they compared and contrasted argumentative essays by different authors on a similar topic. Students then argued their own points of view based on evaluations of their source material. In each course section, we assigned four major essays; in each essay students demonstrated the reading and writing skills practiced
Blended and Asynchronous FYW Course Effectiveness

during each learning module. Webb DOK Level IV (Extended Thinking) involves the development of an original point of view based on multiple sources. Level IV skills are the domain of our Composition II course, so in English 1120 we set the acquisition of Extended Thinking skills as our end-of-course reading skills goal.

Peer review sessions were online in the asynchronous sections and both in-class and online in the blended sections. In the asynchronous sections, Olivia explained her experience:

Initially, peer review in the online course was a disaster. I assigned partners first through Google Drive and then through Blackboard file exchange. Most students got through it, but enough were left with missing partners that I changed peer review into a Blackboard discussion assignment. Then it really took off and every student received feedback. Several reported enjoying the discussion format for peer review.

In her exit interview with me at the end of the semester, Olivia noted, however, a preference for in-class peer-review:

My in-class peer reviews sessions [in F2F classes during previous semesters] were definitely more successful and positive. Students were more motivated to take their time when I required them to “check in” with me before they could leave, and if a student showed up, they left with feedback. I received consistent feedback in student evaluations that peer review was one of their favorite aspects of the course. My lesson learned from online is to downplay peer review and instead emphasize more opportunities for instructor-student conferencing and interaction.

Olivia’s conclusion is troubling because of the important role peer interaction and peer review have in writing instruction. These practices have become nearly ubiquitous in models of best practices, perhaps most succinctly quantified in Chickering and Gamson’s (1987) landmark “Seven Principles for Good Practice in Undergraduate Education.” Research on peer review has been abundant in the last twenty years, with increasing attention paid to training students in effective peer review methods (Lam, 2010; Liou and Peng, 2009). The blended course instructors had similar experiences with peer review. Kelly used class time in her blended section for peer review, and reported positive results:

The peer workshops that I conducted during our in-person meetings elicited positive responses from students. I decided that if we were only going to see each other once per week, I wanted us all to interact face-to-face as human beings during that time. The majority of our in-person meetings were conducted this way, with peer workshops focusing on either outlines
or full rough drafts. In this way, I emphasized the importance of revision and the writing process, and students were able to form a sense of community. Removing the computer screen from these sessions is a decision that I feel was successful.

So what Kelly remembers as the most successful element of her course had actually little to do with online instruction, and instead reverted to traditional F2F techniques.

Several resources were also available for students. We had adopted Bedford’s *Writer’s Help* as an online handbook/resource the previous year, and the university writing center was free for students during almost all regular university daytime hours. Students were required to attend the university writing center once for each essay in both Jossalyn’s and my sections, once in Kelly’s blended section, and twice in Olivia’s asynchronous sections. Therefore, students in the asynchronous and blended English 1120 sections had access to the same resources and peer review activities as students in F2F English 1120 sections.

Student Impressions of Their Online Course Experience

As one of the qualitative assessments for measuring our understanding of the asynchronous and online English 1120 sections, we administered a survey to students during the last week of the semester. Students across all sections were offered extra credit for completing the survey, and were given one week to finish it at their convenience. Overall, 70 out of 113 students completed the survey, for a 61.9% response rate: 61 freshmen, 7 sophomores, 1 junior, and 1 senior.

Potential Benefits. Regarding their decision to enroll in an online/blended section of English 1120, 52% indicated they would have preferred an F2F section, but one was not available when they enrolled, or no F2F sections fit their schedules. Another 7% chose an asynchronous or online section specifically for the instructor. The remaining 41% specifically chose an asynchronous or blended section. And when asked if they had the option of enrolling in another asynchronous or blended course again would they do so, 56% indicated they would. When asked what they enjoyed most about their asynchronous or online course, 51/70 cited course flexibility—either reduced or no F2F class time, extra time to complete assignments, or improved flexibility for enrolling in other courses for the semester—as what they most liked about their asynchronous or online course.

Given the exigencies of increasing student enrollment at Missouri S&T and the limited classroom space that accompanies increased enrollment, the physical space and course scheduling flexibility are important benefits when considering implementing online course sections. Student satisfaction may also be improved, and if course outcomes are
comparable to F2F sections, then asynchronous and blended courses may actually improve student persistence and retention.

However, only three students cited that they preferred discussion boards in online courses to oral class participation in their F2F courses. Only one mentioned that their online instructor provided more notifications of upcoming assignment and activity due dates than did their F2F course instructors, and two stated increased access to the instructor as what they most liked about their online or blended course. Seven students wrote that they did not like anything about their online or blended course experience.

**Potential Disadvantages.** When asked in the survey how often they voluntarily corresponded with their instructor, 61% indicated they corresponded either seldom or not at all (0-1 time per month) with the instructor. Another 30% indicated they corresponded with the instructor only occasionally (1-2 times per month). This lack of voluntary communication corroborates the instructors’ impressions that students in the asynchronous and online sections were difficult to engage. Detachment seemed to be the most significant problem. Although each of us agreed that we sent more email reminders to students than we did in any previous course we have taught, and despite often twice-weekly reminders that we were available to work with students on their writing outside of class, each of us reported only 5-6 students per section regularly visited us outside of class. Furthermore, students rarely utilized the two weekly hours of what would have otherwise been “class time” in the blended sections for visiting us for writing help, even though each of us set aside those times particularly for our blended students.

Among those students who expressed their preference for F2F instruction, most cited oral feedback from the instructor and oral interaction with other students as reasons. Three students indicated they had difficulty navigating Blackboard to find course materials, and two more cited difficulty reading as an obstacle to their success in their online/blended course. And when asked in the survey what they would have done differently to succeed in their asynchronous or blended course, just over half—26 of the 50 who responded—cited time management as their most significant problem, from submitting assignments on time to studying more and devoting more time to their FYC course. The second most-cited regret was with the lack of interaction they initiated about their writing: 7 said they would have attended the university writing center more, and 8 indicated they would have asked their instructor more for help. Other reasons cited were the need to revise their essays more than they did (5), or learn to better navigate Blackboard (1). One student stated the need to contribute more on the discussion board, but did not elaborate if she/he missed interaction with other students or lost
course points for not contributing. Another student admitted that she/he should have better understood course and grading requirements.

Would students’ time management have been better—and thus they would have been more satisfied and/or more successful in the course—if they had been in an F2F section? It is certainly possible that auditory learners who rely on an instructor’s verbal reminders about class assignments and due dates, and the routine accountability of physically going to class regularly, may play a role in a student’s successful course completion or improved overall coursework. The first semester in college—which was the case for 85% of the students in our asynchronous and blended sections—is a particularly crucial time for students to develop good academic habits. Although the factors contributing to student persistence and retention in the first semester of college are diverse and complex (Alarcon and Edward, 2013; Honken and Ralston, 2013), there is considerable agreement that both peer interaction and engagement with support staff play important roles (Russo-Gleicher, 2013; Singh, 2013), particularly through increased faculty-student interaction (Yook, 2013; Hill and Christian 2012). Kelly best encapsulated the frustration we all felt, however, in our constant pursuit of maintaining our students’ engagement and communication in our English 1120 sections:

The overall level of engagement seemed much lower in my blended section, compared to my traditional sections. I’m basing my impression on several factors: the number of students who met with me during my office hours (lower), the level of engagement during our in-person meetings not involving workshops (the amount of note-taking and discussion contributions: both lower), and the number of sentence-level errors and fundamental problems in their papers, especially at the beginning of the semester (much higher). Most of my students tended to seem very disconnected from the class and unwilling to reach out for help.

While it cannot be discounted how scheduling flexibility and longer time to complete activities in asynchronous or blended sections positively affects students’ perceptions of the course, there is some question as to whether their perceptions of their learning is enhanced. While students enjoyed the convenience of meeting only once per week in the blended sections or not at all in the asynchronous lessons, many still perceived F2F courses as better in helping them with time management.

Furthermore, many remarks about the flexibility of online course may reveal a corresponding devaluing of those courses. Embedded in responses to open-ended questions in the survey reveals the familiar bias against humanities courses by STEM students. However misguided, the attitude for many STEM students that “English is not my thing”—as one student
wrote in the survey—has always presented a challenge for FYC instructors. And at a university that aggressively promotes STEM in general and engineering in particular, the attitude is tacitly inculcated at our campus beginning with their arrival on campus: incoming students are required to complete a math placement test and are tracked into both math and introductory engineering courses, but no placement test exists for English, no developmental English courses are offered, and as I have noted earlier in this article, only 60% of all Missouri S&T students are required to complete English 1120. Offering English 1120 as an asynchronous or blended option, when students and their parents already have a low impression of both English and online classes, risks devaluing FYC even further among students and particularly within STEM degree curricula.3

Course Effectiveness and Student Learning Assessments

At the core of this study is the question of whether online delivery methods enhance instruction. To investigate this question, I examined the course grade distribution in the online and F2F courses, the results of a reading comprehension post-test administered to students in the blended section and a control group of F2F English 1120 sections, and the instructors’ impressions of their experience teaching English 1120.

In recent studies of online course effectiveness, the amount of and degree to which students participate in online discussion has often been used as an important measure of a course’s effectiveness (Oztok et al, 2013; Morris et al, 2005; Rovai, 2002; Johnson et al, 2000). I would argue, however, that quantity of online participation can be misleading. In each of our online and blended sections, students were required to post a response to each item in the discussion boards; such requirements are typical in online courses. Discussion board responses, writing activities, and sentence/paragraph building exercises accounted for only 20% of the final course grade for all six sections. Therefore, 80% of final course grades was determined by a weighted system for the four major course essays.

Final course grades. Essay grades were much more significant than discussion in determining final course grades [See Appendix A]. Additionally, Davies and Graff (2005) argue, based on their study of 122 undergraduate students in online courses, that frequency of online participation and interaction—either with the instructor or with each other—did not contribute significantly for students in achieving higher course grades. Davies and Graff conclude that “the reported beneficial effects of online participation and interaction do not necessarily translate into higher grades at the end of the year” (p. 663).

Final course grades in the six online and blended sections—a total of 116 students (n=116)—were compared with a control group of four
F2F English 1120 sections, all of which where taught by Jossalyn and Kelly, who also taught blended sections (n=58).

Asynchronous and Blended Final Course Grades

<table>
<thead>
<tr>
<th>Final Course Grade</th>
<th>Blended/ Kelly</th>
<th>Blended/ Author</th>
<th>Blended/ Jossalyn</th>
<th>Asynch/ Olivia</th>
<th>Asynch/ Olivia</th>
<th>Asynch/ Olivia</th>
<th>Totals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>23</td>
<td>19.82%</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>35</td>
<td>30.17%</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>32</td>
<td>27.50%</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>7.76%</td>
</tr>
<tr>
<td>F</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>14</td>
<td>12.07%</td>
</tr>
<tr>
<td>W</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>2.59%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>20</td>
<td>19</td>
<td>19</td>
<td>18</td>
<td>20</td>
<td>116</td>
<td></td>
</tr>
</tbody>
</table>

Control Group F2F Final Course Grades

<table>
<thead>
<tr>
<th>Final Course Grade</th>
<th>Jossalyn</th>
<th>Kelly</th>
<th>Kelly</th>
<th>Kelly</th>
<th>Totals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>14</td>
<td>17.95%</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>31</td>
<td>39.74%</td>
</tr>
<tr>
<td>C</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>24</td>
<td>30.77%</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2.56%</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>6.41%</td>
</tr>
<tr>
<td>W</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2.56%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>18</td>
<td>20</td>
<td>20</td>
<td>78</td>
<td></td>
</tr>
</tbody>
</table>

Results show that a significantly lower percentage (27.58%) received a C in the asynchronous and blended classes. A’s and B’s were higher, though, in the asynchronous sections than in the blended sections, but Olivia tends to award approximately 10% more A’s and B’s per section each semester than do Kelly, Jossalyn, or I. Of the students in asynchronous sections who responded to the survey, 50% (10/20) reported that they specifically chose an asynchronous online section of English 1120 compared with only 28% (14/50) of those students from the blended sections who indicated they specifically chose a blended section. Initial satisfaction with course section placement may have been a contributing factor in promoting student engagement, overall course satisfaction, and learning outcomes.

Students in the asynchronous and blended sections also had a higher D or F rate. Lack of engagement in the course, dissatisfaction with initial course section placement, and lack of instructor or student-to-student interaction may have been factors for these low scores. Most significant among
these factors may be the lack of meaningful interaction between instructors and students, and between students with each other. All three instructors reported similar impressions about the lack of student engagement in their sections, and I concur. I also found students detached and withdrawn during our weekly class meetings; oral discussions were nearly impossible because students were consistently reticent to speak. Jossalyn wrote in her assessment of the course that “the cohesiveness of the class suffered terribly, which made my insistence that writing is a conversation and a collaboration extremely difficult to prove.” Kelly’s impression was similar. When asked if she believed her blended English 1120 was more, less, or as effective as her F2F sections, Kelly wrote, “I’d have to say less effective, considering how much I feel (and see) is lost when incoming freshmen don’t meet as often in a face-to-face manner with their instructors and their peers.”

Perhaps most telling is the impression Olivia had, particularly because Olivia teaches exclusively online in her full-time position in our department: I believe the majority of the freshman students in English 1120 simply need the structure of the classroom and the F2F guidance of an instructor. Some students flourished, but they were likely the same students who would have flourished in the classroom, too.

For all of us, communication with students was difficult. All four of us reported difficulty in getting students to respond to messages, and resistance—whether vocal or implicit through absences—to face-to-face conferences with instructors. In this crucial area in particular, therefore, the asynchronous and online courses did not provide a comparable experience to F2F instruction. And the lack of interaction students had with us as instructors or with their peers likely contributed significantly to the overall lower course grades.

**Reading Comprehension Post-Test**

At the semester’s end, each of us in the blended sections administered a reading comprehension post-test to assess if students’ reading comprehension scores had improved after completing English 1120 and a semester in college. The test, which I wrote, was formatted in the same way as the diagnostic—20 reading passages, with 10 Webb DOK Level 1 questions and 10 Webb DOK Level 2 questions. Like the initial diagnostic, questions came from history, science, business, engineering, literature, and psychology, and included four sentences that asked students to ascertain the meaning of an unfamiliar word based on context clues in the sentence. Instructors from eight F2F English 1120 sections also administered the post-test to their students during the last week of the semester—Kelly in all three of her F2F English 1120 sections, and two other instructors, one of whom taught two sections and another who taught three.⁴
Reading comprehension post-test scores were slightly higher in the blended English 1120 sections than in the control group [Appendix B]. Here, online delivery may be most effective. Since in online courses the delivery method is typically through writing, in the form of discussion boards and wikis, blogs, online chats, and email correspondence, students must absorb course content primarily by reading. Simply assigning more reading because of a course’s online delivery method, however, cannot account for improved reading comprehension. An instructor in an online course who specifically targets reading comprehension skills through the questions she asks in online delivery methods may offer greater opportunities for students to improve reading comprehension than would an instructor using primarily an F2F oral delivery method. In online courses, students must learn to communicate with their instructor and with each other through written language—it is the communication method they will often exclusively practice in an online course. It stands to reason that students’ reading comprehension skills may therefore increase at a slightly greater rate than in an F2F course.

The possibility also exists that students’ reading comprehension scores may naturally increase somewhat during the first semester in college. Students are often nearly overwhelmed with the amount of reading for which they are responsible in college. It is possible that the sheer volume of reading students do during their first semester in college may account for the increase in their reading scores on the English 1120 post-test. But even this possibility may not entirely account for the increase in reading scores. Scores improved for every sophomore, junior, and senior who completed the post-test; none scored the same or lower. The theory that “quantity improves quality” becomes something of a non sequitur for non-freshmen. What we are left with is that English 1120, with its emphasis on reading comprehension skills, and especially the focus on Webb DOK Level 1 and 2 skills through written activities in the blended classes, may have contributed to the increase in post-test scores.

Course Evaluations

End-of-semester course evaluations are online at Missouri S&T, are made available to students during the second-to-last week of the semester, and are entirely voluntary. While students are strongly encouraged to complete the course evaluations through frequent emails sent by Missouri S&T and by instructors through in-class reminders and emails, completing course evaluations is entirely at students’ own discretion.

The following chart shows each asynchronous and blended English 1120 section, the number of students who completed course evaluations, and each instructor’s overall ratings on a 4.0 scale (1=not at all effective as an instructor, 4=very effective as an instructor).
<table>
<thead>
<tr>
<th>Number Responding</th>
<th>Asynch</th>
<th>Olivia 5-semester Average</th>
<th>Blended</th>
<th>Kelly, Jossalyn, Author 5-semester average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26/57 (46%)</td>
<td>33/59 (56%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor’s overall teaching effectiveness average</td>
<td>3.4</td>
<td>3.7</td>
<td>3.3</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Overall evaluation scores are comparable with averages for the instructors in F2F sections, and somewhat lower for Olivia than her five-semester average. It should be noted, however, that Jossalyn and I received overall evaluation scores (both of us received a 2.7) that were substantially lower than our five-semester average for the course (2.9 and 3.3, respectively). Kelly’s high overall evaluation score of 3.5 raised the three blended courses’ average. And although our communication methods, promptness in returning feedback on papers, and willingness to meet with students were all comparable, students expressed in their written comments more positive feedback about Kelly personally. Neither Jossalyn nor I received negative written comments about our teaching, but more students in our sections wrote in the open-ended section about their dissatisfaction with the blended class format:

- Blended classes are bad. I don’t learn very much reading the notes and doing discussion boards/online exercises.
- I don’t feel like I learn a lot. Also getting comments back online instead of having the hard copies of papers returned is not as helpful.
- I didn’t like how the class was blended. I would rather meet in class every day rather than have some days online because I learn better when I am communicating with an actual person instead of staring at a computer screen.
- It’s very disconnected from the instructor and other classmates. In fact, both Kelly and Jossalyn received fewer comments—either positive or negative—about their teaching effectiveness in the blended course evaluations than they did in their F2F English 1120 sections.

Students reported a higher level of satisfaction with Olivia’s asynchronous sections than those in the blended sections, even though Olivia’s overall scores were lower than her five-year average. Although Kelly, Jossalyn, and I made considerable effort to respond promptly to student emails and maintain correspondence with every student, only Olivia’s students mentioned her communication abilities. One student’s comment encapsulates what others said about the asynchronous course: “Even though the class was completely online, I felt as though I was being taught by an actual teacher in the classroom.”
Olivia’s frequent use of video-captured instruction may account for the higher student satisfaction with her asynchronous sections. She created short videos for major assignment instructions, suggestions for successful writing strategies, and reminders about upcoming due dates and deadlines. In short, even though Kelly, Jossalyn, and I met with our students once per week in a traditional classroom setting, through her videos Olivia may have provided students with a greater sense of “connectedness” with their instructor. Her videos were informal, quickly made, and lightly edited. Thus the videos had a “natural” feel to them, as though Olivia were talking to her students in a traditional classroom. More of Olivia’s students self-selected an asynchronous online class than students in the blended class, who were more often than not forced to enroll in a blended section because no others were available.

Students who do not self-select online courses may resent the online format because they miss the familiar classroom setting. Such students may not be internally motivated enough, at least initially, for the demands of an online course. The physical act of having to come to class may be a necessary external motivator for many students. The world of distractions outside the classroom is great, and first-year students can be easily overwhelmed by those distractors if they do not have the physical necessity of classroom attendance. Students at a residential state campus like ours, where faculty-student interaction is aggressively promoted as one of our university’s most attractive features, also may not be mentally prepared for the very different motivational requirements of online courses. Students come to Missouri S&T expecting direct face-to-face interaction with faculty; online courses obviously will not satisfy that expectation.

Conclusion

By using a blended research approach of both qualitative and quantitative data, we can gain an overall sense of the course’s effectiveness when delivered in asynchronous and online formats. Multiple perspectives were used to examine the course: students’ perceptions of their own learning in the course, instructor perceptions of the course’s success, final course grades, and the reading diagnostic and post-test. The result is a rich body of data to study. Furthermore, most students did not self-select into the asynchronous or blended sections; the resulting impressions about the courses were therefore from students not necessarily predisposed to enrolling in an online course. In this regard, students in the English 1120 asynchronous and online sections were highly representative of students in all our English 1120 sections.
Both the qualitative and quantitative data I gathered from this study do not consistently support arguments that online delivery offers a comparable experience to F2F instruction. And the data therefore also does not support arguments that online delivery can enhance instruction and thus improve learning outcomes, except perhaps in one key area: reading comprehension. Because in online and blended sections most or nearly all instructional delivery is written, students' reading abilities are vital to their success in the course to an even greater extent than in F2F FYC courses. Interestingly, students expressed highest satisfaction among any of the online courses in Olivia's asynchronous sections, where she made extensive use of video instruction. Even though Kelly, Jossalyn, and I met with our students once per week, those F2F class meetings were apparently not sufficient to overcome students' dissatisfaction with the blended format. It is likely that a combination of more self-selection of students into the asynchronous courses, use of video instruction, and Olivia's consistently high-quality teaching skills all contributed to her high overall course evaluations.

The primary difficulty all of us had was maintaining student engagement. We all sensed student detachment in one form or another, either through uncommunicative, listless classes during the F2F meetings in the blended classes, or lack of consistent communication through email replies to instructor queries. As Kelly observed, "Overall, most of my students seemed to enjoy the idea that the blended class allowed for more flexibility in their schedules. They enjoyed avoiding in-person meetings." Of course, that is not necessarily a good reason to provide blended or online sections of English 1120. In fact, many students commented that they would have preferred to enroll in a traditional section because they need someone to help make them accountable. Many students seemed to have an overall difficulty in following the syllabus themselves. They did not like that they did not have in-class reminders of every assignment. Many seemed aware that blended sections require a high level of responsibility and self-directional skills that most of our English 1120 students do not possess. My students did tend to want to disconnect, but they also had insight into their behavior and needs, and in the end, they knew that they would do better with more supervision and personal attention. I take that to mean that students do want to be successful, in the end, even if that means sacrificing personal convenience. I have found that online sections of English 1120 are successful for older, more responsible students, but not for younger, incoming freshmen who are still learning basic college skills.

FYC is unique among those in an institution's foundational courses because much of the FYC experience is social, and often serves as an
orientation to the academy. In few other courses during their first year are students asked to develop their own ideas, come to their own conclusions, and defend their own positions as they are in FYC. And while FYC may not be a favorite foundational course at many institutions, at a STEM university, where most students are immediately tracked into an engineering or STEM field, resentment about an FYC requirement may be more widespread than at other institutions with larger populations of humanities and social science majors. And because success in FYC depends on interaction—with the instructor and with fellow students—the challenges of engagement and interaction in an online course may prove too difficult for some first-year students.

These difficulties may be reflected in the blended students’ overall course grades, which were noticeably lower than in the F2F control group. Both Kelly and Jossalyn reported that students in their blended sections were less willing to use instructor office hours than students in their F2F courses, and fewer students in the blended sections regularly corresponded with Kelly and Jossalyn. I also experienced a noticeable lack of connection with my students, especially regarding help with writing the major essays. Only 6 of my 19 students saw me regularly for help, despite repeated messages to all my blended students to make appointments, even outside of regular office hours.

If students are well-prepared and highly motivated, current research suggests that online courses offer a comparable experience to F2F instruction. But as Jaggers and Bailey (2010) note, many studies that examine the effectiveness of online courses feature those in which technology is an integral component of the course or are from schools that are selective or highly selective in their admissions process. Few studies exist that examine the effect of online courses for students during the first year of college, and those courses’ roles in first-year students’ movement into the academy, ability to integrate into the college milieu, and finally their persistence and retention rates. Jaggers and Bailey particularly warn that “for low-income and underprepared students...an expansion of online education may not substantially improve access and may undercut academic success and progression through school” (p. 11).

Additional research needs to be conducted to examine the effect of online courses on student integration into college life, persistence, and retention after the first semester or first year in college. This study was also limited in scope; much wider studies of multiple asynchronous and online courses, compared with F2F counterparts of the same course, across a department’s offerings, and even among comparator institutions, could reveal much more about the ability of online courses to deliver comparable learning outcomes.
While online instruction can provide some benefits—this study revealed a higher overall degree of improvement in reading comprehension scores in the blended sections over the F2F control group sections—I urge SCU administrations—especially at the mid-size level—to evaluate student selection into online sections of foundational courses during the first year, and especially the first semester of college. Assertions such as VanDerLinden’s that “the implementation of blended learning at colleges and universities needs to be positioned as an institutional strategy that can result in organizational learning” (p. 83) presupposes an idea that blended learning—and I would add all online delivery as a primary instructional method—is a desirable instructional method that enhances student learning. This case study’s findings contest that assumption. Jossalyn sums it up in her final remarks about her blended English 1120 teaching experience:

The human connection is so very important to writing. As much as I had been in favor of blending courses before, I’m realizing that having a student take an online writing course is a lot like having him buy a $200 ticket to a Rolling Stones concert, only to then have him listen to a boombox on the stage (no matter how awesome the music is, something is missing).

As we learn more about our students’ auditory and visual learning needs, and about their learning challenges especially during their first year of college, the structured environment of an F2F course may be more critical than ever. The convenience for our students that asynchronous instruction offers may come at too high a cost for them—the cost of involvement in the life of their campus and of crucial social interaction. If we re-examine the role of FYC in developing students’ interpersonal communication skills, we may find that F2F instruction best fulfills that important mission.

Notes
1Information in this section has been previously published in a different form and context. Permission has been granted by Composition Forum journal to reproduce this information first detailed in my 2015 article.
2At the time of this study, testing conditions for the asynchronous online students could not be duplicated for asynchronous delivery. Therefore, students in Olivia’s asynchronous online sections did not take the reading diagnostic or post-test.
3During the first month of student orientation days in February and March, advisors found it difficult to enroll students in the online and blended sections of English 1120. Advisors reported that parents were highly skeptical of online courses’ effectiveness, and would not allow their children to be placed in those sections. As one parent put it in a way that was common of the many comments about online offerings:
“We aren’t sending our son to a resident campus so he can not go to class.” So by April of 2013, only online and blended sections of English 1120 were still open for enrollment.

Jossalyn had scheduled the post-test in her F2F section for the last day of class, but a snowstorm prevented travel, and thus her class (and the post-test for her F2F section) were cancelled.

References
Blended and Asynchronous FYW Course Effectiveness

Student performance and satisfaction in an online versus a face-to-face introductory sociology course. Teaching Sociology, 40(4), 312-331.


Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. The Internet and Higher Education, 6, 1-16.

**Appendix A: English 1120 Objectives and Outcomes**

Instructors select from a group of readers chosen for the course by our composition committee; we do not use a rhetoric textbook. Each instructor is then free to develop her or his own course activities and assignments, with the following required objectives and outcomes for all FYC sections:

**COURSE OBJECTIVES**

- Demonstrate critical and analytical thinking for reading, writing, and speaking.
- Develop and employ a wide-ranging vocabulary.
- Compose sound and effective sentences.
- Compose unified, coherent, and developed paragraphs.
- Understand and use strategies for generating, revising, editing, and proofreading texts.
- Produce rhetorically effective writing for subject, audience, and purpose.
- Demonstrate effective research and information literacy skills.

**COURSE OUTCOMES**

- Four essays, 1000-1250 words each, in multiple drafts:
  - Essay One: 10% of total essay grade
  - Essay Two: 20% of total essay grade
  - Essay Three: 30% of total essay grade
  - Essay Four: 40% of total essay grade
- Short assignments might include: summaries, reading or grammar quizzes, in-class writings, study questions.

**GRADING SCALE** (approximate; use either % or points)

- Four Essays: 80%
- Attendance/participation/peer review/short assignments: 20%

Suggested essay instructions and essay-specific rubrics, written by the composition committee, are provided for each instructor. During fall 2013, 9 of our 10 English 1120 instructors—including every instructor in this study—used the common essay assignments and rubrics.
Appendix B: English 1120 Reading Comprehension Post-Test Results

Blended Sections

<table>
<thead>
<tr>
<th>Number Tested = 44</th>
<th>Overall Score/20</th>
<th>Locate-Recall/10</th>
<th>Skill-Concept/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>15.86</td>
<td>8.16</td>
<td>7.70</td>
</tr>
<tr>
<td>Median</td>
<td>16</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.04</td>
<td>1.53</td>
<td>2.04</td>
</tr>
</tbody>
</table>

Comparison with Diagnostic Scores

Students who Scored:

<table>
<thead>
<tr>
<th></th>
<th>Lower than Diagnostic Score</th>
<th>Same as Diagnostic Score</th>
<th>Higher than Diagnostic Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>16%</td>
<td>14%</td>
<td>70%</td>
</tr>
</tbody>
</table>

F2F Control Group Sections

<table>
<thead>
<tr>
<th>Number Tested = 108</th>
<th>Overall Score/20</th>
<th>Locate/Recall</th>
<th>Skill/Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>14.94</td>
<td>7.64</td>
<td>7.3</td>
</tr>
<tr>
<td>Median</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.87</td>
<td>1.56</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Comparison with Diagnostic Scores

Students who Scored:

|                                | Lower than Diagnostic Score | Same as Diagnostic Score | Higher than Diagnostic Score |
|                                | 27                            | 9                         | 72                           |
|                                | 25%                          | 8%                        | 67%                          |

Locate/Recall (Webb DOK 1)

|                                | Lower than Diagnostic Score | Same as Diagnostic Score | Higher than Diagnostic Score |
|                                | 35                            | 19                        | 54                           |
|                                | 32%                          | 18%                       | 50%                          |

Skill/Concept (Webb DOK 2)

|                                | Lower than Diagnostic Score | Same as Diagnostic Score | Higher than Diagnostic Score |
|                                | 19                            | 20                        | 68                           |
|                                | 18%                          | 19%                       | 63%                          |