

# The Power of Open Content: Designing Low Cost, Highly Effective Math Courses

Low cost | Simple to Adopt | High academic ownership

Paul Golisch – Lumen Learning

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# Who is at ORMATYC?



**SARA  
SWANGARD**

Executive Director,  
West



**RACHEL  
ZACCARO**

Director of Product  
Marketing



**Paul Golisch**  
Math Specialist



**DEBORAH HUR**

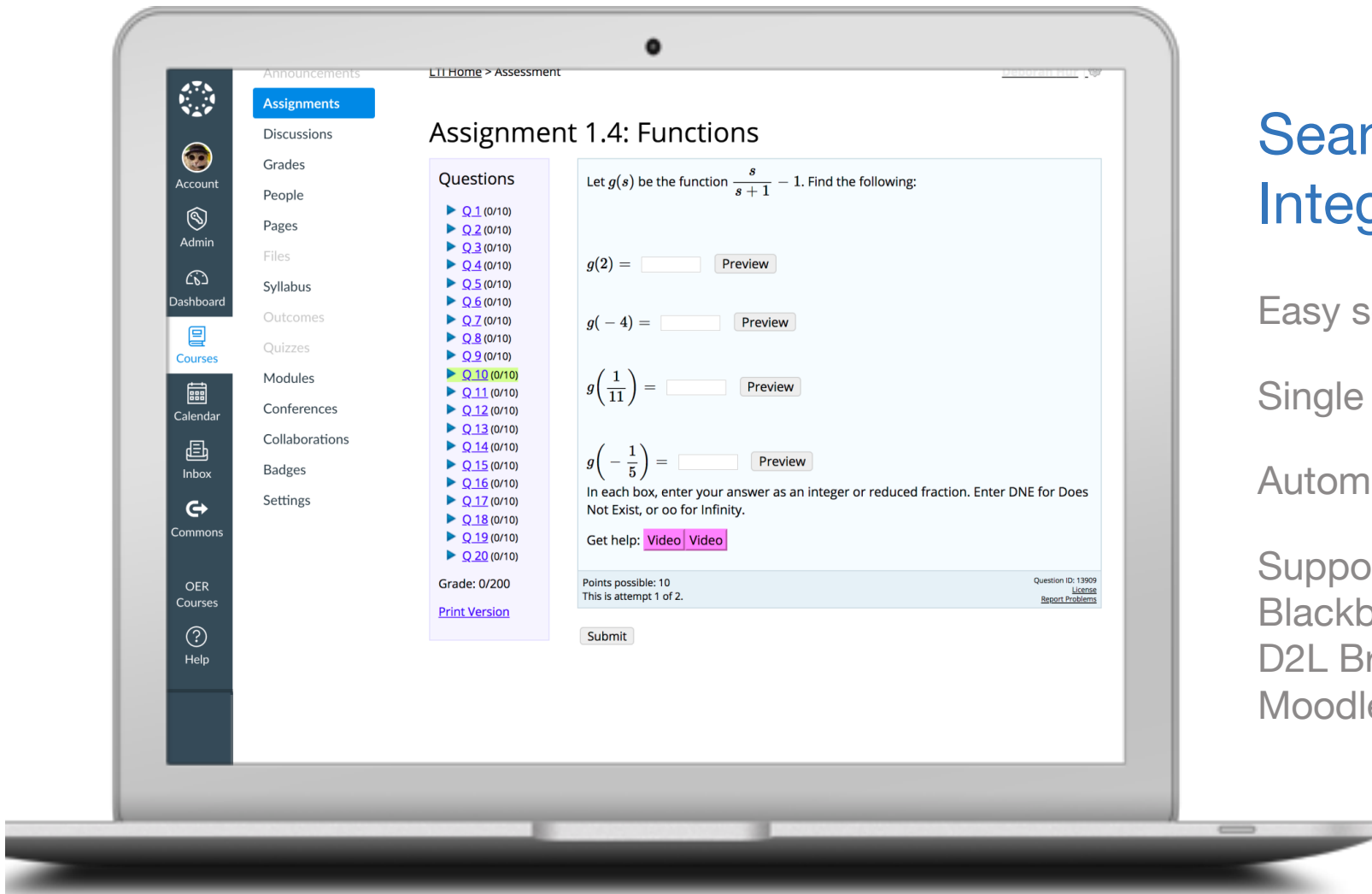
STEM Platform Product  
Manager



**Sean Gannon**  
Course Product Manager  
Math

What are some challenges  
you face teaching math?

What are some challenges  
you face when changing  
courseware?



# Seamless LMS Integration

Easy set-up

Single sign-on

Automatic grade return

Supported systems:  
Blackboard, Canvas,  
D2L Brightspace,  
Moodle

# Template Courses Include Textbooks, Videos, Assessments and More

The screenshot displays a course management interface for 'Demo - Coreq College Algebra'. The left sidebar contains navigation icons for Account, Admin, Dashboard, Courses, Groups, Calendar, Inbox, Commons, and OER Courses. The main content area shows a list of modules and assignments, with 'Module 1: Polynomials and Factoring' selected. The interface includes buttons for 'View Progress' and '+ Module'.

**Course Information** ✓ + ⋮

**Module 0: Review of Fractions, Percents, and More** ✓ + ⋮

**Module 1: Polynomials and Factoring** ✓ + ⋮

- Why solve linear equations and inequalities? ✓ ⋮
- Section 1.1: Solving Linear Equations ✓ ⋮
- Textbook Section 1.1: Solving Linear Equations ✓ ⋮
- Video Lesson Assignment 1.1 Solving Linear Equations 30 pts ✓ ⋮
- Assignment 1.1: Solving Linear Equations 170 pts ✓ ⋮

# OHM Pricing & Payment Options

Payment Model	Standard pricing per student using OHM
<b>Course Fee</b> (collected by institution, per enrollment)	\$25
<b>Direct-to-Lumen Payment</b> (collected by Lumen, per enrollment)	\$25
<b>Bookstore Activation Code</b> (per enrollment)	\$25*
<b>Follett includED</b> (streamlines course fee)	\$25
<b>Annualized Fee</b> (per institution, pre-paid)	Negotiated based on current and projected usage

*\*Campus stores may add additional markup; this is left to discretion of institutions*



## Learning Impact with Lumen OHM

SLCC achieved massive impact after putting OER options in place for all Quantitative Literacy pathway courses for fall 2017, using Lumen OHM

*Results based on fall 2016 to fall 2017 completion rates with 6,423 students enrolled in pathway courses and 7,500 enrolled in OER courses during fall 2017.*

**7,500** students using Lumen OHM in fall 2017

**\$700K** textbook cost savings

**+22%** quantitative literacy pathway completion compared to fall 2016



## Quick Course Set-up in Lumen OHM

**1** Choose a customizable template course

**2** Review & adjust content to align with your course


**3** Adjust due dates and settings to suit your course

**4** Get help at any point from Lumen support

# Help is only a Click Away!



Ask the Community




Connect with other faculty to find out how they use OHM on their campus with their students.

[Community Forums](#)

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User Guides



The OHM Faculty User Guide provides practical how-to information about using OHM and integrating OHM into your Learning Management System.

[User Guides](#)

Ask Lumen



Get personal assistance from Lumen's support team.

ticket subject

how can we help?

your email address

priority

[Submit](#)

[Help](#)

Documentation

Post Post

6/18, 10:53 am

9/18, 8:44 am

5/18, 8:22 am

18, 8:37 pm

18, 8:34 pm

18, 6:03 am

7/18, 11:48 am

18, 6:09 pm

18, 5:52 pm

18, 8:01 pm

17, 10:48 am



# Inside an OHM course

OER online homework platform

"Physics is Phun" ([goo.gl/Qg9cfF](https://goo.gl/Qg9cfF)) by ShashiBellamkonda is licensed under CC BY 2.0



# Logging in to OHM

**Login**

or

**Enroll In a New Course**

- [What is Lumen OHM?](#)
- [Forgot Password](#)
- [Forgot Username](#)
- [Request an instructor account](#)

# OHM Home Page

Welcome to Lumen OHM

## Courses you're teaching

[Sample: College Algebra \(Coreq\)](#)

Add New Course

[Change Course Order](#)

## Courses you're taking

[OHM Community Course](#) [Posts \(1590\)](#) X

[OHM Orientation Course](#) [Posts \(209\)](#) X

Enroll in a New Class

[Change Course Order](#)

## New messages

No new messages

## New forum posts

Thread	Started By	Course
<a href="#">Please help: Vote for Canvas to give automatic zeros after the due date</a>	Shahbazian, Roy	OHM Community Course
<a href="#">Save for Later / Save Progress on Homework Assignments?</a>	Hargraves, Anthony	OHM Community Course
<a href="#">Polys Macro</a>	McKay, Ronald	OHM Community Course
<a href="#">student locked out of quiz</a>	Aly, Mohamed	OHM Community Course
<a href="#">...recover a deleted assignment?</a>	James, Wade	OHM Community Course
<a href="#">New Colors of the Homepage</a>	Harrison, Evgenia	OHM Community Course
<a href="#">Injecting 'section' or 'category' on assignments</a>	Kennedy, Mony	OHM Community Course
<a href="#">Last Login Date of 1969</a>	Watts, Libby	OHM Community Course
<a href="#">Calendar colors</a>	Gill, Judith	OHM Community Course

# Adding a Course to an Account



[Home](#) > Add New Course

## Add New Course

How would you like to start this course?

Start with a blank course

Copy a template course



Great place to start!

Copy from an existing course

# Template Courses

The screenshot displays the Lumen Learning Course Browser interface. At the top, the 'Course Browser' title is visible. Below it, there are filter buttons for 'Level', 'Primary textbook', 'Modality', and 'Contents'. A dropdown menu is open under the 'Level' filter, showing a list of course levels with checkboxes. The 'College Algebra' option is selected. The background shows two course cards: a green 'Group Template Course' and a purple 'Template Course'. The 'Template Course' card has a description box at the bottom.

Course Browser

Filter results: Level ▲ Primary textbook ▼ Modality ▼ Contents ▼

Show courses that contain any of:

- Arithmetic
- Prealgebra
- Elementary Algebra
- Intermediate Algebra
- Non-STEM Algebra / Math Literacy
- College Algebra
- Trigonometry
- Precalculus
- Calculus
- Math for Liberal Arts / Quantitative Reasoning
- Statistics
- Linear Algebra
- Differential Equations
- Chemistry
- Other

**DEMO: C** Group Template Course

arning)

course Copy This Course

**Arithme** Template Course

-1 per day or section)

A true arithmetic course, with late integers and no algebra. This is based on the MITE book, revised to integrate statistics and geometry throughout the course rather than isolating them to separate chapters. The text contains no exercises, but for each section, this course includes a worksheet with a 1-page summary of the section and a set of problems that could be used for in-class practice or as homework.

# Quickly Rearrange Course Content

Use icons to drag-and-drop order. Click the icon next to a block to expand or collapse it. Click an item title to edit it in place. [Save Changes](#)

## Bb College Algebra Demo (Paul)

[Expand All](#) [Collapse All](#)

- 📁 **Course Information** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Lesson 0 - Intro to Lumen OHM** [Questions](#) | [Settings](#) | [Delete](#) | [Copy](#) | [Grades](#)
- 📁 **Module 0: Review of Fractions, Percents, and More** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Module 1: Polynomials and Factoring** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Module 2: Radicals and Inequalities** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Module 3: Relations and Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Module 4: Quadratic Equations and Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
- 📁 **Module 5: Polynomial and Rational Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
  - 📁 **Why learn about polynomials?** [Modify](#) | [Delete](#) | [Copy](#)
  - 📁 **Section 5.1: Polynomial Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
  - 📁 **Section 5.2: Polynomial Equations** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
    - 📖 **Textbook Section 5.2: Polynomial Equations** [Modify](#) | [Delete](#) | [Copy](#)
    - 📺 **Video Lesson Assignment 5.2: Polynomial Equations** [Questions](#) | [Settings](#) | [Delete](#) | [Copy](#) | [Grades](#)
    - 📄 **Assignment 5.2: Polynomial Equations** [Questions](#) | [Settings](#) | [Delete](#) | [Copy](#) | [Grades](#)
  - 📁 **Section 5.3: Rational Expressions and Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
  - 📁 **Section 5.4: Rational Equations** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
  - 📁 **Section 5.5: Applications of Rational Equations** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)
  - 📄 **Module 5 Review Assignment (33 questions)** [Questions](#) | [Settings](#) | [Delete](#) | [Copy](#) | [Grades](#)
  - 📄 **Module 5 Test (20 questions)** [Questions](#) | [Settings](#) | [Delete](#) | [Copy](#) | [Grades](#)
- 📁 **Module 6: Inverse, Exponential, and Logarithmic Functions** [Modify](#) | [Delete](#) | [Copy](#) | [NewFlag](#)



## Applications of the Derivative

### Questions

- ▶ Q.1 (0/1)
- ▶ Q.2 (0/1)
- ▶ Q.3 (0/1)
- ▶ Q.4 (0/1)
- ▶ Q.5 (0/1)
- ▶ Q.6 (0/1)
- ▶ Q.7 (0/1)
- ▶ Q.8 (0/1)
- ▶ Q.9 (0/1)

Grade: 0/9

[Print Version](#)

A piece of cardboard measuring 10 inches by 8 inches is formed into an open-top box by cutting squares with side length  $x$  from each corner and folding up the sides.

Find a formula for the volume of the box in terms of  $x$

$V(x) =$

Find the value for  $x$  that will r

$x =$

Get help: [Video](#)

Points possible: 1  
This is attempt 1 of 2.

MathQuill

Basic   Functions   Trig

$\frac{\square}{\square}$   $x^{\square}$   $x^{\square}$   $\sqrt{\square}$   $\sqrt[\square]{\square}$   $|\square|$   $(\square)$   $\pi$   $\infty$  DNE

$x(10 - 2x)(8 - 2x)$

← ↑ ↓ → ✕

Question ID: 1620  
[License](#)  
[Report Problem](#)

# Online Homework System

Large bank of teacher-created questions

Many question types

Algorithmically-generated problems

## Assignment 3.2: Quadratic Functions

### Questions

- ▶ Q.1 (0/10)
- ▶ Q.2 (0/10)
- ▶ Q.3 (0/10)
- ▶ Q.4 (0/10)
- ▶ Q.5 (0/10)
- ▶ Q.6 (0/10)
- ▶ Q.7 (0/10)
- ▶ Q.8 (0/10)
- ▶ Q.9 (0/10)
- ▶ Q.10 (0/10)
- ▶ Q.11 (0/10)
- ▶ Q.12 (0/10)
- ▶ Q.13 (0/10)
- ▶ Q.14 (0/10)
- ▶ Q.15 (0/10)

Grade: 0/150

[Print Version](#)

Consider the parabola given by the equation:  $f(x) = 2x^2 - 8x - 13$

Find the following for this parabola:

A) The vertex:  [Preview](#)

B) The vertical intercept is the point

C) Find the coordinates of the two  $x$ -intercepts

[Preview](#)

It is OK to round your value(s) to two deci

Get help: [Video](#) [Video](#)

Points possible: 10

This is attempt 1 of 5.

[Submit](#) [Jump to Answer](#)

Video

Secure | <https://ohm.lumenlearning.com/assessment/watchvid.php?url=http%3A%2F%2Fwww.y...>

Ex 1: Factorable Quadratic

Example 3

$f(x) = ax^2 + bx + c$

WE CAN SUBSTITUTE THIS X VALUE INTO THE FUNCTION

## Enriched OER Content

Instructional text (incl. editable text options)

Video lessons and tutorials

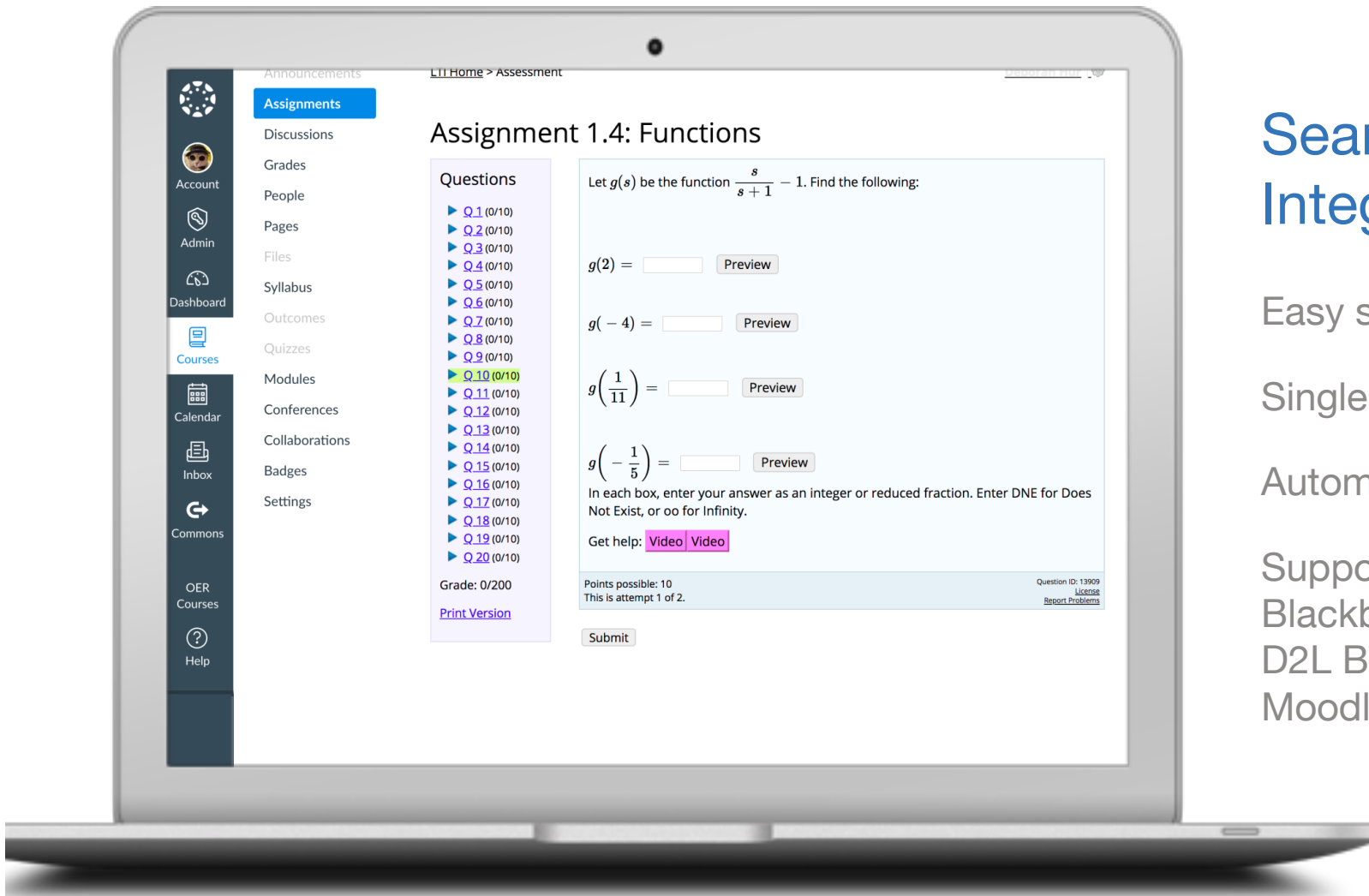
Huge, teacher-created question bank

Possible to include hints, directed feedback

Question Libraries	Number of Questions
Arithmetic/Pre-Algebra	3,200+
Algebra	10,400+
Trigonometry	2,600+
Calculus	3,100+
Differential Equations	580+
Math for Liberal Arts / Quantitative Reasoning	990+
Linear Algebra	190+
History of Math	260+
Statistics	2,800+

## Supported Question Types

number, calculated number, multiple choice, multiple answer, matching, function, string, essay, drawing, N-tuple, calculated N-tuple, numerical matrix, calculated matrix, interval, calculated interval, complex, calculated complex, file upload, multi-part, conditional



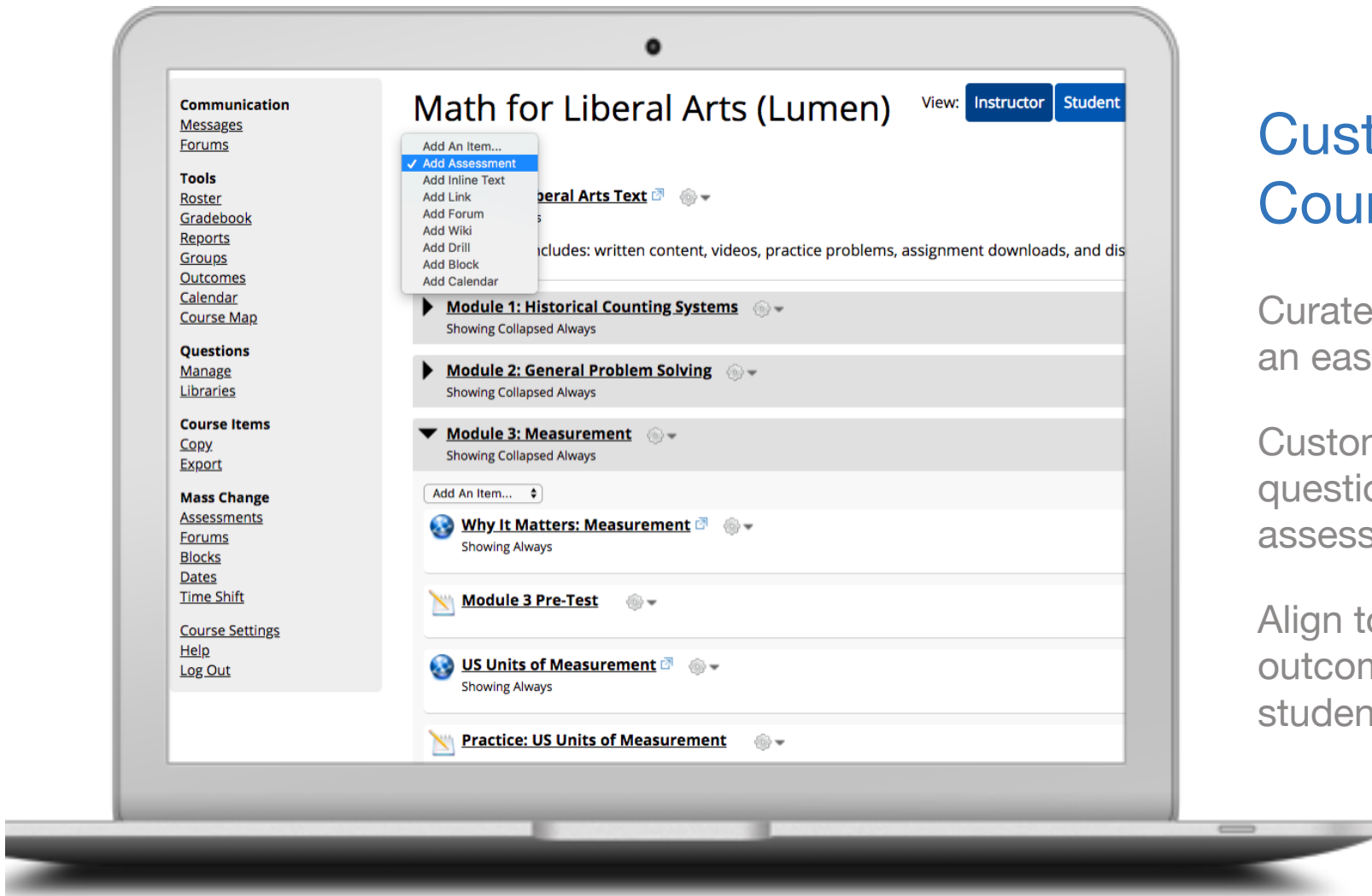
# Seamless LMS Integration

Easy set-up

Single sign-on

Automatic grade return

Supported systems:  
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D2L Brightspace,  
Moodle



## Customizable Course Design

Curated courses make an easy starting point

Customize activities, questions, assessments

Align to fit learning outcomes, term length, student needs, etc.

The screenshot shows the LumenOHM interface. At the top, the logo 'lumenohm online homework manager' is on the left, and the user 'Deborah Hur' is logged in with links for 'User Settings', 'My Classes', 'Log Out', and a 'Help' button. A navigation bar includes 'Course', 'Messages', 'Forums', 'Roster', 'Calendar', and 'Gradebook'. The breadcrumb trail is 'Home > Math for Liberal Arts (Lumen) > List Students > Manage LatePasses'. The main heading is 'Manage LatePasses'. Below it, a paragraph explains that students can redeem LatePasses for automatic extensions to assessments, but must do so before the due date unless the instructor has opted in. It states that Late Passes extend the due date by 24 hours. There are input fields for 'To all students: 1' and buttons for 'Add' and 'Replace'. A 'Save Changes' button is also visible. The table below has two columns: 'Name' and 'LatePasses Remaining'.

# Teacher-requested Bells & Whistles

LatePass option for assignments

Easy time shift to mass-update assessments

Time exception multiplier

Why choose Lumen OHM  
over traditional publishers or  
other OER options?

Key Features	Lumen OHM	MyOpen Math	MyLabs	Web Assign
Low cost: ≤\$25 for text+online homework	✓	✓		
Create and customize OER content	✓	✓	(✓)	(✓)
Robust system with algorithmic assessments	✓	✓	✓	✓
Faculty support: Onboarding, training, help	✓		✓	✓
Supported LMS integration with grade return	✓		✓	✓
Professionally maintained enterprise solution	✓		✓	✓
Admin & support for wide-scale adoption	✓		✓	✓
Maintain your own version control	✓	✓		
Curated, customizable template courses	✓	(✓)	✓	✓
Easy peer-to-peer sharing of courses, assessments, content, innovation	✓	✓		



What learning impact  
are institutions seeing  
with Lumen OHM?



## Learning Impact with Lumen OHM

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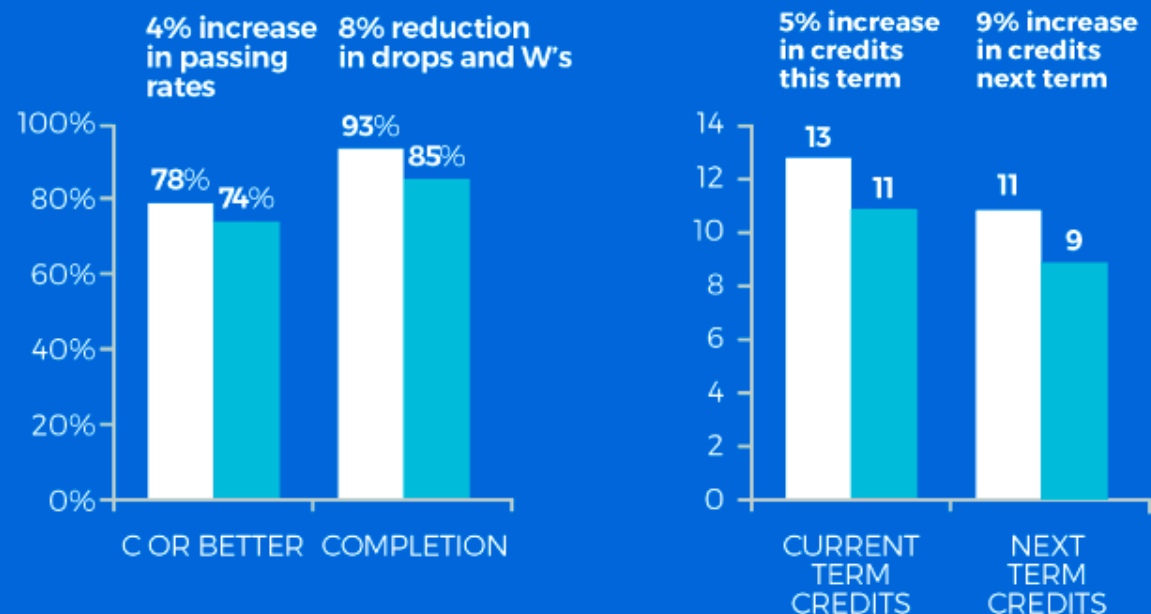
quantitative literacy pathway completion compared to fall 2016

Lumen OER improves student success.

Students perform as well or better in sections using OER.

## RESEARCH: LUMEN OER IMPROVES PASSING RATES IN MULTIPLE SUBJECTS

■ OER COURSES ■ TRADITIONAL COURSES



**SAMPLE:** 4,909 open course students, 11,818 traditional course students, 50 different undergraduate courses, 130 teachers, 8 institutions in 2014-2015 academic year.

**METHOD:** Quasi-experimental design with: Propensity Score Matching, Post Test Only.

**DEPENDENT VARIABLES:** Completion; C or Better; Credits Enrolled This Term; Next Term. Independent variable: Textbook condition. 3 covariates: including age, gender, and race.

**SOURCE:** Published in the Journal of Computing in Higher Education <https://link.springer.com/article/10.1007/s12528-015-9101-x/fulltext.html>

## Next Steps

Explore Lumen OHM

Check out Lumen OHM at [ohm.lumenlearning.com](https://ohm.lumenlearning.com)

Request a [Lumen OHM instructor account](#)

View recommended courses via our Course Catalog:  
[lumenlearning.com/courses](https://lumenlearning.com/courses)

How to learn more or adopt a course

- Use forms on any course page in the catalog
- Email [info@lumenlearning.com](mailto:info@lumenlearning.com)
- [Request a demo](#)
- Visit [lumenlearning.com](https://lumenlearning.com)

# Leaders in learning innovation choose Lumen



Thank you.

