



Pearson



Using Learning Design to Build More Effective, Engaging Products

How Pearson is applying learning design at scale

In recent decades, the field of learning design has matured, bringing extensive research to bear on the creation of learning experiences and environments. Products and systems that effectively leverage learning design can deliver superior learning outcomes. As we design ever more sophisticated digital learning environments, it has become even more important to incorporate these research-based techniques into our work.

This is not easy. Well-designed educational technology has often lacked a learning sciences base, and many research-based education products have lacked a compelling user-centered design. How can world-class user experience (UX) design—*grounded in a fail-fast culture*—and educational research—*grounded in rigor*—peacefully coexist?

Three years ago, Pearson embarked on a journey to find out. This paper shares what we've learned and presents specific examples of how we are incorporating best-practice learning design in actual products.



Compiling principles, clarifying learning goals

To make learning design work in a complex product development organization, we needed to focus on two core issues that are so tightly interrelated, they are really two sides of the same coin:

1. Identifying and applying research-based principles offering the greatest value for learning
2. Specifying more detailed and actionable learning goals for every product and tightly linking them to objectives, content, assessments, and outcomes



Defining learning design principles we can rely on

At Pearson, product development involves professionals with many specialized skills: content creators, instructional designers, information architects, graphic designers, UX experts, and software developers, to name a few. For us to create coherent, successful learning experiences, they must all share common terminology and principles.

Capturing the principles

To that end, we tasked a team to synthesize the field's most well-supported learning design research: *What do we now know about learning?*

Many learning design principles are now very well established by research: we can be quite confident about them. Others are less well-established, or seem most applicable only with certain environments or learners. We know our principles will continue to evolve and expand, because we will ask more questions as we continue to build new products, solve new problems, and leverage new platforms and affordances. However, even in beginning the process, we already had deep resources to draw on.

Many solidly-established principles emerged as we explored the most reliable and up-to-date research to answer specific questions raised by our product team members. In other cases, we could establish principles proactively by performing formal literature reviews and drawing on published research syntheses and meta-analyses. When necessary, we performed original research. Increasingly, we are learning from analytics data generated by our instrumented products.

Transforming principles into practices

So far, we've identified 46 principles: research-based syntheses of targeted topics that offer actionable "points of view." To make sure they're practical in our environment, we've vetted them with both internal and external stakeholders, and looked for ways to complement work our teams were already doing.

For each principle, our teams can now explore concise definitions, examples, theoretical support, design impacts, and implications. They can also access detailed implementation recommendations, including many specific techniques that have been repeatedly shown to promote learning.

Inspired by common approaches to organizing learning science, our principles and recommendations now encompass:

- *Foundational issues*, e.g., formative and summative assessment
- *The nature of knowledge*, including the role of critical thinking and learning transfer
- *Practices to foster effective learning*, e.g., inquiry-based and mastery learning
- *Approaches to learning together*, such as peer tutoring and collaboration
- *Learning environments*, e.g., simulations and mobile learning
- *Moving learning science into the classroom*, including tactics to help instructors succeed

Building these has been challenging, but they now help us work together to integrate learning theory throughout our products, processes, methodologies, and organizational structures. Our teams now have a shared language and aren't constantly "reinventing wheels." Even where the principles are "classic"—for example, when they discuss scaffolding—they are accompanied with techniques that are detailed, current, and proven.

Our principles *don't* replace our expertise. They *do* help us establish a strong evidentiary basis for our choices about everything from content to affordances. They also enable us to build the entire organization's learning sciences capacity, without having to repeatedly answer the same learning questions. Moreover, they are *two-way*: product teams feed experience back upstream, so we can build better theory as we build better solutions. Put another way: we see our principles as iterative. They are dynamic understandings that evolve and deepen. As we watch learners use our products, we can improve both efficacy and theory.





Maintaining focused, consistent learning goals throughout product lifecycles

In traditional educational product design, development teams sometimes built products that aimed to be “all things to all people.” Often, the resulting products excelled at nothing. Assessments were sometimes misaligned with goals, so they captured inadequate information. Products sometimes looked great but failed to teach — or delivered superb pedagogy through ineffective interfaces that didn’t address real learner needs.

We can overcome these problems by identifying how to use principle-based design to develop a clearer path from problems to solutions. Through our principles, we gain deeper insight into what leads to better learning. We can then identify the gap between the *current* state — how students and instructors attempt to learn and teach now — and the *more ideal* state our principles point towards. That gap represents a learning need we can potentially address.

We now begin product development by clearly triangulating that need to specific user and market needs. Additionally, the principles become the foundation for our solutioning, giving focus to the proposed product features and tying them back to the learner needs.

Example: designing away distractions

For example, our new REVEL product responds to the reality that many college-level humanities and social sciences students come to class unprepared. Engaging with the homework materials is crucial to the learning experience in these disciplines, but many students don’t.

We have many tools to clarify problems like these, and their causes. We can use diary studies and ethnographies. We craft detailed personas to gain a textured understanding of our students and instructors, so we can meet them where they are. But we can also use our extensive base of learning design research to inform our questions and solutions.

So, we quickly recognized that students were easily distracted by conventional textbooks. This told us we needed to eliminate distractions: any extraneous cognitive load that doesn't promote learning.

Fortunately, our learning design work reveals many proven techniques for accomplishing this. REVEL segments all content into manageable pieces and presents it via a consistent structure. It provides strong signaling cues to highlight key material and places all relevant content on screen simultaneously to offer a continuous, uninterrupted experience.

Clarity about goals and learning design principles is key. In this instance, REVEL's developers, recognizing engagement as a key goal, resisted temptations to add media assets that require superfluous navigation.

Beyond making better decisions throughout the development process, we validate our explicit learning assumptions by evaluating REVEL's efficacy. The results of our efficacy studies feed back into the design cycle, helping us refine our understanding of how people learn in digital learning environments, and continually optimize REVEL's learning impact.



Example: promoting more effective peer collaboration

As we set out to enhance one of our writing tools, our upfront research identified opportunities to strengthen students' writing by improving their collaboration as peer reviewers. Our learning design principles supported this. We know it works, and we know how to make it work.

So, consistent with our research-based recommendations, we are providing more extensive just-in-time help for peer reviewers. They might recognize a run-on sentence but not know how to advise the writer on fixing it. We are researching how to best scaffold peer interactions, providing those insights exactly when needed. This won't just help the reviewer support her peer; it will also help her improve her own writing skills and confidence.

These examples show how top-level goals link to learning design principles and drive decisions made throughout development, and beyond. These goals and principles flow through objective setting and assessment, shaping decisions about everything from interactives to instructional patterns, platform interactions to assessment items.

Our developers continually validate their designs, asking: *Does this help solve the learner's problem, and make learning more effective, simpler, more enjoyable?*

Moreover, the story of design innovations like these doesn't end when the product ships. We continue to measure the impact of our designs until we're sure they're meeting our efficacy goals. Learning design is never a "once-and-done" process.

Iterating to improve everything we do

Many experienced ed-tech developers have seen new products proposed based on anecdote alone. Companies may make extensive investments to build them and only then discover that they don't perform well. At this point, further investments are often made to "bandage" the product with additional features, without facing its deeper problems.

We break that cycle by putting our learning designs in front of students—in harm's way—as early as possible. This involves extensive use of wireframes and lightweight testing tools. Increasingly, it also involves student co-design, where students play a deeper role in shaping future learning environments.

We've learned from experience that the first design solution isn't always the best, even though there's a deep human tendency for designers to fall in love with it. If students don't love our design idea, it might not be lovable!

Merely knowing this isn't enough, of course. We need to get our organizational culture and incentives right, too. For example, the commitment to revisit early design decisions requires leaders who mean it when they talk about learning from failure. So, too, our product development teams have needed to establish and refine new product development processes optimized for new digital learning environments. This has meant going well beyond the print-based learning experiences they were already world-class experts in developing.

Occasionally, a design itself hasn't failed, but designers need to explain it and illustrate its advantages more effectively. So, if we're presenting a concept map, do students know what those are and how they help? Do instructors know how to effectively apply them in their instructional activities? The necessary fixes aren't always complex or expensive, *especially if they're identified early.*

As testing progresses, we can overcome problems that compromise outcomes and build a strong case that our design will support learning. The very same work also helps us tightly define assessments to find out if the product works in real classrooms.



Applying learning design more effectively as we move forward

As we've said, transforming learning design into better outcomes is a long journey. Here are a few directions we're pursuing as we move forward.

Leveraging analytics

Even the most thorough testing relies on small groups of students. But today's instrumented products generate data from thousands or even millions of them. Using this data, we can quickly test our learning design assumptions at every level: high-level information architecture, time spent on task, even distractors in specific multiple-choice questions.

We can also extend analytics beyond student behavior—such as determining whether students perform better when faculty count a product's use for 20 percent rather than 10 percent of a grade. We can combine analytics with learning design to build richer, higher-value interactions with open educational resources (OERs) integrated into products. We can even gradually extend analytics across a student's school years, identifying and closing learning gaps before they prevent him from succeeding at higher levels.

Retrofitting older products

Just as learning design can support new product development, so too can it be used to improve older products that weren't originally designed with it. We can reassess existing products' designs through the lens of new learning science, identify the best opportunities to improve learning in future iterations, and pinpoint our investments accordingly.

Applying new technologies and affordances

Ed tech is notorious for applying “tech for tech’s sake.” By consistently grounding our work in the learning sciences, we can resist this problem while still leveraging emerging technologies when they do promote learning.

For example, affordances offered by mobile devices can be used to suggest brief study sessions while students are traveling to school or to re-engage students if they’ve been away from the app for an extended period of time. Learning design can help us properly space out practice, define its length, and determine how long to wait before providing reminders.

More speculatively, augmented reality devices might allow students to see nature from a botanist’s viewpoint or to look at buildings with an architect’s eye. Learning design may help us assess whether this would promote learning sustainably—after the novelty has worn off—and, if so, it may show us the best ways to do that.

Personalizing learning designs

Every learning experience is unique. A student will experience each part of a product differently, and her experience will change as she works with it. So, are we presenting the right amount of help? Can we adjust help to avoid expertise reversal effects, where too much help for experienced users actually decreases learning? As we become more sophisticated at applying learning design, we can increasingly personalize learning experiences, based on where each student is right now.



Promoting social learning

Students don't just learn from instructors: they learn from each other. We can identify principles of learning design that allows us to harness peer and social learning far more effectively than ever before. We are beginning to discover actionable insights about how learners learn from and with each other; how they can tutor each other more successfully, and how they can become more effective in collaborative projects and digital learning environments.

As we build this knowledge, we can deploy it in our products—and we have reason to believe this will make an important measurable difference in the outcomes we achieve. Those outcomes go beyond the classroom: in a world that values collaboration more than ever before, we can make an important contribution to students' workplace success long after graduation.



Learning design: It's hard, but it works

At Pearson, we've pioneered applying learning design theory and research at scale and measuring the results. It's hard work, not a panacea. But it has helped us strengthen our focus on what works and more tightly link goals to outcomes across the entire product lifecycle.

Learning design has been especially valuable in online learning environments, where it offers valuable opportunities to improve student and teacher interactions, helping them both make the most of limited time. Online and off, however, it is helping us shape learning solutions that are more efficient, relevant, and engaging. We believe it can do the same for you.

Learn more at [pearson.com/research](https://www.pearson.com/research)