Implementing a Blended Model of Mathematics Instruction – Issues and Outcomes

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Implementing a Blended Model of Mathematics Instruction – Issues and Outcomes

D. Natasha Brewley
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Barry D. Biddlecomb
Georgia Gwinnett College

SOTL Commons
Georgia Southern University
March 9, 2012
Agenda

- **Background**
  - Who is GGC?
  - Blended Instruction Model

- **Methods**
  - Research Objectives
  - Data Sources

- **Results**
  - Course Outcome Goals
  - Student Perceptions
  - Student Evaluations

- **Discussion**
Who is GGC?

- Established in 2006
- Open-access, 4-year institution
- Rapid growth
- Core principles
  - Student engagement
  - Technology focused
  - Educational innovation
Blended Instruction Model

Online...

...in class
Blended Instruction Model

Student Engagement Activities

Innovative Technology – Student Response Systems

Lecture and Discussion
Blended Instruction Model

Homeworks, online quizzes & exams, video lectures

Discussion Boards or online chats

Out of Class Assignments (OCA)

Online Discussion - Midterm Review “What Do You Know?” (12 Messages / 12 New )
So we are at the midterm point in this class. Your exam will cover Chapters (1 and 2). It is important to your discussion for this week, please list the following:

(a) Name two concepts (From Chapter 1-2) that you feel at this point you really understand.
(b) Name two concepts (From Chapter 1-2) that you feel at this point you really do not understand.
(c) When you respond to your classmates’s …more

Online Discussion - Designing Word Problems (16 Messages / 16 New )
Each student should design two word problems that could be solved using linear equations. Both problems have more than one problem on simple interest. You should POST the problems and their algebraic solutions.

I am giving you some extra time to complete this assignment. Your online discussion is to be posted next week.

Online Discussion - Cumulative Review Chapter (4 & 5) (7 Messages / 7 New )
As a way of reviewing the material that has been covered so far and as a way of seeing several problems in the textbook. Choose one problem from the cumulative review (problems 1 - 35) and solve them completely so that your classmates know.

SHOW ALL WORK - EXPLAIN YOUR ANSWER! NO TWO POSTS SHOULD BE ALIKE. IF SOMEONE CHOOSES A PROBLEM SIMILAR TO YOURS...

MyMathLab

Domain Approach Papers Summary

6
Motivation for Blended Instructional Model

- **Institution-friendly**
  - Uses classroom resources more efficiently
  - Relieves faculty from face-to-face class time

- **Student-friendly**
  - Allows flexible scheduling to meet family or work obligations
  - Develops more self-directed learners
  - Accommodates varying levels of computer literacy
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Research Objectives

- Compare *student performance on assessment* in the traditional and blended instructional model

- Assess *student perceptions* with the blended instructional model
College Algebra Research Study

Fall 2010
• College Algebra
• 5 sections
• 2 instructors
• N = Lost Data

Spring 2011
• College Algebra
• 4 sections
• 2 instructors
• N = 16 (MT)
• N = 5 (F)

Fall 2011
• College Algebra
• 4 sections
• 3 instructors
• N = 40 (MT)
• N = 53 (F)
Data Sources

- **Course Outcome Goals:** Performance on common mid-term and final exam questions
  - Traditional sections
  - Blended learning sections

- **Student Satisfaction:** Online anonymous surveys (In-Class Surveys)
  - Mid-semester and End-of-semester
  - Likert-scale and Open-ended
## Fall 2011 Respondents

| Classification | Freshman (68.6%)  
Sophomore (19.6%)  
Junior (7.8%)  
Senior 0%  
Other (3.9%) |
|---------------|-------------------|
| Age           | 18-20 (79.2%)     
21-25 (11.3%)  
26-30 (5.7%)  
Above 30 (3.8%) |
| Gender        | Female (59.6%)     
Male (40.4%) |
| Student Status| Full Time (88.7%)  
Part Time (11.3%) |
| Online Course Taken Before This Class? | None (60.4%)  
1 (26.4%)  
≥ 2 (13.2%) |
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- Discussion
Course Outcome Goals

- **COG 1** – Analyze relationships using functions in multiple ways
- **COG 2** – Model situations using appropriate functions
- **COG 3** – Demonstrate critical thinking by applying problem-solving strategies to multiple-step problems
- **COG 4** – Manipulate mathematical information and concepts to solve
- **COG 5** – Use mathematical language appropriately
- **COG 6** – Use appropriate technology in problem-solving situations
Course Outcome Goals

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blended</strong></td>
<td>34.5</td>
<td>51.6</td>
<td>73.9</td>
<td>66.5</td>
<td>78.1</td>
</tr>
<tr>
<td><strong>Traditional</strong></td>
<td>49</td>
<td>68.3</td>
<td>87.1</td>
<td>83.5</td>
<td>86.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>83.9</td>
</tr>
</tbody>
</table>
Student Perceptions

<table>
<thead>
<tr>
<th></th>
<th>Amount of Interaction with professor</th>
<th>Quality of Interaction with professor</th>
<th>Overall satisfaction with course</th>
<th>Interest in taking another hybrid</th>
<th>Relevance of online work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-point</td>
<td>2.82</td>
<td>2.54</td>
<td>3.12</td>
<td>3.05</td>
<td>3.55</td>
</tr>
<tr>
<td>End of Semester</td>
<td>2.9</td>
<td>2.8</td>
<td>2.9</td>
<td>2.9</td>
<td>3.4</td>
</tr>
</tbody>
</table>
### Student Evaluations

Considering the hybrid format, how do you think having so much responsibility for your own learning has affected your performance in the course?

<table>
<thead>
<tr>
<th>Quote</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;I could work at my own pace and learn on my own pace.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;It showed me how smart I can be when I want to be. If I studied then I got a good grade – visa versa.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I put my grade in my hands by doing all work assigned.&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;I am able to perform better because I have gotten in the habit of constantly checking for assignments.&quot;</td>
<td></td>
</tr>
</tbody>
</table>
## Student Evaluations

<table>
<thead>
<tr>
<th>What was the most effective part of the hybrid class?</th>
<th>What has been the least effective part of the hybrid class?</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The online MyMathLab was by far the most beneficial part of the hybrid class I used it to learn/study/ and practice the material.”</td>
<td>“Only having this class once, maybe twice a week would have been good. Just a little help here and there.”</td>
</tr>
<tr>
<td>“The worksheets the teacher gave us each week along with the videos online were a big help. Also the ability to work the problems step by step online in the help section.”</td>
<td>“The online work out of class.”</td>
</tr>
<tr>
<td>“I am able to perform better because I have gotten in the habit of constantly checking for assignments.”</td>
<td>“I have had to find other resources to help me.”</td>
</tr>
</tbody>
</table>
## Student Evaluations

<table>
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<th>What was the most effective part of the hybrid class?</th>
<th>What has been the least effective part of the hybrid class?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Themes</strong></td>
<td><strong>Major Themes</strong></td>
</tr>
<tr>
<td>• Flexibility</td>
<td>• Out of class work</td>
</tr>
<tr>
<td>• MyMathLab homework assignments</td>
<td>• Online assignments</td>
</tr>
<tr>
<td>• Ownership of the course and course materials by students</td>
<td>• Learning material on one’s own</td>
</tr>
<tr>
<td>• Independent learning</td>
<td></td>
</tr>
<tr>
<td>• Video Lectures</td>
<td></td>
</tr>
</tbody>
</table>
What’s next?

- **Limitations**
  - Improve how students are surveyed at midpoint and end-of-semester

- **Future research**
  - Expand number and type of blended learning courses, for example: Pre-Calculus and Calculus
  - Conduct interviews with students that have taken blended learning courses
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Questions?
Thanks for your time and attention!!

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