

May 7th, 1:30 PM - 3:00 PM

Project Overview and Research Findings

Kimberly Cassidy

Bryn Mawr College, kcassidy@brynmawr.edu

Jennifer L. Spohrer

Bryn Mawr College, jspohrer@brynmawr.edu

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Conference on
 Blended Learning at
 Liberal Arts Colleges
 May 7-8 2012

Sponsored by a grant from



BRYN MAWR
 COLLEGE



HISTORY OF THE PROJECT

Why Blended? Why Now?

- Annual meeting of Consortium for Financing Higher Education (COFHE)
 - Candace Thille presented on Carnegie Mellon's Open Learning Initiative (OLI)
 - Several schools interested in piloting courses
- Readings at Joint Meeting of Northeast Deans and CFO's (Barnard, fall 2010) ...

Evidence of Appeal

- Students and faculty reported higher satisfaction with blended courses
 - vs. fully online
 - vs. fully classroom based

C. Dziuban, J. Hartman, and P. Moskal. (2004). Blending Learning. *ECAR Research Bulletin* 7, <http://net.educause.edu/ir/library/pdf/ERBo407.pdf>.

Evidence of Engagement

- Students reported feeling more connected to peers and faculty
- Students were demonstrably more engaged in classes, with peers, and with faculty

Aspden, L. and Helm, P. (2004). Making the Connection in a Blended Learning Environment. *Educational Media International*. 41(3), 245-252.

Association for the Advancement of Computing in Education. Perspectives on Blended Learning in Higher Education. *International Journal on E-Learning*. 2007.

Evidence of Learning

- Higher student performance in blended courses
- Mastery of introductory statistics in half the time using OLI statistics

Means, B., Toyama, Y., Murphy, R., Bakia, M., Jones, K. (2010). *Evaluation of Evidence-Based in Online Learning: A Meta-Analysis and Review of Online Learning Studies*. U.S. Department of Education, Center for Technology in Learning.

Lovett, M., Meyer, O., Thille, C. (2008). *The Open Learning Initiative: Measuring the Effectiveness of the OLI Statistics Course in Accelerating Student Learning*. Journal of Interactive Media in Education. Web. 15 Oct. 2009.

But, Studies at *Large* Institutions

- Would blended learning offer the same or equivalent benefits at a liberal arts college?
 - Student satisfaction related to reduced “seat time” on commuter campuses
 - Control courses vs. typical LAC intro course
- Next Generation Learning Challenges (NGLC) RFP focused on *innovation and research*



NGLC BLENDED PROJECT

NGLC Initiative

NEXT GENERATION

LEARNING
CHALLENGES

Transforming education through technology

THE WILLIAM AND FLORA
HEWLETT
FOUNDATION

BILL & MELINDA
GATES *foundation*

CCSSO 
Council of Chief State School Officers

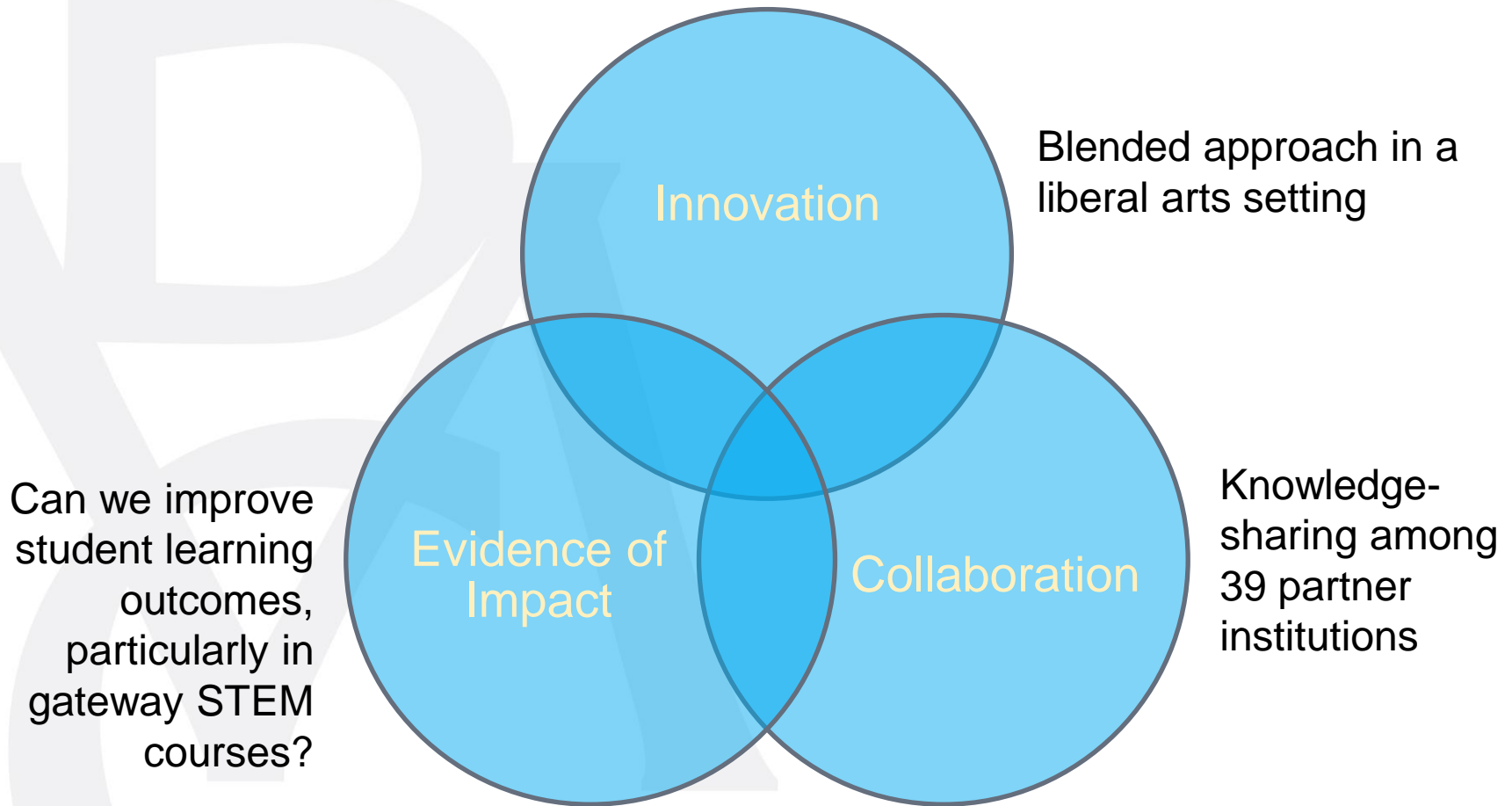
EDUCAUSE

 *League* .org
**FOR INNOVATION
IN THE COMMUNITY COLLEGE**

*i***NACOL** 
International Association for K-12 Online Learning

- \$250,000 grants to colleges in Wave I
- 600 applications, 29 projects funded

NGLC Project Components



What is “Blended”?

- Our working definition
 - Students receive feedback on learning outside classroom through computer-based materials
 - This extra-classroom learning alters how instructor teaches or uses class time

What is “Blended”?

- No prescriptions beyond this
 - No requirement to reduce “seat” time
 - Faculty identify pedagogical challenges and goals
 - Pedagogy drives technology
- Flexibility is crucial to success



PRELIMINARY FINDINGS

Courses in the Study

Preparatory

QUAN001

CHEM101

Introduction to Major

GEOL202

PSYC205

Introductory Level

BIOL101 & BIOL102

BIOL111-113

CHEM103

CMSC110

Intermediate/Advanced

ECON242

CITY328 (GIS)

CMSC/LING325

Research Question

- Can a blended approach improve student learning outcomes, particularly in gateway courses?

engagement

completion

mastery

persistence

Evaluation/Assessment

- In all courses, assess perceptions of impact through
 - Faculty start/exit interviews
 - Student attitudinal surveys
- Where possible, compare perceptions against quantifiable evidence of impact

Summary of Findings

- When surveyed, **all fall faculty** indicated they would continue blended approach
- Over 75% of students reported computer based components were very helpful or somewhat helpful




FACULTY PERCEPTIONS

What is Valuable? Instant Grading

Mozilla Firefox
brynmawr.edu https://moodle.brynmawr.edu/mod/quiz/reviewquestion.php?state=8925&number=17

17
Marks:
1/1



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:

- Assess sooner and more often
- “Testing effect”
- Build in periodic review

Supported By Research

- Testing Effect
 - Assessment stimulates recall
 - Act of recalling improves retention

Marsh, E., Agarwal, P. & Roediger, H. (2009). Memorial consequences of answering SAT questions. *Journal of Educational Psychology: Applied*, 15, 1-11.

Johnson, C. & Mayer, R. (2009). A testing effect with multimedia learning. *Journal of Educational Psychology*, 101, 621-629.

Roediger, H. & Karpicke, J. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1, 181-210.

Supported by Research

- Importance of periodic review
 - Repeated assessment at intervals after material is first encountered intensifies effect

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin*, 132, 354-380.

Roediger, H. & Karpicke, J. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science*, 1, 181-210.

What is Valuable? Learning Data

Mozilla Firefox

brynawr.edu https://moodle.brynawr.edu/mod/quiz/reviewquestion.php?state=8925&number=17

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:
radial, gray ✓
*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:

#	Action	Response	Time	Raw score	Grade
1	Grade	serpentine,	16:20:38 on 7/09/11	0.5	0.5
2	Grade	andalusite,	16:21:00 on 7/09/11	0.5	0.5
3	Grade	kyanite,	16:21:21 on 7/09/11	0.5	0.5
4	Grade	quartz,	16:21:50 on 7/09/11	0.5	0.5
5	Grade	amphibole,	16:22:03 on 7/09/11	0.5	0.5
6	Grade	pyroxene,	16:22:12 on 7/09/11	0.5	0.5
7	Grade	calcite,	16:22:51 on 7/09/11	0.5	0.5
8	Grade	epidote,	16:23:10 on 7/09/11	0.5	0.5
9	Grade	plagioclase,	16:23:23 on 7/09/11	0.5	0.5
10	Grade	sillimanite,	16:53:08 on 7/09/11	1	1
11	Grade	sillimanite, radial, gray	16:53:29 on 7/09/11	1	1
12	Close&Grade	sillimanite, radial, gray	16:53:29 on 7/09/11	1	1

- Real-time sense of how students are doing
- More “agile” teaching
- More fruitful conversations with students about learning

Relevance to Goals/Challenges

- More individualized, learner-centered teaching
- Responding to classroom diversity
- Using classroom time for approaches that encourage deep learning, such as collaborative projects, discussion, etc.

Faculty Caveats

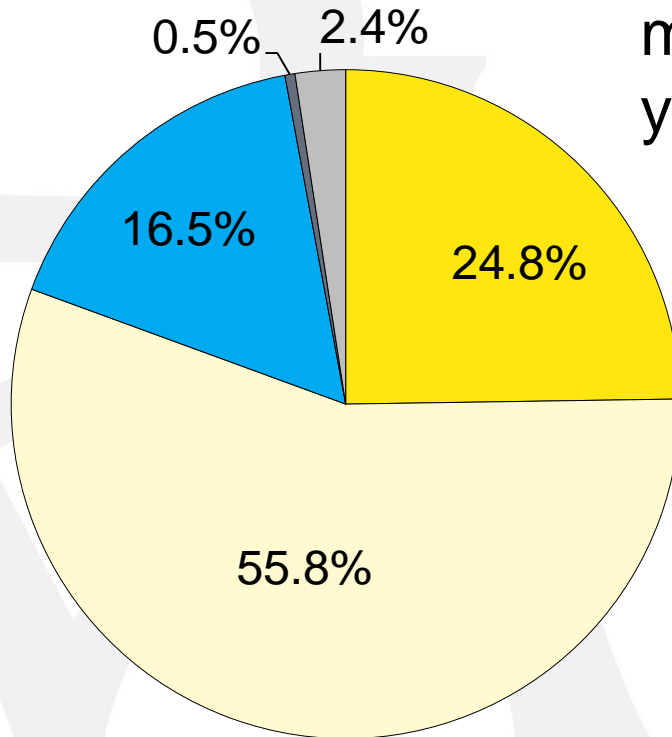
- Available materials do not always align well with courses
- Significant up-front time investment to find and evaluate; even more to develop
- Importance of reusability



STUDENT PERCEPTIONS

Perception of Impact

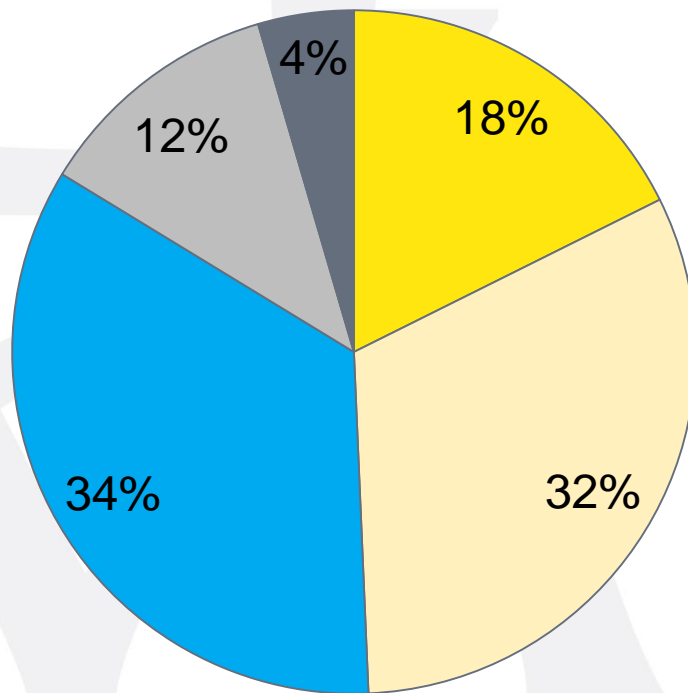
Did the computer-based materials impact how well you did in this course?



- Yes, very much
- Helped some what
- Didn't help or hurt
- Negative impact
- Not sure

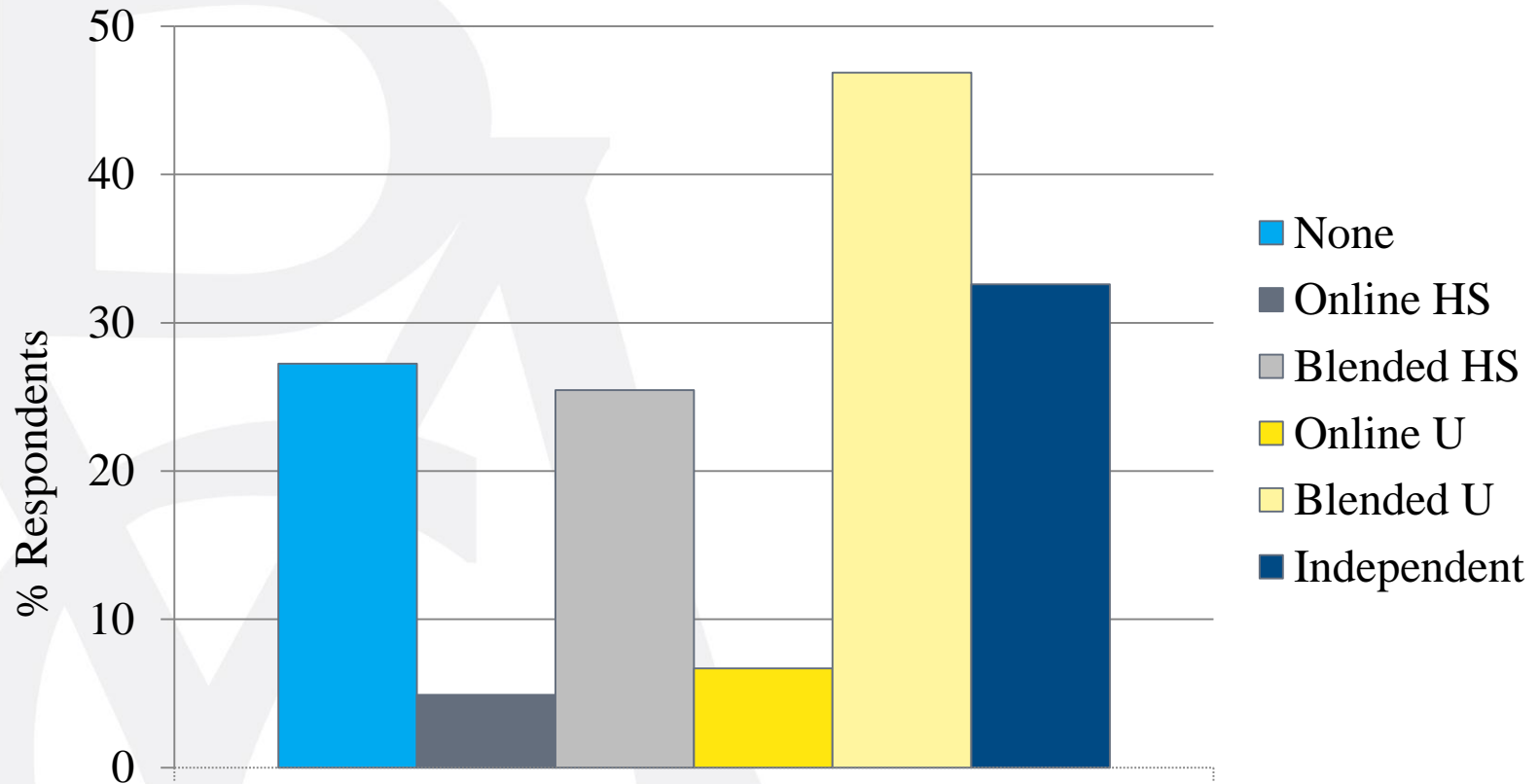
Impact Better than Expected

What was your attitude to computer-based learning going to this course?

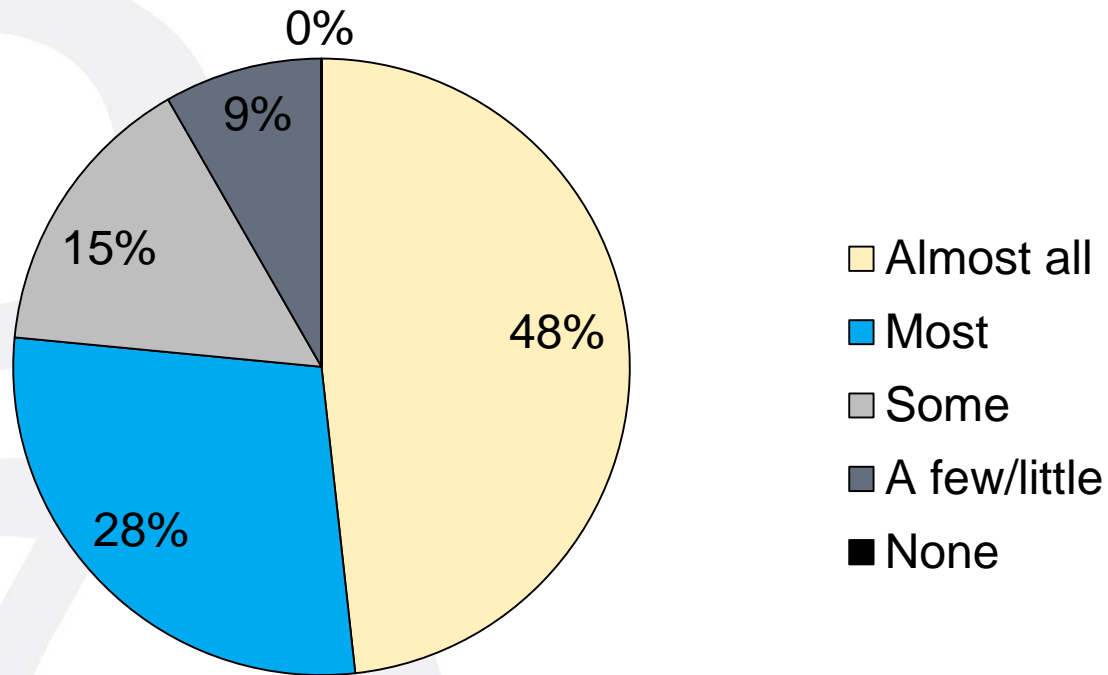


- Strongly positive
- Somewhat positive
- Neutral or Uncertain
- Somewhat negative
- Strongly negative

Students' Prior Experience

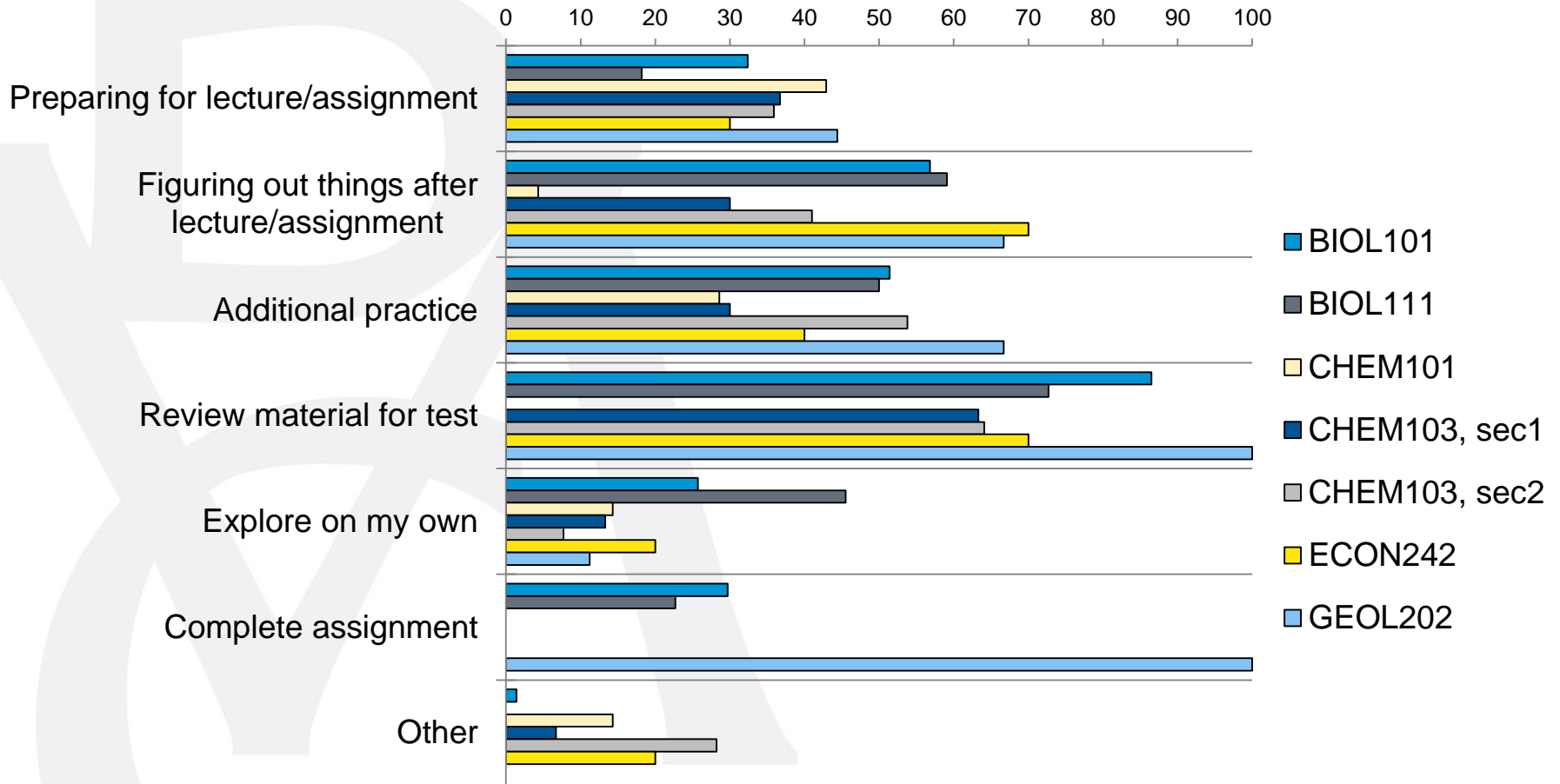


Self-Reported Use of Materials



This is compatible with what we have observed in tracking data analyzed so far.

How Students Used Materials



What Was Helpful? Practice

- Made mistakes, received feedback before “it counted”
- Could practice more **if needed**
- Equally important – could stop when not needed
- Describing focus on mastery, though don't use this term

What Was Helpful? Feedback

- They knew sooner whether they had understood
- They could use that knowledge
 - To better structure study time
 - To ask better questions

What Was Helpful? Visuals

- Preferred video over textual explanations, but
 - Not too long
 - Not necessarily in place of **classroom** explanation
 - Not necessarily video of a person talking
- Key was visual presentation of information – animations, simulations, diagrams, etc.

Supported By Research

- Controlled experimental research on multimedia and learning
 - Strong evidence that people learn better when visuals are combined with words – *in any medium*
 - Little evidence that seeing face of narrator matters

Mayer, R. E. (2005). *The Cambridge handbook of multimedia learning*. Cambridge, U.K.; New York: Cambridge University Press.

Student Caveats

- Not all computer-based materials created equal
 - Worst were boring, repetitive, low-level learning
 - Less helpful when feedback was limited to right/wrong
- Best materials
 - Required application of concepts or skills
 - Offered “scaffolding”
 - Explained *why* answers were right or wrong

Student Caveats

- Value was a cost-benefit analysis
- Things that waste time
 - slow load times
 - confusing interface
 - difficulty entering answers correctly
- If substantial, can outweigh perceived benefits

Research Plans

- Measure student performance
 - Grades
 - Standardized assessments
 - Tests of long-term retention
- Compare to
 - Historical data for same/similar courses
 - Predicted performance (SATM, placement tests)
 - Learning data tracked by courseware

Courses at Partner Institutions

Institution	Course	Instructor	Term
Trinity College	PBPL 812-01 Women and Politics	Stefanie Chambers	Summer 2012
Wesleyan University	SCIE612 Biology, Neuroscience and Behavior	Janice Naegele	Summer 2012
Smith College	MTH247 Regression Analysis	Nicholas Horton	Fall 2012
Colorado College	Physics 220 The Physics and Meaning of Flight	Randy Stiles	Fall 2012
Haverford College	MATH203 Statistical Methods and Their Applications (lab)	Lynne Butler	Fall 2012
Union College	HST256 Modern European Ideas	Mark Walker	Fall 2012
Connecticut College	Graphics and Virtual Environments	Bridget Baird	Fall 2012
Vassar College	Math 141-51/52 Introduction to Statistics	Ming An	Spring 2013

