Lessons Learned During an Experimental Blended Course

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Previous Research had Shown Potential Blended Benefits

- Increased opportunity for students to reflect on what they are learning \(\text{(long term learning)}\)
- Time to think and rethink individual responses \(\text{(better for non-verbal learners)}\)
- Topic discussions can continue over extended times allowing students to consider and prepare their responses \(\text{(increased depth of topic examination)}\)
A Blended Learning Pilot Project

- Online Learning Department sponsors pilot courses in which a portion of the class time is canceled and replaced with some form of asynchronous (any time, any where) discourse.

- Faculty were invited to collaborate with instructional designers to:
  - Transform a traditional course to a blended course.
  - Monitor key activities to measure levels of success and acceptance.
  - Participate in disseminating results.
Compare Blended and Online Learning Environments

- Rochester Institute of Technology - Fall 2003
- Operating Systems for Telecommunications
  - 0614/728 - a core course in the MS program
  - Examines the features and performance of local and global operating systems with emphasis on distributed networks
  - Written assignments and integrating knowledge into scholarly discussions are key components of student grades
- Course conducted in two sections (89 and 90)
Section 90: Asynchronous at a Distance
Expectations of Distance Learners

- All learners were expected to contribute to the weekly class discussions.
- Those in the distance learning section posted at least three substantive messages on three of the seven days of each week:
  - A substantial message promotes learning for everyone in the class and is at least 350 words long.
  - These messages constitute an asynchronous discussion which promotes student learning.
- Post a weekly summary addressing personal learning.
Section 89: Blended

This section met face-to-face (F2F) once a week while conducting the remainder of its activities at a distance over the Internet.
Expectations of Blended Learners

- The three substantive messages are replaced with a weekly 50-minute long, F2F meeting
- Attendance recorded and participation noted
- Learners are expected to contribute content and/or raise questions on the topics of that week
- BL students post a summary message to review individual personal learning for that week
- No interaction between the DL and BL sections
Online Vs Blended
Same Course – Different Environment

- Same Faculty and Grading Criteria
- Same Textbook
- Similar Assignments
  - differences were only made to:
    - encourage student to student interactions
    - allow remote testing for distance learners
- Students Drawn From the Same Population
Nature of the Research

- **Question:** Compares the two environments
- **Included:** Lessons learned about faculty and student satisfaction and student performance

- **Method:** Measure student satisfaction and student achievement in both the blended and the distance learning environments

? Significant differences ⇔ No differences ?
Class Demographics

- Nineteen students took the course
  - Six in the blended section
  - Thirteen in the distance section
- Four international students took the course
  - Two in the distance section
  - Two in the blended section

Note: International students, under recent homeland security rules, are allowed to attend only one course per term where physical presence is not required.
Blended Session Experience

- Initially, learners in the F2F meeting were not prepared to support a discussion and to learn from each other
- Expecting to attend a traditional class with a standard lecture
- After much encouragement by the instructor, the BL students began participating in meaningful discussions
- Perhaps there was also an element of ‘not-knowing’ each other which initially inhibited the sharing of knowledge and experience
- Email messages from the faculty member attempted to force students to prepare for the F2F class period
- In the future, points toward the final grade will be made available for students to earn by participating in the discussions of the F2F sessions
Blended Session Experience

- Interaction and sharing of ideas did ultimately happen in the later weeks of the course.
- When peer-to-peer communication did happen, the 50-minute, F2F meeting time was not sufficient to allow everyone to express their opinions.
- F2F sessions exceeded the allotted time and then, even, continued right out into the parking lot.
- In the future, longer F2F sessions will be included.
Measure Student Satisfaction

- Student satisfaction opinions were surveyed for both the online and the blended sessions
  - Attitudes on course objectives
  - Attitudes on course learning materials
  - Attitudes on course assignments
  - Attitudes on faculty performance
  - Attitudes on course grading
- Grades used to measure student performance
<table>
<thead>
<tr>
<th>The Course</th>
<th>SECT-90 Distance Learning</th>
<th>SECT-89 Blended</th>
</tr>
</thead>
<tbody>
<tr>
<td>How well the stated course objectives were fulfilled</td>
<td>4.25 (4)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>Quality of the course media (videos, CD-ROM, print material, etc)</td>
<td>4.50 (4)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>Effectiveness of course materials (textbook, handouts, videos, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in helping you learn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of the course assignments (homework, laboratory work, papers, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in helping you learn the course content</td>
<td>4.50 (4)</td>
<td>4.50 (4)</td>
</tr>
</tbody>
</table>
**Figure 1. Student Evaluations for Online and Blended Sessions**

<table>
<thead>
<tr>
<th>The Instructor</th>
<th>SECT-90</th>
<th>SECT-89</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness in explaining, giving examples, and discussing the course material</td>
<td>4.25</td>
<td>4.50</td>
</tr>
<tr>
<td>Organization and preparation for course (planning assignments, announcing quizzes, etc)</td>
<td>4.75</td>
<td>4.50</td>
</tr>
<tr>
<td>Receptiveness to student questions and concerns</td>
<td>4.75</td>
<td>5.00</td>
</tr>
<tr>
<td>Helpfulness of responses to student questions and concerns</td>
<td>4.50</td>
<td>5.00</td>
</tr>
<tr>
<td>Availability for individual assistance to students</td>
<td>4.50</td>
<td>5.00</td>
</tr>
<tr>
<td>Use of teaching techniques and styles that encouraged learning</td>
<td>4.25</td>
<td>4.50</td>
</tr>
<tr>
<td>Timeliness in returning graded work</td>
<td>4.75</td>
<td>5.00</td>
</tr>
</tbody>
</table>
### Figure 1. Student Evaluations for Online and Blended Sessions

<table>
<thead>
<tr>
<th></th>
<th>SECT-90 Distance Learning</th>
<th>SECT-89 Blended</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarity of exam/quiz questions</td>
<td>4.00 (3)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>Relevancy of the exam/quiz questions to the course objectives</td>
<td>4.00 (3)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>Fairness of the standards used for grading</td>
<td>4.50 (4)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>Consistency of the standards used for grading</td>
<td>4.50 (4)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This course overall</td>
<td>4.50 (4)</td>
<td>4.50 (4)</td>
</tr>
<tr>
<td>The instructor overall</td>
<td>4.50 (4)</td>
<td>4.75 (4)</td>
</tr>
</tbody>
</table>

**Legend:**

5 = Very good, 4 = Good, 3 = Adequate, 2 = Poor, 1 = Very Poor
**Figure 2. Comparison of Grades Earned**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance Learning Section (SECT-90)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>8</td>
<td>89</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blended Learning Section (SECT-89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Distance Delivered Session
Outcomes Compared to The Blended Session

A Z-statistic was used to test whether the difference between any of the pairs of means is significant.

\[ Z = \frac{X_1 - X_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}} \]

- \( X \) – mean value
- \( s \) – standard deviation
- \( n \) – number of measurements

At the 0.01 confidence level, there is no statistically significant difference between any pair of means.
Conclusions

- The driving force behind the Blended Learning Pilot was a demonstration of the use of alternative teaching and learning environments using easily-acquired, modern educational technology
  - Lessons were learned about how to develop and deliver a blended course evolved from an online course
  - Learner satisfaction and performance did not significantly differ (statistically) between the online and the hybrid blended learning environments
Computers are FUN

Questions?