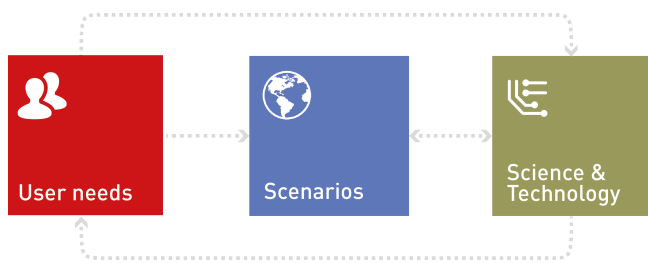




VERVE

VERVE is a research project that aims to develop new technologies to support the treatment of people who are at risk of social exclusion, either because of fear and apathy associated with ageing, or because of a neurological disorder.

The engagement can be summarised in the diagram below – we have sought to investigate how three specific User Needs can be met by applying Science & Technology through a number of specific Scenarios.

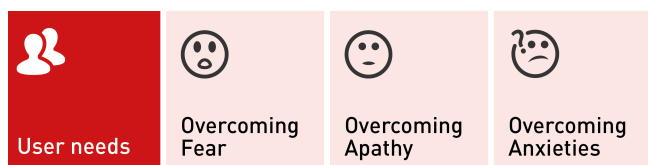


User Needs

Who are we seeking to help?

As the number of older adults grows worldwide, so too does the cost of health care. People live longer, but don't necessarily enjoy the same quality of life.

Amongst the challenges faced by adults, young and old, VERVE seeks to investigate ways to help them to cope with Fear, Apathy and Anxieties, by using a combination of new and existing scientific methods and computer technologies.



Specifically we are hoping to help older people at risk of falling, persons with Parkinson's Disease, Alzheimer's disease and memory problems, as well as those with phobias.

Scenarios

How are we hoping to help?

The clinical partners in VERVE have identified a number of Scenarios that apply the science and technology that we are researching to help with these challenges.

	Fear	Apathy	Anxieties
Scenarios	Fear of falling	Kitchen & Cooking	Dog Phobia
	Freezing of Gait	Memory motivation	Crowd Phobia

Overcoming Fear

The **Institute for Neuroscience** and the **Centre of Bioengineering** at **Trinity College Dublin** have been working closely with **St James's Hospital** and the **Dublin Neurological Institute** at the **Mater Misericordiae Hospital** to help older adults who have a Fear of Falling and persons with Parkinson's disease who experience Freezing of Gait.

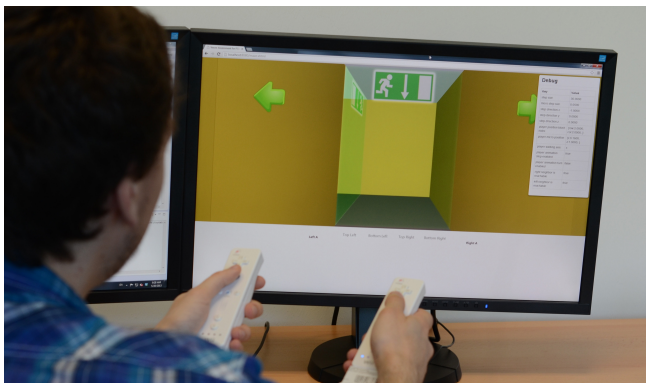
Scenario 1: Fear of Falling

Many older persons experience a fear of falling when walking around their home or their neighbourhood, which may lead to reduced activities and social isolation. Some aspects in the environment, such as busy streets, may increase the fear and the risks of falling. VERVE will help improve confidence by training older adults to navigate through difficult situations in a simulated virtual city environment, while simultaneously training balance control, spatial cognition, and multisensory perceptual abilities.



Scenario 2: Freezing of Gait

Freezing of Gait is a debilitating symptom of Parkinson's disease where the person experiences a sudden inability to move their legs when walking. Within VERVE, we use virtual reality to induce freezing of gait in the lab or clinic in order to better study and understand this phenomenon. More importantly, VERVE has developed a training tool that will help patients overcome freezing by getting them to navigate in a virtual maze filled with challenging freezing 'triggers' that they may encounter in real life. We hope that by practicing to overcome these situations in the virtual world may help them deal with these situations in the real world.



Overcoming Apathy

Many sufferers of Dementia and Alzheimer's struggle with apathy. **Nice University Hospital** has lead research in this area of the VERVE programme.

Scenario 3: Kitchen & Cooking

Those with Alzheimer's can struggle with many simple tasks such as cooking a meal. They can remember how to perform each step, but can't always remember the correct sequence. The Kitchen & Cooking scenario aims to help by allowing users to practice simple recipes using an iPad game played at home, helping them to re-establish the sequences and building confidence to try the recipes for real.



Scenario 4: Memory Motivation Virtual Experience (MeMoVE)

Memories triggered by a personal item or a scene from childhood can be great motivators for those with Dementia. MeMoVE places individuals in a virtual environment and compares whether a scene that has a personal meaning to them motivates them more than a scene with no connection. This will help to understand whether these personal elements will make a difference in games targeted at stimulating memory and deferring the onset of Dementia.

Overcoming Anxieties

The **IRCAM** group in **CNRS** specialises in treating people with phobias such as Dog or Crowd Phobias.

Scenario 5: Dog Phobia






The Dog Phobia scenario uses an immersive virtual environment – one with screens on three walls and the floor – that comes close to simulating a real life scene. Think of the Holodeck in Star Trek! This will be used to help understand if the environment can be used to help people with a fear of dogs to overcome it.



Scenario 6: Crowd Phobia

A second area of investigation is whether simulating a crowd, using virtual characters in the immersive environment, is sufficiently realistic to be a tool that can help people with a fear of crowds.

Science & Technology

 Science & Technology	 Virtual Humans	 Clinical Evaluations	 Environments	 Platforms
	Believable communication	Neural & behavioural assessments	Indoor/Outdoor	Video games
	Realistic appearance	Tracking game performance	Personalised	Virtual reality
Virtual crowds	Evaluating game training outcomes	Image-based capture & display	3D web graphics	

Making it Work

Behind the scenes VERVE has pushed forward the boundaries of research to answer a key question...

How can we create serious games and virtual environments that are effective and that will help our target users?

The answer – and the focus of the VERVE research has centered on a number of important factors: **making it fun**, **making it believable** and **knowing if it makes a difference**.

Making it Fun

The creative adult is the child who has survived (Ursula K. LeGuin)

An important aspect of VERVE has been the use of “serious games” – computer games used at home that we hope will have a beneficial purpose such as deferring the onset of Alzheimer’s and helping participants to better deal with real world challenges that they face such as fears and phobias. But even serious games have to be fun! **Testaluna** has brought a wealth of experience in games development and has worked to ensure that the VERVE games that are used are not only easy to use but also interactive, engaging and entertaining.

Making it Believable

A picture is worth a thousand words

Another theme of the VERVE research has been to look at whether the participants respond better to a game that includes realistic, personal scenes – from their local area, from their memories or from personal items that have special meaning for them. But to personalise a serious game it is traditionally too expensive and time consuming to be practical.

INRIA has addressed this challenge by allowing photographs taken of their street, local landmarks

or memorable scenes from their childhood to be rapidly combined to create a virtual environment that acts as the backdrop for a serious game or a virtual environment in a clinic. This is achieved by the development of a powerful new approach to Image-Based Rendering.



More than just words

In the 70s psychologists such as Mehrabian, Kendon and Ekman put forward the view that nonverbal behaviour plays a crucial role in communicating the overall message. Words are not everything. **CNRS** has pioneered ways to make avatars (the computer-generated characters in the serious games) more believable by conveying emotions, such as showing empathy to game participants by mirroring facial expressions, eye contact and other non-verbal cues.

Beauty is only skin deep

Another aspect of realism is the emotions that we convey through our faces. **UNIZAR** has lead the way in giving avatars skin texture that looks real and that reinforces the body language through skin colouring, such as reddening of the skin to show strong emotions.



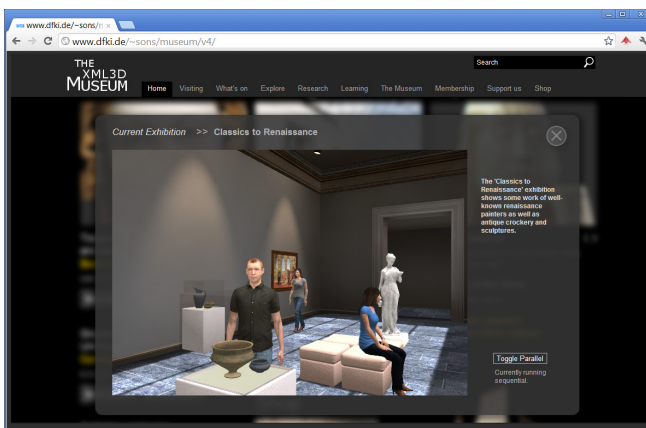
Two's company, three's a crowd

Trinity College Dublin has investigated how larger groups of people interact and how serious games can model realistic crowd behaviour, looking at how the behaviour of one member of the crowd affects the others.



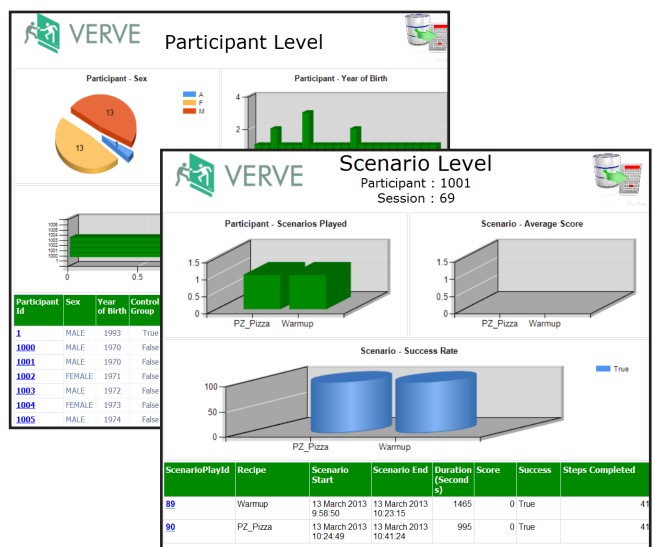
Knowing if it Makes a Difference Getting it out there

To be effective, the game has to be usable on a wide range of devices that are available to the participants, not just on dedicated gaming machines. DFKI has driven forward XML3D – a standard for presenting 3D scenes through ordinary web browsers. This means that the games can be used on almost any internet connected device such as PCs, games consoles, tablets and smart phones.



The proof of the pudding is in the eating

But does it really make a difference? To help the VERVE clinical partners assess whether realistic, personalised games are actually effective, Kainos has worked with the other partners to capture information about how often the games are played at home between clinic sessions. It also allows the clinicians to monitor each participant's progress over time and to compare these to results for other participants. Importantly, the clinical partners involved in each scenario will evaluate the effectiveness of the serious games by comparing participants' performance on a battery of clinical and neuropsychological measures before and after a certain number of training game sessions.



If you are interested in knowing more you will find further information and contact details for each of the VERVE partners on our website www.verveconsortium.eu.

We look forward to hearing from you.



Please check out our website www.verveconsortium.eu

