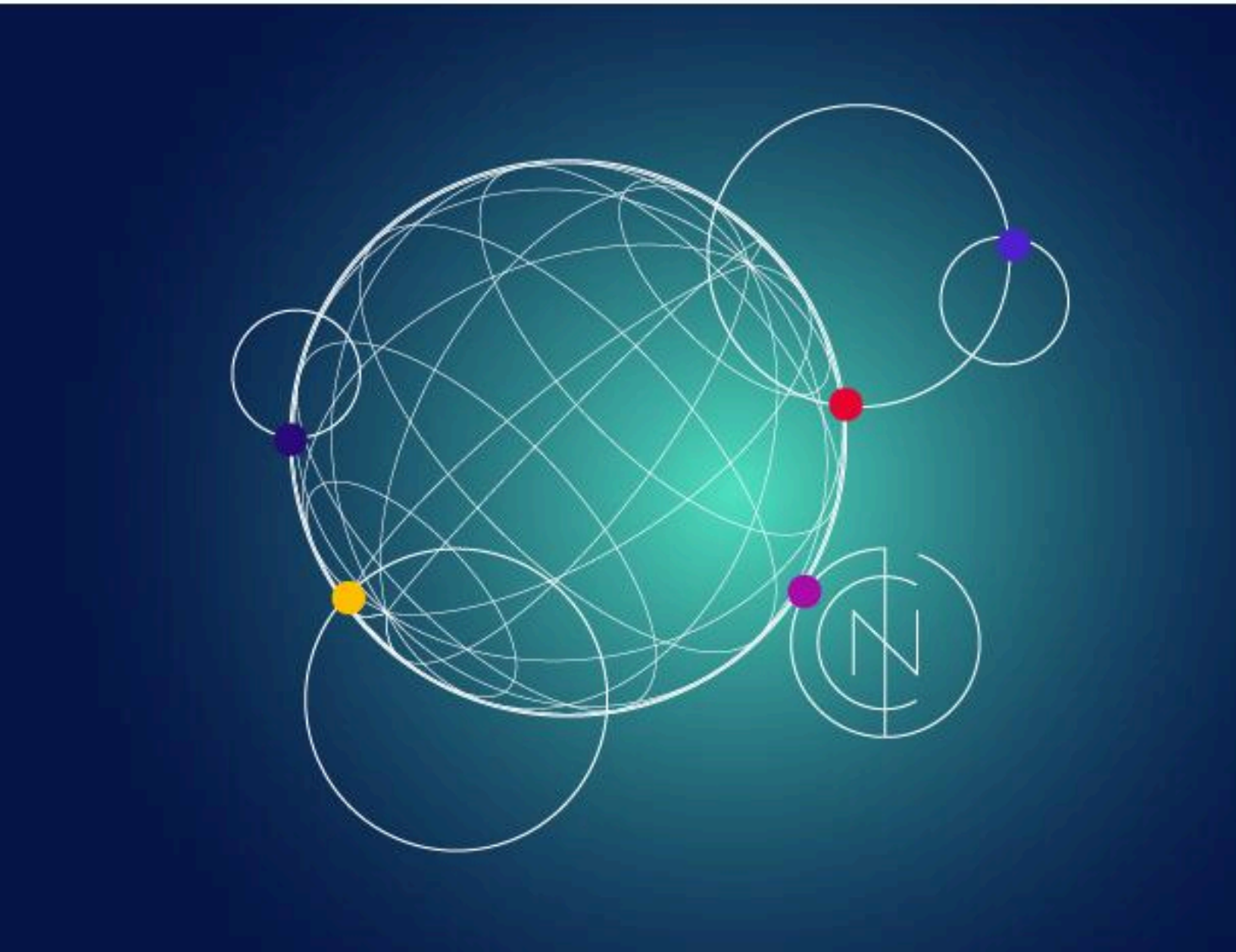
Teaching in the Open: Project-Based Learning and Professional Growth

30 October 2025



Introduction

The National Center on Education and the Economy (NCEE)'s global research shows that high-performing school systems provide time, resources, and support for teachers to develop and customize curriculum to meet the needs of students in their classrooms.[1] In the United States, teachers report that they spend a substantial amount of their non-instructional time supplementing or creating curriculum because they either lack materials or need to tailor existing materials to better engage and inspire their students.[2] Searching for, combining, and creating new materials is time consuming[3] and often done in isolation;[4] additionally, evidence suggests students are poorly served when teachers inadvertently select low-quality or below-grade-level resources.[5] Teachers have shown remarkable ingenuity in curating and creating materials to meet their students' needs. With the right structures of support, open pedagogy can amplify that creativity, helping educators harness the "decentralized online universe"[6] of available materials with intention, alignment, and shared purpose. This paper demonstrates how an open pedagogy approach to professional learning can support classroom innovation and build system-wide capacity for skilled curriculum adaptation.

"Through OEP, educators can learn how to refine teaching materials so they align more closely with their local communities and students while contributing to a shared collection of open resources and building a community that can advance professional growth."

Open pedagogy and open educational practices (OEP) center on the idea that educators and learners can co-create knowledge, openly share resources, and adapt materials to fit a range of contexts.[7] Educurious project-based learning (PBL) units and courses use a student-centered approach to connect core academic content with authentic problems and questions.[8] This approach positions teachers to adapt PBL curriculum to reflect the local context as part of their professional practice.

Open pedagogy with PBL emphasizes collaboration and the use of openly licensed materials that can be freely used, revised, and redistributed.[9] OEP not only expands access to content but also empowers educators to customize instructional materials to meet the needs of students.[10]

When applied to curriculum-based professional learning,[11] open pedagogy creates a participatory space where teachers collaboratively adapt and iterate on curriculum. Through OEP, educators can learn how to refine teaching materials to align more closely with their local contexts while contributing to a shared collection of open resources and building a community that can advance professional growth.

This paper explores the evolving concept of open pedagogy and its connection to professional learning. It then traces Educurious' efforts to integrate open pedagogy with PBL and the professional development of PBL teachers. Finally, it presents two models of collaborative professional learning and offers key considerations for effective implementation.

Open Pedagogy Is . . . ?

Defining open pedagogy is challenging.[12] Scholars offer a range of overlapping but distinct interpretations, shaped by evolving digital learning contexts and philosophies of openness. Since the concept of open pedagogy was introduced in the early 1970s,[13] it has become inextricably linked to open educational resources (OER), in particular with the opportunities that the internet and educational technologies offer for teaching and learning. Beyond the connection with OER, the meaning and use of the term *open pedagogy* has been murky:

- Wiley defines open pedagogy as "teaching and learning practices only possible in the context of the free access and the 4R [now 5R] permissions characteristic of open educational resources."[14] While this definition provides necessary qualities of an open pedagogy context, it falls short of defining what open pedagogy actually is.
- Riehman-Murphy and McGeary attempt to define the concept in their Open Pedagogy Project Roadmap with more specificity. They describe open pedagogy as student-centered, experiential, and renewable projects in which learners act as co-creators of knowledge rather than consumers.[15] However, this defines open pedagogy by projects and assignments. Pedagogy is, by its own definition, an *approach* to teaching to support learning, quite different from the assigned learning tasks. Examples of pedagogy include project-based learning, the Socratic method, behaviorism, constructivism, game-based learning, and blended learning, among many others. While not pedagogy, per se, the

assignments in Riehman-Murphy and McGeary's definition are certainly characterized by qualities associated with open pedagogy.

- Hegarty proposes a model for open pedagogy with eight key attributes: participatory technologies; people, openness, trust; innovation and creativity; sharing ideas and resources; connected community; learner generated; reflective practice; and peer review.[16] Implementation of this model is how Hegarty conceives of OEP, which involves a learning experience facilitated by teachers *and* peers that leverages OER to improve and innovate education.[17] While all eight of these attributes contribute to our understanding of open pedagogy, they do not alone form a practical definition.

- DeRosa and Jhangiani define open pedagogy as an access-oriented commitment to learner-driven education and as a process for designing tools that enable students to shape the public knowledge commons. This reinforces the distinction between open pedagogy and OEP in the Open Pedagogy Notebook. They go on to say that OEP "can be defined as the set of practices that accompany either the use of OERs or, more to our point, the adoption of Open Pedagogy."[18]

- Witt tackles the amorphous definition of open pedagogy head-on by deriving a taxonomy from 98 peer-reviewed articles and book chapters on the topic. Like Hegarty, Witt offers a clear delineation between open pedagogy and OEP with a simple distilled definition. Open pedagogy is:

  > any pedagogy informed by the practitioners' conscious identification with the open movement, open access, and open educational resources (OER). In effect, open pedagogy describes the interaction between the open movement and pedagogy, whereas open educational practices (OEP) and OER-enabled pedagogy describe the actual practices arising from that pedagogical approach.[19]

  In other words, open pedagogy is an approach to teaching that is guided by the spirit of openness, and OEP is the enactment or implementation of that approach in a learning environment, digital or otherwise. By this definition, for OEP to exist, the teacher must approach instruction through an open pedagogy lens.

Across these perspectives, open pedagogy can be understood as a pedagogical stance grounded in openness, collaboration, and learner agency, while open educational practices (OEP) represent the application of that stance in teaching and learning environments. This distinction shapes how the concept is applied throughout the remainder of this paper.

A New Context for Open Pedagogy

Traditionally, open pedagogy and OEP have been used in higher education learning contexts. DeRosa and Jhangiani emphasize a focus for open pedagogy and OEP "on how we can increase access to higher education and how we can increase access to knowledge—both its reception and its creation."[20] In much of the literature on open pedagogy and OEP, instructors and students in higher education are the default participants. However, OER materials are available and used in learning environments beyond higher education institutions, such as K–12 classrooms, online masterclasses, research, and professional training. Widening the aperture for applicable contexts for open pedagogy and OEP offers increased opportunities to bring a vision of a public learning commons to life. Through this expanded lens, Educurious brought teachers together across geographic distances in an online professional learning environment facilitated by practitioners of open pedagogy. They engaged Wiley's "5R activities"—*retain*, *revise*, *remix*, *reuse*, and *redistribute*[21]—to make and share localized adaptations to OER high school curriculum and create a teacher community network of support for implementation. This case illustrates a professional learning model that builds teacher communities, supports sustained adult learning, and contributes to the broader open education movement.

"Widening the aperture for applicable contexts for open pedagogy and OEP offers increased opportunities to bring a vision of a public learning commons to life."

Our Journey into OER and Open Pedagogy

Educurious stumbled into the landscape of open educational resources in 2018 with few expectations and little awareness of the movement itself. As we reflected on our journey and subsequent growth as developers of OER curriculum, we realized our progress can be mapped against the 5R's, particularly when viewed as a progressive sequence of simpler to more complex elements that help operationalize *openness*. An educational resource is considered *open* when a user is permitted to practice any one (or a combination) of these elements. Whether our mostly linear process was coincidental or consistent with other developers is a question to explore as our expertise grows and we learn more about the experiences of other OER developers.

Before describing our route through the 5R's, let's review the criteria as defined by Wiley:

1. **Retain**: make, own, and control a copy of the resource (e.g., download and keep your own copy)
2. **Revise**: edit, adapt, and modify your copy of the resource (e.g., translate into another language)
3. **Remix**: combine your original or revised copy of the resource with other existing material to create something new (e.g., make a [music or video] mashup[22])
4. **Reuse**: use your original, revised, or remixed copy of the resource publicly (e.g., on a website, in a presentation, in a class)
5. **Redistribute**: share copies of your original, revised, or remixed copy of the resource with others (e.g., post a copy online or give one to a friend)[23]

In this section, we share the story of how Educurious evolved toward fully realized open content and open pedagogy in three phases: our first foray into *retain* and *revise* (2017–2018); the pandemic-fueled push to add *remix* and begin thinking about *reuse* (2019–2022); and our current phase of integrating and field testing *reuse* and *redistribute* in our open materials (2023–2025).

Phase One: Retain and Revise (2017–2018)

Initially, our focus was primarily on the first two R's: *retain* and *revise*. Our interest was partly due to our organizational goals and theory of learning and partly due to the practical issues of disseminating materials.

To understand our interpretation of *retain*, it's important to know that Educurious has its roots in educational research and redesign. Our mission is not about profiting from educational materials but to lead systemic transformation in how young people engage in learning. We design PBL curriculum that is high quality, rigorous, and creative to provide essential tools for shifting the quality of teaching and learning in classrooms across the nation (and ultimately around the world).

To this end, we believe teachers occupy one of the most powerful positions in advancing educational improvement that is grounded in the science of learning, flexible instructional design, and future-ready outcomes. Educators continuously improve instruction, engage in reflective inquiry, and act in partnership with students, families, and communities to ensure learning is relevant and rigorous. Their impact extends beyond classrooms to the broader instructional and organizational structures of schools and districts.

Our theory of action is that teachers who have high-quality project-based curriculum to work from will more rapidly and effectively enact instruction that embodies the vision described above. It is important that teachers can access their own copy of the materials; or, in the parlance of the 5R's, teachers need a way to obtain and then *retain* the curriculum. Many districts provide approved curriculum either as physical materials (i.e., textbooks and workbooks) or as digital materials via online platforms such as Canvas and Schoology. For a freely available curriculum, it is also important that the files are compatible with district technology and student-facing digital systems.

In addition, it is essential to the Educurious PBL Design Framework that teachers are able to *revise* the curriculum to meet the needs of their students and reflect their learning context. Whether they want to change a word, add an introduction to a guest expert, rewrite the rubric to match their school's grading system, add images for multilingual support, or revise the final product criteria, we believe teachers must be able to edit curricular materials to reflect their classroom and teaching needs.

The Port of Seattle partnered with Educurious in 2017, and we launched a partnership to increase awareness of the Port's regional role and relevant career pathways through three engaging projects for middle school and early high school students. One outcome of the partnership was that the units would be freely available online to all interested educators as models of community-based and career-connected PBL.

By late 2018, we were ready to deliver the Port of Seattle units as our inaugural OER curriculum. We decided to post PDFs of the complete teacher's guide for each unit on our website, where they could be easily accessed with a direct link and freely downloaded. From embedded links in the PDFs, teachers could download all of the editable files from the server and save them on their personal system to revise as desired.

As our first foray into open content, this approach was functional but limited. We primarily shared materials and links to the units by word of mouth at conferences and coordinated with interested teachers by email. The materials weren't easy to find if teachers didn't know where to look and extra steps were needed to gain full access to the units.

Our contributions to the open movement at this point were limited to *retain* and *revise*. We did not yet engage an open pedagogy approach to professional learning or have a method for open distribution.

Phase Two: Remix and Reuse (2019–2022)

Following our first OER curriculum partnership, we were primed to go deeper into the open landscape, which became possible during the COVID-19 pandemic. Once schools were beginning to function again in late 2020, our work became driven by a request from a consortium of districts to develop a seventh-grade Washington state history (WASH) course. Six districts came together to initiate this project because of the need for high-quality curriculum that highlights multiple perspectives on Washington's history. The districts pooled their resources to cooperatively fund, co-design, and field test a year-long OER PBL course: five units that would align with state social studies standards, integrate literacy supports, and incorporate elements from the state-mandated Native American history curriculum.[24]

Two important influences on the development of the WASH course had a bearing on our relationship with the 5R's that enable open pedagogy. The first was funding from the Washington Office of Superintendent of Public Instruction (OSPI),[25] and the second was Creative Commons.[26]

In 2021, the WASH course received its first OER grant from OSPI. The funding supported the course development and required publication of the units on an open platform, OER Commons.[27] We learned that OSPI had established the Washington OER Hub[28] on OER Commons in 2020 and was actively promoting the use of open curriculum to districts and teachers in Washington. Exploring OER Commons led us to realize that open content came in every shape and size, for every grade level and content area, and from a wide variety of sources. While OER Commons provided a critical platform, it soon became clear that hubs like the Washington OER Hub served an important role in curating relevant and higher-quality content.

Creative Commons was the second major influence on our open content when it came to the *remix* component of enabling open pedagogy.[29] Developing OER units gave us a reason to become deeply familiar with the suite of Creative Commons licenses, which guided the types of external resources we selected to support the curriculum as well as how we licensed our materials to maximize their future use by teachers and contribute to a thriving culture of open education.

In order to uphold OER expectations for remixing materials, we needed to develop new protocols for vetting and attributing open-source materials and images. We realized the entire team needed to shift gears in both subtle and significant ways when producing OER curriculum that complied with Creative Commons licensing rules and sustained the spirit of a robust OER community.

The WASH course is a model of *remix* in action, enabled by the CC BY-NC license that allows teachers and any other noncommercial users of the materials to continue tailoring them through adaptation.

The opportunity to support teachers' *reuse* ("use your original, revised, or remixed copy of the resource publicly") of the WASH course came in 2022, when another OSPI grant funded the support of educators' adaptations that connected the content and skills of the WASH units with locally focused applications of curricular concepts, including partnering with local Tribal Nations to integrate Indigenous knowledge and community perspectives.

The purpose of the grant was to build teacher capacity to address the learning needs of their students by adapting the WASH curriculum to increase entry points for learners and incorporate local connections. Such adaptations are a defining feature of effective PBL implementation.

Adapting PBL curriculum can present a challenge for educators because it creates tension between the goals of maintaining fidelity to the curriculum as it is written while meeting the unique needs of students in their classrooms. We decided to develop a toolkit that would support teachers through the adaptation process. A group of WASH educators from across the state was convened to work out what the process looked like in practice. Supported adaptation and structured debriefs led to the development of adaptation principles and tools for teachers, which Educurious compiled in an *Educator Adaptation Guide for the Washington State History Course*.[30]

The adaptation guide hinted at open pedagogy for professional learning by providing clear guidance for the *remix* process and implicitly supporting *reuse*. However, it did not directly provide ways that teachers could share their adapted work publicly. Guided by survey feedback (see Table 1), this would become a clear focus in our next phase of development.

Table 1.

Exit survey from the Educator Adaptation Guide for the Washington State History Course			
Survey question: Based on your experience, why is it important to localize curriculum and student learning?			
"In order for the content of our curriculum to be at its most effective and valuable to our students, it has to be relevant and relatable." —Teacher at Highland Middle School, Mead School District	"So students will feel better connected to their community and may be spurred to seek additional connections and want to learn more on their own." —Teacher at Chief Umtuch Middle School, Battle Ground Public Schools	"Buy-in for learning is strongest when history is localized." —Teacher at Carbonado School District	"Localizing curriculum makes what students learn in the classroom more relevant and relevancy increases engagement for students and helps them connect what they learn in the classroom directly to their lives." —Teacher at Chief Umtuch Middle School, Battle Ground Public Schools

Phase Three: Redistribute (2023–2025)

In 2023, a serendipitous opportunity launched Educurious's ability to more fully support *redistribute*, the last 'R' of Wiley's framework. This happened when Educurious acquired Sprocket, a platform that was originally designed by Lucas Education Research to host OER PBL curriculum while it was the subject of several large-scale randomized control trials. The research found that PBL is an effective model for achieving equitable learning outcomes.[31] In addition to hosting the curriculum, Sprocket was built with features that enabled coaches and facilitators to support implementation and allowed teachers to adapt the curriculum and share their adaptations within and across groups. These features created conditions for Educurious to finally support the redistribution of teacher-adapted versions of PBL units and resources and explore open pedagogy for educator professional learning.

We knew the adaptation features of Sprocket would be instrumental to our support of OER and open pedagogy. But a review of Sprocket's implementation data revealed that explicit support would be needed to kick-start teacher use of its adaptation tools and opportunities.

We believed intentionally designed and facilitated online communities on Sprocket could provide educators with a space to come together within and across school systems to share resources, learn and deepen their understanding of PBL and open pedagogy, create and share adaptations, and collaborate and problem-solve to meet the learning needs of students across diverse contexts. And by leveraging open pedagogy to design professional learning, we would be able to support teachers in making principled adaptations to tailor curriculum for their local context while preserving the rigor, content, and key PBL practices of the original, researched curriculum.

In 2024, after Educurious merged with the National Center on Education and the Economy (NCEE), we launched a pilot effort to field-test a supported Sprocket educator community and enlisted an NCEE-developed AI tool, Teaching Partner, to help. With the support of the William and Flora Hewlett Foundation, the AI engineering team, teacher leaders, and the Educurious team, Teaching Partner was customized to help teachers make principled adaptations to localize Sprocket curriculum for specific geographic and cultural contexts. This helped expedite teacher learning by quickly generating suggestions guided by carefully designed prompts that would support, but not replace, the role of the teacher in adapting curriculum. Teaching Partner offered relevant resources, pedagogical tips, and student scaffolds while preserving teachers' autonomy and creativity.

In the following sections, we'll describe in greater detail how we introduced teachers to this process and developed a shared OER workspace, but for the purposes of this retrospective description of Educurious's progressive integration of the 5R's over the last eight years, it is worth

emphasizing that harnessing a digital platform capable of supporting teacher adaptation allowed us to check off the last boxes of the 5R's.

Sprocket is a unique platform in that it exclusively hosts full courses of PBL curriculum. However, there are other spaces where educators can publicly share and redistribute resources and adaptations, such as OER Commons or one of the many CC-enabled platforms highlighted by Creative Commons.[32] Something for educators to consider, then, is where they want to establish roots and a community that will sustain their needs and make use of their contributions to the OER knowledge base.

Open Pedagogy and Professional Learning

Curriculum-based professional learning immerses teachers in the instructional materials they will use in the classroom.[33] An open pedagogy approach to curriculum-based professional learning offers teachers the opportunity to engage with OER instructional materials and customize them for authentic, relevant learning experiences for their students.

Educurious has historically championed curriculum-based professional learning for PBL without intentionally connecting it to any kind of open framework. The 2023 acquisition of Sprocket helped surface the connections between what we were already doing and open pedagogy. This prompted us to develop goals for Educurious's OER PBL curriculum and explore how to integrate open pedagogy into our design of professional learning. We identified two models of professional learning for teachers using OER PBL.

As we considered how these models should be designed, we drew on research that shows the two enabling conditions most consistently cited for successful scaling of PBL are teacher agency and strong, aligned professional learning, followed by teachers' perception of increased student engagement.[34] Informed by this research, we gave the models working titles of *Scale Wide* (cultivating a teacher learning community across geographic distance) and *Scale Deep* (cultivating a teacher learning community within a school system).

In keeping with the research on PBL, our understanding of scaling as a way of building teacher capacity and achieving deeper learning and engagement is based on the four interconnected dimensions detailed by Coburn:[35]

- **Depth:** A change in classroom practices that goes beyond resources or teaching methods and is integrated into everyday teaching and learning, school routines, and existing systems
- **Sustainability:** The ability to endure change over time
- **Spread:** The expansion of changes, including norms, principles, and beliefs, across and within classrooms, schools, and districts
- **Ownership:** A reform that shifts from external to internal ownership when districts, schools, and teachers develop the capacity and care to sustain the change.

Scale Wide

The Scale Wide model is an intentionally designed and facilitated online community to provide educators implementing a shift to PBL in a particular content area (e.g., science, social studies, language arts) with a space to consistently come together across systems without geographic barriers. Anyone with the internet can access Sprocket's OER curricular resources, join a facilitated public course group, learn and deepen their understanding of PBL pedagogy, create and share adaptations to resources, and collaborate and problem-solve to meet the learning needs of students across diverse contexts. Our hope is that building this kind of open community can address challenges to sustaining change initiatives for PBL, such as isolated teachers, rural geography, and a lack of access to professional learning.

An example of the Scale Wide approach is the program designed for a collection of Latine and Asian American, Native Hawaiian, and Pacific Islander (AANHPI) units. Teachers of the curriculum may be the only ones teaching the subject in a school or district. With support from the Library of Congress Teaching with Primary Sources program, Educurious designed a series of free, online professional learning workshops to prepare high school teachers to engage their students with primary source–based OER PBL units and analytical tools that aid in content knowledge acquisition and the development of historical literacy skills. In each workshop, teachers strengthen skills and strategies for PBL, deepen their content knowledge, build a professional support community, and learn how to make principled adaptations to localize the curriculum. As

curriculum-based professional learning, the workshops guide teachers through each unit's launch lesson from a student perspective. Teachers create versions of student products and walk through an internalization process to understand each unit's arc of learning, key content and skills, PBL practices, and assessments. The AANHPI and Latine units address complex social and cultural issues through multiple perspectives. Participants spend time in each workshop learning and sharing strategies for teaching about these issues respectfully and honestly. For teachers who have little background knowledge about the subject, are not members of the units' featured communities, are teaching in isolation, or are learning PBL pedagogy, having peer and professional learning support with the Scale Wide model can have great value.

As presented in Table 2, the implementation of the Scale Wide model touches on all of the 5R's of open pedagogy through the OEP leveraged in professional learning. The open pedagogy approach to professional learning in the Scale Wide model has been well received. Participants have returned consistently for workshops and championed PBL, the OER curriculum, and the professional learning program.

Table 2.

	SCALE WIDE Cultivate a teacher learning community across geographic distance.	**SCALE DEEP** Cultivate a teacher learning community within a school system.
RETAIN	Provide participants with their own copies of the PBL curriculum.	
REVISE	Support teachers with editing their copies of the resources to differentiate for learning needs, such as multilingual learners, pacing, and standards alignment.	
REMIX	Provide guidance for teachers to make localized adaptations by combining their copies with other existing materials (e.g., replacing examples, adding relevant local resources, and/or changing the project to address a community issue). Materials become increasingly place-based depending on the extent of remixing.	
REUSE	Teachers use their original, revised, or remixed copy of the curriculum publicly when they teach it.	Adaptation teachers provide professional learning for all teachers within the system using the remixed copy of the system-specific resource. This process develops teacher leadership, especially if they are designated as coaches or leaders for ongoing implementation support. All teachers across the system use their own version of the remixed curriculum (that they may have made additional revisions to) publicly when they teach it.
REDISTRIBUTE	At any time, teachers can share copies of the original, revised, or remixed resource with others. This includes sharing during professional learning and with others in the building, district, or publicly online.	Individual teachers or professional learning communities in the system can continue to refine and share their adaptations in the closed workspace shared with their colleagues. Content (e.g., science) specialists or coordinators can make changes to their customized version of the original Sprocket curriculum that are contained within the system's shared workspace. Remixing and revising can be done by a single admin user with backend access to the curriculum to make changes for all users in the system.

Scale Deep

The Scale Deep model is also an intentionally designed and facilitated online community for educators implementing a shift to PBL, but it is bound within a particular education system. Members of the system (e.g., school district, charter network, educational service district, private school consortium) are brought together in a privately shared online curriculum workspace (e.g., Sprocket Group, Google Group) for which open pedagogy professional learning is provided. With their education system peers, teachers of OER PBL curriculum adopted by their system can learn and deepen their understanding of PBL pedagogy, create and share adaptations to resources, and collaborate and problem-solve to meet the unique learning needs of their students. The outcome is a significantly revised and remixed curriculum that is place-based for the community in which the system sits. Our hope with the Scale Deep model is that teachers can receive targeted support for their specific student populations and other unique aspects of their system's context while maintaining consistently high-quality PBL implementation. Within a system, teachers can collaborate and support one another across buildings, which can help weather some of the challenges of system-wide integration of PBL. System-level administrators can update curriculum adaptations in the shared workspace and those changes can reach all of the educators seamlessly.

An example of the Scale Deep model is our work with a school district on an unincorporated U.S. island territory that adopted the K–5 OER PBL science curriculum on the Sprocket platform. The year-long comprehensive curriculum was aligned to the Next Generation Science Standards and end-to-end PBL. To support affordability, the curriculum was intentionally designed to have minimal materials that could easily be procured at a low cost. This was an essential decision factor for a location that must consider the high cost of shipping for most science curriculum purchases. However, the curriculum was originally designed for implementation in schools in the continental United States. The scientific phenomena that grounds the learning were often irrelevant to the students on the island. For example, a third-grade unit about animal adaptation used squirrel adaptations as the anchoring phenomenon. There are no squirrels on the island, which made the phenomenon too distal for students to care about or understand well. PBL intends to engage students with authentic and relevant learning experiences; teachers in this district knew the curriculum needed adaptation to meet this expectation.

The curriculum already supported the 5R's by virtue of being OER; however, the Scale Deep model could greatly facilitate the *reuse* and *redistribute* elements with a principled, supported approach to adaptation that would meet the high-quality expectations of the district while sharing a localized and culturally relevant version of the curriculum across the system. The consistency and coherence of this approach mitigates the effort and risk inherent in the potential outcome of teachers adapting in their own way on their own.

This district's context provided fertile ground for creating enabling conditions for scaling PBL: teacher agency; strong, aligned professional learning; and the opportunity to increase student engagement.[36] Critically important, the district had two strong champions of OER curriculum leading their science teachers who could help launch and sustain a teacher community and shared workspace on Sprocket, where a team of teachers could adapt the curriculum to better reflect the island's culture and geography and share it across the island's 26 elementary schools and 8 middle schools.

Supported in part by the William and Flora Hewlett Foundation, Educurious partnered with the island school system to develop a set of three adaptation principles to make localized adaptations throughout the curriculum that increased relevance and engagement for students. These principles were informed by research[37] and our experience designing the Washington state history adaptation guide. The adaptation principles are:

1. Make it authentic.
2. Localize to the community.
3. Center students' identities and interests.

Guided by these principles, Educurious, the island school system leaders, and a science teaching consultant designed an open pedagogy professional learning program to create a deeply student-centered version of the K–5 Sprocket curriculum. The Scale Deep professional learning program was created for a subset of adaptation teachers who, in turn, provided island-wide professional learning for all of the K–5 science teachers.

Like Scale Wide, a Scale Deep model for K–5 science engages all of the 5R's of open pedagogy, but with differences in the *reuse* and *redistribute* processes noted in Table 2. This can be attributed to the different purposes for each model. Scale Wide is intended to bring individual teachers together across geographic distances in online professional learning communities for PBL, while Scale Deep is designed to bring teachers from within an education system together to support system-wide integration of PBL.

The open pedagogy approach to professional learning in the Scale Deep model has been implemented by three large school systems. We have yet to understand the extent to which this model of system-wide integration can support teachers with open pedagogy professional learning. Anecdotal feedback suggests that teachers feel more ownership of the curriculum than with a traditional adoption, students experience increased learning and engagement, and teachers seek to grow their professional practices and leadership.

Relationship Between OER and PBL products

Well-designed and well-implemented PBL experiences conclude with a culminating event or public product with an authentic audience. This is an opportunity for students to showcase all of the knowledge and skills they learned through the course of instruction and project work. They bring their learning to the world beyond the classroom, often with opportunities to take some kind of civic action. One important adaptation that OEP affords in PBL is enhancing the final product.

Whether with a Scale Wide or Scale Deep model, when teachers have been supported in a community of practice by OEP and open pedagogy for professional learning, the curriculum they use in the classroom is tailored to maximize learning and engagement for *their* students. As one teacher participating in a WASH adaptation workshop described, "My students see the negative aspects of our community every day. There are a lot of great things (past and present) about [city]. [Localizing curriculum] helps them to see the forest through the trees."[38] During professional learning, teachers can begin to consider what meaningful opportunities exist for students to share their products with the broader local community in a meaningful way. Doing so fosters a sense of civic responsibility, agency, and pride in students' work. To prepare for this, teachers must *revise* and *remix* the PBL OER curriculum to ensure students are answering the driving question with an authentic application of their learning—the final product—and that there is an authentic venue for sharing students' creative, collective actions in the community. Starting this process during collaborative professional learning helps teachers backward plan for a coherent learning experience. By co-creating a comprehensive curriculum that specifically speaks to certain students' lives, communities, cultures, issues, and interests, engagement is optimized for deep learning.

Conclusion

After our retrospective analysis of our journey through open pedagogy, we have learned that it offers more than a framework for sharing resources. It provides a transformative approach to teacher professional learning that can foster a sense of ownership, a collaborative community, and the development of curricular adaptation skills. Leveraging these practices ensures that teacher and student learning aligns with local contexts, student interests and experiences, and community connections.

In our experience, an open pedagogy approach maximizes the benefits of professional learning while producing a highly relevant PBL curriculum and contributing to the open movement. The model has also laid the groundwork for ensuring that capacity, resources, and expertise grow within a system over time.

However, as with all ambitious initiatives, there are some considerations for implementation. For one, adaptation requires a significant investment of time. Time needs to be allocated for several phases of the work, including onboarding teachers to the technical and pedagogical revision process, the internalization and adaptation of units, and sharing the finalized curriculum with a cohort of teachers. Our experience sharing Teaching Partner with the Scale Deep cohort suggests AI tools can be a powerful way to accelerate adaptation with an open pedagogy approach.

Once adapted OER materials have been rolled out, maintenance becomes a logistical and financial challenge. Most funding does not include maintenance in the budget; therefore, keeping materials current becomes an obligation either for the original developers or current users.

Another consideration with adaptation is quality control, because teachers are at liberty to make any adaptations they want without oversight. This is why professional learning is critical. Teachers can learn how to make principled adaptations and retain the key practices of PBL, which infuses some degree of quality control. To help ensure the effectiveness of adapted curriculum, professional learning communities (PLCs) or other systems can provide opportunities to share and act upon student work, data, and other district benchmark measures. Our Scale Deep model can add a layer of administrative review of adapted curriculum and ensure quality per the standards of the system.

Additionally, Scale Deep is most impactful when using full OER courses (as opposed to individual units). Year-long courses create conditions for teachers to more effectively implement PBL while more sustainably building pedagogical expertise and capacity in a system. On the other hand, the Scale Wide model—which brings individual teachers together across distances—is more effective for rural systems, small districts, and supplemental curriculum.

Once these considerations are addressed, a significant benefit of open pedagogy is that teachers report a sense of ownership and professional fulfillment when they see visible change in the engagement of students with an adapted curriculum that reflects their interests and communities. Districts appreciate that money saved on curricular resources can be spent on professional learning and localized adaptation.

An important question for us to explore next is whether our design principles for adaptation provide enough guidance to support teachers while being flexible enough for broad application. We will also continue to refine our understanding of the role AI can have in supporting and accelerating the adaptation process. Future research would also help us examine outcomes for teachers and students as both groups engage with pedagogies that have the potential to supercharge factors that drive teacher excellence, student engagement, and academic achievement.

Notes

1. National Center on Education and the Economy, *NCEE Blueprint: Designing Systems That Work* (NCEE, 2024), https://ncee.org/blueprint.
2. Sy Doan, Ashley Woo, Anna Shapiro, Laura Bellows, and Emma B. Kassan, "Teachers' Use of Instructional Materials from 2019–2024: Trends from the American Instructional Resources Survey" (RAND Corporation, 2025), https://www.rand.org/pubs/research_reports/RRA134-30.html.
3. TNTP, *Teachers' Time Use: A Review of the Literature* (TNTP, 2025), https://tntp.org/wp-content/uploads/2025/06/Teacher-Time-Use-A-Review-of-the-Literature-TNTP-2025.pdf.
4. David Steiner, "The Unrealized Promise of High-Quality Instructional Materials," *State Education Standard* 24, no. 1 (2024), https://www.nasbe.org/the-unrealized-promise-of-high-quality-instructional-materials.
5. Jill Barshay, "Proof Points: Many High School Math Teachers Cobble Together Their Own Instructional Materials from the Internet and Elsewhere, a Survey Finds," *The Hechinger Report*, April 29, 2024, https://hechingerreport.org/proof-points-many-high-school-math-teachers-cobble-together-their-own-instructional-materials-from-the-internet-and-elsewhere-a-survey-finds; Morgan Polikoff and Jennifer Dean, *The Supplemental Curriculum Bazaar: Is What's Online Any Good?* (Thomas B. Fordham Institute, 2019), https://fordhaminstitute.org/national/research/supplemental-curriculum-bazaar; "Why Materials Matter," EdReports, accessed September 15, 2025, https://edreports.org/impact/why-materials-matter.
6. American Historical Association, *American Lesson Plan: Teaching U.S. History in Secondary Schools* (AHA, 2024), https://www.historians.org/wp-content/uploads/2024/09/American-Lesson-Plan-1.pdf.
7. Robin DeRosa and Scott Robison, "From OER to Open Pedagogy: Harnessing the Power of Open," in *Open: The Philosophy and Practices That Are Revolutionizing Education and Science*, eds. Rajiv S. Jhangiani and Robert Biswas-Diener (Ubiquity Press, 2017): 115–24, https://doi.org/10.5334/bbc.i.
8. Lucas Education Research, *Key Principles for Project-Based Learning* (LER, 2021), https://www.lucasedresearch.org/wp-content/uploads/2021/02/Key-Principles-for-PBL-White-Paper-1.pdf.
9. David Wiley, "Defining the 'Open' in Open Content and Open Educational Resources," *Improving Learning*, accessed September 15, 2025, https://opencontent.osrg/definition.
10. Anita Walz, "A Library Viewpoint: Exploring Open Educational Practices," in *Open: The Philosophy and Practices That Are Revolutionizing Education and Science*, eds. Rajiv S. Jhangiani and Robert Biswas-Diener (Ubiquity Press, 2017): 147–62, https://doi.org/10.5334/bbc.l.
11. Jim Short and Stephanie Hirsh, *The Elements: Transforming Teaching Through Curriculum-Based Professional Learning* (Carnegie Corporation of New York, 2020), https://www.carnegie.org/publications/elements-transforming-teaching-through-curriculum-based-professional-learning.
12. Anita Walz, "A Library Viewpoint: Exploring Open Educational Practices," in *Open: The Philosophy and Practices That Are Revolutionizing Education and Science*, eds. Rajiv S. Jhangiani and Robert Biswas-Diener (Ubiquity Press, 2017): 147–62, https://doi.org/10.5334/bbc.l.
13. Claude Paquette, "Quelques fondements d'une pédagogie ouverte," *Québec français* 36 (1979): 20–21, https://www.erudit.org/fr/revues/qf/1979-n36-qf1208689/51334ac.
14. David Wiley, "What Is Open Pedagogy?," *Improving Learning*, October 21, 2013, https://opencontent.org/blog/archives/2975.
15. Christina Riehman-Murphy and Bryan McGeary, "Introduction and Glossary," The Open Pedagogy Project Roadmap, accessed September 15, 2025, https://oeproadmap.psu.edu/introduction-and-glossary.
16. Bronwyn Hegarty, "Attributes of Open Pedagogy: A Model for Using Open Educational Resources," *Educational Technology* 55, no. 4 (2015): 3–13, http://www.jstor.org/stable/44430383.
17. Open Educational Quality Initiative, *Beyond OER: Shifting Focus to Open Educational Practices* (OPAL, 2011), https://www.oerknowledgecloud.org/archive/OPAL2011.pdf.
18. Robin DeRosa and Rajiv Jhangiani, "Open Pedagogy," Open Pedagogy Notebook, accessed September 15, 2025, https://openpedagogy.org/open-pedagogy.
19. Alan Witt, "Towards a Working Definition of Open Pedagogy," *International Journal of Open Educational Resources* 3, no. 2 (2020): 57, https://doi.org/10.18278/ijoer.3.2.5.

20. Robin DeRosa and Rajiv Jhangiani, "Open Pedagogy," Open Pedagogy Notebook, accessed September 15, 2025, https://openpedagogy.org/open-pedagogy.
21. David Wiley, "Defining the 'Open' in Open Content and Open Educational Resources," *Improving Learning*, accessed September 15, 2025, https://opencontent.osrg/definition. Updated from Wiley's 2017 criteria for openness to include "Revise" as a fifth R.
22. *Merriam-Webster Dictionary*, "mash-up," accessed September 15, 2025, https://www.merriam-webster.com/dictionary/mash-up.
23. David Wiley, "Defining the 'Open' in Open Content and Open Educational Resources," *Improving Learning*, accessed September 15, 2025, https://opencontent.osrg/definition.
24. "John McCoy *(lulilaš) Time Immemorial*: Tribal Sovereignty in Washington State," Washington Office of Superintendent of Public Instruction (OSPI), accessed September 15, 2025, https://ospi.k12.wa.us/student-success/resources-subject-area/john-mccoy-lulilas-time-immemorial-tribal-sovereignty-washington-state.
25. OSPI home page, accessed September 15, 2025, https://ospi.k12.wa.us.
26. Creative Commons home page, accessed September 15, 2025, https://creativecommons.org.
27. OER Commons home page, accessed September 15, 2025, https://oercommons.org.
28. "Washington OER Hub," OER Commons, accessed September 15, 2025, https://oercommons.org/hubs/washington.
29. Cable Green, "Open Licensing and Open Education Licensing Policy," in *Open: The Philosophy and Practices That Are Revolutionizing Education and Science*, eds. Rajiv S. Jhangiani and Robert Biswas-Diener (Ubiquity Press, 2017): 29–41, https://doi.org/10.5334/bbc.c.
30. Educurious, *Educator Adaptation Guide for Washington State History Course*, OER Commons, uploaded May 24, 2023, https://oercommons.org/courses/educator-adaptation-guide-for-washington-state-history-course.
31. Lucas Education Research, *Key Principles for Project-Based Learning* (LER, 2021), https://www.lucasedresearch.org/wp-content/uploads/2021/02/Key-Principles-for-PBL-White-Paper-1.pdf.
32. "OER," Creative Commons, accessed October 14, 2025, https://creativecommons.org/about/education/education-oer-resources.
33. Jim Short and Stephanie Hirsh, *The Elements: Transforming Teaching Through Curriculum-Based Professional Learning* (Carnegie Corporation of New York, 2020), https://www.carnegie.org/publications/elements-transforming-teaching-through-curriculum-based-professional-learning.
34. Lucas Education Research, *Enabling Conditions for Scaling Project-Based Learning* (LER, 2021), https://www.lucasedresearch.org/wp-content/uploads/2021/03/Enabling-Conditions-for-Scaling-PBL-White-Paper.pdf.
35. Cynthia E. Coburn, "Rethinking Scale: Moving Beyond Numbers to Deep and Lasting Change," *Educational Researcher* 32, no. 6 (2003): 3–12, https://doi.org/10.3102/0013189X032006003.
36. Lucas Education Research, *Enabling Conditions for Scaling Project-Based Learning* (LER, 2021), https://www.lucasedresearch.org/wp-content/uploads/2021/03/Enabling-Conditions-for-Scaling-PBL-White-Paper.pdf.
37. Emily C. Miller, Samuel Severance, and Joseph Krajcik, "Motivating Teaching, Sustaining Change in Practice: Design Principles for Teacher Learning in Project-Based Learning Contexts," *Journal of Science Teacher Education* 32, no. 7 (2021): 757–79, https://doi.org/10.1080/1046560X.2020.1864099.
38. "WA State History Cohort: Reflections & Feedback (Responses)," unpublished report (Educurious, 2022).