

Improving Math Instruction with Open Educational Resources

Power in Numbers

Advancing Math for Adult Learners

LUMINARY LABS

Overview

1. Meeting the needs of adult learners
2. The opportunity in OER
3. Making OER work for you
4. How to get started
5. Lessons learned



Meeting the needs of adult learners

The Problem

Math skills significantly affect employability and career options.

The Need

Many adults lack access to high-quality education and training experiences.

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How can we make math education more accessible?

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How can we better support educators and adult learners?

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The Need

Many adults lack access to high-quality education and training experiences.

How can we make math education more accessible?

How can we better support educators and adult learners?

Could edtech be part of the solution?

**Power in Numbers: Advancing
Math for Adult Learners** is

working to help adults develop
the applied math skills they need
to succeed in the real world.

Our work, at a glance:

9

Subject matter experts

4

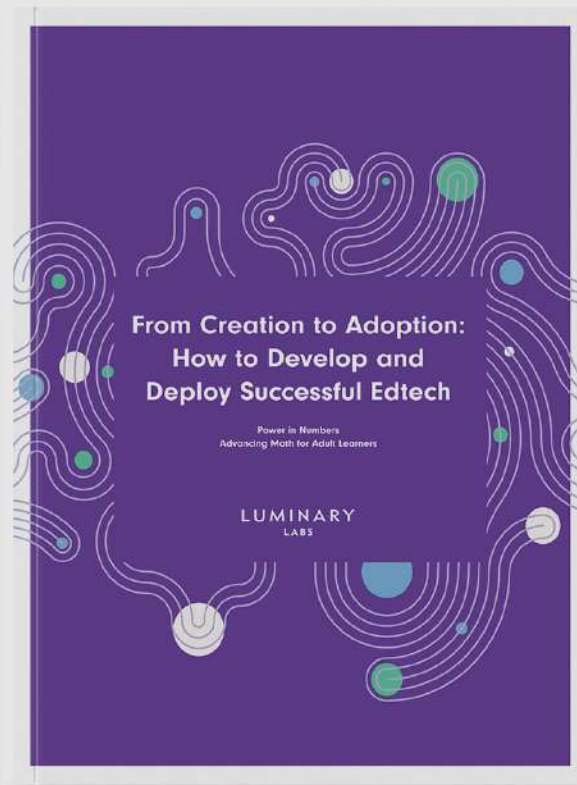
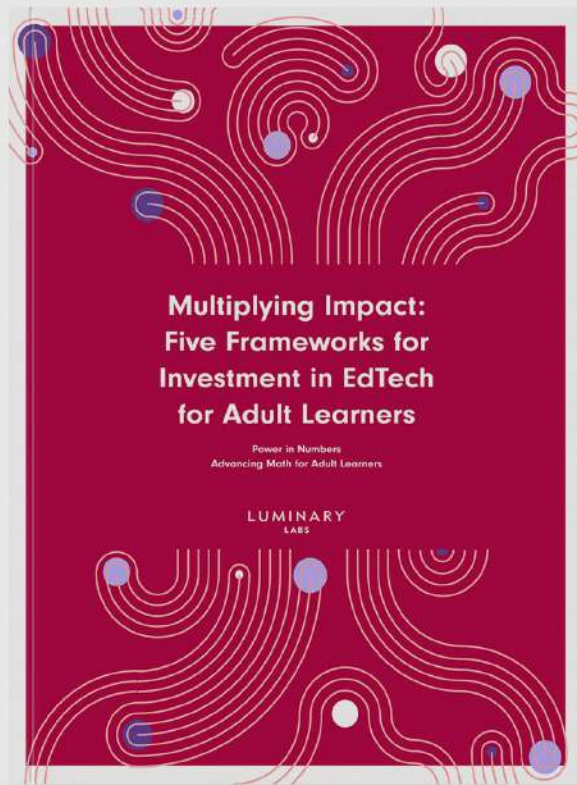
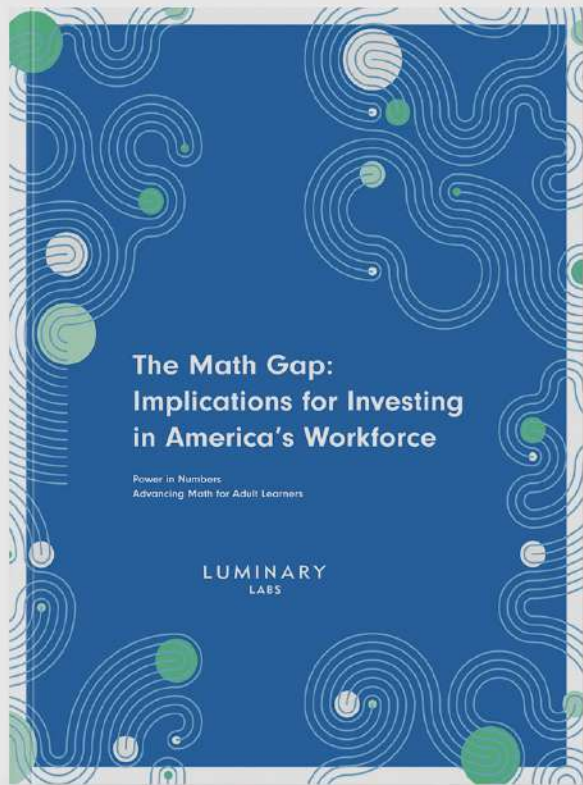
SME summits

37

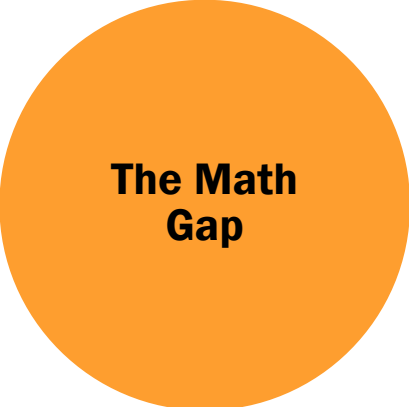
Educators from 21 states

100+

Resources reviewed



Power in Numbers reports available on LINC S!



**The Math
Gap**

Market Scan 1:

Identify adult learning market needs



**Multiplying
Impact**

Market Scan 2:

Define high-impact edtech categories



**From
Creation to
Adoption**

Market Scan 3:

Clarify pathways to edtech development



**Coming
2019**

In progress:

Summary report with case studies



The opportunity in OER

OER are teaching, learning, and research resources that are in the public domain or have been released under a license that permits free use and repurposing by others.

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OER can be:
Lesson plans
Tests
Experiments
Simulations
Course designs
Videos
Software
Teaching techniques
Group activities
Writing prompts
Textbooks
Learning modules

How does OER help?



Reduce cost



Increase efficiency



Improve instruction



Encourage contextualization



Expand access and equity

OER's flexibility is particularly beneficial to multimodal math learning

Solving math problems in more than one way

Show with numbers

Show with a picture or graph

Show with words

Explain your thinking

OER's flexibility is particularly beneficial to multimodal math learning

Solving math problems in more than one way

Subtraction

$$4 - 1 = 3$$



I bought four bagels and gave one to my friend. I was left with three.

Step 1



Step 2



Step 3



How does OER help?



Reduce cost



Increase efficiency



Improve instruction



Encourage contextualization



Expand access and equity

Source: [The Review Project](#)

94%

of educators who participated in our Power In Numbers user group said they would continue to use OER in their classrooms.

“OER...engage our non-traditional students in ways that allow them to develop conceptual understandings and to **redefine what it means to do math** and who they are (and can be) in a math classroom.”

User Group Member



**Making OER
work for you**

How to make OER work for you

1

Connect with communities and circles of support.

2

Trust in your experience to adapt OER to your needs.

3

Use OER as a professional development opportunity.

**Connect with
communities and
circles of support.**

OER adoption and usage does not happen in isolation

Educators expressed interest in more circles of interaction and more opportunities for inter-teacher collaboration.

“I could not believe the powerhouse of teachers that were gathered for this project, **I would have loved to work with them more.**”

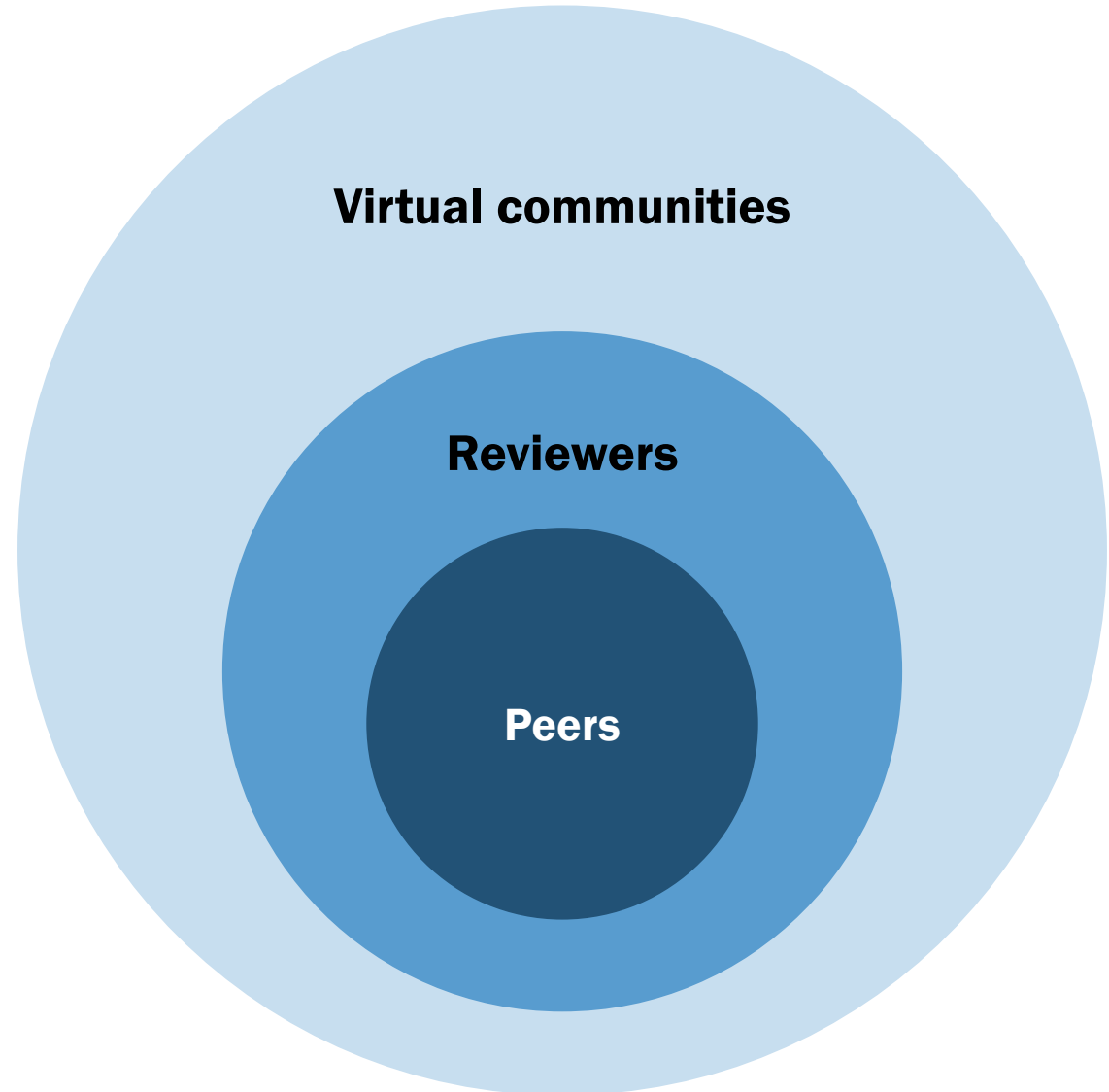
User Group Member

“We kept in touch and did just that and our proposal was accepted! **Since then, we’ve worked together on various projects** and in strengthening the ties...with other math communities. I’ve learned a lot...as a result of all this collaboration.”

User Group Member

Circles of support

Different types of connections provide complementary tiers of support, ranging from direct, peer-to-peer discussion to extended professional development communities.




Recommendations for educators

1

Expand your circles of support using different channels, including online groups, social media, and conferences.

Seek out like-minded peers and **form your own communities of practice.**

The image features a dark blue background with large, abstract white and dark blue shapes on the left side. The text is positioned on the right side of the image.

**Trust in your
experience to adapt
OER to your needs.**

Lesson integration is a hurdle to implementing OER

33%

of educators who participated in our Power In Numbers user group cited difficulties with integration as a major issue while testing OER in their classrooms.

“...was **hoping for more lessons that integrated technology into the classroom.** Maybe it was just the lessons that I chose, but when there was interactive games or documents, they seemed to be added just because and not integrated into the lesson.”


User Group Member

Recommendations for educators

2

Check OER Commons for curriculum guides to help integrate OER into your lesson plans.

Support other educators by **sharing tips and tricks** with the broader community.



**Use OER as a
professional development
opportunity.**

Develop your expertise by using and creating OER

100+

educators applied to be part of our Power In Numbers user groups — demonstrating the appetite for OER usage and creation within adult math.

User groups rated, reviewed, and categorized 70+ OER and created 20 new OER.

“I thoroughly enjoy working on math content and finding ways to **help teachers and students become comfortable and proficient** with math topics.”

User Group Member

“It would be a good experience for me to not only become more familiar with OER, but also help me **develop and share my own materials.**”

User Group Member

Recommendations for educators

3

Consider **creating your own OER** as a professional development opportunity.

Explore resources available through **online professional development platforms.**

Recommendations for educators

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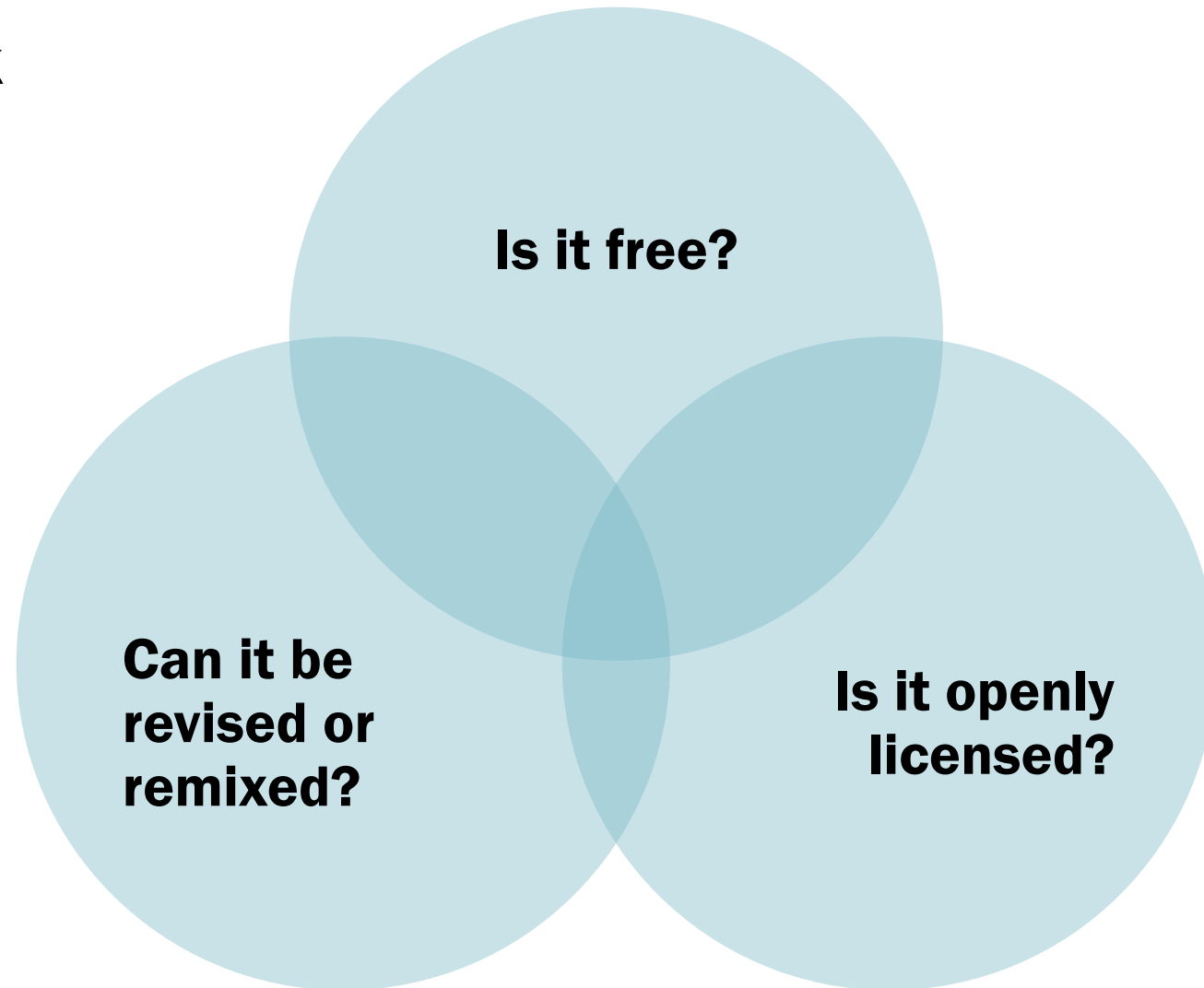
Explore resources available through **online professional development platforms.**

The background is a solid teal color with a repeating pattern of white line-art icons. These icons include a magnifying glass, a calculator, a bar chart, a line graph, a pie chart, a pencil, a ruler, a document with arrows, and various geometric shapes like circles and rectangles. The icons are scattered across the background, creating a busy, professional aesthetic.

How to get started

How to identify OER

Questions to ask



How to identify OER

Recommended resources

OER Commons (*recommended*)

oercommons.org

Merlot

merlot.org/merlot/index.htm

Creative Commons Search

search.creativecommons.org

National Science Digital Library

nsdl.org

SkillsCommons

skillscommons.org

How to identify OER on OER Commons



Create OER with Open Author

Open Author helps you build Open Educational Resources, lesson plans, and courses (on your own, or with others) — and then publish them, to the benefit of educators and learners everywhere. Select one of our authoring formats to get started:

 Resource Builder Create media rich documents. Start Authoring Learn more	For K-12  Lesson Builder Create interactive lessons. Start Building Learn more	For Higher-Ed  Module Builder Create interactive modules. Start Building Learn more
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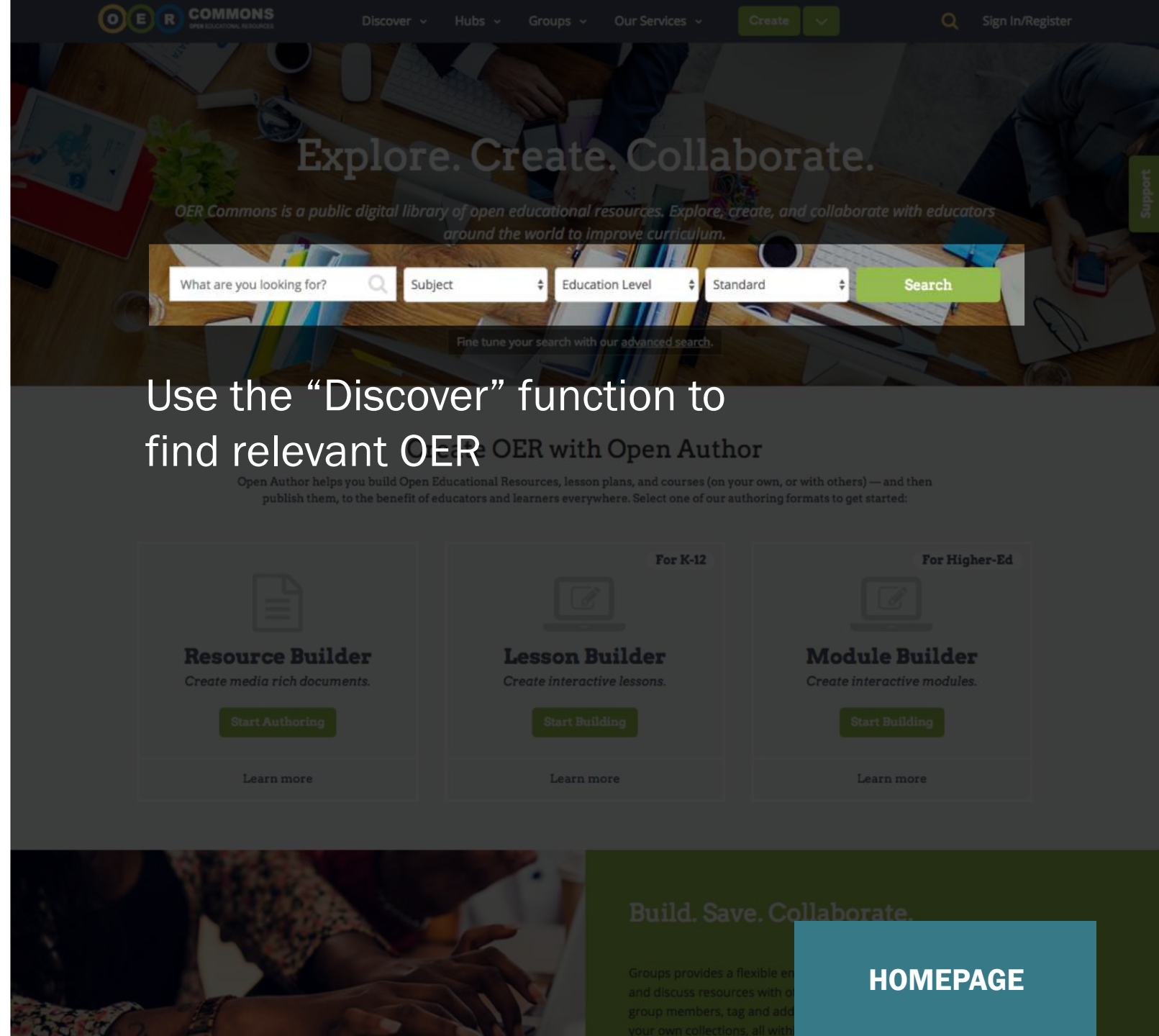


Build. Save. Collaborate.

Groups provides a flexible environment to explore, create, and discuss resources with other group members, tag and add your own collections, all with

HOMEPAGE

How to identify OER on OER Commons



Use the “Discover” function to find relevant OER

HOMEPAGE

How to identify OER on OER Commons

The screenshot shows the OER Commons search results page. The top navigation bar includes the OER Commons logo, a search bar, and links for Discover, Hubs, Groups, Our Services, Create, and Sign In/Register. The left sidebar is titled 'Refine your search' and contains two main sections: 'Education Standards' and 'Subject Area'. Under 'Subject Area', 'Mathematics' is selected and highlighted. Below it, various sub-topics are listed, including Algebra, Calculus, Functions, Geometry, Measurement and Data, Numbers and Operations, Ratios and Proportions, Trigonometry, Physical Science, and Social Science. The 'Education Level' section is also visible, listing options from Preschool to College. The main content area is titled 'Search Results (279)'. It shows search filters for 'Adult Education' and 'Mathematics'. The results are displayed in a list format, with each item showing a thumbnail, a title, a rating, a brief description, and metadata such as subject, material type, author, and date added. The first result is '[3ACTS] Nana's Paint Mixup - dy' by Dan Meyer. The second is '5 Pythagorean Solids' by Brent Purkape and Kerry Magruder. The third is 'A+ Click K-12 Math Test' by Igor Kokcharov. The fourth is 'Adding Integers to Real Life Problems'.

Refine your search

Education Standards

Subject Area

- Applied Science
- Arts and Humanities
- Business and Communication
- Career and Technical Education
- Education
- English Language Arts
- History
- Law
- Life Science
- Mathematics**
- Algebra
- Calculus
- Functions
- Geometry
- Measurement and Data
- Numbers and Operations
- Ratios and Proportions
- Trigonometry
- Physical Science
- Social Science

Education Level

- Preschool
- Lower Primary
- Upper Primary
- Middle School
- High School
- Community College / Lower Division
- College / Upper Division

Search Results (279)

Per page 20 By Title View

Selected filters: Adult Education Mathematics

[3ACTS] Nana's Paint Mixup - dy
Rating ★★★★★
Dan Meyer's Three Act Math task on proportions. Learners work with ratios ...
More
Subject: Education, Mathematics, Ratios and Proportions
Material Type: Activity/Lab, Assessment
Author: Dan Meyer
Date Added: 05/11/2018
Conditions of Use: No Strings Attached

5 Pythagorean Solids
Rating ★★★★★
This OER explores the basic organization of the Pythagorean Solids. It contains ...
More
Subject: Arts and Humanities, History, Mathematics
Material Type: Activity/Lab, Diagram/Illustration, Homework/Assignment, Lecture Notes, Primary Source, Student Guide
Author: Brent Purkape, Kerry Magruder
Date Added: 01/28/2016
Conditions of Use: Remix and Share

A+ Click K-12 Math Test
Rating ★★★★★
A+ Click is an interactive collection of more than 3700 math problems ... More
Subject: Mathematics, Algebra, Geometry
Material Type: Activity/Lab, Assessment, Game, Lecture Notes
Provider: aplusclick, NSDL Staff
Provider Set: Individual Authors, Mathematics Gateways and Resources
Author: Igor Kokcharov
Date Added: 02/16/2011
Conditions of Use: Remix and Share

Adding Integers to Real Life Problems
Rating ★★★★★
Adult Learners will review ...
More
Subject: Education,
Material Type: Inter

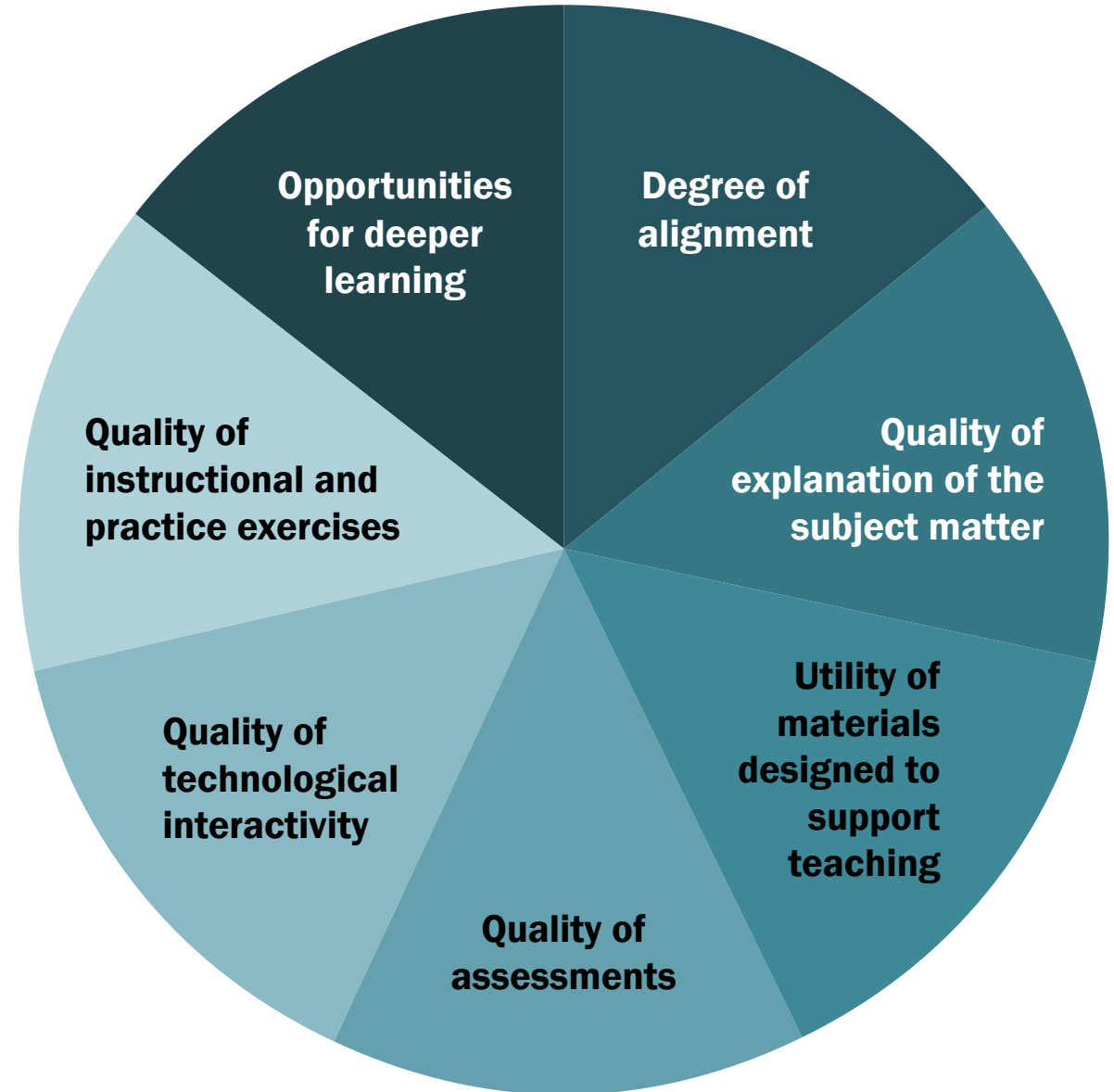
SEARCH RESULTS VIEW

How to review OER using the Achieve Rubrics

The Achieve Rubrics are designed to assess alignment to Common Core, quality, and effectiveness in meeting key educator needs and requirements.

How to review OER using the Achieve Rubrics

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How to review OER using the Achieve Rubrics

The Achieve Rubric is embedded into OER Commons

OER Commons Rating: ★★★★★ Save My items Comment Evaluate Tags Link Share

Achieve OER

Guidelines & Reminders

NR Degree of Alignment to Standards

Quality of Explanation of the Subject Matter

Applies to objects designed to explain subject matter. Used to rate how thoroughly subject matter is explained or otherwise revealed in the resource. Teachers might use object with whole class, small group, or individual student. Students might use this object to self-tutor. [Rubric 2](#)

3
 2
 1
 0
 N/A

Mouse over for score description

[+ Comment](#) [Clear rating](#) [Save & Go to Next Rubric](#)

Utility of Materials Designed to Support Teaching

Quality of Assessments

Quality of Technological Interactivity

Quality of Instructional and Practice Exercises

Opportunities for Deeper Learning [What's this?](#)

OER Rubrics (PDF Version) [View Results](#)

dy/dan

[Starter Pack](#) [Contact](#) [Speaking](#) [Archives](#) [Three-Act Math](#)

[3ACTS] Nana's Paint Mixup

By [Dan Meyer](#) · February 20, 2014 · [15 Comments](#)

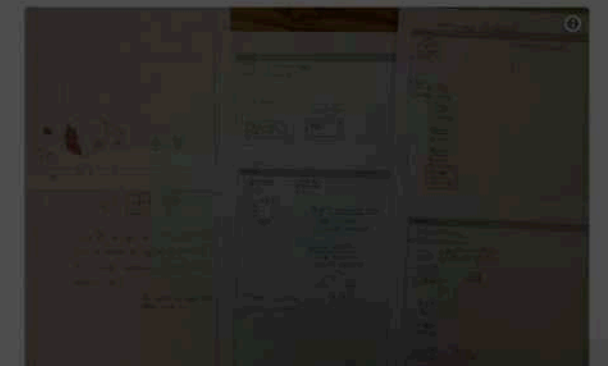
Nana's back.

I messed up her chocolate milk order a few years back. This is a new ratio task I first heard of at the Shell Centre last winter.



Here's the [download link](#), which includes the third act.

Featured Tweet



How to review OER using the Achieve Rubrics

What the review looks like

The screenshot displays the OER Commons interface for reviewing an activity. At the top, navigation links include 'Discover', 'Hubs', 'Groups', 'Our Services', and a 'Create' button. The main content area is titled 'Activity 15.1 Ticket to Algebra' and includes navigation for 'Previous' and 'Return to Search Results'. A 'View Resource' button is present on the right. The central focus is the 'Achieve OER' review table, which lists various criteria and their scores. Below the table are 'Tags' for the activity and a section for 'Conditions of Use'. On the right side, there is a 'View Resource' button, author information (Cheryl S. Knight and Janice F. Voss), subject (Algebra), provider (Appalachian Community College System), level (Adult Education), language (English), material type (Activity), and media format (Downloadable). A rating of 5 stars is shown, along with 12 users, 5 thumbs up, and 7 thumbs down. An abstract describes the activity as basic algebraic equations that may spark student interest in skills professional development. The activity is attributed to State University.

Achieve OER Average Score (3 Points Possible)

Degree of Alignment	N/A
Quality of Explanation of the Subject Matter	N/A
Utility of Materials Designed to Support Teaching	3 (1 user)
Quality of Assessments	N/A
Quality of Technological Interactivity	N/A
Quality of Instructional and Practice Exercises	2 (1 user)
Opportunities for Deeper Learning	3 (1 user)

Tags (7)

Activity Adult Basic Education Algebra Algebraic Equations GED Unknowns Writing Equations

Add New Tag:

Conditions of Use:

Custom License

Activity 15.1 Ticket to Algebra

← Previous Return to Search Results

View Resource

Author: Cheryl S. Knight, Janice F. Voss
Subject: Algebra
Provider: Appalachian Community College System
Level: Adult Education

Language: English
Material Type: Activity
Media Format: Downloadable

Rating: ★★★★★
12 5 7

Abstract: This activity covers basic algebraic equations and may spark student interest in skills professional development.

State University.

Comments

Leave your comment

How to review OER on OER Commons

Best practices

Score across **all seven criteria**

Leave a comment for each review

Add adult education “tags” as
necessary

Be honest

How to make OER

Exercise: Remix existing OER

Goals: To create a curriculum guide for a course using two or more existing OER

To post new OER curriculum guide on OER Commons

Remix existing OER

PLAN



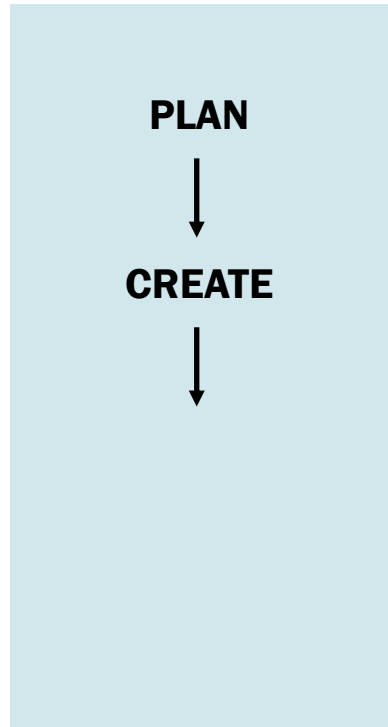
Step 1: Plan

- Browse OER guides on OER Commons; discuss findings with colleagues.
- Choose a focus area for your curriculum guide.
- Brainstorm and share 3-5 ideas with a colleague.

EXAMPLE

#PowerinNumbers

Remix existing OER



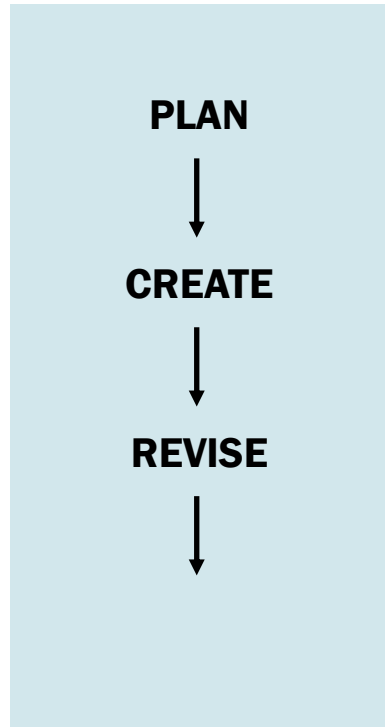
Step 2: Create

- Choose one idea.
- Create a draft OER curriculum guide using Microsoft Word or Google Docs.

EXAMPLE

#PowerinNumbers

Remix existing OER



Step 3: Revise

- Exchange draft curriculum guide with one to two colleagues.
- Review colleagues' curriculum guides; provide and collect feedback.
- Incorporate feedback into your draft.

EXAMPLE

#PowerinNumbers

Remix existing OER

PLAN



CREATE



REVISE



SHARE

Step 4: Share

After drafting and revising your OER in your preferred software, use **Open Author** to submit it.

The screenshot displays the Open Author interface. At the top left is the 'OER COMMONS' logo. Below it is a text input field with the placeholder text 'Click to edit title...'. To the left of the input field is a 'SAVE' button, and a tooltip above it reads 'Escape to cancel, Enter or Tab when finished'. To the right of the input field are two buttons: 'Write' (with a pencil icon) and 'Describe' (with a list icon). Below the input field is a rich text editor toolbar containing icons for undo, redo, bulleted list, numbered list, link, unlink, table, and help. The toolbar also includes text formatting options: Paragraph (dropdown), Bold (B), Italic (I), Underline (U), Text color (A), Background color (A), Link (chain), Unlink (chain with slash), [1] (link icon), and a calculator icon. On the left side, there is a 'Table of Contents' sidebar with a help icon, and two options: '+ Add New Unit' and '+ Add Heading'.

EXAMPLE

Lessons learned

Affordable Learning Georgia

CASE STUDY

Affordable Learning Georgia

The University System of Georgia

USG identified the link between affordability and student success.

ALG was created to support the adoption of OER like OpenStax textbooks to **increase rates of student retention, progression, and graduation.**

Affordable Learning Georgia

The University System of Georgia

USG identified the link between affordability and student success.

ALG was created to support the adoption of OER like OpenStax textbooks to **increase rates of student retention, progression, and graduation.**

CASE STUDY

Results:

170 OER projects completed and
60 projects currently in progress

320,996 students saved
\$55 million

Students provided with free course materials achieve **significantly better academic results**

Student surveys show **positive perceptions of OER**

Affordable Learning Georgia

Lessons learned

CASE STUDY

1

Academic freedom should always be at the core.

2

Meet educators where they are with different OER offerings.

3

Librarians, instructional designers, and administrators are critical OER stakeholders.

4

Build collaborative communities to improve responsiveness and remixability.

Power in Numbers Resources

Visit

LINCS

[lincs.ed.gov/state-resources/
federal-initiatives/power-in-numbers](https://lincs.ed.gov/state-resources/federal-initiatives/power-in-numbers)

Subscribe

The Math Minutes

bit.ly/TheMathMinutes

Stay tuned

Power in Numbers

Final report and case studies

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