

## A New Dimension for Just-in-Time Training: High-Impact Training Courseware using Repurposed 3D Content White Paper

*The patrol team was 25 miles away from the rest of the unit when the vehicle sputtered and stalled, refusing to restart. The driver and the four other soldiers looked at each other and knew this was not good. Another quick 360-degree scan of the terrain didn't show any signs of enemy troops, although each of the five knew that the situation could change at any moment.*

*The driver quickly flipped open a laptop PC, clicked on the vehicle maintenance and repair training module, and typed "sudden stall" in the help field. With a few clicks, she ran a learning module that showed how to clean out an air filter that was clogged with sand. She hadn't been trained on this reconnaissance vehicle, but the 3D animated diagrams that popped up on the screen gave her an immediate understanding of its engine configuration.*

*Another soldier had already opened the hood. Using a ruggedized laptop while sitting on the fender, he watched and listened to an on-the-fly lecture about opening and cleaning the filter as he performed the procedure in step with the animated display. Within five minutes, the filter was cleaned and replaced, the soldiers back in the vehicle, the engine restarted, and the team moving safely back towards the base.*

While no traditional classroom training can prepare our soldiers for every situation they will encounter, the fast-paced nature of technology and increasing number of joint-services missions have resulted in completely new approaches to the larger issues surrounding human performance. The need for a flexible workforce is also a major driving force, as the variety and complexity of equipment increases dramatically. Considering the risks and costs in time alone associated with matching skilled personnel to the tasks at hand, it is no surprise that military organizations are taking a whole new approach to performance support; a complete rethink in the way that soldiers are trained and supported out in the field.

Today, many choices exist for extending classroom learning, efficiently supporting complex equipment, and conveying critical knowledge to joint teams. The alternatives fall under many labels; distance learning, Web-based learning, computer-based training (CBT), interactive multimedia instruction (IMI), and e-learning. Each offers cost savings and flexibility for students, but none of them alone overcome all of the challenges of keeping up with rapidly advancing technologies.

In the opening scenario, soldiers in the field are faced with a situation that had not been covered in their training. Is it possible to ensure that every technician, whether on base or deployed, is constantly in possession of the most up-to-date knowledge? Is our air-filter scenario a fictional situation or can just-in-time training (JITT) solutions tackle the most critical in-field challenges today?

Right Hemisphere contends that it is possible to deliver the right training at the right time, and that companies and the military can optimize JITT solutions with recent technology advances, to effectively meet their objectives. This paper explores the key technology enablers for a new generation of JITT tools, and a solution architecture that can overcome the challenges that previously restricted the availability and effectiveness of interactive, on-the-fly training.

### Benefits of Media-Rich Training

JITT solutions rely on the presentation of extremely technical information in a format that ensures fast understanding and immediate application. Skimming a traditional textbook or a CD-ROM based version of the same text heavy, 2D content would require hours, not minutes, to find and understand the relevant material. But experts agree that media-rich materials, especially those that integrate 3D visuals, animation, and interactivity, greatly speed the learning process and result in higher retention.



Figure 1. Example JITT Application using interactive 3D content.

A media-rich educational tool represents important information in a format that maximizes learning and minimizes knowledge acquisition time.

The introduction of 3D data allows a student to visually take in a lot of information quickly. It is the best format for showing how parts fit together; and within a virtual environment a 3D drawing allows a student to walk around the part, flip it upside down, and thoroughly investigate it in relation to its position and function.

In the past, developing the 3D content required for effective JITT tools was an expensive and time-consuming process. Often, the content was outdated by the time it was deployed. Today, Right Hemisphere delivers solutions for extracting 3D data from existing engineering applications and repurposing that data for non-engineering uses such as rich JITT content. As such, you can now affordably and immediately leverage engineering data, and can take advantage of Right Hemisphere solutions for adapting the visuals and conveying high-impact knowledge.

For example, a CAD model can be converted to an animated non-photorealistic style that highlights parts and components most effectively, applies color effectively, and shows how the parts move when in use. Training developers can choose from many options for creating a look and feel that perfectly suits the content of each JITT module.

Different real-time rendering styles, from standard CAD to illustration styles, are all real-time outputs from Right Hemisphere's Interactive Training Solution. Real-time rendering means that objects can be dynamically rotated and manipulated by the user, giving users the best view for understanding the way the components function together.

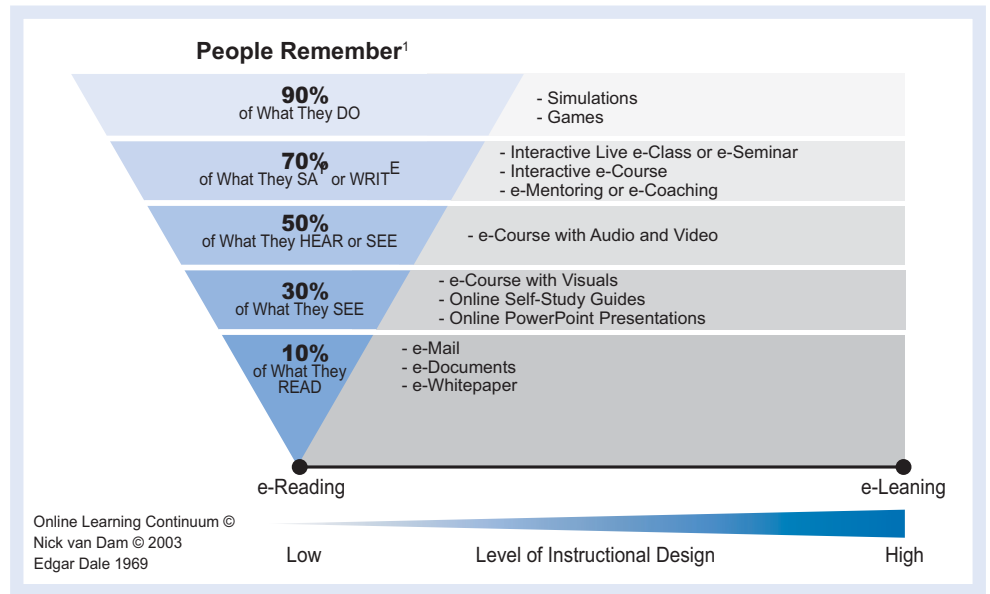


Figure 2. Online Learning Continuum illustrating efficacy of simulation for learning

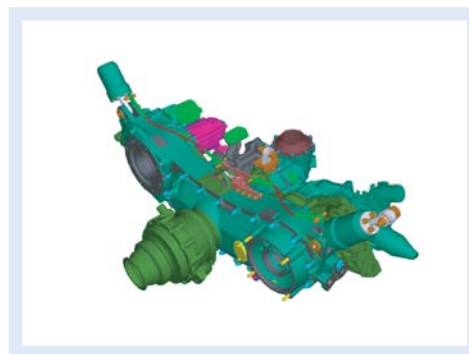


Figure 3. Original CAD Data

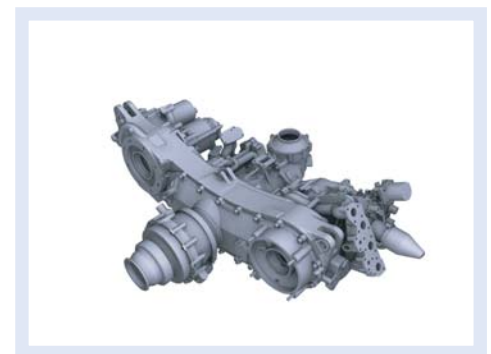


Figure 4. Photorealistic rendering styles

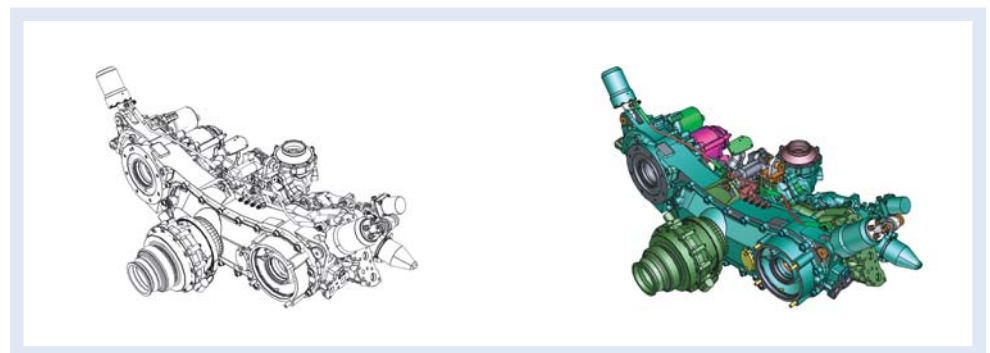


Figure 5. Non-photorealistic illustration styles, for enhanced visual clarity

## The Current Technology Terrain

The timing is right for 3D-enhanced JITT. Today's PCs come equipped with CPUs that run at speeds in excess of 1GHz and high-powered 3D graphics processor units that can support 3D data without overpowering the system. Video compression technologies and emerging standards for multimedia formats make it possible to create media-rich virtual classrooms on very affordable desktop and laptop systems.

The advancements in Internet broadband access, wireless and satellite communications, and the world-wide Web enable affordable connections from literally any place on the globe, and even large media-rich 3D data files can be downloaded and displayed in real time.

Networks today also integrate the necessary security features to restrict access, encrypt data, and ensure the complete protection of sensitive content.

The computer and network foundations can therefore support intuitive 3D representations of data, and the 3D data already exists within the engineering departments. Users are conditioned to 3D interactive content, largely due to the proliferation of sophisticated 3D games. With companies like Right Hemisphere bridging the historical gaps between engineering and training departments, content can be incorporated into highly effective JITT modules without the expense and time constraints previously associated with content authoring.

The true indication of how far we have come can be seen in the numbers of companies that are currently authoring a new generation of JITT solutions. Anark, Beyond Reality, Viewpoint, and Right Hemisphere are just some of the players in this exploding market. These companies provide the total learning solution, they apply product graphics management solutions from Right Hemisphere to extract CAD data, add animation, add interactivity, and deliver learning material in a software-based player that can run on a broad range of viewers.

When creating courseware, authors and subject matter experts can leverage CAD data from multiple sources. Data repurposing standards are being driven by Right Hemisphere, Adobe, Intel, Unigraphics, Dassault, and others. For example, this solution can import numerous file formats and deliver data that can be handled by the users' choice of authoring tools. The flexible and expandable data repositories protect content creation investments, and safely store and manage data in formats that can be easily changed or augmented in the future as requirements change. As new file formats arise, existing data servers can be upgraded to incorporate support, ensuring that the training environments remain open and flexible, and avoiding restrictions based on any particular formats.

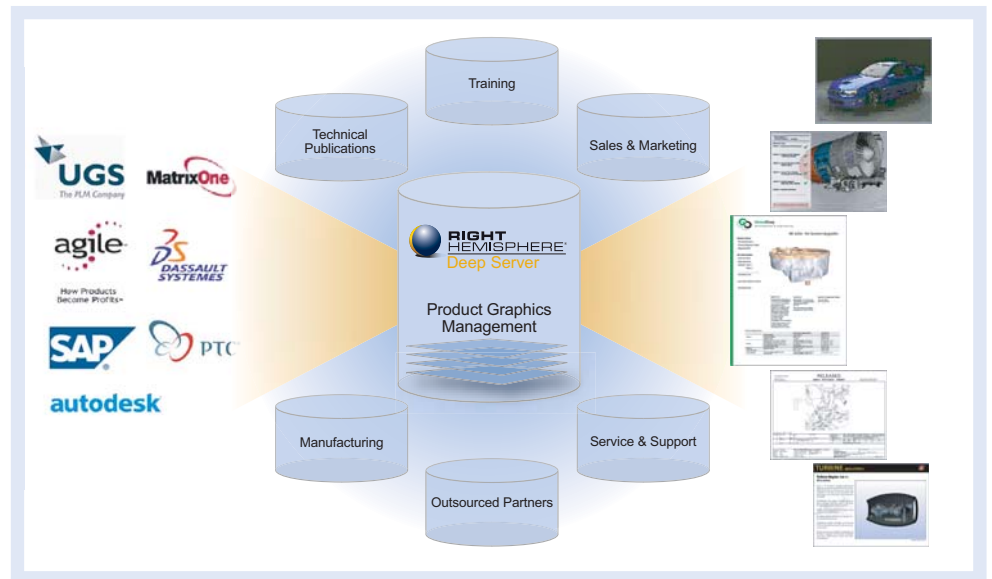


Figure 6. The JITT authoring pipeline from Right Hemisphere starts with CAD/PDM data on the left and delivers rich interactive training on the right.

## Learning to Learn in a New Way

Prior to 3D-enhanced JITT, advancements in training methods and technologies were basically attempts to repurpose traditional 2D content into more cost-effective delivery formats. JITT represents a major departure from the traditional model for learning and results in the ability to continually support personnel while on the job.

Training can be limited to exactly what is needed, when it is needed. Basic training can be stripped down to the true basics, giving students a foundation for later on-the-job learning and in-field support. Rather than aiming to deploy personnel that have already experienced the tasks that they might face during a mission, teams can now send out personnel that have confidence that they can learn anything they need when the need arises, and avoid spending unnecessary time learning content that will never be applied in the field.

Media-rich interactive JITT systems can also leverage experiences gained in the field, and promote knowledge sharing. Learning sessions can be recorded and reused as "Tips from the Field" when anyone else faces the same task in future. Graphical markups, notes, and suggestions from content experts can be uploaded to a central JITT server that gathers and redistributes this information. This new approach fosters true bidirectional learning for the whole enterprise, with huge payoffs in efficiency over time.

JITT is already changing the way we learn. Companies and the military are applying JITT solutions to those areas that are the most sensitive to equipment downtime in terms of cost and potential loss of life. Media-rich JITT solutions are also being deployed to streamline maintenance in extreme conditions. With the growing availability of 3D-enhanced JITT solutions, procurement decisions should adjust to take into consideration the cost advantages that will result from the application of these new solutions. In industries where training costs are a substantial percentage of the equipment purchase price, JITT promises to not only improve the quality of training, but also ease budgets. In an age when students are often overwhelmed with information and graduate from training without a high level of confidence in their ability to handle the job, media-rich JITT can introduce learning changes that foster confidence for on-the-fly problem solving.

## Right Hemisphere Interactive Training Solution

Right Hemisphere's Interactive Training Solution accelerates time to market, increases revenue via more compelling interactive training courseware, and reduces interactive training costs.

Right Hemisphere's Interactive Training Solution blends Right Hemisphere products, industry best practices, and consulting services so you can:

- ▶ Integrate your CAD/PDM and training applications
- ▶ Automate your graphics publishing processes for CBTs, instructor led training, simulations, virtual reality and more
- ▶ Manage your interactive training related graphics

## Right Hemisphere

Right Hemisphere® is the leading provider of Product Graphics Management software. Product Graphics Management is a new category of enterprise software that integrates, automates, and manages 2D and 3D product graphics across the extended enterprise. Five of the top six automotive OEMs, nine of the top ten aerospace and defense contractors, and hundreds more customers use Right Hemisphere software to streamline publishing of technical publications, interactive training, marketing communications, engineering collaboration documents, and more. Right Hemisphere accelerates time to market for new products and product support offerings, increases revenue and competitive advantage, and reduces product lifecycle costs.

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