

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

## Project Overview and Research Findings

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Cassidy, Kimberly and Spohrer, Jennifer L., "Project Overview and Research Findings" (2012). *Blended Learning in the Liberal Arts Conference*. 13.

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

Sponsored by a grant from



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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*

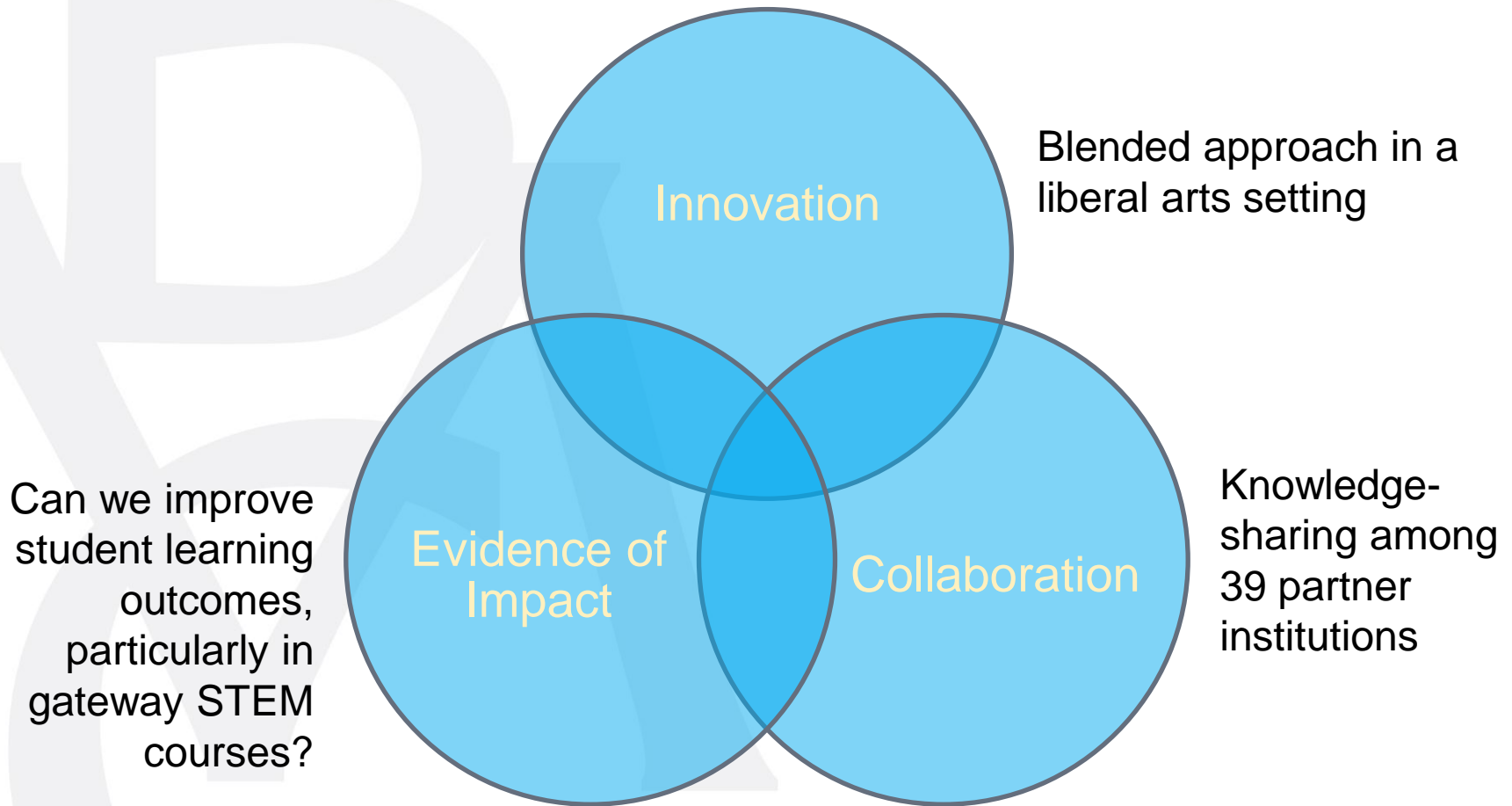
**EDUCAUSE**

 *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

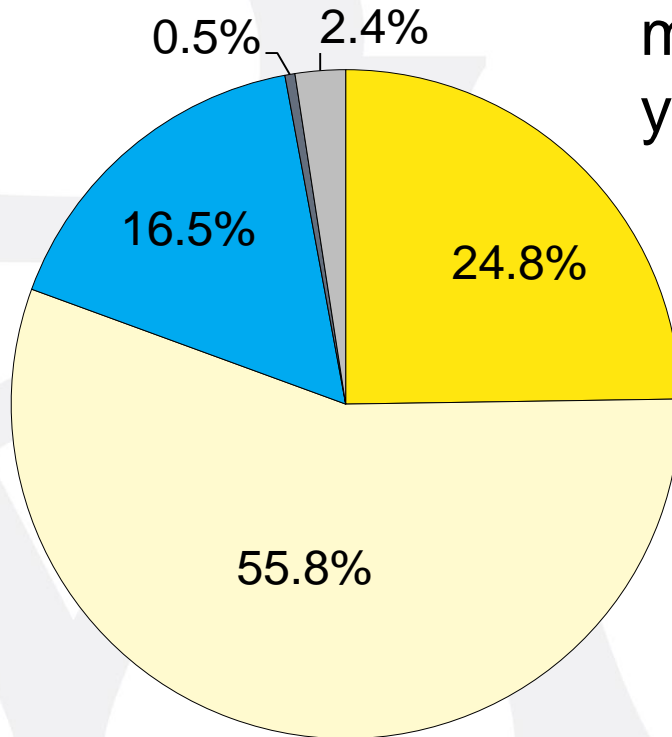
- Available materials do not always align well with courses
- Significant up-front time investment to find and evaluate; even more to develop
- Importance of reusability



# STUDENT PERCEPTIONS

# Perception of Impact

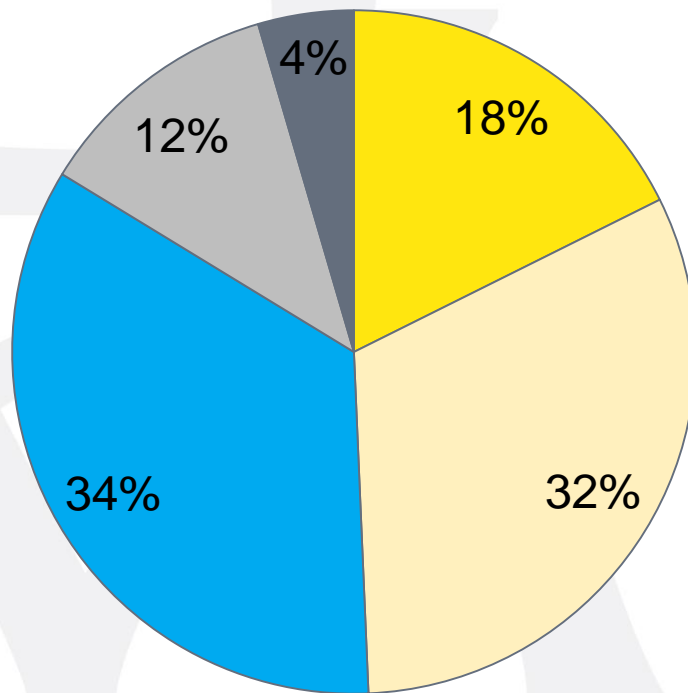
Did the computer-based materials impact how well you did in this course?



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

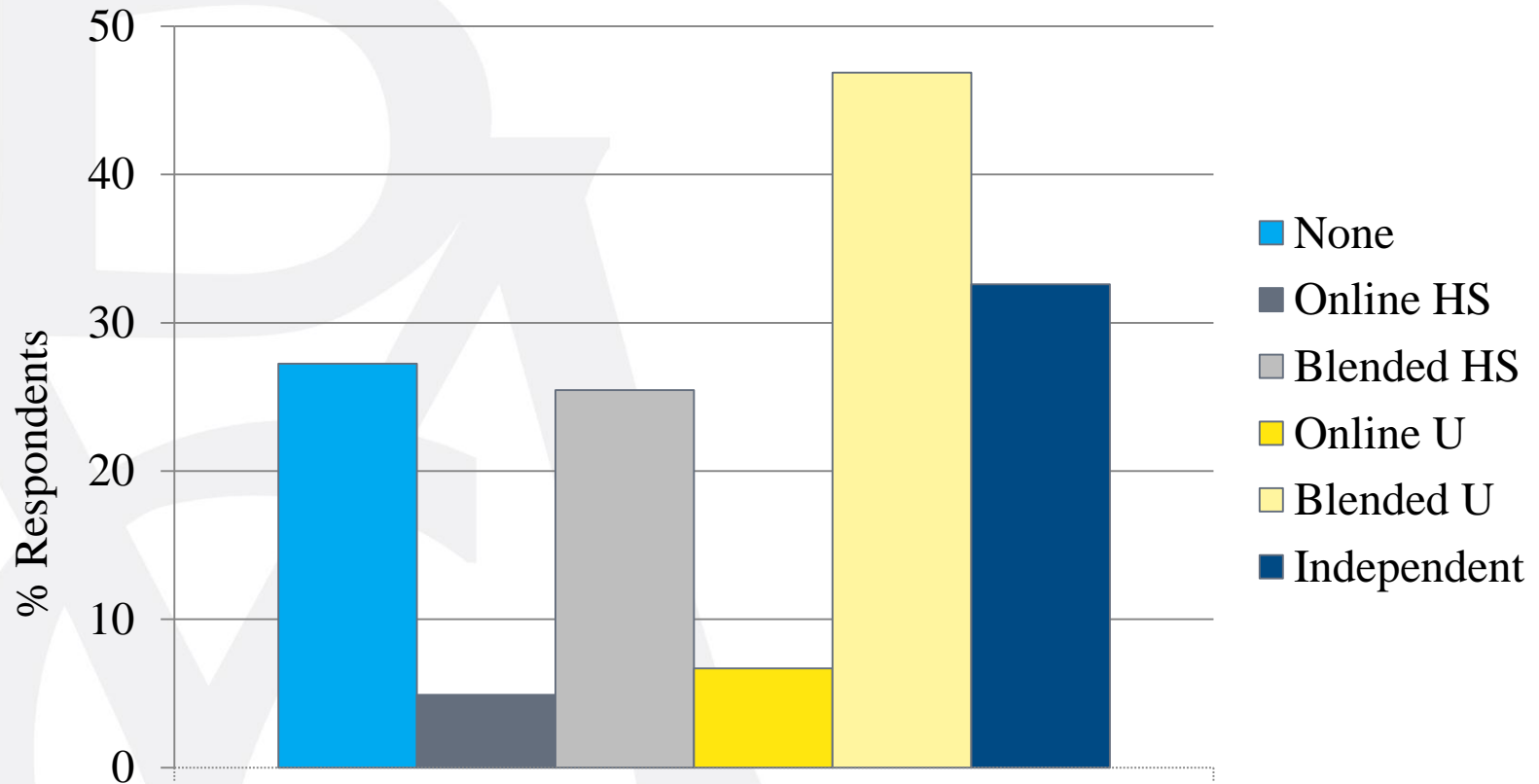
# Impact Better than Expected

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

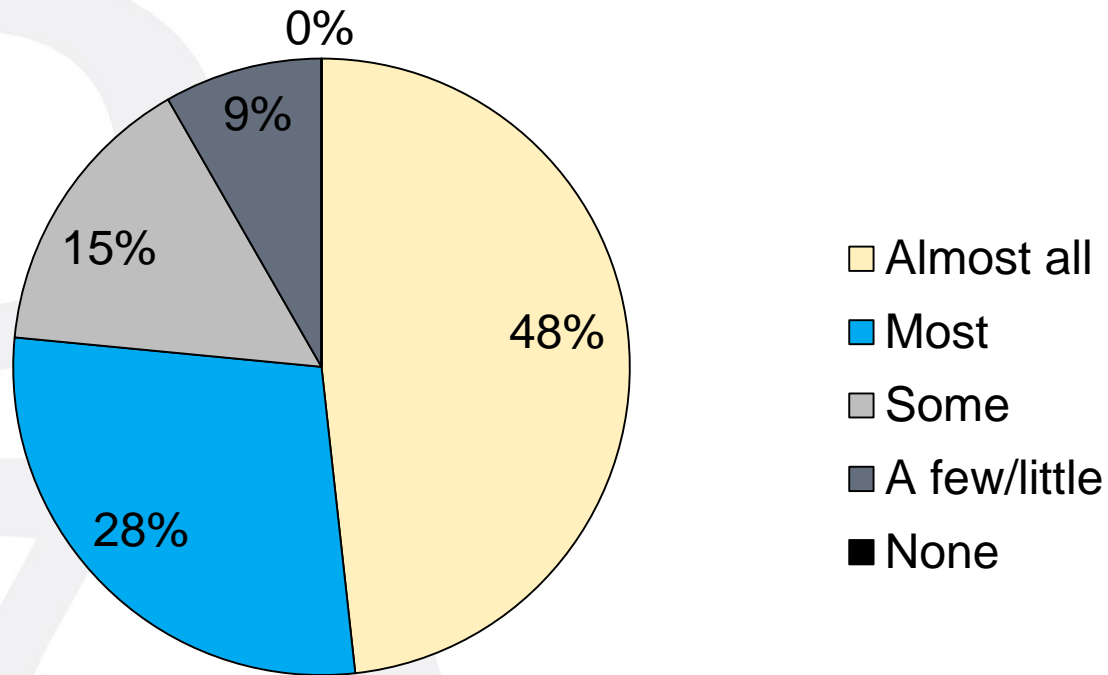


- Strongly positive
- Somewhat positive
- Neutral or Uncertain
- Somewhat negative
- Strongly negative

# Students' Prior Experience

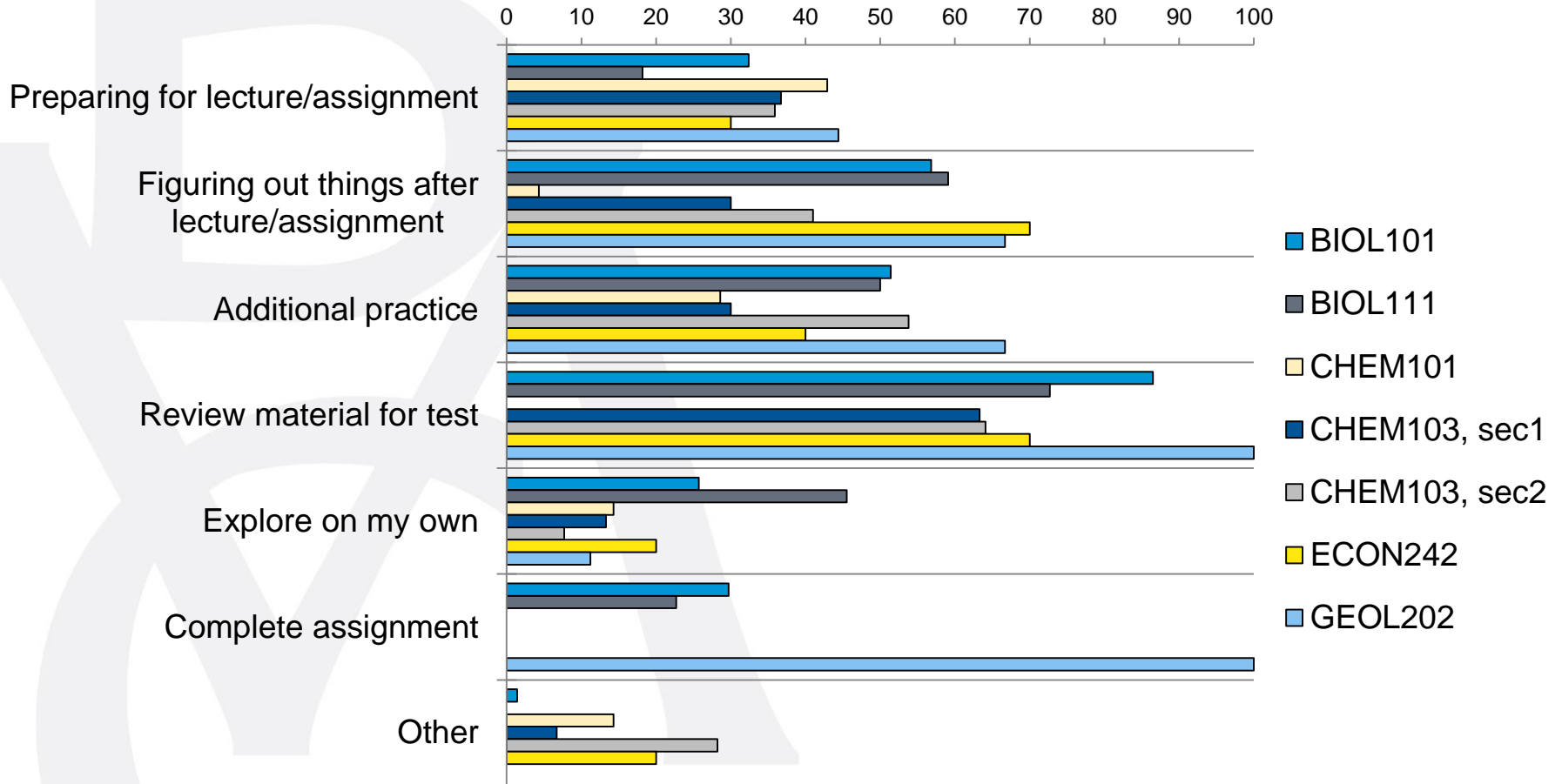


# Self-Reported Use of Materials



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



**MOVING FORWARD**

# 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





# SUMMARY AND LESSONS LEARNED