



Creating the ultimate student experience

Choosing the right type of immersive environment





The difference between a Cave and an Igloo

There's a common misunderstanding out there in the immersive technology market, and especially in the academic and research-related communities.

All too often, the terms Cave and Igloo are used interchangeably. But, the truth is, they are two **VERY** different technologies, with **VERY** different attributes, and **HUGELY** different costs.

So, we thought it may be useful to emphasise the distinctions. This, in turn, may help potential users and buyers of immersive environments to choose the one that best meets their particular requirements.

What's an Igloo?

The Igloo, originally, was a product of the 1990s dance music community. And it was put together by technically-minded pragmatists who wanted to deliver the best possible experience at the lowest possible price-point.

The term Igloo is a brand name, which refers to the original dome-shaped systems. An Igloo can now come in a range of standardised shapes and sizes. Typically, it is a cylinder-shaped space, deploying high-resolution front-projection technology.

What's a Cave?

The Cave, originally, was a product of the 1990s academic community. And it was put together by idealistically-minded academics who wanted to deliver the most realistic possible experience using the best possible components.

The term, Cave, is an acronym, which stands for cave automatic virtual environment. It is also a clever reference to the allegory of Plato's Cave (which explores the nature of perception, reality, and illusion). Typically, it is a cube-shaped space, deploying the highest of high-end 3D rear-projection technology.

What's the difference?

You could debate the details for hours. But, in essence, it comes down to three key points:

1. Complexity

A Cave tends to be a complex system, made-up of complex components. So, they are complex to use, complex to maintain, and complex to upgrade. They can also require a complex set of onsite services, like the power supply, ventilation and air conditioning. And importing content from other 3D tools and models also tends to be a complex process.

By contrast the Igloo is built with usability in mind. After a few hours training, anyone can operate it. The entire system fits under standard ceiling heights and can be connected to existing services. And it is compatible, out-of-the box, with a wide range of 360° or VR content and tools.

An Igloo can be used by almost anyone, irrespective of their level of technical expertise, for almost any type of academic or research project that entails 360° or VR content.



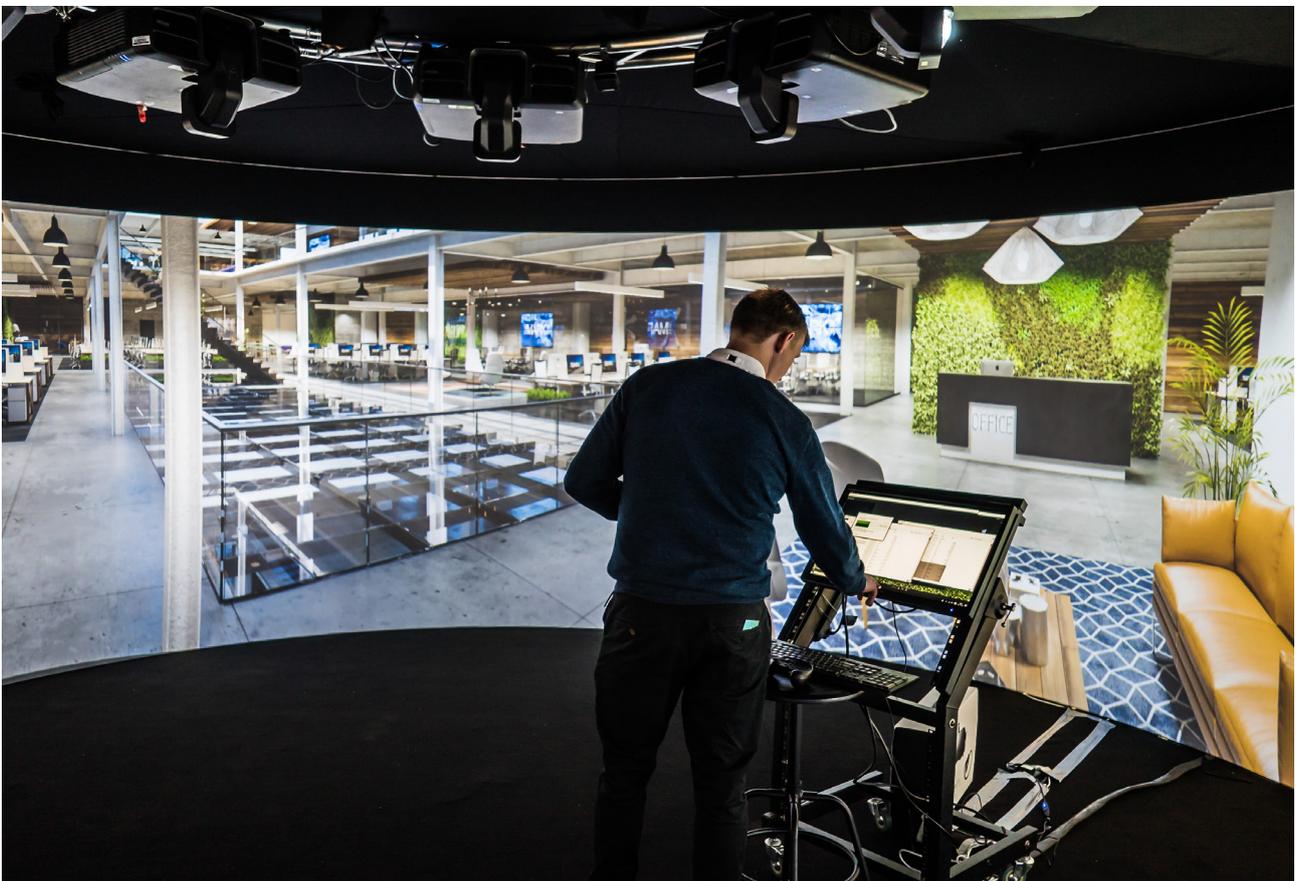
2. Flexibility

Most Caves are bespoke systems and, once installed, have limited scope for customisation. So, they tend not to be very flexible. And, often, they end-up as single-use systems which are primarily used by one team or, at best, one department.

By contrast, an Igloo is modular. It can be up- or down-graded at will, using standard, off-the-shelf components. So, for example, 2D projectors could be replaced with 3D; head-tracking could be added or subtracted; and other ways to interact can be easily incorporated (like gesture control or haptics or accelerometers).



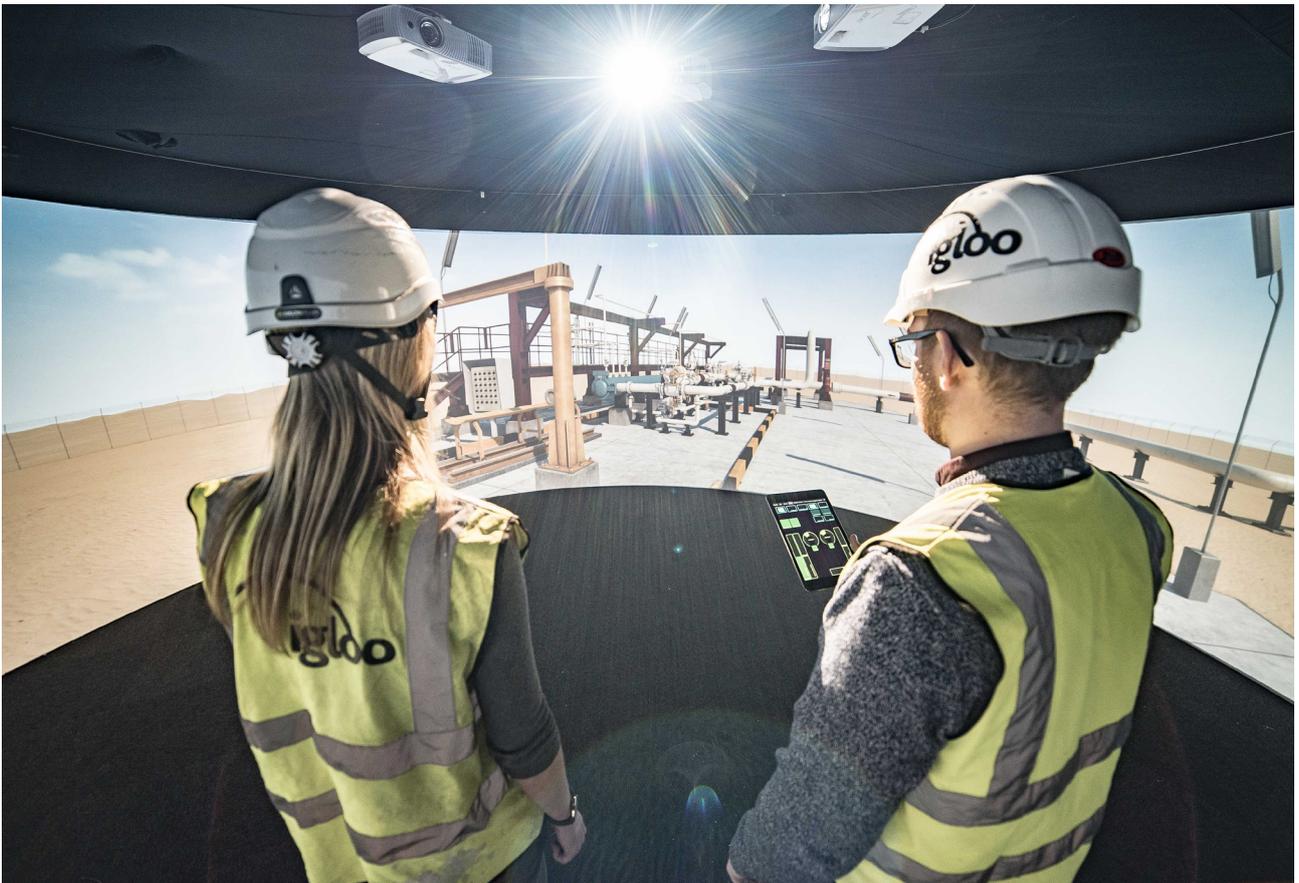
An Igloo can be used for arts and entertainment applications, for simulation, and also for visualisation. If required, an Igloo could also be scaled-up to become almost as complex and costly as a Cave (but a Cave could never be scaled-down to be as elegant and affordable as an Igloo).



3. Cost

The costs of a Cave reflect the quality and complexity of the components within it, and are then bulked up by the integrator's margin. Typically, the costs we see quoted are in excess of US\$2 million, and can be much higher. In addition, there are the additional services to factor-in (for example, one university told us it had spent US\$150,000 on the air conditioning alone).

An Igloo will generally be around 5% or 10% of the price of a Cave. Even with the highest possible specification, it would be unusual for an Igloo to exceed 25% of the price.



In summary, Caves can be great for very specific tasks (like high-end engineering applications). And, to get the best from them, deep technical expertise is generally required.

If you are looking for something less bespoke, which can be used by a broader range of people for a wider range of applications, you may want to consider an Igloo.

So, if you are thinking of investing in a new immersive environment, or replacing an existing system, here are a few considerations:

		Cave	Igloo
Cost	How affordable is it?	Often has a price ticket in excess of US\$1 million and, to become more affordable, needs to be downgraded to a 'powerwall' or 'V-type' format.	Starts at less than one-tenth of the cost of a Cave – with an entry-level price of well below \$100,000.
	How big is it?	Usually uses rear projection, so its footprint tends to be much larger than the usable space.	Usually uses front projection, so its foot print is barely larger than the usable space.
Practicality	How easy is it to install?	Tends to be a custom installation requiring significant services – such as power, ventilation and air conditioning.	A simple, pop-up design that fits below standard ceiling heights and can run with conventional power, ventilation and air conditioning.
	Is it portable?	Usually a permanent installation which can't be moved and needs to be fed by its own dedicated services (power, air conditioning, etc).	Intended to be semi-portable (and even comes packed in flight cases), so can be transported to different locations.
	How easy is it to upgrade or downgrade?	Tends to be a bespoke installation, based on fixed components and proprietary technology.	A modular system deploying off-the-shelf components which can be upgraded (or downgraded) with ease.
	Is it content agnostic?	Generally uses proprietary technology, so it may be difficult to import content from other VR or 3D tools and platforms.	Is content agnostic. It works out-of-the-box with most game engines and is integrated with most 3D design tools and VR platforms
	How easy is it to operate?	Tends to be a complex piece of kit that requires deep technical expertise to start-up, operate, and maintain.	Uses simple touch-screen controllers and interfaces, making is easy to import, set-up and schedule content, switch between channels, integrate multiple formats, etc.
Usability	Is the experience claustrophobic?	Can be of any size, but will generally be 3-metre-square, which can often feel claustrophobic, especially for group-work.	Can be of any size, but will often have a 6-metre diameter, which comfortably accommodates teams of up to 10 people.
	How do you navigate through content?	Generally uses wearable devices (like headtracking) or haptic feedback devices, which some users can find awkward.	Can use any technology, including wearables and haptics, but also gesture control, game controllers, and android or iOS2 devices.
	How immersive is the experience?	Tends to be a supremely immersive experience with 3D projection spanning the walls, floor and ceiling.	As immersive as required – uses 2D panoramic projection as standard, and can be upgraded to 3D and fully spherical formats.
	How much compute power is required?	Tends to be a highly sophisticated, power-hungry beast, requiring significant compute power.	Standard systems use Dual Nvidia GTX 1080 Ti GPU technology, with 1TB SSD storage, and can be upgraded as required.
	How good is the resolution?	Tends to use the highest of high-end projectors, so benefits from the highest resolution available.	Projectors can be specified to suit requirements, ranging from entry-level lamp projectors to the most sophisticated laser projectors.
	How noisy is it inside?	Some users report that the noise of the high-end projectors can be a real distraction.	With standard lamp or laser projectors, the noise is no more than a faint hum (of course, if you like noise you can turn up the surround-sound system!).

Speaking off the record

In putting together this comparison we spoke, off the record, to several universities about their experience with Caves. Here's the gist of what one of them told us:

**“It's great for open days.
But, most of the time it just sits
there wasting space.**

Originally, it was specified by one professor for a particular research application. Unfortunately, he left soon after it was installed, then his technician left. And, since then we've had neither the demand nor the knowledge.

There are still pockets of use. And, when it is running, the level of collaboration and teamwork you see is great. But the complexity gets in the way. It's difficult to operate. It's difficult to calibrate. It's difficult to import data. And it's also surprisingly noisy (those big projectors sound like a jumbo jet taking off).

There's definitely potential in what it can do. But the reality of using puts too many people off – so they stick with a combination of VR headsets and flat screens. ”



So, maybe an Igloo would represent the perfect half-way-house?



For more information

Igloo Vision is the Shared VR company.

From bases in the UK, USA, Canada and Australia, we work with clients worldwide, and have partnered with many universities and research establishments, including:

- Hong Kong Academy of Medicine
- Liverpool John Moores University
- Manchester Metropolitan University
- Michigan State University
- Mid-Sweden University
- Robert Gordon University
- University of Brighton
- University of Essex
- University of Hertfordshire
- University of Loughborough

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