altoura

The Definitive Guide to Immersive Training

Improve productivity and lower costs with an effective learning program for frontline workers

Who Should Read This Guide?

This guide will assist the following business leaders as they consider and evaluate an immersive training platform for their enterprise:

- **HR leaders**
- **Engineering Operations leaders**
- **Learning & Development (L&D) leaders**
- **Business Operations leaders**
- **Innovation Team leaders**
- **Engineering Safety and Quality leaders**

This guide is relevant for all industries where frontline workers need hard and soft skills training. It is optimized for enterprise industrial companies that need to capture institutional knowledge from an aging workforce and use it to train workers in a safe, virtual space—without taking people or equipment offline—using immersive technologies to visualize and simulate interactive business workflows.

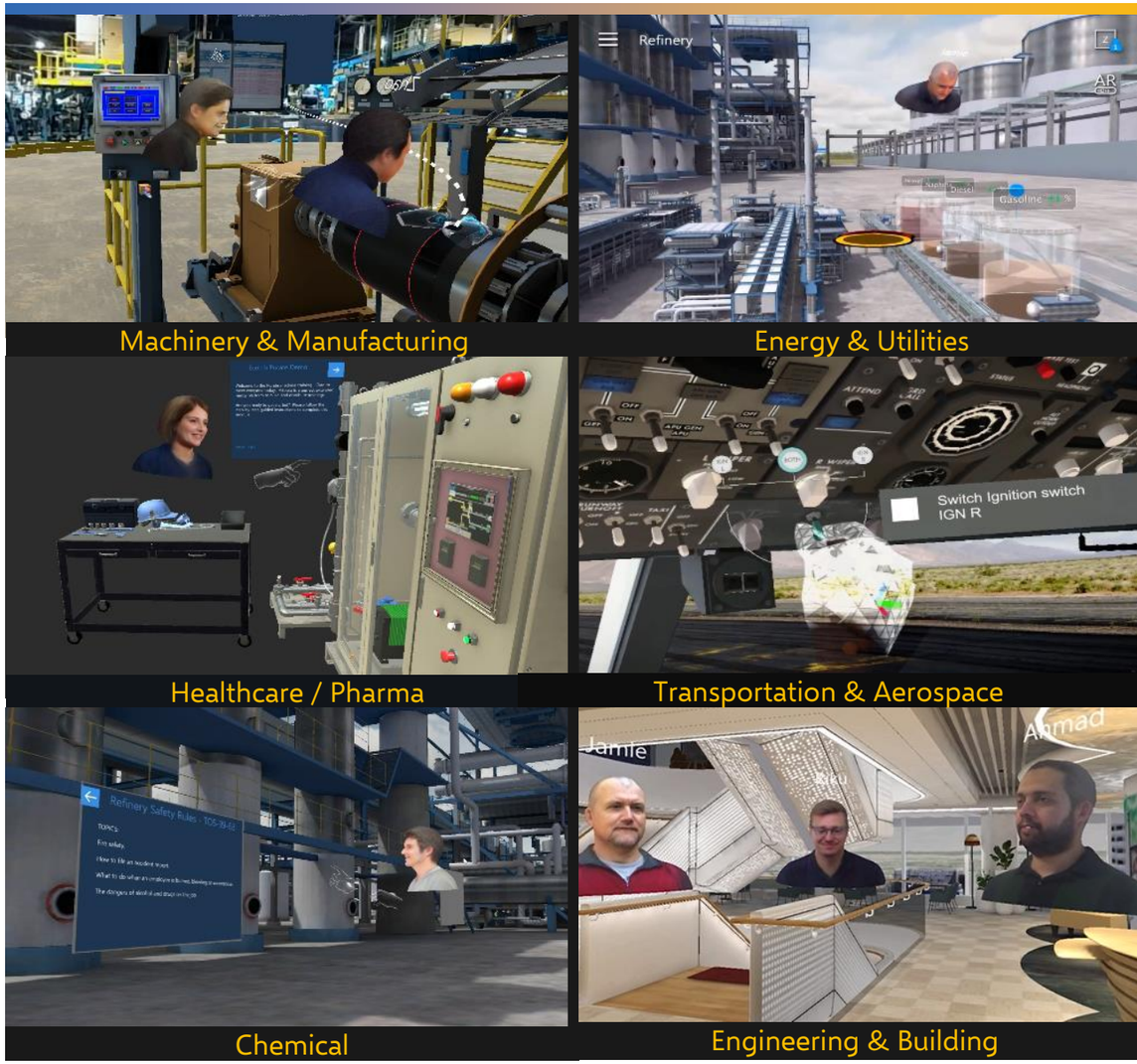


Table of Contents

01

The New Reality of Work

IMMERSIVE TRAINING

Improve Business Outcomes Through Immersive Experiences

According to McKinsey & Co's studies on the new reality of work, 50% of frontline workers need reskilling post-Covid, and 94% of business leaders expect employees to learn the skills they need for the future on the job. Frontline workers, which make up 2/3 of the global workforce, value experiential learning and skills training second only to pay in terms of importance to career satisfaction. Cleary, both employees and the company leaders they work for are incentivized to implement training programs that generate impact—and that can be measured.

HR, Learning & Development (L&D), Innovation, Operations, Quality, and line-of-business leaders are under pressure to ensure their frontline workers have the competencies required for the coming era of digitization, automation, and hybrid work.

So, what outcomes will a modern training platform help industrial companies achieve and measure?

- Faster, more engaging training at lower costs
- Improved time to proficiency
- Less waste and less downtime, with more efficiency
- Procedures done correctly, quickly, and safely
- More capable and confident workers
- Higher employee retention

Every day, innovative and successful companies achieve these kinds of results by building and delivering immersive learning programs to their workforce. They use data insights from these programs to onboard, train, and upskill their frontline workforce. According to Gartner, almost every Fortune 500 company will rely on immersive technologies for workforce enablement by 2025.

This guide is a blueprint for how to plan and build an immersive learning program for frontline workers to reduce training costs and increase worker productivity.

Immersive Training Defined

Immersive training is a worker enablement strategy that uses spatial computing (AR/VR) to facilitate learning in an interactive virtual environment. It can be written as an equation:

Immersive Training = Real-Time 3D Environment + Simulations + Experiential Learning

To deliver a compelling user experience, immersive training integrates several disciplines:

- Data science
- Neuroscience
- Cognitive psychology
- Instructional design
- Spatial design
- Enterprise cloud computing

To construct a learning environment, creators construct 3D models (digital twins) and add interactivity and experiences using 3D animations, simulations, step-by-step guides, and interactive content that enable workers to interact with the virtual spaces and equipment as if they were in their physical environment. These experiences help workers learn and acquire competencies before showing up on the front lines.

Immersive Training is the Killer App of the Industrial Metaverse

Industries worldwide look to the industrial metaverse to become more efficient and to empower frontline workers with the skills they need to be productive.

The industrial metaverse requires multiple technologies and trends to function:

- Internet broadband and 5G
- Virtual reality (VR) and augmented reality (AR)
- Head-mounted displays (HMDs)
- 3d models and digital twins—large facilities to small tools can created from 3D CAD models
- Internet of Things (IoT) sensors and analytics
- Artificial intelligence (AI)

While the industrial metaverse is built on internet infrastructure, the ability to work and interact spatially—and to simulate tasks inside a virtual environment—generates several benefits:

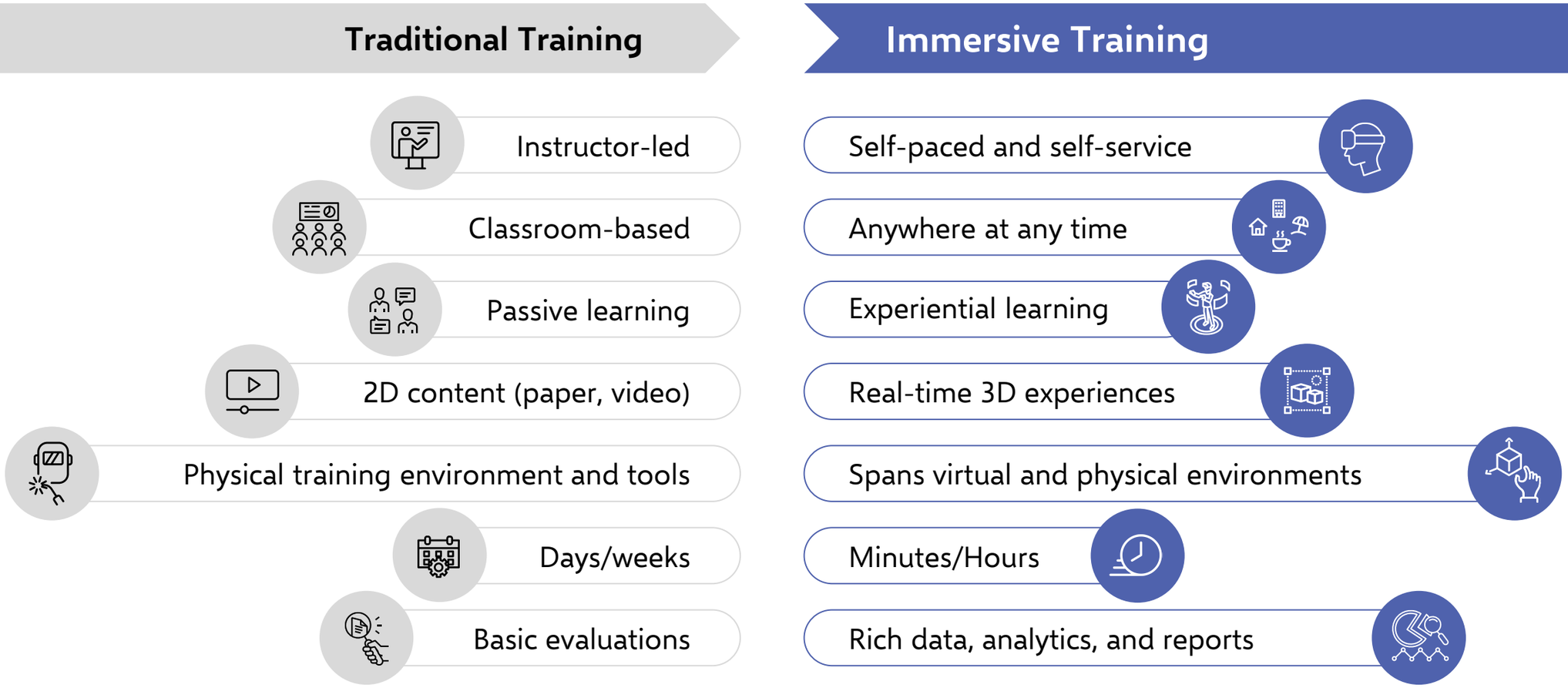
- Creates a psychologically secure and engaging setting for workers to experiment, make errors and ultimately become proficient in their job.
- Provides a virtual world where workers interact and collaborate to solve real-world problems.
- Generates a vast trove of data for business managers to assess and optimize experiences for usability and to optimize outcomes.

The future value of the industrial metaverse is expansive—from improved collaboration and customer engagement to predictive insights and increased sustainability. Meanwhile…

the benefits of immersive training in the industrial metaverse are here and now.

The New Reality of Frontline Worker Training is Immersive

Traditional training is rapidly being displaced by immersive training that is more effective, less costly, and delivers superior outcomes. McKinsey & Co's seminal study on the Future of Work identified companies that embrace immersive programs as those most likely to gain a competitive advantage in their industry.



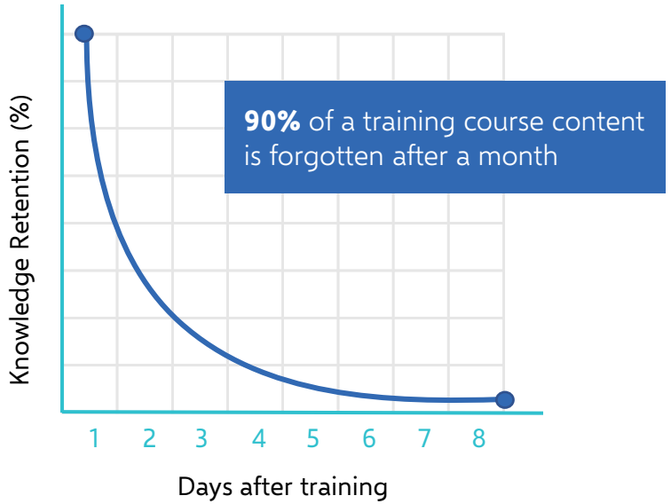
Immersive Training Flattens the Dreaded "Forgetting Curve"

Can you recall 3 takeaways of the last corporate training you attended? *Hint: nobody can*.

German psychologist Hermann Ebbinghaus demonstrated that within one hour, people forget an average of 50 percent of the information presented. Within 24 hours, they forget an average of 70 percent of new information, and within a month, 90 percent. It's a phenomenon now referred to as the *forgetting curve*.

For 21st century workers, the forgetting curve is magnified by the sheer quantity of information they must process—the unrelenting emails, texts, and notifications they are expected to service—and the constant demands on their time by social and productivity applications.

To optimize knowledge retention, organizations can now turn to immersive learning technologies that improve worker confidence, accelerate learning, and help them feel more emotionally connected to other workers—and flatten the forgetting curve.



PwC research shows that immersive training delivers a cost-effective and efficient experience to workers compared to traditional training methodologies.

400%
More focused than e-learners

4X
Faster than classroom training

350%
More emotionally connected to the content than classroom learners

275%
More confident to act on what they learned after training

Should Your Organization Evaluate Immersive Training?

The answer is YES if any of these apply:

You need to capture knowledge from an aging workforce and make it available to new hires

Capture institutional knowledge in immersive training modules so new hires can onboard rapidly inside a virtual environment and learn best practices before reporting to the front lines.

Facilities/equipment are expensive to take offline for dedicated training

Workers can train from anywhere at any time in a virtual environment—without tying up in-service equipment or requiring expensive travel to a training facility.

Workers perform complex repeatable tasks or scenario-based work

Workers can repeat complex, large-scale tasks and develop muscle memory and expertise in a virtual, simulated environment before performing live work. This enables a safe, self-paced, and engaging mode for learners.

You currently take senior (experienced) workers off the front line to train new hires

Keep your talented workers on the front lines so they can be productive. New hires can onboard and learn to complete tasks in a virtual, simulated environment before they deploy to the front lines.

You would like to update your training program frequently

Immersive training software is easily updated, tested, and globally deployed, and it lets you gather data insights (attendance, completions and employee improvement) that can inform how you tune your training program.

Frontline workers operate in hazardous environments where safety is critical

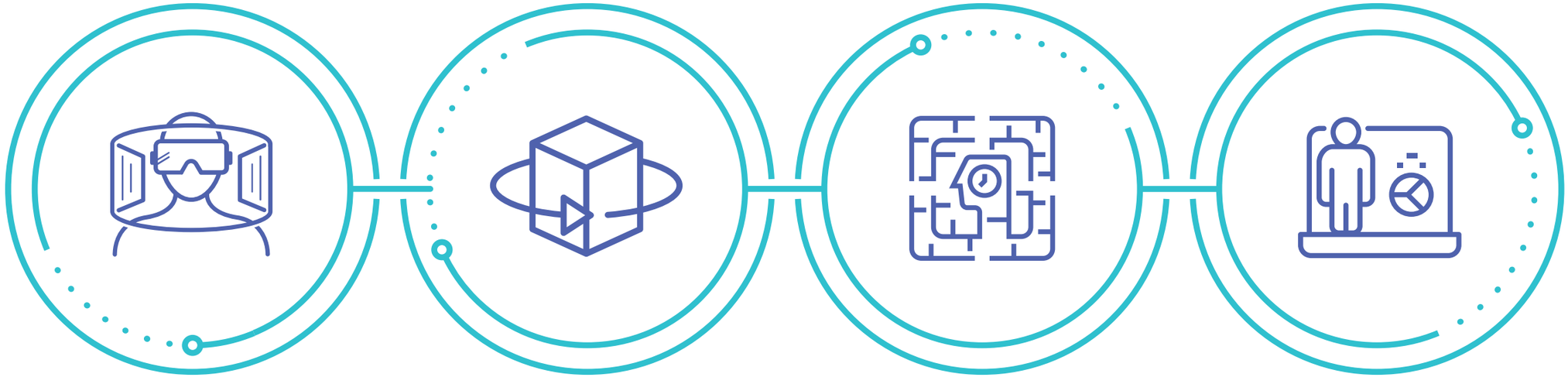
Reduce risks of injury or catastrophe with virtual training sessions so workers can complete virtual tasks and operate virtual equipment in a totally simulated, highly realistic environment before working on the front lines.

02

FOUR BUILDING BLOCKS OF IMMERSIVE TRAINING

Four Building Blocks of Immersive Training

Immersive training combines spatial computing (AR and VR) with spatial design, immersive experiential learning, and data analytics to improve learning effectiveness and frontline worker engagement.



Spatial Computing

Spatial Design

Immersive Experiential Learning

Data Analytics

The 1st building block of immersive training

Spatial Computing

Spatial computing in augmented reality (AR) and virtual reality (VR) enable learners to participate in simulated work in an immersive environment that replaces or augments their real-world surroundings with high-fidelity 3D representations of people, places, and things.

When training is entirely off-site, a fully immersive experience may offer the most compelling way to isolate all the important elements of a training inside a simulated step-by-step training. However, in certain industrial environments, you may decide to implement task guidance—AR assistance with holographic images overlayed on top of the physical environment—to guide frontline workers through their tasks. The difference between VR and AR immersive experiences is the degree to which the physical world is occluded from the training experience.

Immersive experiences exist on a spectrum

AR

A mix of digital 3D holograms overlayed on your physical environment

100% digitally-created environment where your physical space is fully occluded

VR

AR partially immerses learners into a virtual experience by combining a view of the real world with computer-generated elements (like holograms) and sensory information. This gives AR learners the ability to move around aware of their environment and surroundings.

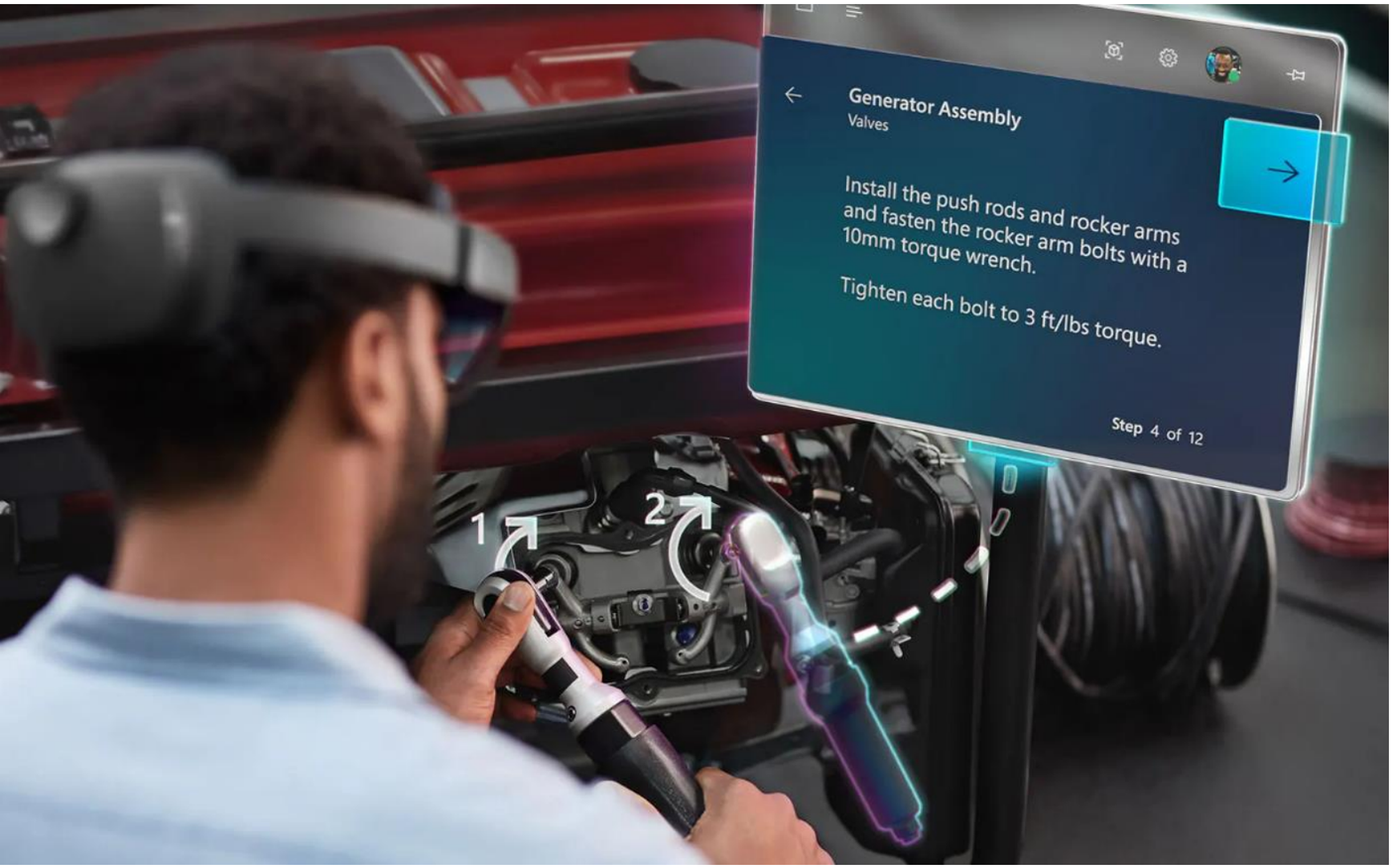
VR fully immerses learners into a digital computer-generated environment with sensory information. Learners typically wear a VR headset (and perhaps hand controllers) that allows them to move within a virtual environment and interact with objects and other users.

Differences Between AR and VR

Both AR and VR are very effective immersive training modes. Training teams should evaluate the features of VR and AR and decide which mode will deliver the most compelling immersive experience. That choice will then guide decisions regarding hardware, development tools, and curriculum.

Attributes	VR	AR
Device type	VR headset	AR headset, mobile devices, PC, Mac
Environment	Entirely virtual	Real, with virtual elements
Immersion	Immersive, no context of outside world	Partially immersive; learners see the physical world
Sensory elements	Simulates sight and sound	Overlays 3D graphics and animation on top of real-world environments
Field of view (FOV)	Approx. 100° horizontal	Approx. 45° horizontal
3D imagery source	Digital twins, 360 video, or CGI	Computer vision, digital twins
Degrees of freedom in movement	3° of freedom when using 360° video; 6° of freedom when using immersive VR	6° of freedom
Tethered vs untethered	Most headsets must be tethered to a PC	Most headsets are untethered (standalone)

Main Benefits of AR



Contextual: maintaining a view of the physical world empowers learners to move naturally in the experience and maintain spatial awareness.

Natural: because the environment is only partly immersive, new users learn to operate an AR headset and navigate a training application in minutes.

Hands-free: without having to use hand controllers, learners can maintain hands free to work with tools and physical equipment.

Enterprise ecosystem: large companies like Microsoft, Apple, Qualcomm, Nvidia and others are establishing a growing market and community for AR applications.

Available: While AR headset costs can be higher than VR, most learners already have mobile devices and PCs, so a mix of AR devices can be used at scale.

Common AR Training Scenarios

On-Site Task Guidance

Frontline workers to get real-time information, guidance, and visual aids overlaid on their physical environment (as holograms). Task assistance can be used in industrial maintenance, repair, and operation (MRO), military training, and many other scenarios to improve efficiency, accuracy, and safety. AR reduces the time and effort required to complete the task.

Remote Assistance

Frontline workers can use a remote assistance application running on an AR device to connect with an expert for task support. The expert can see the same view as the worker (through his/her headset) and provide visual instructions and annotations on the screen, allowing for a more effective and efficient support experience.

Education & Awareness

AR enhances the learning experience by making subjects more engaging and interactive, and allowing students to visualize complex concepts in real time, easily navigate massive environments, and interact with digital twins of their physical environment and equipment.

Main Benefits of VR

Captive: immersive experiences shut out the physical world and focus learners on a specific environment and intended tasks and outcomes.

Controlled: creators can build a program that directs learners' attention and behavior along a specific learning path.

Realistic: virtual practice in a fully digital world with high fidelity leads to real-world behavioral changes. Digital twins and CGI make it possible to build photorealistic environments in which to deliver hard or soft skills training.

Accessible/Affordable: Not everyone has access to hands-on instruction and expert training. Virtual simulation changes the game by expanding access through increasingly affordable headsets and training platforms.

Proximate: learners can train in a virtual world with peers and instructors, from wherever in the world they happen to be.

Common VR Training Scenarios

Hard Skills Training

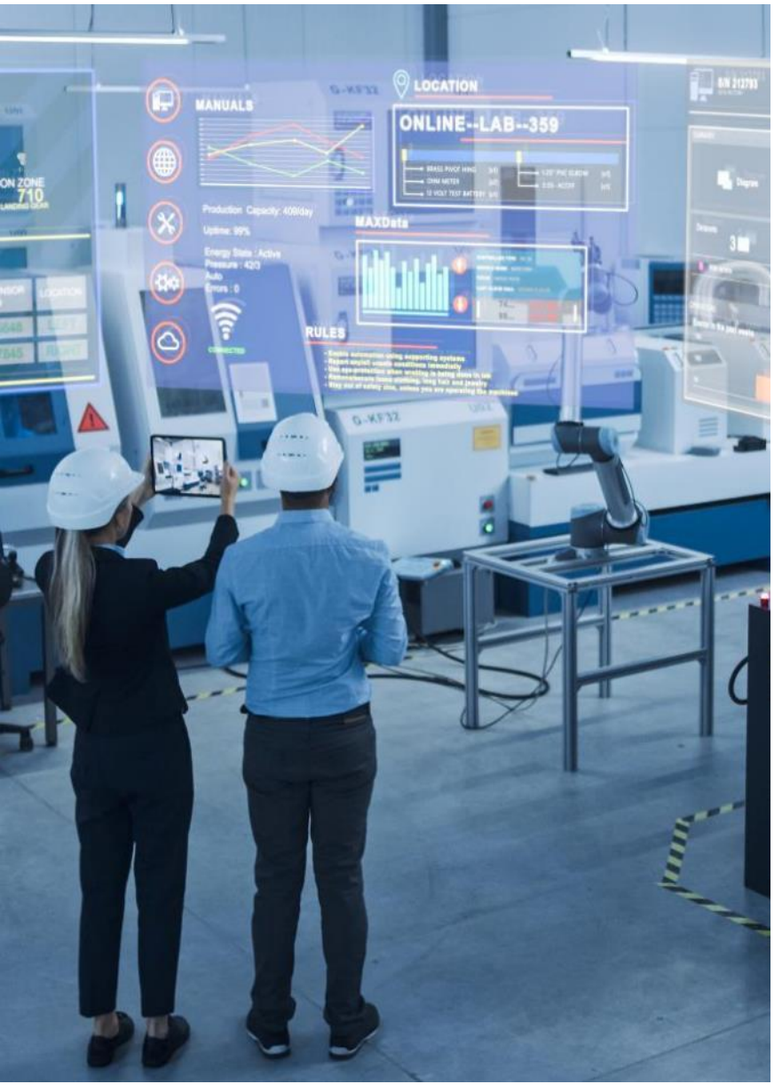
With an aging workforce and a new generation of frontline workers that need training, many industrial companies use VR training to capture and redistribute institutional knowledge and to train workers virtually before they show up on the front lines. This approach keeps top workers and machines productive instead of being pulled offline for training, which has a material impact to productivity and the bottom line.

Safety Training

VR training enables teams to recreate emergency scenarios at an office, warehouse or distribution center. Not only does this approach eliminate any risk to lives or property, but the simulated environment gives employees the opportunity to practice their reaction time, decision-making, and ability to work under pressure. This way, they're better prepared if an emergency occurs when they are on the job.

Soft Skills Training

From navigating a difficult customer conversation to resolving conflicts to developing leadership skills, VR training can be delivered in a realistic setting that guides workers through soft skills scenarios and then helps them understand emotional reactions and practice skills in role-playing.



The 2nd building block of immersive training

Spatial Design

Spatial design is the art and science of creating immersive environments and experiences. It is a coordinated effort across several disciplines such as user 3D design, interface (UI) design, user experience (UX), and instructional design.

While spatial design is not a new discipline for game or mobile developers, it is relatively new to enterprise organizations (outside of Architecture, Engineering, & Construction) which are rooted primarily in 2D architectures, applications, and tools.

In order to build a great first-person experience, content creators and designers need to give up a certain amount of control to the learner. In exchange, the creators can influence learner behavior using powerful spatial design tools. They can control the way things look and sound in order to affect how the learner ultimately feels.

When spatial designers understand the touch points the user identifies with, the needs that drive them, and the benefits they seek, they can create designs people crave. The more designers focus on the user, the more they can create deep emotional connections.

Most experienced interactive designers quickly discover that building immersive experiences in AR or VR requires an additional set of skills that are additive to the ones they acquired in gaming and mobile app development.

Principles of Successful Spatial Design

Following the core principles of spatial design enables creators to deliver powerful immersive experiences that help learners develop competencies faster—and maintain those competencies longer. When designed well, spatial experiences are authentic, realistic, and engaging—and they help learners make measurable improvements in their work.

Realism

Create a high-fidelity 3D environment that replicates and simulates the learner's physical (real) work environment

Interaction

Require the learner to actively participate in the learning experience

Feedback

Give the learner visual cues to reinforce correct behavior and indicate progress

Agency

Give the learner the freedom to act, make mistakes, and correct behavior in the experience

Collaboration

Provide a multi-user environment to strengthen teamwork and collaborative learning

Simplicity

Keep learning experiences short, easy to use, and easy to finish

Goals of Spatial Design

Done right, spatial design results in experiences that are intuitive, comfortable, and engaging for the user

Intuitive

Use visual navigation markers to lead the learner through the experience in a logical way, with prompts and other visuals that indicate direction and next steps. Audio can be used for spatial positioning and light can be used to reveal a path to follow.

Comfortable

Design for physiological comfort by avoiding too much movement, which can make learners queasy. Also avoid making learners uncomfortable in small, large, or high spaces.

Engaging

Keep the energy high by creating an immersive interaction that requires learner input and ownership. Consider the use of rewards and points to motivate learners to meet training objectives.

3D Models Enable High-Fidelity Learning Experiences

Great spatial design can lead to great immersive training experiences—and great immersive training experiences require the use of a 3D model, a representation of an object or a scene in three dimensions, typically created using 3D modeling software, scanning, or photogrammetry.

3D models of environments (buildings, factories, and workspaces) and equipment (tools, machines, etc.) help learners acquire and practice new skills by interacting with the models in a safe and controlled environment. 3D models can be used to train frontline workers in various scenarios:

- **Daily work processes**: 3D models can be used in virtual simulations of industrial processes and equipment, allowing workers to practice and learn SOPs (standard operating procedures), maintenance, and troubleshooting skills in a safe and controlled environment.
- **Safety procedures**: Frontline workers can train with 3D models of machinery and tools, which enables them build muscle memory before deploying to the front lines—and to train without the fear or risk of injury or impact to production.
- **Product visualization**: 3D models can be used to create virtual prototypes of products, allowing designers, engineers, and other stakeholders to test and evaluate designs in a virtual environment.

In immersive training, 3D models provide the context, and interactive simulations provide the experiential learning (viewed through AR or VR devices with hand tracking or hand controllers) for learners to interact with and practice their job in a virtual environment that resembles the real world.

Users completing a simulation with 3D models of their equipment and environment

Real-Time 3D vs 360-Degree Video

Real-time 3D delivers a superior learning experience

Real-time 3D experiences are both *immersive* and *interactive*, and learners have precise control over their experience, with six degrees of freedom (similar to a video game). This is particularly effective in manufacturing or process-heavy scenarios where it is essential that learners see how things fit together and can interact with virtual tools, equipment, and machinery in real-time before going to work in the physical environment on the front lines.

Some companies push "VR training" products and services that rely on producing 360-degree video to create a virtual environment in place of real-time 3D models. While 360-degree video can be implemented as a virtual backdrop for learning experiences, it does not enable learners to manipulate objects or explore the virtual environment in real-time. In fact, learners are limited to 3 degrees of freedom, which means they can look around the virtual environment by moving their head up, down, left, and right, but they cannot move forward, backward, or sideways.

Industrial companies should invest in an enterprise no-code authoring platform for their immersive training program. This platform gives them the ability to construct real-time 3D experiences for their frontline workers, offering them the most engaging and interactive learning environment possible.

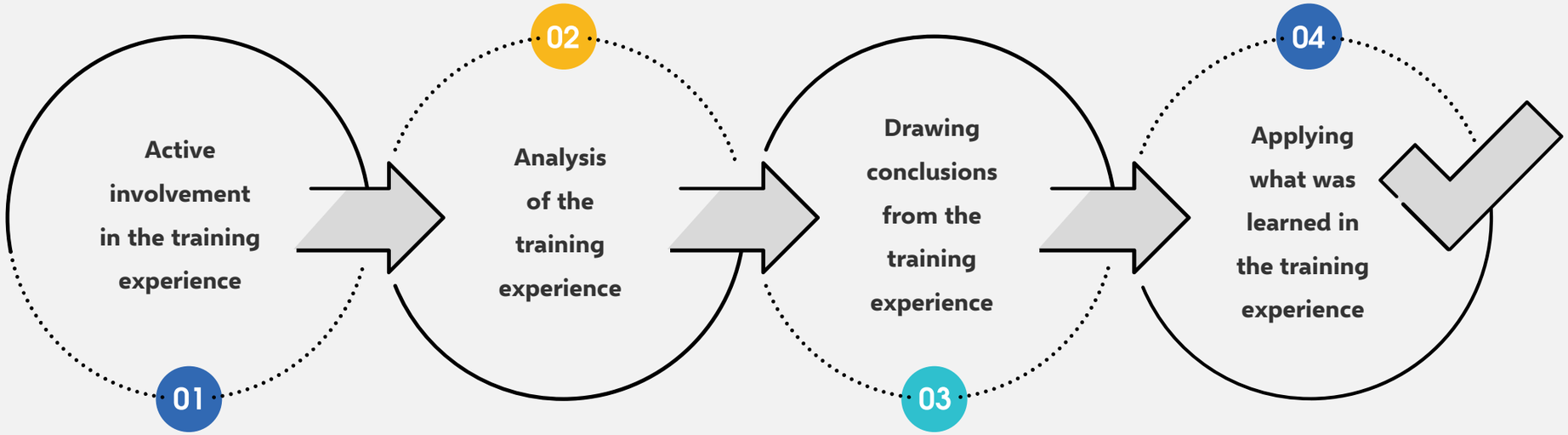
Real-time 3D experiences give learners six degrees of freedom

The 3rd building block of immersive training

Immersive Experiential Learning

Immersive experiential learning is the process of acquiring knowledge and changing behaviors with the assistance of spatial technologies (AR/VR). Grounded in advanced learning theory and principles of the most recent behavior models that have emerged from Altoura and the Stanford Behavior Design Lab, immersive experiential learning reinforces the principle that *learning by doing* is critical in the development of knowledge construction, and that both learning and behavior are most affected through *emotions*, *discovery* and *active participation*.

> Experiential learning is the process whereby knowledge is created through the transformation of experience
>
> - David A. Kolb



Psychologist David Kolb in his book "Experiential Learning: Experience as the Source of Learning and Development"

The eminent psychologist David Kolb proved that users learn faster by role-play, simulations, problem-solving, and on-the-job training than by other modes of instruction.

Building on his four phases of learning, content creators can build immersive experiential learning experiences with spatial technologies (AR/VR) to help users become active participants in their own development. They do this by creating immersive, interactive learning experiences to deepen learner engagement, enhance learning outcomes, and offer more meaningful and memorable learning experiences.

When combined with experiential learning, spatial technologies can help create powerful, engaging simulations that allow students to explore complex concepts in a hands-on, interactive manner.

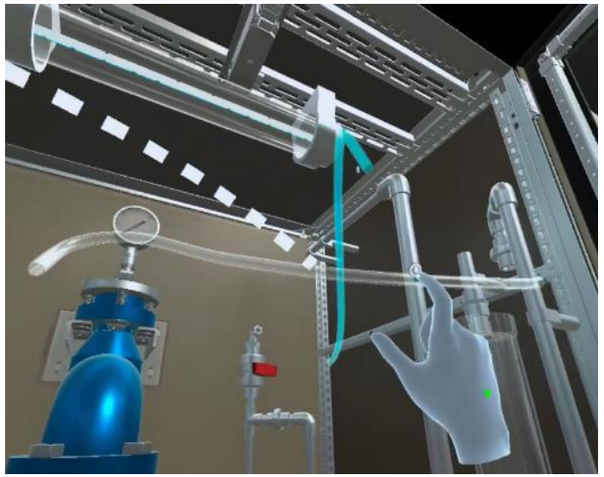
When done well, it produces a visceral reaction in the learner. It can help learners make lasting change in behavior and develop best practices for their line of work. For the organization, these changes can then lead to improved performance, productivity, profitability and competitiveness in the global marketplace.

Best Practices to Optimize Immersive Experiential Learning

You should deliver experiential learning that provides a dynamic and engaging learning experience that encourages active participation, reflection, feedback, collaboration, and emotional engagement. Here's how:

- **Make Interactions Meaningful:** Ensure the simulations in the experience allow learners to engage with the virtual environment and objects that are critical to learning goals.
- **Provide Immediate Feedback**: Provide learners with instant feedback to help them understand their performance to reinforce successful actions or help them course correct.
- **Encourage Exploration**: Encourage learners to explore and experiment rather than simply following a prescribed path.
- **Make it Engaging**: Use interactive simulations, video, and audio to make the experience more engaging and memorable.
- **Use Scenario-based Learning**: Use real-life scenarios in the virtual environment to help learners understand how to apply the concepts and skills they are learning.
- **Foster Social Interaction**: Encourage social interaction among learners by including opportunities for collaboration and communication.

Simulations Are the Foundation for Immersive Experiential Learning



Simulations in a virtual, 3D environment provide an engaging, realistic, and safe environment for learners to apply what they have learned in a controlled setting and make mistakes without real-life consequences. This helps learners develop confidence and expertise, which transfer to real-life situations.

Additionally, simulations can also be easily customized to cater to specific training scenarios and objectives, making immersive training an effective pedagogy. Effective simulations should meet a combination of several factors:

- **Realistic graphics and visuals**: The simulation should have high-quality, detailed 3D models, textures, and environments that accurately represent the virtual world.
- **Natural and intuitive interactions**: The simulation should allow users to interact with objects, characters, and environments in a natural and intuitive way, using gestures, movements, or controllers.
- **Physics and animations**: The simulation should accurately simulate the laws of physics and the movements of objects and characters, providing a believable experience.
- **Engaging content**: The simulation should require interactions that simulate real-world work, such as turning a screwdriver a specific number of degrees or lowering a lever to a specific height.
- **High performance**: The simulation should run smoothly, with minimal lag or stutter, and provide a comfortable and enjoyable experience for users.
- **User testing and iteration**: The simulation should be regularly tested and refined based on user feedback, and improvements made to enhance the overall experience.
- **Integration of advanced technologies**: The simulation can also benefit from the integration of advanced technologies such as AI, machine learning, and neural networks, to enhance the realism and immersion of the experience.

Experiential learning is the touchstone of immersive training. Our team spent years developing a no-code platform that empowers training creators to make 3D models interactive with powerful simulations that make learning engaging and effective.

Richard Dormer
Creative Director, Altoura

The 4th building block of immersive training

Data Analytics

The goal of any immersive training program should be to drive business outcomes—and that means any immersive training platform you adopt, and any program you put in place, must deliver insights into how users interact with your immersive content, how to improve the overall user experience, and how to optimize the performance and design of your training program.

With these data-based insights, you can measure the quality and impact of immersive learning paths. You can analyze learners' actions—and the cumulative data that you collect should give you insights into behavior that traditional training methods never have.

Data Analytics Help Optimize Your Immersive Training Program

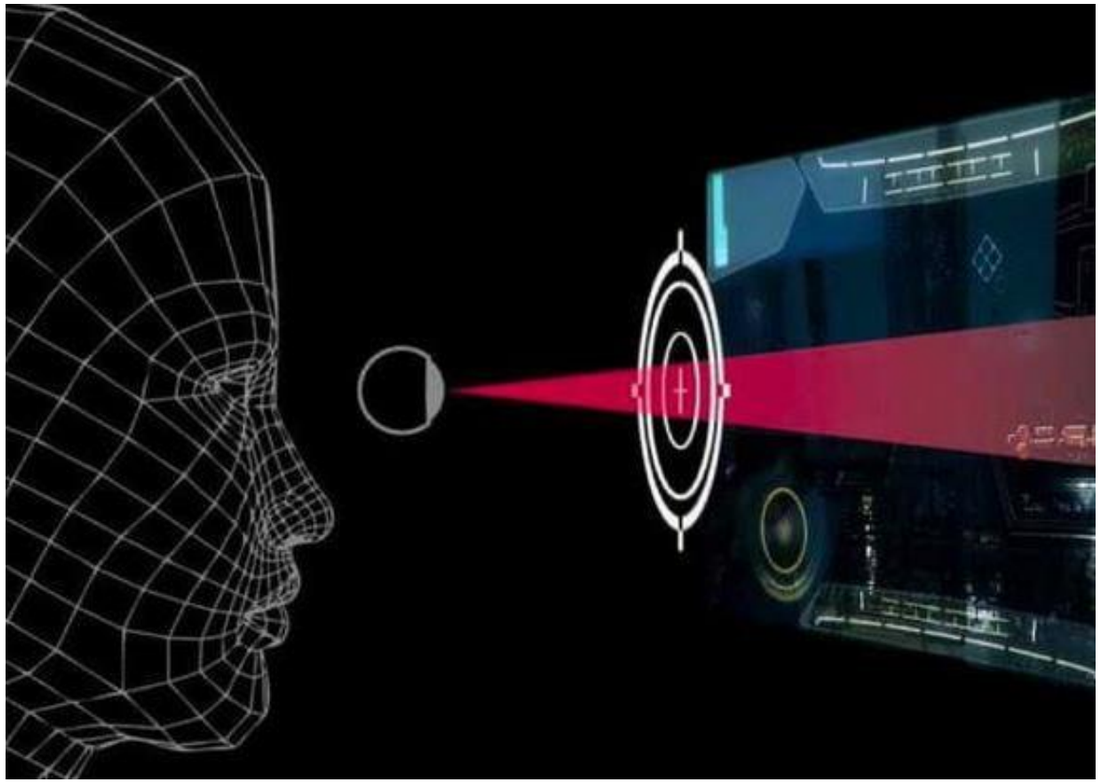
Data analytics for immersive training refers to the collection, analysis, and interpretation of data generated by spatial (AR or VR) devices. Data collected by the headset can be captured in a dashboard or passed to your existing LMS. Some of the most important data analytics include:

- **Usage data:** captures training frequency, duration, and completion
- **Performance metrics**: tracks user performance on tasks and objectives, such as accuracy and completion time, to evaluate effectiveness of the training.
- **User behavior**: tracks user movements, actions, and interactions in the virtual environment to understand how users engage with content.
- **Engagement metrics**: measures the level of engagement and attention of users, such as the amount of time spent in a specific area of the experience.
- **Immersion metrics**: measures the level of immersion and presence felt by users, such as the degree of sensory and emotional engagement.
- **User sentiment feedback**: qualitative data through surveys, interviews, or other means to get insights into user perceptions and preferences.

Advanced Data Analytics Help You Predict Outcomes

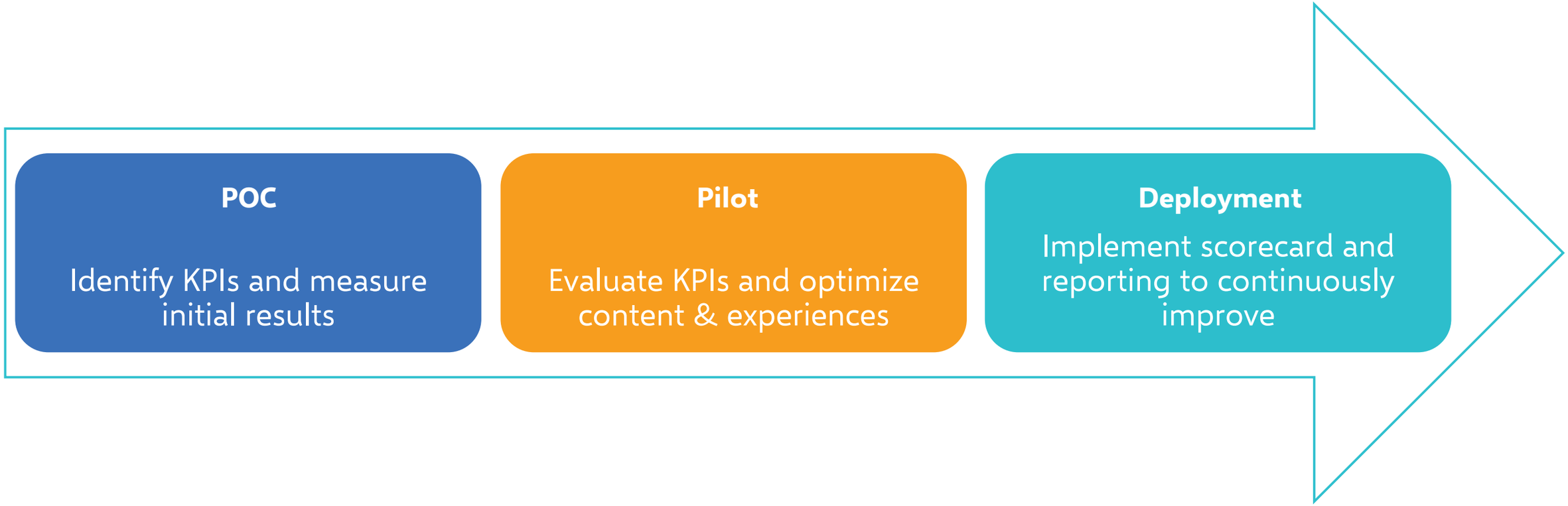
Advanced data insights are available from only the most robust enterprise immersive training platforms with built-in analytics. These analytics follow advancements in technology and increased demand for effective and efficient training solutions. Advanced capabilities include:

- **Use of AI and machine learning**: Analytics algorithms and models will become increasingly sophisticated to help training teams predict outcomes and optimize productivity and intelligently schedule based on skill-levels and expected worker performance, which ultimately helps you tailor the level of guidance and support to meet the needs of each of your frontline workers.
- **Eye tracking and biometric feedback**: Biometric feedback may include monitoring a learner's heart rate or energy expenditure to get insight into stress levels, and data showing where learners are looking in the VR experience can be visualized in a "heat map" to determine which content is being seen at key moments in the learning module.
- **Integration with other data sources**: Immersive training analytics will be integrated with other data sources, such as IoT and wearable devices, to provide a more complete picture of user behavior and performance.



Immersive Data Can Inform Each Phase of Your Immersive Training Program

Learning project leaders must be obsessive about using data at each phase of a project to convert insights to improvements and use immersive training to drive transformational change to the way their frontline workers onboard and upskill.



03

SIX PHASES OF IMMERSIVE TRAINING

The methodology outlined in this section has been proven to work at scale by the most innovative and successful companies in the world. This is your blueprint for a successful immersive training pilot and deployment.

The Six Phases of Immersive Training

1
Envision & Plan

2
Develop The Curriculum

3
Create 3D Content, Simulations, & Training

4
Roll Out Training

5
Assess Outcomes & Business Impact

6
Create Governance & Change Mgmt Plans

Phase 1: Envision & Plan

Every immersive training program should start with an envisioning and planning phase to determine the scope of the project, the desired outcomes, and the use cases for immersive technologies.

1. **Identify the business problem**. Document the existing issues and the primary business problem to be addressed through frontline worker training. For example: a manufacturer could identify the cost of training as the problem, and then document the drivers of cost, which may include the costs that result from lost production by taking skilled laborers and equipment off the front lines to train new employees, and the waste produced in training.
2. **Define critical business objective and KPIs:** Establish an overarching goal with clear, measurable KPIs (outcomes) that you will used to measure success of the training program. For example, a strategic goal might be to reduce costs, and the KPIs for the training program might include % of reduced waste, % faster training, $ save in T&E, and % improvement in employee retention.
3. **Envision the learning program**. This is a process of framing a pilot program to validate how immersive training will lead to business impact, and what outcomes are needed to justify further commitment and investment.
    - Identify use cases to be evaluated
    - Choose the appropriate immersive device platforms, such as AR, VR, or mobile
    - Specify the pilot learner group
    - Identify project leader and program v-team particpants (Innovation, L&D, Operations, IT)
4. **Build the project plan.** The plan should include timeline, budget, roles, and resources needed. For the initial pilot, the project plan acts as a logistics framework, not an exhaustive list of tactics.

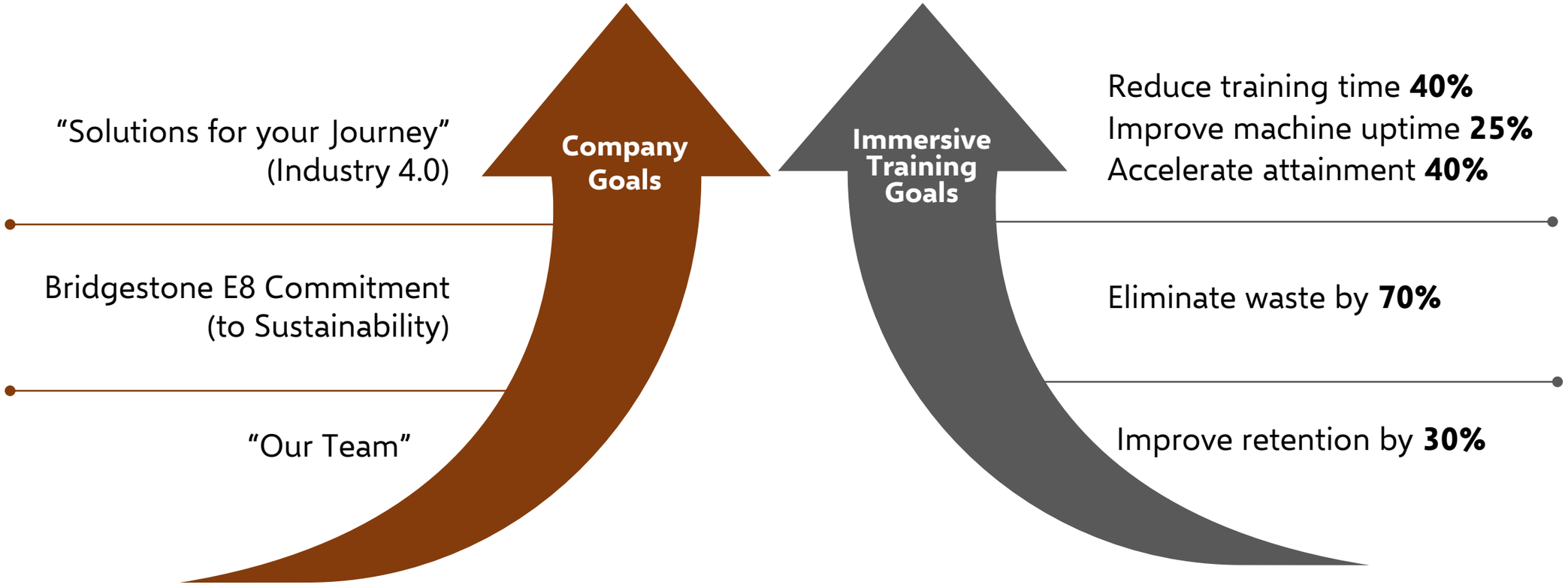
Best Practice

The project leader should coordinate with L&D, Innovation, and Engineering Operations to complete Phase 1—and secure a budget—before proceeding to Phase 2.

Company Spotlight

BRIDGESTONE

In their Envisioning & Planning phase, the Bridgestone team aligned their immersive training goals with company goals to ensure alignment and buy-in for their pilot program.



We partnered with Altoura from phase one to define measurable KPIs and collect the data, which helped us communicate the value of immersive training at Bridgestone.

Andy Warren
Sr Manager, Engineering Process Systems Development
Bridgestone Americas, Inc.

Phase 2: Develop The Curriculum

In this phase, the training project leader works with the training team members (usually from L&D, Innovation, and Engineering Ops) to identify the learning units, and the learning goals for each unit. Learning goals should identify specific competencies you want to teach in the immersive experience (via a lesson or an activity). Instructional designers then lead in writing the curriculum.

The project leader provides these inputs to the immersive instructional designers

- Learning units (topics)
- Learner group demographics
- Learning goals for each learning unit
- Evaluation criteria/KPIs
- Approximate timing/steps required per learning unit
- Learning environment
- Regulatory or safety issues (that might be required to comply with safety standards, like OSHA)
- Existing learning content (paper, video, tutorials, etc.)
- Performance results from past training
- Learner feedback and insights from past trainings

Immersive instructional designers create a learning curriculum with input from the project team

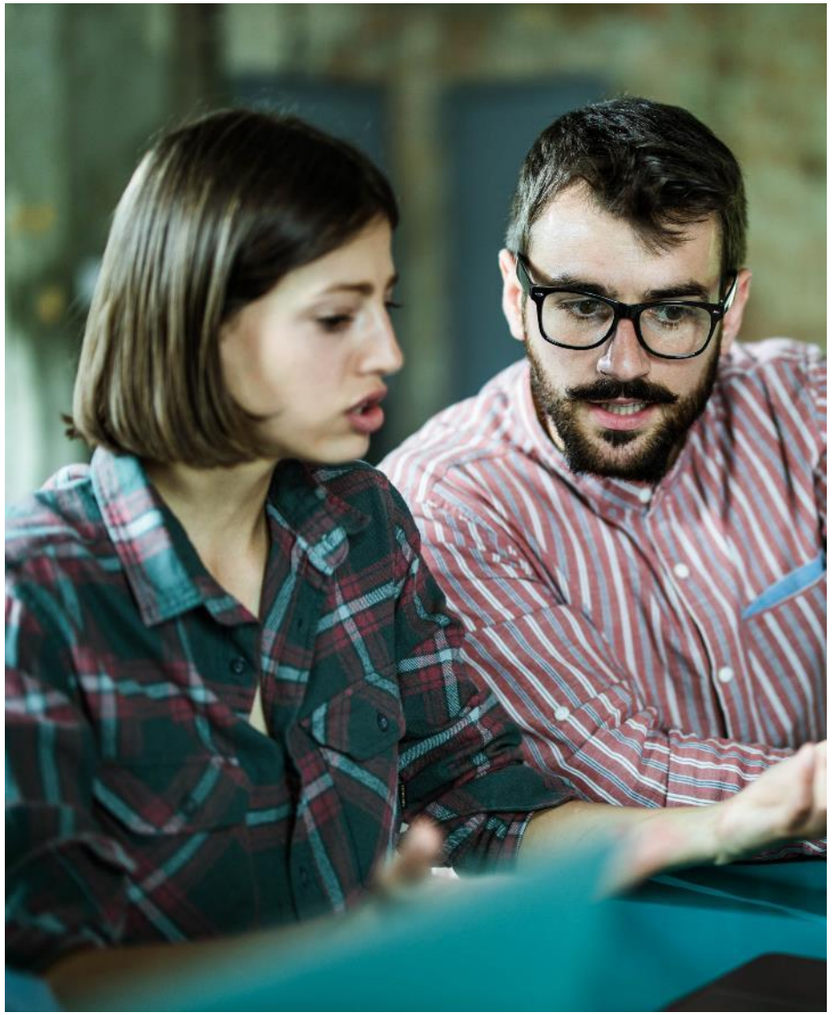
1. **Determine platform and 3D content needs**: identify the optimal level of immersion (AR or VR) and what 3D models are needed to replicate the learning environment.
2. **Identify engaging activities** for the experience by planning attention-grabbing activity, videos, reflection questions, interactivity, animation, scenarios, etc.
3. **Create a storyboard:** prepare a flow for learning unit topics based on the type of instruction (facts, process, classification, relationship) as well as the modes of instruction (video, step-by-step guides, simulations, etc.).
4. **Develop a prototype**: create a short immersive training scenario to validate design goals and the storyboard.

Best Practice

Build a curriculum for 2-3 learning modules for the pilot program, assess the impact of those modules, and use the data insights to make a business case for expansion.

Sample Input to Aid Curriculum Design

Learning Unit: Lockout Tagout (LOTO)	
Learner group demographics	Avg age 43; Avg tenure 5.2 yrs; 62% men. White 51%, Black 29%, Hispanic 18%; Avg sal $49K. 64% HS, 14% college degree
Learning goals	1. **Choose and inspect equipment:** select appropriate tools that are in good working condition. 2. **Identify equipment needing LOTO:** recognize which equipment requires LOTO procedures. 3. **Properly communicate:** when to send notifications to other workers through the LOTO process. 4. **Apply Lockout Tagout:** take the proper steps at the circuit board to apply and remove Lockout Tagout 5. **Repair equipment:** follow correct safety procedures to repair equipment error-free
KPIs to be measured	Time to proficiency; time to complete; confidence; success rate
Approximate timing / # steps / # users	20 min / 40 steps / Single-user
Environment / devices supported	Fully immersive / HoloLens, MagicLeap, Quest Pro, Vive
Regulatory or safety issues?	Yes. See OSHA requirements
3D models required	Hydraulic pump; circuit board, wrench, radio, room, tools
Learning unit activities	Interactive tutorial; simulations; video; instruction guides
Interaction models	Hands and motion controller; hands-free gaze; voice input
Existing learning content	See existing online documentation and video tutorials
Past performance result	56% first time right after training (F). See stats in LOTO report
Past learner feedback and insights	See verbatims and qual focus group content in LOTO report



Storyboarding

Storyboarding is the process of translating learning goals and planned activities from the curriculum into a linear flow of the learning experience. Instructional designers and content creators flesh out the steps, scene details for each step, and content required to support each scene. It can be done any number of ways, including pen and paper. If you have a modern no-code platform, it can be done within the authoring tool as a way to "stub" out the end-to-end experience, which allows content creators to later add instructional content, simulations, etc.. This is a typical storyboarding process:

1. **Capture the steps**: Using the learning goals from the learning unit curriculum, document the sequence of steps of the learning experience from start to finish. Graphics are optional.
2. **Build out the scenes:** For each scene, which will include multiple steps, document or sketch the context of the scene: clarify the location, the equipment and tools that are needed, and what animations, simulations, and instructional guides are needed to assist the learner to successfully complete the steps.
3. **Add notes and annotations**: Add notes to each scene to describe the actions that take place in each scene. This can include descriptions of character movements, interactions with objects, and any other relevant information. Add annotations to the sketches to indicate the user's perspective, camera angles, and other important information.
4. **Build scene branches**: if the interaction of the user affects the learning path, create a decision tree for different scenarios within the realm of possibilities.

Storyboards communicate the "gestalt" of a learning unit

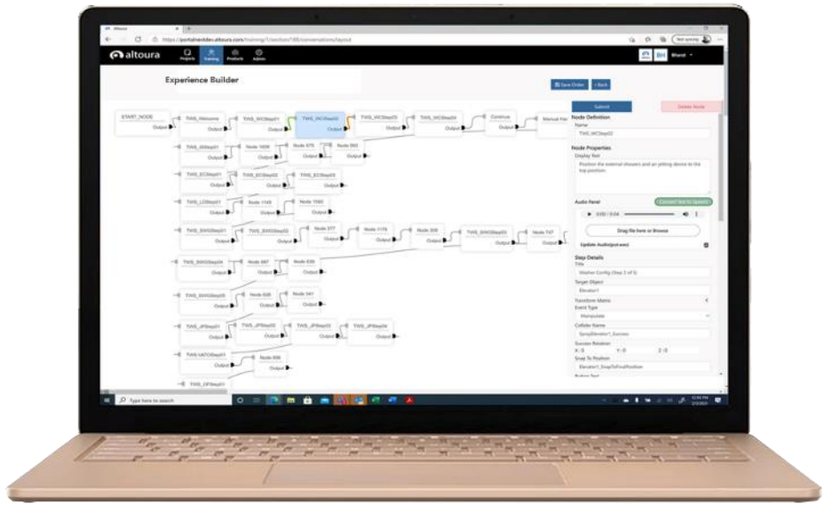
Best Practice

Don't get bogged down by artistry and graphics. Use a Word document with NO graphics if desired. The key is to gain consensus on the steps and identify potential gaps.

Phase 3: Create 3D Content, Simulations, and Training

Once your team has completed the curriculum planning, you are ready to create and import 3D models into the authoring tool and to build interative simulations, animations, and instruction guides. This is only possible with a platform that can ingest 3D models and enable creators to author step-by-step training experiences.

1. **Create and import 3D models** into the authoring tool.
    - **Build a 3D model of the static learning environment** (e.g., a factory, warehouse, or machine room) so you can place learners in a virtual world that mirrors their work environment and gives them six degrees of freedom to navigate and interact with their surroundings (unlike 2D or 3D videos, which limit engagement).
    - **Identify and build 3D models** for every piece of equipment, tool, or object that is going to move, be animated, or made interactive. These will be the training assets.
2. **Build animations, simulations, and training** as mapped out in the curriculum.
    - **Require actions that help the learner achieve tasks**. Simulations should be specific. If the learner needs to turn a dial, specify the number of degrees. If the learner must pull a lever, specify the exact distance. The app will require the learner to meet these requirements successfully before advancing to subsequent tasks.
    - **Build guidance and instructions for standard operating procedures (SOPs)** if safety is a priority. You can use of text instruction guides, warnings, videos, and animations, as well as interactivity.
    - **Build step-by-step guides** to assist the learner through the experience.



Altoura imports 3D models so they can be made interactive

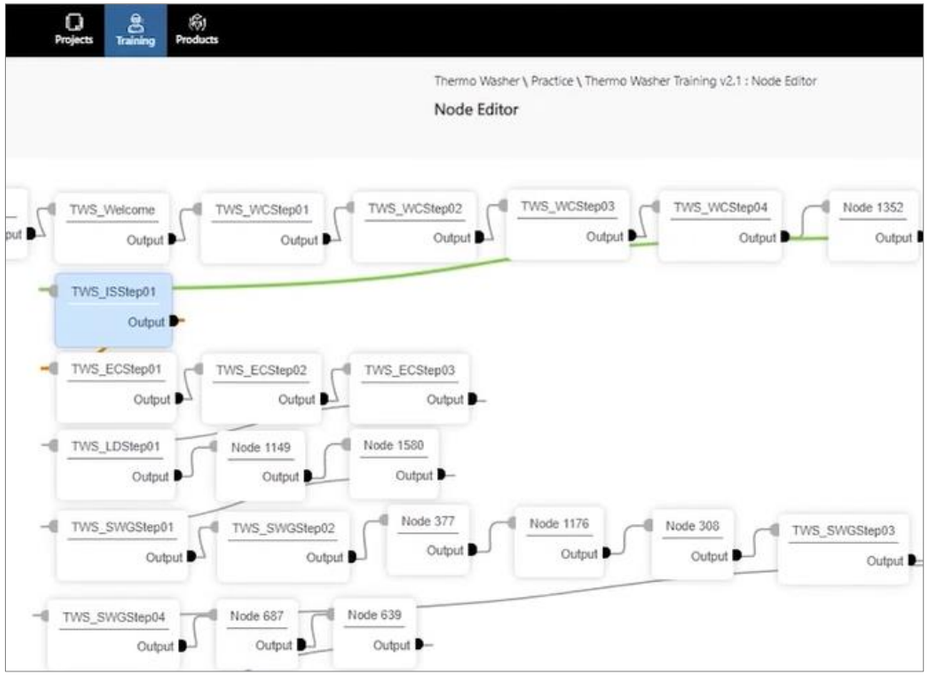
Best Practice

Some teams find it easier to start by authoring step-by-step guides within a no-code authoring tool as a storyboarding exercise, then return to each step to add 3D models and simulations.

No-Code Platform vs Unity

A no-code platform (like Altoura) makes it fast and easy to build immersive training—without having to hire dedicated Unity experts or rely on consultants to build 3D content and develop code to design and publish a training experience.

Altoura	Unity
Altoura is a platform for business users—L&D experts, Operations team members, and Innovation team members—to create immersive learning experiences without the need to write code.	Unity is a platform for software developers to build applications.
Altoura is a **visual platform** that allows business users to build a workflow **inside** a 3D, spatial, full-scale virtual replica of the physical object/environment.	Unity requires a software engineer to write **c-sharp code** to build and publish an application.
When you publish training from a no-code tool to the application running on the device, you can view the experience right away to validate and test it. You use Experience Builder to make changes in real time—such as a text edit or a new simulation—and instantly see the change in experience on every supported device.	Example: if one word was misspelled in a training prompt inside a Unity application, you would need a software engineer to open the code, fix the error, rebuild the app, test and resubmit to the app store. This would take a minimum of 24 hours (and likely many days).



Altoura's no-code Experience Builder uses drag and drop training development

No-Code Platform vs VR Training Application

Gartner, Accenture, and Forrester recommend investing in people, processes, and technology to support the adoption of an enterprise immersive training platform that drives engagement and interactive experiences, whether in AR or VR. However, most offerings on the market are applications (not platforms) and they require pricey professional services to build immersive experiences. A no-code platform gives your team the ability to self-author and self-publish training with little or no assistance.

	Altoura	VR Training	Traditional Training
Categorization	Immersive Training Platform	Application	Instructor-led Class or Tutorial
Operating environment	AR or VR	VR only	Classroom or computer
Authoring tool (to build training)	No-code Experience Builder	Professional services required	Professional services required
Immersive environment	Real-time 3D (models)	360-degree video	2D video and paper
Level of realism to work environment	High (3D Photorealistic)	Medium (360-degree video)	Low (2D)
Interaction style	Engaging, Interactive, Realistic	Engaging	Passive (watching)
Devices supported	HoloLens, Quest, MagicLeap, Vive, iOS, Android, PC, MAC,	VR device only	None
Quality of data insights	Actionable	Basic	Limited
Time to create a training experience	Hours	Days	Weeks
Cost to build new experiences	Free (Self-Service)	$ Thousands	$ Thousands
Set up costs	Free	$ Thousands	$ Thousands
Grade on meeting needs of remote users	A	C	F

Quality Testing for Human Factors

Prior to rolling out an immersive learning unit, whether for a small pilot or large-scale deployment, it's important to assess how well it meets the needs and abilities of your frontline workers in terms of its design, usability, and overall user experience. This process gives the project team input to help fine tune the experience.

1. **Usability testing**: evaluate the user interface and overall user experience to ensure that it is intuitive and user-friendly. Learners should complete a portion of the training and provide real-time feedback on how well the training met their needs and expectations.
2. **Content testing**: evaluate the quality and accuracy of the training content, including the instructional design and interactive elements. Participants can be asked to complete the training and provide feedback on their understanding of the material.
3. **Performance testing**: measure the performance of the learning unit to ensure it meets the required specifications, such as frame rate, resolution, and latency.
4. **Device compatibility testing**: test the training experience on different hardware devices and configurations to ensure compatibility and performance across different systems.

It is important to thoroughly test the end-to-end learning unit to ensure it provides a high-quality experience. Addressing feedback and making updates can be done quickly and usually in real-time with a no-code authoring tool, which reduces the need for re-coding or rebuilding an experience.

Best Practice

Require project team members and several frontline workers (that have had no exposure to the learning unit) go through the experience and provide feedback. The project team should observe and capture input.

Our team is committed to empowering our customers to onboard and ultimately own their training curriculum and processes by building their own unique experiences tailored to their unique workflows.

John Thomas
Director of Professional Services
Altoura

Phase 4: Roll Out Training

The roll-out phase is not a single activity, but a process to ensure a smooth launch and landing. The project lead works with the selected facilitators to introduce the training to learners, considering factors such as the size of your company, the number of learning units you have, and the availability of devices.

Best Practice

Facilitators will need to assist learners from initial setup to the completion of a learning unit, so it's best to anticipate breaks and schedule adequate time for each session.

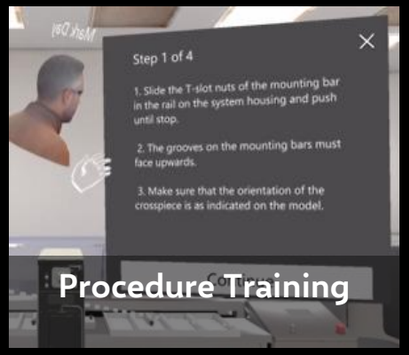
1. **Train the trainer**: If you assign facilitators to assist, make sure they are skilled in the learning unit and prepared to proctor a great learning experience by helping learners put on the device, access the learning unit, and troubleshoot any issues with the learning program.
2. **Evangelize the program**: Leverage internal sponsor (executive) to communicate the training program to employees, including its goals and objectives, how it will be used, and the benefits it will bring to their jobs. Build excitement and buy-in!
3. **Create hardware management instructions**: Ensure that all equipment and devices needed are set up properly. Document instructions so facilitators know how to maintain the device, keep it clean, and anything else related to immersive learning at their location.
4. **Deliver training to the target learner group:** Facilitators assist learners as they put on their device, launch the experience, and complete the training. *Note: the project lead should manage the platform's access controls to make sure learners can access the project in the cloud.*
5. **Publish self-service instructions** if you are going to invite learners (particularly remote learners) to participate in a learning experience without direct facilitator assistance. Assign help resources as well.
6. **Evaluate and update the learning unit content**: Evaluate the data analytics regularly, gather feedback from employees, make improvements to the content and delivery, and update content and delivery methods as needed to ensure that employees are receiving the best training experience.

Sample Roll-Out Plan

Immersive Training Roll-Out Plan	
Learning unit name	“Big Boy” Rocket Parts Assembly
Executive Sponsor	Scott Henderson
Project lead	A. Hama
Training facilitators	Carol Lawson, CJ Craig, Doug Silva, Mark Moss
IT support lead	Amy Dupre
Learner group	Green badge and new hires
Learning team primary locations	Austin, Houston, Kent, San Jose
Number of learners	400 total
Hardware / # of devices	HoloLens and Meta Quest Pro / 12 total (4 of each at every location)
Device storage location	IT locker storage room in each location
Training platform	Altoura
Cloud service	Azure
Connectivity	Wi-Fi
Training place	Facilitated in a dedicated training space on Day 2 of onboarding
Integrations	xAPI integration with X-Central LMS; PowerApps, Dynamics 365 Remote Assist

Opportunities for Adoption Across Your Enterprise

A no-code immersive training platform can be used by many users for many workflows across your enterprise, providing greater value than a standalone application.

	CREATORS	FRONTLINE WORKERS			MANAGERS
Job Role	 Learning & Development Experts	 Maintenance & Engineering Managers	 Service & Repair Technicians	 Production Workers	 Project Managers/ Analysts
Use Case (Workflow)	 Experience Design	 Safety Training	 Procedure Training	 SOPs, SMPS, and Best Practices Training	 Reporting & Analytics

> A little planning goes a long way. Our roll-out plan guided us as we launched an immersive training pilot, gathered user feedback, evaluated impact, and identified additional workflows for future trainings.
>
> **Mark Reagan**
> Plant Manager, Ecolab

Phase 5: Assess Outcomes & Business Impact

Once learners begin training, the platform will start to capture data that you can use to optimize the training and share with key stakeholders. This is where your earlier efforts from Phase 1 pay off since you have already documented **critical business objective and KPIs** that you want to measure.

Using this data, you can build a report or dashboard to showcase the results to executives and stakeholders. As you construct reports, make sure to address the concerns of each group:

Executives

- Are we achieving business objectives?
- Is the program delivering a solid ROI?
- Is the platform being adopted and used across the enterprise?
- Is this program improving our productivity and employee sat?

Project Team

- Are learners successfully meeting learning objectives?
- Is the curriculum optimally designed?
- What do we need to change or improve?
- How can we improve roll-out when we scale?

Facilitators

- What additional skills or materials do we need to facilitate training?
- Has everyone completed the training on time?

Data Sources to Measure Business Impact

There are several data sources that can be mined to assess the outcomes and impact of an immersive training program:

Performance Metrics

Before and after the training program, employees can take assessments to measure their knowledge, skills, and attitudes. Comparing the results can provide an indication of the effectiveness of the training.

Pre- and Post-Training Assessments

Before and after the training program, employees can take assessments to measure their knowledge, skills, and attitudes. Comparing the results can provide an indication of the effectiveness of the training.

Surveys & Feedback

Surveys and feedback from the project team members, learners, and facilitators will help you identify successes and failures—and where you need to improve. Each can provide their level of engagement and satisfaction, as well as areas for improvement.

Return on Investment Analysis

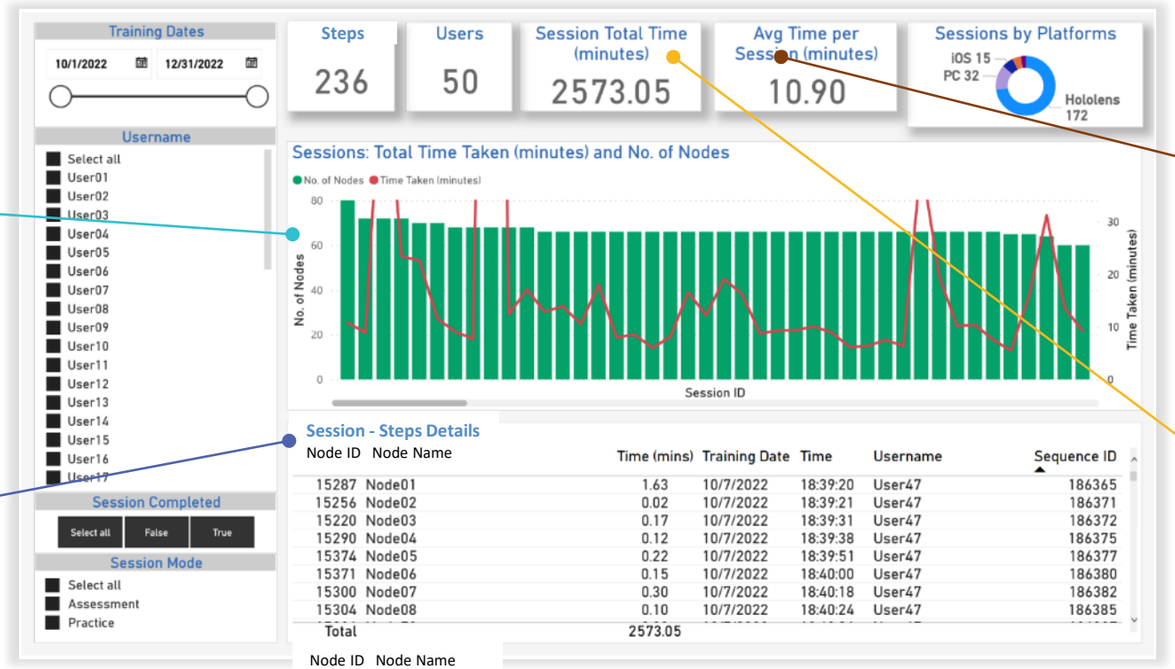
An ROI analysis can help determine the financial impact of the training program. This can include calculating the costs of the training program, as well as any increase in productivity, quality, or safety, and the potential savings from reducing mistakes or accidents.

Using Learner Data to Optimize Your Learning Program

You can generate several reports to evaluate the quality and effectiveness of the training and learner experience. Every experience is recorded as a session, and you can access detailed information about these sessions and the learners. For example, the report below provides data about how many sessions were run by the learners for the selected period of time, the total time taken to run all the sessions, the average time per session and the platforms they were run on. Details about individual sessions, in terms of steps that were completed, and the time taken are also available. This visualization provides various insights, including the following:

The center panel of the visualization allows for easy comparison of performance across users, making it possible to identify which users have already mastered the procedure being taught and which users may require additional training.

The **"Step Details"** in the bottom panel will help identify the nodes the trainees were struggling with.



"Average Time per Session" helps you understand how well the training aligned with the initial requirement, and if it takes too long it may indicate that the training is too complex. This allows creators to adjust as needed.

"Session Total Time" shows how long the system has been utilized.

Phase 6: Create Governance Board & Change Management Plans

When implementing new processes and technologies, there will be push back and concerns, particularly if it means changing behavior. Governance and change management plans are important for your immersive training program because they help ensure that the program is implemented effectively with broad buy-in across your organization.

The Governance board is meant to represent key groups across the company and establish alignment and a common set of goals. The board should approve the strategy, shape communication and decision-making processes, and work to recruit internal champions.

Change management plans can help identify potential risks and impacts of changes, plan for stakeholder engagement and communication, and implement strategies for training, support, and adoption.

Use this phase to recruit your governance board members and communicate the goals and initial learnings of the training program.

Assemble an Immersive Training Governance Board

Make sure your immersive training governance board members are aligned on the goals of the program and senior enough to provide helpful feedback and help you get the visibility, investment, and dedicated support to advance your immersive training program within their business organization.

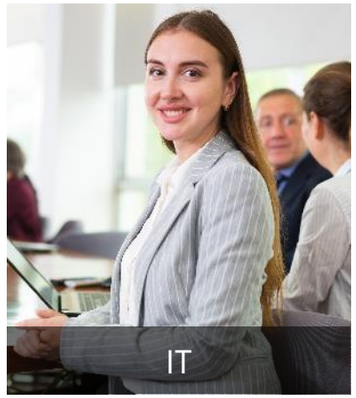
- VP
- Learning Manager
- Project Lead

- Operations Manager
- Safety/Quality Manager
- Plant Manager

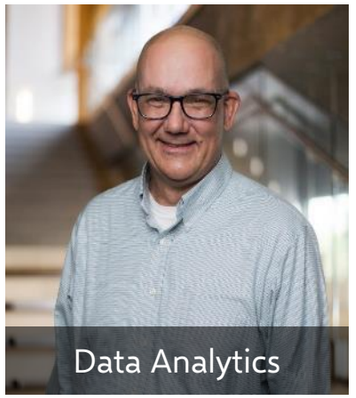
- CLO
- CHRO
- COO
- Line of Business VP

Core Team

- Innovation Lead



- IT Lead



- Project Analyst

Extended Team

Create a Change Management Plan

Taking an immersive training program from pilot to deployment is a journey—and a change management plan will help you reduce resistance and ensure effective communication and buy-in across your organization. You can expect your leadership team to want to understand the steps and strategies that will be used to manage changes to the project throughout its lifecycle. Here are some key elements you should include in your plan:

Implementation Plan: Clarify the plan for extending the pilot to a broader deployment and the roll-out steps needed, resources required, roles and responsibilities, methods for monitoring progress, potential risks and areas where Core Team and Extended Team of the governance board may need to assist.

Change impact assessment: Assess the potential impact of the changes on the project and the stakeholders.

Communication plan: Develop a communication plan that outlines how the changes will be communicated to the stakeholders, when, and by whom. Executive aircover can help land your calls to action with impact.

Training plan: Develop a plan to provide training to the stakeholders affected by the changes across your org.

Metrics and reporting: Define the metrics that will be used to measure the success of the change management plan and how they will be reported to stakeholders.

Ultimately, the change management plan should ensure that your immersive training project maintains the support of stakeholders and the governance board so it can scale to achieve the business objectives you set in Phase 1.

04

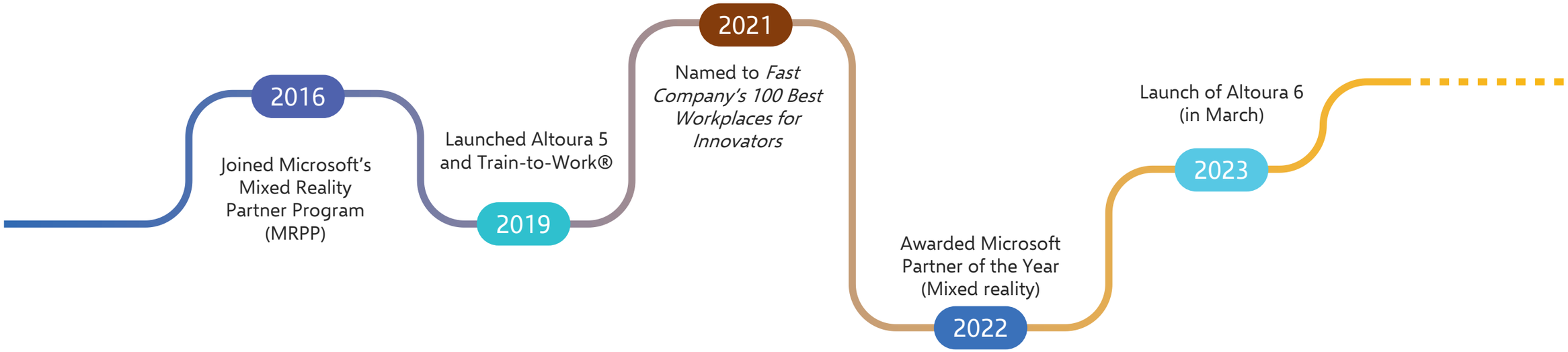
About Altoura

Our Story

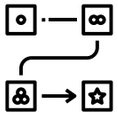
An architect and a prayer.

Altoura was founded by CEO Jamie Fleming over a decade ago while he was working as an architect. Originally branded Studio 216, the small consulting company quickly gained a reputation for its attention to detail, customer care, and expertise in building highly photorealistic 3D content. Eventually Fortune 500 companies were seeking the expertise of the small Studio 216 team. Realizing that most of its customers would benefit from a common immersive training infrastructure and productivity tools, Studio 216 rebranded to Altoura in 2018 and transitioned to a SaaS business model to productize and sell its highly coveted intellectual property.

Today, Altoura is the maker of the immersive training platform for the industrial metaverse. Altoura's platform makes it easy to transform 3D assets into real-time interactive 3D simulations for frontline workers so they can train virtually before they show up on the front lines. Altoura is a strategic ISV partner with Meta and the current Microsoft Partner of the Year for Mixed Reality. With a large and growing base of Fortune 500 customers, Altoura is the #1 choice for companies that want more productive, more engaged employees with less machine downtime, less waste, and fewer errors at a lower cost.



Why Altoura



Complete Workflow

Accelerate time to productivity with **Train-to-Work**, which lets you build an **end-to-end training workflow from virtual to physical environments.** Train workers virtually before they deploy to the front lines, then provide augmented task assistance in the physical environment.

Results-Driven

Improve worker **productivity** and **engagement** and **lower operating costs** from concept to scale with **intuitive** solutions, assessments, robust **analytics**, and support from our in-house **professional services and customer success** teams.

Enterprise-Grade

Get peace of mind with an enterprise-grade platform that offers best-in-class **security, compliance, and manageability**—and that runs on **any device**, connects to **any LMS**, and is **proven in large enterprise deployments.**

No-Code Platform

Create **powerful 3D simulations** and **step-by-step guides** for hard and soft skills training with Experience Builder, no development experience required. Altoura's **integration with Dynamics 365 Guides** enables teams to **build guides once**, then run them in Altoura.

Train on Any Device

Altoura gives you the flexibility to build immersive training once and publish it to your device of choice with a single click. This approach give you maximum flexibility to deliver immersive experiences to learners across your organization no matter what device they have available to them.


Mac and PC


AR device: HoloLens 2, MagicLeap


Igloo Cave

iOS – phone / tablet


Android – phone / tablet


VR device: Quest Pro, Vive

Altoura Jumpstart Program

The fastest and easiest way to evaluate immersive training

The Altoura Jumpstart program is a *pilot-in-a-box* that makes it fast and easy to evaluate immersive training. Bundled with design services, 3D model creation, step-by-step guides authoring, a device, and platform training, it's a no-risk approach that our customers love! Once your Jumpstart is complete, scaling up is easy because you can reuse everything.

Altoura Jumpstart

8 Week Evaluation Program


Unlimited users


Unlimited creators


Envisioning session and plan (with KPIs)


3D model of one piece of equipment


Training (up to 50 steps)


Platform training in Altoura University


Support for pilot roll out


Business value report and video


Recommendations for next phase


Device with Altoura pre-installed

A Message From Our Founder

“

We’ve built our company on a foundation of customer success. We’ve fine tuned our approach to help our customers set goals and achieve outstanding business value. Our platform and our process are unmatched in the market.

Jamie Fleming
Founder & CEO, Altoura

”

Learn More

The best way to get started with immersive training is to put Altoura to work and evaluate the short-term improvements to your business. Your team could be using Altoura in a matter of days. Prepare for your journey with any of these next steps:

Jumpstart (Quick Eval)

Contact us to evaluate Altoura at no-risk with our experts at your side

Attend a webinar

Register for an upcoming Live or an existing on-demand webinar featuring Altoura customers discussing the *New Reality of Work*

Talk to an expert

Need assistance? Have a question? Email sales@altoura.com and let us know how we can help

Sign up

Sign up to be contacted when we have news or new products to announce