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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
Alvina J. Atkinson
Barry D. Biddlecomb
Georgia Gwinnett College

SOTL Commons
Georgia Southern University
March 9, 2012
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
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
Agenda

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

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

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

- **Discussion**
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

<table>
<thead>
<tr>
<th>Classification</th>
<th>Freshman (68.6%)</th>
<th>Sophomore (19.6%)</th>
<th>Junior (7.8%)</th>
<th>Senior 0%</th>
<th>Other (3.9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-20 (79.2%)</td>
<td>21-25 (11.3%)</td>
<td>26-30 (5.7%)</td>
<td>Above 30 (3.8%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Female (59.6%)</td>
<td>Male (40.4%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Status</td>
<td>Full Time (88.7%)</td>
<td>Part Time (11.3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online Course Taken Before This Class?</td>
<td>None (60.4%)</td>
<td>1 (26.4%)</td>
<td>≥ 2 (13.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Agenda

- Background
  - Who is GGC?
  - Blended Instruction Model

- Methods
  - Research Objectives
  - Data Sources

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  - Student Evaluations

- 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>COG1- Analyze Relationships</th>
<th>COG2- Modeling</th>
<th>COG3- Critical Thinking</th>
<th>COG4- Manipulate</th>
<th>COG5- Math Language</th>
<th>COG6- Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blended</td>
<td>34.5</td>
<td>51.6</td>
<td>73.9</td>
<td>66.5</td>
<td>78.1</td>
</tr>
<tr>
<td>Traditional</td>
<td>49</td>
<td>68.3</td>
<td>87.1</td>
<td>83.5</td>
<td>86.9</td>
</tr>
</tbody>
</table>
Student Perceptions

<table>
<thead>
<tr>
<th></th>
<th>Mid-point</th>
<th>End of Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Interaction</td>
<td>2.82</td>
<td>2.9</td>
</tr>
<tr>
<td>with professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Interaction</td>
<td>2.54</td>
<td>2.8</td>
</tr>
<tr>
<td>with professor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>3.12</td>
<td>2.9</td>
</tr>
<tr>
<td>with course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest in taking</td>
<td>3.05</td>
<td>2.9</td>
</tr>
<tr>
<td>another hybrid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance of online work</td>
<td>3.55</td>
<td>3.4</td>
</tr>
<tr>
<td>work</td>
<td></td>
<td></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>
</tr>
</thead>
<tbody>
<tr>
<td>“I could work at my own pace and learn on my own pace.”</td>
</tr>
<tr>
<td>“It showed me how smart I can be when I want to be. If I studied then I got a good grade – visa versa.”</td>
</tr>
<tr>
<td>“I put my grade in my hands by doing all work assigned.”</td>
</tr>
<tr>
<td>“I am able to perform better because I have gotten in the habit of constantly checking for assignments.”</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>
<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><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>

**Flexibility**

**MyMathLab homework assignments**

**Ownership of the course and course materials by students**

**Independent learning**

**Video Lectures**
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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