



4 REASONS YOU NEED TO START USING **VIRTUAL REALITY** FOR LEARNING & TRAINING

Michael Casale, PhD
Chief Science Officer, STRIVR Labs

INTRODUCTION

Proliferation of virtual reality (VR) technology continues at a rapid pace. One obvious and relatively successful application of VR technology is training. Given the many benefits provided by VR—including the ability to create real-world experiences on demand—it's no surprise VR training applications have found early success. Here, we outline four reasons why VR training is better than traditional training practices. Importantly, the training benefits offered by VR are not just a matter of opinion but are bolstered by longstanding research literature on learning and training. In this paper, we describe the four reasons in the context of scientific principles.

DID YOU KNOW?

In a study carried out by the National Training Laboratory, retention rates for lecture style learning were at 5%, and reading rates were at 10%, while VR had a retention rate of 75%.

Source: MASIE Report 2017

EXPERIENTIAL LEARNING

Learning by doing...without actually doing

There is a growing body of research demonstrating that 'learning by doing' is much more effective than learning by watching. Just think about learning to ride a bike—you learned much better by actually riding the bike versus watching a video about it or reading about it. During learning, brain regions responsible for processing sensory information must strengthen the appropriate connections with the correct cognitive processes (e.g., recognition, decision-making). During any learning experience, it's critical that the brain strengthens the sensory areas (the combination of images, sounds, smells, etc.) that are sufficiently similar to the real-world environment with the appropriate cognitive process (decision making, recognition, etc.). If learning is purely observational, much of the 'real world' sensory information is lost (e.g., no first-person perspective, the timing between the sensory information and a decision is lost) making it much less effective than training with real-world experience.

Of course, real-world learning is difficult if not impossible to replicate with traditional training methods. But with the advent of VR technology, it's possible to closely replicate the real-world experience in a way that is easily integrated with current training practices. The real-world experiences that are replicated in VR will provide users with a much greater chance of translating their training to their real-world environment. Unlike their traditional training counterparts, the perceptual and affective information afforded by VR experiences will map onto the same connections the brain will use to make decisions in the real world. Thus, recreating the perceptual and affective experiences from the real-world will improve the ability of learners to translate their training when it matters most. In other words, VR can so closely mirror the real world that your brain treats VR like a real-world experience. **This means that using VR to learn is just as good as learning-by-doing in real life.**

In the context of certain industries and certain training situations, having VR be just as good as real life is a big boon to retention, safety of learners, and cost of training. Some situations that make sense to use VR are 1) dangerous training environments 2) where it's expensive to conduct training, and 3) rare or hard-to-replicate settings. These types of situations would benefit from the perceptual and affective information that enhances the learning experience.

ENGAGEMENT

Engage with training material like never before

The most effective training techniques are meaningless unless learners are sufficiently engaged with the material. When's the last time you heard or even questioned yourself: "Were the students engaged in the training?" We know from a wealth of prior research that engagement influences learning in the classroom and in the workplace, among other settings. Definitions of what engagement looks like often means different things depending on the training context. For example, take two very different training tasks—learning to bag groceries and learning to operate heavy machinery. The engagement behavior for someone trying to bag groceries effectively will certainly look different than the person learning to operate heavy machinery, since they are very different tasks.

Efforts to standardize measures of engagement have mostly focused on self-report techniques and mostly in the form of surveys. Unfortunately, however, self-reported data are subject to a variety of shortcomings—such as users reporting what they think the company wants to hear. What's more, users often have a hard time putting their true feelings into words when asked. Consequently, there is a recent trend using physiological measurements (e.g., heart rate, pupillary response, brain activity) as a measure of engagement, as they offer the potential for greater objectivity and reliability. However, despite their promise, use of physiological measures have been notoriously difficult to implement at scale.

Enter VR. VR is an unparalleled tool to understand user engagement. The tracking hardware that comes with all VR systems measures body language automatically, unobtrusively, and at a rate that gives more data about human gestures than has ever been possible before. These gestures and movements are the core behaviors associated with engagement.

A reliable measure of engagement provides critical context for training experiences. VR provides as reliable of a measure that exists today. In addition, having a *universal* measure of engagement—something VR can also provide—can help understand if training will be effective as well inform how to create *more* engaging training experiences. **In summary, while those administering training with videos or PowerPoints will struggle to understand how learners are engaging with the material, those using VR for training will know exactly how engaged a learner is and can use that data to create even better training experiences.**

DATA

It's easier than ever to know how you're doing

VR training offers us access to unprecedented data. Every moment of a VR experience provides insight into the mind of a learner. Moreover, the data is captured is a more valid representation of real world behaviors, since learners are acting within a real-world simulation (and going back to the first section, are treating VR like a real-life experience). Finally, VR experiences provide data not only on how learners react and make decisions in a real-world environment, but also data that can help better address *why* certain reactions or decisions were made. If we know that an incorrect decision was a result of from not paying attention to or not observing something, we can use that information to provide useful, real-time guidance *during* training to help learners train more quickly and effectively.

Because we don't expect all training to have the same effect on all learners, it's important to have some insight into what learning differences may exist for across individuals. From the data generated by VR experiences, we can create automated and adaptive training protocols that will greatly increase both the effectiveness and efficiency of training with respect to individual needs and behaviors.

Finally, VR environments offer a platform that allows for a variety of useful data capture. In VR, you can know where someone looked and for how long—data that cannot be captured during e-learning or live instruction. Take an example of delivering safety training to help employees learn to identify safety hazards. With traditional training, you would be able to look at images, watch a video, or read about hazards. The trainer has little knowledge of exactly how well a learner is picking up the concepts or if they are even paying attention the right things. With VR, you can drop the learner *into* the hazardous environment and watch them look around and identify the hazards. If they do not notice or spot an important hazard, it is easy to know through the data output. Learners cannot hide when using VR—they are always on the spot and therefore always very engaged with the material—something that is a dream to most all trainers and instructors.

In summary, VR provides data that has never been available to both learners and trainers. This data is both unique and extremely valuable to the learning process.

ON-DEMAND EXPERIENCE

A rich learning experience—anytime, anywhere

While a lot of training is now able to be accessed on-demand via Internet and mobile devices, this training is often siloed to just short videos, reading, and other simple experiences. With VR, learners can access rich and powerful training experiences at any time. Want the experience of dealing with an angry customer? Fire up VR and get practice in that difficult situation. Want to conduct safety training but don't want to bring employees to a dangerous environment? Use VR to enter that situation from the comfort of a meeting room. With a VR setup available, you can access these rich learning experiences anytime, anywhere. No need to fly across the country and no need to set up elaborate scenarios. In the absence of going out to do things live (which is hard for training classes), VR brings the most relevant and impactful training right to you and your team—anytime, anywhere.

Furthermore, VR allows an organization to replicate its best instructor or trainer and establish an amazing level of consistency in training. Many organizations find it difficult to achieve consistency of training delivery due to nuanced differences in instructor delivery, knowledge, or location. With VR, you can create standard training with your best instructor just once, and then have that training accessible to all employees at any time in VR. This way, whenever someone wants to learn about a certain topic, they always learn from the best, and in a way that will get them to remember it better than ever before. This not only saves time and money in the training process, it leads to improved efficiency and faster paths to an individual's full productivity.

To summarize, great training experiences don't have to exist only a few times a month or year. With VR, great training can happen at a moment's notice.

CONCLUSION

We've identified 4 ways in which VR is improving the training experience.

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As more organizations begin to understand the value of immersive experiences, even greater investment and technological development of new immersive technologies will occur, resulting in even better training capability. However, to leverage the full potential of these immersive technologies in the coming years, it's important to ensure that the technologies are matched with the scientific principles of training and learning that have been proven for decades.

ABOUT THE AUTHOR

Michael Casale, PhD, might be the only person in history to author an article in *The Journal of Cognitive Neuroscience* as well as play collegiate basketball. For over 15 years he has researched learning, memory, and brain science, publishing dozens of papers in top journals in the field. He is an expert in learning transfer—how a training experience generalizes to everyday life. Since leaving academia, he has led multi-million dollar research projects using virtual technology to facilitate learning and behavior and has worked with Fortune 100 companies to help formulate their science and technology strategies. At STRIVR, Dr. Casale blends his research expertise with his insights as a high-level athlete to help develop training methodologies that optimize for maximum learning and performance.

ABOUT STRIVR LABS

Founded in 2015, STRIVR Labs is the world leader in using virtual reality (VR) to train individuals and improve performance. STRIVR is used by the world's top organizations including Fortune 100 companies and professional sports teams. The platform leverages the power of immersive VR training to help individuals learn faster and more effectively—improving reaction time, pattern recognition, and decision-making. STRIVR uses data to assess retention, enabling organizations to make data-driven decisions about individual preparedness for critical situations.