



O'REILLY®

The new technologies impacting on-demand learning

Artificial intelligence, augmented reality, voice interfaces, and other emerging technologies are helping learners at their point of need.

The internet was just the beginning. Today, emerging technologies like artificial intelligence (AI), voice interfaces, and augmented reality (AR) are poised to radically change the nature of work—and learning. And in response, Learning & Development (L&D) and HR departments are changing what they do and how they do it. They have a new role to play: architects of dynamic learning ecosystems.

While the formal learning experiences at the center of most current L&D programs are as valuable as ever, L&D professionals now have a huge opportunity to bring more value to their organizations through on-demand, informal learning powered by new tech-enabled platforms and tools. With these new offerings, L&D expands its mandate and impact beyond “programs” to providing an ecosystem that enhances workers’ productivity precisely because it’s embedded in their daily routines and is right at hand when they need it.

Employees' expectations of technology are often shaped outside of the workplace. Voice assistants like Alexa, Siri, and Google Assistant may be available in as many as 55% of homes by 2022.¹ Smartphones and tablets are constantly by our side, letting us get directions or send a text. In many cases, these technologies are helping us become more productive outside of work.

Like checking the weather or searching Google to answer a quick question from a smartphone, we see similar behavior on O'Reilly's learning platform. A significant portion of learning events over the last year have been nonlinear—our users are frequently logging into the platform to answer a quick question, solve a problem, and return to their workflows. We're hearing from several clients that this type of behavior is helping their employees save time and be more efficient.

Emerging technologies such as natural language processing (NLP), voice interfaces, virtual reality (VR), and augmented reality (AR), among others, are likely to accelerate these nonlinear trends. Of course, these technologies will not replace the need for immersive learning experiences but will supplement them with access to high-quality tools and information at the point of need.

Point-of-need learning (aka on-demand or just-in-time learning) is not a new concept, but, until now, it's been tough to deliver. Most L&D departments have offered mostly linear e-learning modules

or traditional classroom experiences. Recent research from the Association of Talent Development (ATD) and the Institute for Corporate Productivity (i4cp) found that 88% of organizations use formal self-paced e-learning—and when they didn't rely on that technology, formal learning was delivered in a classroom.² This same report also found that 65% of surveyed organizations valued on-the-job training strategies, including coaching, rotational programs, knowledge-sharing initiatives, stretch assignments, and job-sharing opportunities. In our experience, however, such efforts are often department specific, ad hoc, and labor intensive, which makes them hard to scale and measure.

Point of need, but embedded or adjacent?

We believe that it's useful to consider two distinct kinds of point-of-need learning: performance support and performance adjacent. Performance-support technologies are directly embedded in the workflow itself (e.g., the digital adoption platform WalkMe³). Performance-adjacent tools are not embedded into a workflow but are easy to access and allow the learner to jump out of the workflow, get the answer or idea they need, and get back to work seamlessly. Performance-adjacent tools can be more cost effective and scalable than traditional performance support because they don't need to be customized to specific workflows or embedded in particular technologies.

¹ [businesswire.com/news/home/20171108005702/en/Juniper-Research-Amazon-Echo-Google-Home-Reside](https://www.businesswire.com/news/home/20171108005702/en/Juniper-Research-Amazon-Echo-Google-Home-Reside)

² td.org/research-reports/next-generation-e-learning

³ [walkme.com](https://www.walkme.com)

Performance-adjacent learning tools can encompass many workflow types as long as they minimize friction by making it easy to access information and quickly return to the job at hand.

While performance-adjacent tools don't need to be custom built, they do need to provide learners with precise and efficient help at their point of need. This is no small feat. People want the best and quickest solution. They *don't* want to read through several pages or watch an entire video, as formal learning experiences commonly require.

Enter the wonders of increasingly sophisticated technologies!

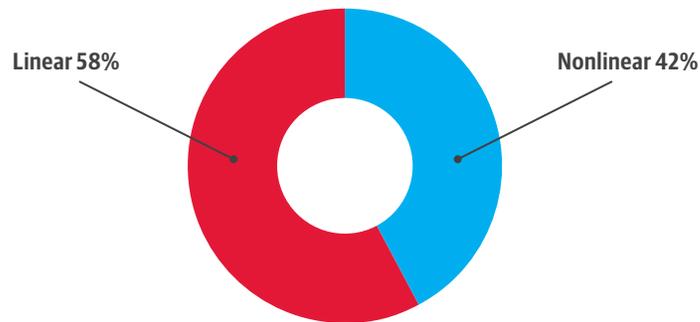
Natural language processing (NLP) is a field of computer science that uses AI to process large bodies of natural-language data. NLP allows finer search capabilities, so learners can jump to the exact point in a digital book, chapter, video, or paper that provides the relevant information they need. When NLP works well, a simple search can become a strategic strike into a body of knowledge with precise results—the answer to a highly specific question. Can your learning system do that?

AI is a key component of another emerging technology that may well be on your kitchen counter or a favorite and amusing conversational partner of your toddler (think voice-enabled devices like Google Home or Amazon Echo and voice assistants like Siri). Voice technologies represent an exciting frontier for learning. These technologies don't require you to touch—or even look at—a device to use it. Voice interfaces recognize and

respond to the user's speech, in effect creating a new, but familiar, communication channel that runs parallel to the learner's "regular" work. The learner can speak a question and receive an answer from a trusted learning source without even taking their eyes off what they are working on. Further, as learning platforms evolve to take advantage of this technology, the learner may be able to interact in a wide variety of ways with the platform, including speaking commands to build a personal playlist, underline passages, or even request testing on important concepts to reinforce something they've just learned.

While some of the technologies that will likely accelerate this nonlinear trend are still nascent in the learning world, we know that learners are already seeking performance-adjacent tools. For example, we see performance-adjacent behavior in the more than 2.25 million users of the O'Reilly learning platform. By aggregating one quarter's worth of usage data across 12 industries, we examined 1,622,983 individual learning events executed by 169,146 unique learners. We found that inside these organizations, learners were engaged in nonlinear learning behavior an average of 42% of the time. These learners weren't taking a full video course or reading through an entire book; they were searching for something specific, and once they found it, they went back to work. It's clear that many learners frequently jump in and out of the platform for short sessions rather than approach content in a more sequential and concentrated manner.

Linear vs. nonlinear learning behavior



Analysis based on Safari usage across select large enterprise accounts over a three month period

Qualitative data backs up these statistics. In a study of engineers at one of our clients, learners self-reported a high degree of nonlinear, point-of-need Safari usage. They engaged with the platform at discreet but multiple times, usually to find a piece of code and then return to their workflow and put it to use. A large financial institution, also a customer of ours, shared a rather dramatic story: a crucial system went down, and the company was losing thousands of dollars an hour until an engineer consulted our platform, found the answer he needed, and was able to correct the problem. By the company's own estimate, this example of performance-adjacent usage likely saved it more than \$500,000.

AI and voice are among the technologies that will support performance-adjacent learning solutions and elevate learning to a continuous and ubiquitous part of work. These and other technologies will continue to decrease the level of friction that exists in most learning experiences today. Think about time out of the office, off the sales floor, or away from the production site that more traditional modalities require. When learning can happen anywhere—and with minimal disruption—the potential for upskilling and reskilling is immense.

While getting an idea in a pinch or finding a solution to a current problem is appealing, it also means that one of the more common L&D metrics, time on learning, should become obsolete. But we're not there yet, as a recent study by ATD found the average number of formal learning hours per employee increased to 34.1 hours in 2016 versus 33.5 in 2015.⁴ ATD defined formal learning hours as standalone time away from regular work activities. We must ask if this increase, however modest, is really a good thing. Should we measure success by how long your learners spend in a learning experience or how efficiently they get what they need and return to work, smarter and more effective than before?

⁴ td.org/insights/good-news-for-l-d-learning-spending-and-hours-are-growing

Learning powered by AR, VR, and gamification

Interaction is a well-established principle of learning. When we provide opportunities for adults to exert agency in the learning process, retention improves. The growth of augmented reality (AR), a technology that overlays digital information on real-world settings, and virtual reality (VR), a system that creates simulated digital environments, is empowering learners in new ways.

AR has enormous potential for point-of-need learning. In December 2017, Apprentice raised more than \$2.5 million in venture funding for its AR tool aimed at scientists, engineers, R&D professionals, and those in associated manufacturing roles.⁵ Its solution runs on smart glasses and allows workers to troubleshoot machinery remotely or conversely, to share what they see on site with others in remote locations. Users can also access manuals and other critical information via the glasses. It's an intriguing glimpse into how AR can help workers increase productivity, solve problems, and learn on the job.

AR and VR also hold promise for formal learning activities, through simulations and gamification. These technologies allow the learner to experience a simulated situation in a safe environment and experiment with a variety of behaviors and

solutions while getting real-time feedback. Walmart, partnering with VR startup STRIVR, has developed training for its associates utilizing the Oculus Rift VR headset.⁶ STRIVR's technology puts Walmart employees in simulated real-world situations so that employees can learn how to deal with a myriad of retail challenges. In a nod to blended design, Walmart has gone further and used the headsets with a link to a classroom screen that allows a class of students and an instructor to observe the active learner (i.e., the one wearing the headset) and prompt discussion and further instruction opportunities.

Gamification principles underlay the approach to learning taken by the Deloitte Leadership Academy (DLA). The academy, which trains both Deloitte employees and its clients, is centered around "missions" that involve multimedia content consumption, engagement via quizzes and assessments, and reward by badges. Learning is placed in a social environment and structured to encourage both friendly competition and engagement. This initiative was so successful it increased engagement 37% (per week).⁷ We can't learn if we don't engage, and Deloitte's gamification boosted engagement by making the learning process interesting, fun, and social.

⁵ trainingindustry.com/press-release/learning-technologies/apprentice-receives-2-5-million-for-new-augmented-reality-solution/

⁶ businessinsider.com/walmart-using-virtual-reality-employee-training-2017-6

⁷ hbr.org/2013/01/how-deloitte-made-learning-a-g

Architecting an ecosystem

L&D professionals must tackle the challenge of enabling continuous, frictionless learning across every boundary we currently hold. We must do this to remain relevant, to meet the demands of our learners and organizations, and to continue to be strategic enablers of individual and organizational success. Fortunately, advances in technology are fueling our ability to answer this call. In many instances, we need only ask the right questions and seek the right features for the ecosystem to become balanced. So the next time you are considering your portfolio (or ecosystem) of learning offerings, consider these questions:

1. Do the learning tools that you're providing to your employees allow for performance support and performance adjacency? Are learning tools being used in this way in your organization, and can you tell the story of their impact?
2. How "smart" are your learning tools? Can learners engage with them in different ways (e.g., reading, watching, talking) or find a quick answer to a question (e.g., find what they need without having to skim through irrelevant content or material)?

3. Where are you using AR, VR, and voice in your strategy? What problems (behavioral, structural, or technical) could an AR, VR, or voice solution solve for your organization?
4. Can you create more opportunities for fun (which leads to engagement and retention) in your learning experiences through simulations, gamification, and social learning? What would lead to more engaged employees and learners?

Many organizations have the linear and formal learning experiences optimized (or at least well done!) after years of practice. These experiences have value and shouldn't be discounted, but they don't provide the fully balanced ecosystems our learners need. The on-demand, simulative, and augmented technologies we have at our disposal allow us to truly architect ecosystems that meet the learner where they are and exactly when they need the learning. The possibilities are many but one thing seems certain: point-of-need and on-the-job learning experiences are about to get a whole lot more fun and drive stronger results.