Adaptive Learning and Adult Students

Kathy Warner, Beth Mulherrin, and Kim Miller
Agenda

• Introduction to the University
• Adaptive technologies
• Gateway Courses
• Redesign of three courses
• Findings
• Student Learning
• Lessons Learned
• Member of the University System of Maryland
• Part-time, adult students
• Large population of military and veteran students
• Most students bring transfer credit
• 85% of offerings are online
Adaptive Learning

- Adapt presentation of material to student’s learning needs
- Data-driven approach to student learning
- Improve student success
- Reduce time to complete courses
- Supplement curricula
Evolution of Adaptive Learning

- 1980s-1990s: Bloom to CBT
- 2000- Fast-growing industry
- Platform and subscription business models
- OER membership model (NROC/EdReady)
- Integrated into LMS
Course Design in Undergraduate School

- Entire unit devoted to Online Course Design
- Common content across all sections
- NCAT-model
- Scaffolding in introductory courses
- Student Learning
Open Learning Initiative

- Carnegie Mellon University
- Face-to-face
- Traditional age students
- Grant-funded initiative to integrate cognitive tutoring into online courses
Gateway Courses

• High enrollment, first courses
• General Education
• Top 20
• Adapt three Open Learning Courses for UMUC students:
  – General Biology, Business Statistics, and gen ed computing course
Partnership

• Partnered with Prince Georges Community College and Carnegie Mellon
• BIOL course completely redesigned
• Computing course adapted UMUC material for OLI platform
• Enhanced Statistics course
Common Features

- Faculty dashboard
- Student dashboard
- Immediate feedback to students
- Multiple opportunities to interact with materials
- Snapshot of student learning at any point in class
OLI Enrollment

Total Enrollment By Course

- BIOL 101
- BIOL 103
- STAT 225
- STAT 230
- IFSM 201
About Concept

• Self-assessment opportunity for students at the end of each OLI Unit.
• Faculty authors insisted on this feature.
• Students rate their understanding of the learning objectives on a scale of 1-5.
• Students have the opportunity to write two questions to the instructor.
Students can view my answers to their questions through my “Ask Dr. C.” conference with posts titled “Week X OLI My Response Questions Answered by Dr. C.”.

“I alert the students when I have posted this information through class announcements and/or e-mail.”

Dr. Carpenter
“Where possible, I try to point them back to the OLI materials”

Dr. Carpenter
Internal University Measures

- Failure Rate
- Withdrawal Rate
- Grade Distributions
- Course Evaluation Student Satisfaction Score
UMUC Findings

Percentage of Failures

Percentage of Students Who Attend the Class and "Fail"

- Fall 2012
- Spring 2013
- Summer 2013
- Fall 2013

UMUC Findings
UMUC Findings

Fall 2012 Course Evaluations

- **BIOL 103**: Non-OLI Average Score, OLI Average Score
- **STAT 225**: Non-OLI Average Score, OLI Average Score
- **IFSM 201**: Non-OLI Average Score, OLI Average Score

University of Maryland University College
A data analysis service for the learning science community

https://pslcdatashop.web.cmu.edu/index.jsp
Data Shop: Course Design & Improvement

• Information on Learning Activities
  – Raw numbers on practice, hints, errors, corrects
  – First response “correct”
  – Final response “correct”
  – Utilization rates
  – Completion rates
  – Accuracy rates
Most Used Approaches

- Key Component Modeling
- Learning Curve Analysis
- Problem Breakdown
- Performance Profiler
- Error Report
Performance Profiler

View measures of:
- Error Rate
- Assistance Score
- Avg # Hints
- Avg # Incorrect
- Residual Error Rate
Data Shop: Research and Evaluation

Learning Curve

![Graph showing learning curve with various analysis options and data for different knowledge components.](chart)

- **Dataset:** Geometry Area (1996-97)
- **KC Model:** LFA Search All / Whole Model 3

### Learning Curve Types
- **Error Rate**
- **Assistance Score**
- **Number of Incorrects**
- **Number of Hints**
- **Step Duration**
- **Correct Step Duration**
- **Error Step Duration**

### Opportunity Cutoffs
- Min: Clear
- Max: Clear
- Std. Deviation Cutoff: 2.5 Clear

### Categorize Curves
- 10: Student threshold
- 2: Opportunity threshold
- 20.0: Low error threshold
- 40.0: High error threshold
- 0.0: AFM slope threshold

### Graph Information
- All Data: 5,104 (0)
- Included observations (dropped observations)

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Real-Time Learning Data’s Instructional Benefits

- Real-time information to emphasize course content
- Enhanced student feedback
- Instructors monitor engagement
- Student Progress dashboards lead to faculty and student perception of increased engagement and student performance.
- Instructors spend a lot more time on instruction rather than grading.
- Applied activities and grading criteria maintain consistency between courses.
- Instructor perceptions are that students come out with a broader and more stable knowledge base
Lessons Learned

- Course Choice
- Faculty training
- Presentation of Materials
- Supplement content
- Integration with classroom
THANK YOU
Questions?

- Kathleen Warner  
  kathleen.warner@umuc.edu
- Beth Mulherrin  
  beth.mulherrin@umuc.edu
- Kim Miller  
  kimberly.miller@umuc.edu