Blended Learning in a Liberal Arts College Setting
WHERE WE STARTED

Blended Learning in a Liberal Arts College Setting
The Original Study

- 2011-2013, funded by $250,000 NGLC grant

- A consortium of 40 liberal arts colleges, including Colorado, Grinnell, Macalester, and St. Olaf
Why Blended Learning?

By 2010, studies had shown that blended courses could out-perform online and face-to-face courses:

- Higher faculty and student satisfaction\(^1\)
- Greater student engagement\(^2\)
- Improved student performance\(^3\)

However, all of these studies were of large institutions.
Our Research Questions

- Would blended learning offer the same or equivalent benefits at a liberal arts college?
- Was it compatible with the culture and values of liberal art colleges?
Goals of NGLC Study

1. Encourage and support faculty experimentation
   ● 14 Bryn Mawr faculty, AY2011-2012
   ● 40 faculty at 25 partner colleges, AY2012-2013

2. Collect and analyze data on these experiments
   ● Faculty and student perceptions of impact
   ● Quantitative assessment of impact (where possible)
Our Definition of “Blended Learning”

1. Students receive feedback on learning outside classroom through computer-based materials
Example: Online Interactive Quiz

Name the mineral: sillimanite

Note: Case does not matter, but spelling does!

Consciously or unconsciously, we identify minerals using a few key characteristics that we associate with them. Name the two or three characteristics of this mineral that allowed you to name it:
Example: Online Interactive Quiz

Consciously or unconsciously, we identify minerals using a few key characteristics that we associate with them. Name the two or three characteristics of this mineral that allowed you to name it:

- sillimanite
- radial, gray

*Note: Case does not matter, but spelling does!*

*Note: You get credit for listing your criteria -- the green check mark does not mean they are correct!*

Make comment or override grade

**Correct**

Marks for this submission: 1/1.

History of Responses:

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<th>Action</th>
<th>Response</th>
<th>Time</th>
<th>Raw score</th>
<th>Grade</th>
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Our Definition of “Blended Learning”

1. Students receive feedback on learning outside classroom through computer-based materials

2. Online component alters how instructor teaches or uses class time
Positive Response: Students

Do you think the computer-based materials impacted (have impacted) how well you did (are doing) in this class?

- 50% Yes, I did considerably better than I would have without them.
- 25% Yes, I think they helped somewhat.
- 22% I don't think they really helped, but they didn't hurt either.
- 4% I think they had a negative impact on how well I did.
- 2% I don't know.

At Bryn Mawr

At partner colleges
Positive Response: Faculty

- **All** BMC faculty who participated in pilot continued using a blended approach (albeit with tweaks)
- Experimentation has spread beyond that initial cohort

**Example Indicator: Moodle Quiz Use**

<table>
<thead>
<tr>
<th>Number of ...</th>
<th>Fall 2011</th>
<th>Spring 2012</th>
<th>Fall 2012</th>
<th>Spring 2013</th>
<th>Total Unique</th>
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<td>Faculty using Moodle Quiz (of which were in NGLC cohort)</td>
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<td>16 (12)</td>
<td>25 (7)</td>
<td>20 (8)</td>
<td>31 (12)</td>
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<td>Courses using Moodle Quiz</td>
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<td>15</td>
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<td>9</td>
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Evidence of Impact on Learning

● Merit completion rates in blended introductory STEM courses at BMC improved
  ● 83% was historical baseline
  ● 90% was target for blended pilot courses
  ● Actual merit completion rate was 93.5%
Evidence of Impact on Learning

- Student performance better than historical norms in 3 of 4 courses* for which data was available:
  - Avg. grade was ~1 SD higher
  - Merit completion rate was 100%, which was 0.8-1.5 std. dev. higher

- More mixed in the fourth course, CHEM 103 general chemistry, but …

*CHEM101 (prep for general chemistry), BIOL101, and GEOL202 (mineralogy)
Evidence of Impact on Learning

In that course completing online material strongly correlated with final grades

SATM and % completed predicted final course grade better than SATM alone
Evidence of Impact on Learning

Since the NGLC study, we’ve extended this analysis to:

- Fall 2012 and 2013 of CHEM 103
- CHEM 104 (2nd semester general chemistry) in spring 2011 and 2012
- CHEM 211 (organic chemistry)

In each case, we saw a similar correlation between completion of online materials and final course grade
Evidence of Impact on Learning

- Across all courses:
  - SATM $R^2 = 0.117$ ($F(1,201)=27.715$, $p<.001$)
  - SATM + % completed
    $R^2 = 0.506$ ($F(2,200)=104.394$, $p<.001$)
Evidence of Impact on Learning

• In organic chemistry, where SATM is not predictive:
  • SATM $R^2 = .010$ (F(1,44)=1.462, $p>.05$)
  • SATM + % completed
    $R^2 = .310$ (F(2,43)=11.095, $p<.001$)

• … completion of online component is clearly predictive.
Support for LAC values

- Enhances face-to-face instruction
  - Assessment and instant feedback enabled students to ask better, more timely questions
  - Access to learning data helped faculty provide more useful answers and coach or teach more effectively
  - Can help differentiate instruction to meet needs of diverse learners.
Support for LAC values

- Supports individualized, learner-driven education
  - Can help free up time or prepare students for activities that fostered deep learning
  - Faculty used blended learning to emphasize mastery, which students appreciated
  - Some faculty used blended learning to help students develop metacognitive skills
Keys to a Successful Technology Initiative

- Change requires investment and cooperation – “start up costs” were barrier for faculty, rather than attitude

- Start with learning goals (pedagogy drives technology)

- Need to demonstrate effectiveness before you can talk about efficiencies, etc.

- Let institutional mission and values be your guide
Blended Learning in a Liberal Arts Setting

WHERE WE’RE HEADED
New Grant-Funded Projects

Bryn Mawr and our partners have received four grants, totaling over $2.8 million to:

● Remove barriers to wider adoption of blended learning
  ● Faculty development
  ● Creation of suitable, high-quality materials

● Use blended learning to enhance access, engagement and success
Developing a Liberal Arts Curriculum for a Digital Age

Andrew W. Mellon Foundation, $800k/3 years

- Expand blended learning in humanities and social sciences at Bryn Mawr College
- Continue the Blended Learning in the Liberal Arts conferences (NEXT: May 20-21, 2015)
Enhancing Comp. and Info. Sci. Learning for Women in STEM

AAC&U/TIDES program, $170k/3 years

● Develop suite of online physics modules that:
  ● Develop students’ computational competencies
  ● Engage students from underrepresented groups

● Provide faculty development needed to incorporate throughout physics curriculum
Modeling Collaborative Curriculum Development

Teagle Foundation, $244k/3 years

- Faculty at 8 colleges collaboratively develop online modules needed for blended approach to psychology research methods and statistics
- How can LACs work collaboratively to create digital materials in areas where none exist?
Blended, Scalable Just-in-Time Approach to Math Remediation

FIPSE “First in the World,” $1.6 mill / 4 years

- With 12 partner colleges including Grinnell and St. Olaf, develop:
  - Online math review modules for skills and concepts needed in intro calculus, chemistry, and physics
  - “Playlists” that align with those courses at each college
- Use modules and playlist to deliver just-in-time remedial support
Open Questions?

- To date, focus is on quality enhancement, is it time to think about costs?
- Tension between customization and reinventing the wheel
- Sustainability – who will maintain links, platforms, etc.
- Platforms we can collaborate on
References


