



feature



# Treating Phobias in Virtual Reality

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Cyberpsychology researchers from Université du Québec needed to quickly and easily create and deploy effective treatment scenarios in virtual reality (VR). They chose 3DVIA Virtools on a Microsoft development and operating platform to develop stable and reliable virtual environments, and use them to treat patients.

Patients with anxiety disorders must face their fears to conquer them. But putting patients in close proximity to what they fear can be difficult. Patients who fear flying, for example, cannot change their minds about a flight once the plane is airborne – unless their experience is a virtual one.

## HELPING PATIENTS FACE THEIR FEARS VIRTUALLY

Researchers in the Cyberpsychology Lab and the Canada Research Chair in Clinical Cyberpsychology at the Université du Québec in Gatineau, Canada, are leveraging virtual reality environments using 3DVIA Virtools on the 64-bit Microsoft Windows platform and customized with Microsoft Visual Studio.Net to help patients with anxiety disorders face and manage their fears in a safe, controlled environment.

Immersive treatment conditions are created by projecting the virtual environments on the walls, floor and ceiling of a “CAVE-like” room, or by using special 3D goggles referred to as head-mounted displays (HMD). Everywhere patients look, the environment surrounds them, changing as they react to the scenarios – much as a video game changes based on the choices players make. The applications are being utilized to treat patients with conditions ranging from phobias and Alzheimer’s disease to addictions. The success rate with virtual reality is equivalent to that for traditional treatments – around 75%.

The six-wall immersive room requires 6 projectors RGB and 8 computers to maximize the image quality, allowing the user to feel fully immersed into the virtual world.



With 3DVIA Virtools, we knew we would be able to quickly and easily create any virtual environment and have it work on any multiple display system.

“With 3DVIA Virtools operating on a Microsoft platform, our researchers can focus on developing applications quickly and that connect easily with a VR environment,” says Dr. Stephane Bouchard, director of the Canada Research Chair in Clinical Cyberpsychology at UQO.

## SEAMLESS AND REALISTIC

Although phobias and anxiety disorders can be treated effectively using traditional approaches, virtual reality environments offer a more practical approach in a clinical setting. It may not be possible for every clinic to keep spiders, snakes, high places, tight spaces and other common fear-inducers on hand to treat patients – but they can all be made available in VR.

## 3DVIA VIRTOOLS: OUT-OF-THE-BOX EASE

With a grant for infrastructure development, Dr. Bouchard’s team acquired 3DVIA Virtools, which gives life to 3D objects and allows control in real time. “3DVIA Virtools was the best choice,” Dr. Bouchard says, “because it is quick

and easy to learn, supports rapid development of new environments, and allows us to use our environments both on the CAVE-like and HMD platforms.”

To create virtual reality environments, the first step is to develop assets or 3D objects in a specialized DCC (digital content creation) or CAD software. Once models are optimized for 3D Real Time, they are imported into 3DVIA Virtools to create a full real-time 3D application. Finally, with the 3DVIA Virtools VR library, users can easily publish applications in different types of Virtual Reality environments. 3DVIA Virtools’ use of VRPN, an open source protocol, allows its environments to be projected or displayed using virtually any hardware on the market. “All of the hardware we need is already compatible with 3DVIA Virtools, so we can just buy a piece of equipment and plug it in,” says Bouchard.



Cyberpsychology Lab research team

The VR Library component of 3DVIA Virtools links the application running on the “master” PC and the cluster of six computers that project images to the cave-like VR environment, ensuring the image is seamless where different surfaces meet. Once the geometry of the room has been input into the system, 3DVIA Virtools makes all of the necessary adjustments. With perspective matrixes, 3DVIA Virtools changes the point of view or stretches the image to show it properly as images are distributed on the surfaces of the room, saving months during design. “If we did everything from scratch, it would take many years to get to the level that 3DVIA Virtools gives us right out of the box,” says Christian Villemaire, programmer and computer section team leader for Bouchard’s research group.

## CUSTOMIZATION WITH MICROSOFT

Villemaire says 3DVIA Virtools was chosen for its ease of use, and it has not disappointed. “3DVIA Virtools is flexible, allowing the team to use the building blocks section for adding more functions and creating new building blocks,” Villemaire says. “Or we use Microsoft’s Visual Studio.Net to alter the code of existing building blocks in 3DVIA Virtools.” Visual Studio.NET gives the lab the power to modify standard blocks of source code in 3DVIA Virtools to create customized objects quickly and easily.



Apartment in 3D, aerial view

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The lab runs 3DVIA Virtools on the popular Microsoft XP Pro operating system. The team’s new development workstations feature Windows Vista 64-bit technology, which delivers the high levels of random access memory (RAM) needed to create more powerful scenarios, launch multiple applications simultaneously, and handle large VR environments.

## SPEED AND DEPENDABILITY

“Because we are funded by research grants, if we needed to spend three years just to develop the backbone and all of the codes for the virtual environment, we would be out of cash,” Bouchard says. “Speed is absolutely key, and showing progress on our research is important for securing the next round of funding. You also can test everything directly in 3DVIA Virtools. If it works in 3DVIA Virtools, it will work in the VR environment.”

Bouchard says 3DVIA Virtools is the dream solution for a research environment. “We’re the ninth cave-like environment in the world and the only one dedicated to mental health, and it’s because we’re using 3DVIA Virtools,” he says. “We wouldn’t be able to do it otherwise” .)

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