Desktop Simulation

Enhance learners' engagement and attentiveness through interactivity

By Guy Boulet
Chief Operations Officer

ModSim 3D

According to the theory of situated cognition, knowledge is linked to context and, therefore, learning happens through performance across situations rather than by the accumulation of theoretical knowledge. This means that authentic tasks are an integral component of situated learning environments and, in order to support the construction of meaning, learners must perform tasks similar to those they would perform on the job in contexts similar to those in which they will be performed.

Virtual environments often used in computer games to create imaginary worlds can also be used to recreate real world environments with the significant advantage that you can manipulate the conditions of the environment to meet specific needs.

Therefore, for procedural knowledge to be effectively transferred from a virtual to a real environment, the simulated environment must reflect the real environment it models, and learning events must refer to a realistic context. Desktop simulation allows learners to immerse themselves in virtual environments that show similarity with the real world environment in which they work, which improves transferability of skills and knowledge.

What Is Desktop Simulation?

Desktop simulations are computer-simulated virtual environment systems based on desktop computers which employ graphic systems to provide optimum performance at a reasonable cost. These virtual environments are representing real or imaginary worlds and although they are mostly based on visual representation, they also often include audio. These immersive 3D environments can be designed to mimic any desired work environment and can be used as a single point of access for training and reference materials.

Desktop simulations provide a computer-generated representation of the real world in which the user experiences real-time interactions with the feeling of actually being in the real environment. They can be designed, configured and branded to meet customer's requirements and include a variety of learning activities: familiarization tours, equipment and systems operation, interaction with simulated people, interaction with other learners, etc.

"Desktop simulations provide a computer-generated representation of the real world in which the user experiences real-time interactions…"

3D modeling software is used to create the photo-realistic components of the virtual environment which are then integrated in a 3D rendering engine to create the whole virtual environment where users can move and interact.

Desktop simulation can be launched from a learning management systems (LMS) allowing tracking of learner's activity. They can be optimized to run even on low end desktop and laptop computers and even portable devices such as tablets or smartphones.

How can Desktop Simulation Help Enterprises?

Studies have shown that adult learners require engaging interactions in order to improve retention. Learner's engagement is directly correlated to the level of interactivity of the training experience. Desktop simulation allows enhanced interactions with the environment in a unique way because of the notion of presence, which enhances learners' engagement and attentiveness through interactivity, providing a more entertaining experience which accelerates the achievement of learning objectives.

"Desktop simulation allows enhanced interactions with the environment in a unique way because of the notion of presence enhances learners' engagement …"

Experience and evidence suggest that desktop simulation can deliver many benefits, depending on the use case, including:

- Desktop simulation allows learners to familiarize with the layout of the work environment and the operation of equipment and systems. For example, a specific piece of equipment can be viewed from various angles, can be set in motion or even disassembled. For more complex systems, desktop simulation allows trainees to walk around the environment, improving their spatial awareness of the work environment.

- Immersion in a desktop simulation allows learners to experiment any abnormal situation and take appropriate action to solve the problem. They can experiment situations such as fire, fuel leaks and equipment breakdown that cannot normally be replicated in a real environment for safety reasons or impact on operations. The ability to simulate complex processes by virtual actions means that learners can work on computer models of real equipment allowing endless experimentation without the need to take real equipment off-line and risk loss of production time. This also allows users to make mistakes and experiment real time results of their actions without putting themselves or the equipment at risk.

- Learners often complain that traditional online learning lacks the opportunity to explore and engage with the content. In desktop simulation learners can explore and interact with the environment. Desktop simulation helps learners develop skills, not just knowledge, because they require them to apply knowledge to simulated tasks.

- Another significant advantage of desktop simulation is that a single 3D model can be reused for different tasks. For example, a model of a plant can be used for spatial awareness training, console operation training, a firefighting simulation, and so on. All that is required is the capability to create new scenarios. Similarly, a single personal computer can be used to replicate any number of environments, whereas real-life training would require multiple separate locations.

- Studies show that repetition of a task improves long time retention. Desktop simulation allows the learners to repeat a task until it is mastered.

Desktop simulation allows companies to deploy experiential learning activities which address various learning styles and offers the ability to reach broadly dispersed audiences efficiently and effectively.

Some Use Cases

Security Preparedness[1]

Context: An experiment proposed the development of a simulator in a collaborative virtual environment presenting an alternative method of training to improve the performance of security agents in emergencies.

Business Objective: Assessment of collaboration among agents who deal with radiological and nuclear emergency situations at big events.

Solution: A Collaborative desktop simulation has been developed to reproduce actual training action scenarios. It added a greater degree of interactivity and immersion to the training, transferring the learners to a three-dimensional virtual environment in which learners must make decisions and develop coordinated and collaborative actions.

Outcome: The collaborative desktop simulation was able to represent a scenario quite close to actual and potential emergency situations that fostered collaboration between learners in a collaborative virtual environment where abnormal events can be reliably simulated. The simulation effectively contributed to enhance competencies like team organization and leadership, improve learners' skills and allow to evaluate the collaborative level of the team.

> ***"The simulation effectively contributed to enhance competencies like team organization and leadership…"***

Spatial and Procedural Knowledge[2]

Context: The Royal Canadian Navy needed train future submariners while submarines were unavailable because at sea or in refit.

Business Objective: Provide spatial and procedural knowledge of vessels, which are not always available for training

Solution: The Royal Canadian Navy developed the Canadian Virtual Naval Fleet (CVNF), a desktop simulation used to provide spatial and procedural knowledge of large vessels. They conducted a study to assess the training effectiveness or the desktop simulation by an indirect method that did not require access to the operational equipment and by a classic method, which made use of privilege access to a submarine. The experiment required navy personnel to complete an emergency drill that involved isolation of a bulkhead in a submarine.

---

[1] Passos C., Nazir S., Mol A.C., Carvalho P.V. (2016). *Collaborative virtual environment for training teams in emergency situations*. Chemical Engineering Transactions, 53, 217-222

[2] Magee, L.E. Thompson, A.A. Cain, B. Kersten, C. (2012). *Training Effectivenesss of the Victoria Class Virtual Submarine: A behavioural assessment of learning a complex task within a virtual environment*. Defence R&D Canada - Toronto, Toronto ONT (CAN)

Outcome: The results show that practice within the desktop simulation provided novices with spatial knowledge that they could use immediately aboard the submarine and that prior task training using the desktop simulation is better than traditional familiarization training aboard the submarine itself.

> ***"…desktop simulation provided novices with spatial knowledge that they could use immediately …"***

Interview skills[3]

Context: Security restrictions at the Canadian border limit access for college students to serve their placement at the actual border, thus eliminating the possibility of first-hand experience. Additionally, in class role-plays designed to practice border interview skills were not adequate to instill the interview process.

Business objective: Allow learners to gain first-hand knowledge of the customs function and operations at points of entry into Canada.

Solution: Using a desktop simulation to simulate the border environment and procedures to allow students access to a simulated real life environment and provide them with the sufficient real world practice they require to grasp and retain essential interview skills.

Outcome: The results of this learning experience translated into greater levels of confidence and significantly improved grades.

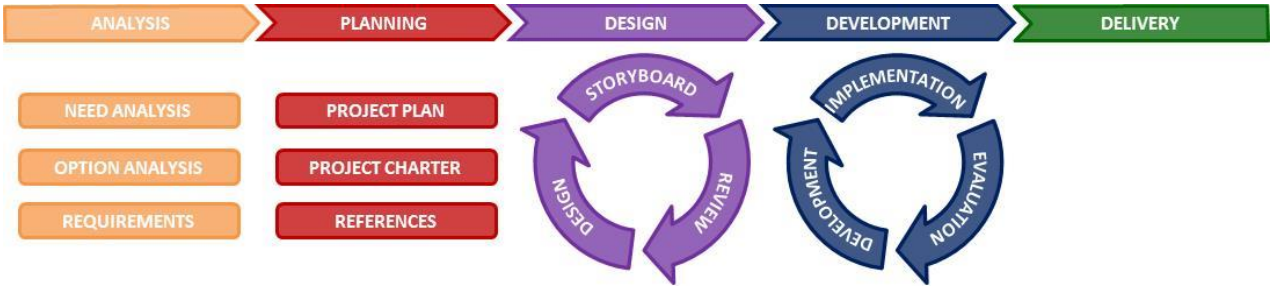
> ***"…this learning experience translated into greater levels of confidence and significantly improved grades"***

About ModSim 3D

ModSim 3D's mission is to model and produce content for simulation. Our clients work primarily in the field of professional training and our team is composed of experts with many years of experience in simulation development.

Our desktop simulations provide interactions that are meaningful for the learner, including "hands on" and immersive experiences unique to the work environment.

[3] Hudson, K., Degast-Kennedy, K. (2009). *Canadian border simulation at Loyalist College. The Journal of Virtual Worlds Research*. Vol.2, No. 1



ModSim 3D Iterative Production Process

Our production process, illustrated above, is iterative in order to allow plenty of opportunities to review the materials before final delivery. Once the client's need has been defined, plans and photos of the work environment are taken for the development of the virtual environment and reference material is gathered for the development of learning activities. Storyboards are then created to illustrate the various learning activities to be created in the virtual environment. These storyboards, once reviewed by the client, are then used by the development team to create these activities within the virtual environment. The client is involved throughout the process in order to ensure accuracy of the product with the actual environment.

Contact Us

✉ info@modsim3d.ca

🌎 www.modsim3d.ca

About the Author

Guy Boulet is the co-founder and Chief Operations Officer at ModSim 3D. He brings over 30 years of experience in corporate training, mainly with the Canadian Forces. He started as an instructor and also served as a course director, training director, training standards supervisor and was also responsible for the implementation of e-learning for the Royal Canadian Navy. As such, he was in charge of the establishment of the Navy Distance Learning Center of Excellence in Quebec City. He has also worked as a Learning Advisor for Université Laval in Quebec city where he designed a program to train over 600 employees on a new file management system. He is also a Learning Specialist for the Department of National Defence where, among others, he designed the Canadian Virtual Naval Fleet.