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## **VRinSight Showcase**



Boosting Virtual Reality Learning within Higher Business Management Education

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## **1. ALTSPACEVR**



Organisation Technical frameworks & key data Source: altvr.com Microsoft

The application supports most VR devices including; Oculus, HTC VIVE, Samsung Gear VR, Googe Daydream. The application is also suitable for introductory level device such as the Oculus GO.

Minimum system Specifications: <u>https://help.altvr.com/hc/en-us/articles/115003538414-Minimum-System-Specifications</u>

Description (purpose and Freely available Social VR (SVR) application. Altspace VR includes main target group) the use of Avatar in a multi-user environment (i.e., embodied communication (verbal and nonverbal) with other Avatars). Altspace VR is supported by most major VR ecosystems. The application is highly suitable for HEI as an introductory practice example because it is easy to get started as a user. Due to multiuser interaction, a tutor can accompany the learner in the VR space. The group interaction also demonstrates much of the communication dynamics, interaction and pedagogical considerations of VR environments. Altspace VR is aimed for consumer use more than enterprises, although it could be used for meetings, discussions, etc. as a substitute for videoconferencing or other online/physical meetings. Customized virtual spaces are also available. Browser sharing feature enables the use of existing 2D content in a virtual meeting.

Prior Knowledge Little or no prior knowledge is required to use this application. This is particularly true with introductory level devices such as Oculus GO, as the application can be sought and downloaded onto the device from the search engine. The basic navigation skills with an environment would be helpful, but this is also covered by virtual tutorial.

However, building or customizing a virtual world requires skills that are more advanced. Uploading content requires some



knowledge about 3D-models: <u>https://help.altvr.com/hc/en-us/articles/360015560614-Unity-Uploader-FAQ</u>

Learning Outcomes	Knowledge:
(knowledge, skills,	- First VR experience
competences)	- First VR interaction
	-First experience with headset and controller
	Skills:
	- Creating an Avatar
	- Creating a virtual space
	- Creating a VR social circle
	- Downloading content
	Competences:
	- Basic navigation
	- Basic communication
	- Basic group interaction
HEI Added Value	The application is highly suitable for HEI as an introductory practice example because it is easy to get started as a user.
	The application also allows multiple user interaction, which means a tutor can accompany the learner in the VR space
	The application allows group interaction, which highlights the capabilities of VR. The group interaction also demonstrates much of the communication dynamics, interaction and pedagogical considerations of VR environments
Learning Content	The application is essentially a social platform rather than a learning platform but is valuable as it allows users to learn the first basic skills needed within a VR environment including, communication, navigation and group interaction.
Practical Work Content & activities	Users must learn the basic skills of a VR environment as detailed above. User can also personalise their location and homespace from a menu. User also can learn how to add objects to the environment and interact with objects. Users learn how to choose content for the optional Youtube wall and connect with social media. User learn how to move from one VR space to the next and connect with other registered users.
Recommendations	Altspace is a multi-user application. Therefore, it allows the tutor to accompany the learner into the VR space.
	It is helpful if the tutor creates and prepares a VR space in which to invite the learner. In this setting the user can earn the basics of navigation and discover the controller and the options available on the lower left hand side of the avatar.
	Slowly the tutor can introduce new features such as movement, spatial sounds, adding objects, and loading the video wall.
	Once the learner is competent, the tutor can invite more avatars to the VR space to demonstrate the group features and the dynamics that accompany a group interaction.

WRinsight	Co-funded by the Examula: Programme of the European Union
	Finally the tutor can ask the user to create his/her own home space, customise to their liking and invites other avatar to the home space.
	Additionally, after participants are familiar with the basics of social VR, there could be discussions that relate to, e.g. how to monetize or create value with social VR platforms. In general, what does these platforms enable for consumers and enterprises?
Requirements	The application supports must VR devices and hardware, and has a single/multi-user capability. The Altspace app can be downloaded conveniently from the VR device search engine (Oculus GO) and will require registration through the account of the device.
Further reading	Recommendations for further reading into subject
Sources	https://altvr.com/
SWOT	Strengths:
	<ul> <li>Quick results and interactions</li> <li>No prior knowledge needed</li> </ul>
	- Supports most devices
	- Multiuser environment
	Weaknesses:
	<ul> <li>Little flexibility in content (content uploading requires technical knowledge)</li> <li>Controls are not optimal</li> </ul>
	- Usability of virtual world customization
	Opportunities:
	<ul> <li>Quickly create and host events</li> </ul>
	- Gives users independence to discover
	<ul> <li>Option to develop user app in VR space</li> <li>Potential to substitute e.g. videoconferencing</li> </ul>
	Threats:
	- Limit in sustain interest
	<ul> <li>To sustain interest, group interaction is required</li> <li>Content limited</li> </ul>

- Social platform open to abuse





(Rinsi



Source: www.eonreality.com

	Organisation Technical frameworks & key data	EON Reality The AVR platform supports VR platforms: Oculus and Vive.
	Description (purpose and target group)	EON is company involved in all aspects of VR & AR providing solution to industry and education.
		The company offers one of the largest immersive learning library available, and has a number of application dedicated solely to education
		AVR platform is dedicated to Education and to help educators enhance the learning experience. The application has a library of ready-made interactive lessons for educators to use in the classroom
		The AVR platform consists of 3 apps used for traingn and education:
		- Creator AVR
		- Virtual Trainer
		- AR Assist
		Target group: Educators, trainers at all levels of education
	Basic Features	Creator AVR
		- Lesson library (Biology, Astronomy, History, Engineering)
		- Content library of 3D objects
		- Tests, and Quizzes creation

- No use of Avatar





Virtual Trainer

- Use of avatar
- Multiple scenarios and locations
- Practical training scenarios
- Tests, and Quizzes creation
- Collaborative Training

#### AR Assist

- AR tool for remote maintentance in industry
- Compatible with Microsoft Hololens

The VR Lesson library is diverse and includes education and practical training

- Biology & Anatomy
- Aerospace Engineering (Jet Engine Assemble & Maintenance)
- Safety training (Airport security, Waste facility, offshore rig, Disaster preparedness)
- Manufacturing engineering (Industrial Planner, Plant visualisation)

Prior KnowledgeThe EON application requires basic VR skill such as: setting up the<br/>VR equipment, downloading the software and using basic<br/>controls when navigating and interacting in a virtual space.

There is a library of ready-made content in EON applications

No programming skills needed.

Learning Outcomes (knowledge, skills, and competences)	- - -	Navigating in virtual space Interacting with virtual objects Importing 3D objects Creating Quizzes & Lessons Creating lessons and training sessions
HEI Added Value		Dedicated education application High immersion in VR Avatar-based interaction Detailed scenarios Manufacturing engineering (Industrial Planner, Plant visualisation) Aerospace Engineering (Jet Engine Assemble & Maintenance) Biology & Anatomy Aerospace Engineering (Jet Engine Assemble & Maintenance)



Learning Content	AVR offers one of the largest immersive learning library			
	available, and has diverse range of content to be used in education, for example;			
	<ul> <li>Biology &amp; Anatomy</li> <li>Aerospace Engineering (Jet Engine Assemble &amp; Maintenance)</li> <li>Safety training (Airport security, Waste facility, offshore rig, Disaster preparedness)</li> <li>Manufacturing engineering (Industrial Planner, Plant visualisation)</li> </ul>			
Practical Work Content & activities	The application provides virtual training in a range of scenarios including			
	<ul> <li>Fire safety Training</li> <li>Laboratory training</li> <li>Compressor Operations</li> <li>Engine Maintenance</li> <li>Airport ground crew training</li> </ul>			
Recommendations	It is recommended that the tutor introduces the Creator AVR initially, and makes use of the sample lessons.			
	This can be combined with a quiz.			
	The more complex VR Trainer application can then be introduced to learners using the sample scenarios provided.			
	The AR assist is designed for use with the Microsoft Hololens.			
Sources	https://eonreality.com/platform/			
	https://www.youtube.com/watch?v=LZryt_O4LT4			

## 3. Calcflow





#### Co-funded by the Erasmus+ Programme of the European Union

	https://www.youtube.com/watch?v=wqZZsIA5V1w&list=PLjQh_Yi8CoBzW3k1QavOOaseD7 XeN_xK_&index=6
Organisation	© 2019 Nanome Inc.
Technical frameworks & key data	<ul> <li>Available for HTC VIVE Steam and Viveport as well as for Oculus Rift and Gear VS (not yet for Quest)</li> <li>Minimum system requirement: Windows7 / i5-4590 processor / 4GB RAM / GTX 1060</li> <li>Recommended system requirement: Windows 10 / i7-4790 processor / 8GB RAM / GTX 1080</li> </ul>
Description (purpose and main target group)	CalcFlow "makes calculus less monotonous and more marvelous". Is is aimed at advanced mathematicians or anybody else dealing professionally with selected field of mathematics. CalcFlow enables mathematical modeling, manipulating 3D graphs, and real-time parameter editing. Pedagogically, CalcFlow fosters focused learning (no distractions in VR). High immersion may enhance participant's motivation to learn. Real time 3D visualizations foster sense-making of mathematical models.
Prior Knowledge	Basic to advanced knowledge in the mathematical areas in seven selected field (see below)
	havigation
Learning Outcomes	Knowledge:
(knowledge, skills, competences)	<ul> <li>Learning/Recalling basic mathematical formulas</li> <li>Skills:</li> </ul>
	<ul> <li>Applying mathematical formula</li> <li>Transferring formula into graphs</li> <li>Competences:</li> </ul>
	<ul> <li>Transform and understand complex mathematical formula into 3D models</li> </ul>
HEI Added Value	High potential for all training courses and professions dealing with those 7 mathematic field covered by the app
	Any kind of company at which mathematics is applied; CalcFlow seems extremely uses to upskill or re-skill staff in the very field of mathematics; therefore, it might be a useful tool for internal C-VET strategies and courses; in this context, if future managers and HRD experts should be familiar with this tool
Learning Content	The app covers 7 main fields (introduced by short tutorials on YouTube):
	Tutorial 1 - Vectors Addition and Cross Product: <u>https://www.youtube.com/watch?v=L-S7nP-</u> <u>ojqo&amp;list=PLjQh_Yi8CoBzW3k1QavOOaseD7XeN_xK</u> Tutorial 2 - Mobius Strip:
	https://www.youtube.com/watch?v=rOp0uxIsCrU&list=PLjQh_Yi8 CoBzW3k1QavOOaseD7XeN_xK_&index=2
	Tutorial 3 – Spherical Coordinates: https://www.youtube.com/watch?v=3TuA8pyvVX0&list=PLjQh_Yi8 CoBzW3k1QavOOaseD7XeN_xK_&index=3

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	Tutorial 4 – Double Integrals: https://www.youtube.com/watch?v=18vSNYfT6-
	c&list=PLjQh Yi8CoBzW3k1QavOOaseD7XeN xK &index=4
	Tutorial 5 – Parametrized Function: <u>https://www.youtube.com/watch?v=0qhBb4EThy8&amp;list=PLjQh_Yi8</u> <u>CoBzW3k1QavOOaseD7XeN_xK_&amp;index=5</u>
	Tutorial 6 – Vector Fields: <u>https://www.youtube.com/watch?v=wqZZsIA5V1w&amp;list=PLjQh_Yi</u> <u>8CoBzW3k1QavOOaseD7XeN_xK_&amp;index=6</u>
	Tutorial 7 – Curl and Divergence Example: <u>https://www.youtube.com/watch?v=b3UyTyDiYZw&amp;list=PLjQh_Yi8</u> <u>CoBzW3k1QavOOaseD7XeN_xK_&amp;index=7</u>
Practical Work Content & activities	NA
Recommendations	The main purpose of the app is not to enable easy learning from scratch in the different fields of mathematics. However, it seem to be perfectly suited for deepening or refreshing learning experiences in the field, applying knowledge, skills and competences in 3D graphs and forms and by understanding which impact any kind of parameter change has on graphs and forms.
Requirements	<ul> <li>Available for HTC VIVE Steam and Viveport as well as for Oculus Rift and Gear VS (not yet for Quest)</li> <li>Minimum system requirement: Windows7 / i5-4590 processor / 4GB RAM / GTX 1060</li> <li>Recommended system requirement: Windows 10 / i7-4790 processor / 8GB RAM / GTX 1080</li> </ul>
Further reading	NA
Sources	Website: <u>https://nanome.ai/calcflow/</u>
SWOT	<ul> <li>Strengths:</li> <li>High visualization of abstract figures, and therefore, to apply data and formula into graphs, figures, forms, etc.</li> <li>Perfect tool to refresh and deepen prior learning experiences</li> <li>available for free</li> </ul> Weaknesses: Opportunities: <ul> <li>Perfect tool for students to understand and apply mathematics</li> <li>Good HRD tool in case upskilling of staff needed in any of the field covered by the app</li> </ul>
	Threats:







#### Source:

https://www.youtube.com/watch?v=C8tuXxCA1PQ&feature=emb title

Avantis Systems Ltd., 2-3 The Glenmore Centre, Waterwells Business Park, Quedgeley, Gloucester, GL2 2AP, Tel: +44 (0)845 862 0390

#### VR hardware: a box with 4 or 8 headsets

- Quad-Core ARM Cortex-A17 Processor
- Stereo Speakers & Internal Microphone
- 2GB DDR RAM & 16GB Internal Storage
- 4,000 mAh Lithium-Ion Battery
- Net Weight: 400g, Dimensions: 185mm x 155mm x 102mm
- 8MP Auto-Focus Front-Facing Camera
- 5.5" 2560×1440 High Resolution Display
- Light & proximity sensor/G-sensor/Electronic Compass/9-Axis gyroscope
- 802.11 BGN Wi-Fi & Bluetooth 4.0
- 3.5mm Stereo Jack Out For Headphone Use
- Aspherical lens with adjustable distance
- Full Size USB Port & Micro USB Port for charging

VR software: ClassVR Portal and ClassVR App

ClassVR is is designed for teachers and for the classroom (content is mainly aimed for elementary schools). ClassVR is not compatible with other VR ecosystems such as Oculus, Steam, or VIVE: both HMDs and the content comes from the technology provider Avantis. ClassVR content is based on 180/360 videos, or build in 3DoF 3D scenarios. ClassVR does not enable navigation in VR, or any complex interactions, because there are no controllers included in the system.

ClassVR is easy to use and cheap low-end VR solution for schools. Pedagogically, ClassVR focuses on enhancing student's sensemaking via VR (taking multiple perspectives, and "being somewhere else"). However, lack of interactions may diminish situated learning and transfer. 3DoF also reduces actional and sensory immersion.

Prior Knowledge Pedagogical experience needed. No advanced technical knowledge required

Organisation

Technical frameworks & key data

Description (purpose and

main target group)





	or the European Union
Learning Outcomes (knowledge, skills, competences)	<ul> <li>Knowledge about how your students learn</li> <li>Using ClassVR Portal to monitor students</li> <li>Supports your coaching</li> </ul>
HEI Added Value	Added Value for HE business Management studies: Allows the teacher to introduce in his lessons immersive experiences for the students. During the use of ClassVR the teacher can monitor all students. Head tracking allows the teacher to detect which students are not looking at the topic presented in the application. Teachers can add their own resources (such as 360° photos or videos)
Learning Content	ClassVR comes with a book '…' and more than 500 VR resources covering the following areas:

 Art
 Image: Article for the for t

Source: https://www.classvr.com/

Every lesson of the vast collection of supporting materials is accompanied with worksheets for the students and lesson plans for the teacher.

To maximize the students retention rate, don't let students experiment on their own without guidance. To keep the focus on the presented topic, students have to fill in worksheets. The teacher can use the ClassVR Portal to monitor all headsets at the same time.

Further reading

**Recommendations** 

Practical Work Content &

Sources

activities

#### Website:

https://www.classvr.com

www.avantiseducation.com

#### YouTube:

https://www.youtube.com/watch?v=Ir4keWRtmUc (Introduction) https://www.youtube.com/watch?v=C8tuXxCA1PQ https://www.youtube.com/watch?v=Nvi6tZyZwz8 https://www.youtube.com/watch?v=Zau6gKIsq-M https://www.youtube.com/watch?v=Ly36XfpmR98 https://www.youtube.com/watch?v=e2DQ-Ro1aRY https://www.youtube.com/watch?v=4jlfp7OetKs (ClassVR Portal updates) https://www.youtube.com/watch?v=eiA55dKePFE (60 seconds of STEM) https://www.youtube.com/watch?v=hQIJcNNESgI (ClassVR Portal)



https://www.youtube.com/watch?v=b8IWPn9sx80 (Marine Discovery Center)

https://www.youtube.com/watch?v=FOSbaXcT1R0&feature=youtu
.be (integration of Thinglink media)

#### Strengths:

- The monitoring application, ClassVR Portal, is a web application and so it is independent of the operating system used.
- Teachers can upload their own resources
- Teachers can monitor every connected headset with the ClassVR Portal.
- A head tracking system allows the teacher to detect which students are not looking at the presented topic.
- Every VR application comes with worksheets for students and lesson plans for the teacher.
- Aventis Systems offers at his website a comprehensive 32 pages book 'A guide to VR & AR in education', to download for free.
- The Aventis development team have created a simple interface within the ClassVR portal that allows to seamlessly take Thinglink media and paste it into your subscriptions library, allowing users to implement the familiar 'drag and drop' system they will already be familiar with.

#### Weaknesses:

- The vast collection of resources is aimed at secondary and highschool students, although the website has a dedicated web page called 'ClassVR for universities' with some examples of professors using ClassVR.
- The vast collection of resources is aligned with American standards

#### **Opportunities:**

- Technicians from Avantis Systems can configure and setup the ClassVR portal for you and configure the system ready for you to use. All you need to do is create an individual password and you are ready to go. The technicians will
  - Configure the ClassVR portal for your school
  - Add teachers as individual users
  - Setup groups and classrooms
  - Provide important network, firewall and port configuration requirements
- Avantis Systems offers comprehensive online courses that cover every aspect of ClassVR and revisit past learning
- Aventis Systems also offers teacher and technician trainings

Threats:

SWOT





- It is a system with dedicated HMD's. Since VR technology is evolving rapidly, possibly the headsets will soon be outdated.

## **5. ENGAGE**



Source: engagevr.io

Organisation	VR Education Holdings PLC			
Technical frameworks & key data	The application supports all major VR platforms: Windows MR, Oculus, Steam, and Vive.			
	Support for standalone VR devices (Oculus Quest, PICO G2, Vive Focus) coming "soon"			
Description (purpose and target group)	ENGAGE is a social VR platforms for education, training, meetings and events. Participant's may use existing virtual locations (21+) and virtual objects (1200+), or download their own content. ENGAGE offers many built-in features such as media streaming, quizzes and session scheduling.			
	Target group: educators, trainers and corporate virtual teams.			
Basic Features	- Multi-user environment			
	- Multiple virtual locations			
	- Avatar creation			
	<ul> <li>Avatar customization (also option to download an image of a user's face)</li> </ul>			



- Content library (3D objects, sound effects, special effects)
- Presentations and videos (supports OneDrive, Dropbox, Google Docs, YouTube)
- Virtual desktop sharing
- Recording and Playback
- Media streaming
- Forms, Tests, and Quizzes
- Interactive objects
- Session Scheduling

Prior Knowledge Smooth interaction in ENGAGE VR requires basic skill of using VR: setting up the VR equipment, downloading the software and using basic controls when navigating and interacting in a virtual space.

> Hosting events and content creation in ENGAGE VR require skills that are more advanced. However, there is ready-made content in ENGAGE VR (library of 3D models, audio effects, special effects). No programming skills needed.

Learning Outcomes (knowledge, skills, and competences) Basics of multi-user VR:

- Creating an Avatar
  - Customizing an Avatar
  - Navigating in virtual space
  - Interacting with virtual objects
  - Interacting with other users

Content creation:

- Importing 2D/3D objects (3D-models, 2D-screens, etc.)
- Importing files, presentations and videos
- Sharing a virtual desktop

Setting up a VR multi-user session:

- Scheduling and hosting an event
- Giving presentations
- Recording presentations
- Streaming presentations

Competences:

- Basics of setting up and using social VR
- Hosting an event in social VR

**HEI Added Value** 

- True 3D environment



- Increased spatial understanding
- High immersion
- Engagement with different stakeholders (e.g. User-Centered Design)
- May substitute videoconferencing (or other communication tools) in virtual teams due to enhanced collaboration capabilities
- Avatar-based interaction: shared focus, easier turn taking, dialogue and problem solving
- Enhanced informal interaction
- Ready-made VR venues/locations for Educators
- 100s of relevant ready-made 3D objects for import (Science, Geography, History)
- Ready-made educational content

(Math, Science, Geography, History)

- Desktop sharing capability for interaction with learning groups
  Up to 36 multi-users to facilitate learning groups
  - Active learning through learner participation and virtual interaction
  - Quizzes and Forms creation feature for learning groups
  - ENGAGE currently being piloted in South Korean education system
- Learning Content The diverse set of features in ENGAGE VR enable users to learn how to use social VR and host social VR events (training, education, etc.).

However, Learning Content is dependent on the content that is created by users/hosts. Users can create presentation style content to share with learning group

- Practical Work Content & Users must learn the basic skills of using social VR as detailed activities above. User can also create and customize their avatars (also based on real facial information). User also can learn how to add objects to the environment and interact with objects. Users learn how to choose content from the content library. Users learn how to host, record and stream an event in social VR.
- Recommendations ENGAGE is a multi-user application. Therefore, it allows the tutor to accompany the learner into the VR space.



It is helpful if the tutor creates and prepares a VR space in which to invite the learner. In this setting, the user can earn the basics of using social VR.

Slowly the tutor can introduce new features such as movement, spatial sounds, adding objects, and loading the video wall or a presentation.

Once the learner is competent, the tutor can invite more avatars to the VR space to demonstrate the group features and the dynamics that accompany a group interaction.

Finally, the tutor can ask the user to host their own event and invite other avatar to their space.

Additionally, after participants are familiar with the basics of social VR, there could be discussions that relate to, e.g. how to monetize or create value with social VR platforms. In general, what does these platforms enable for consumers and enterprises? Other relevant question may relate to what are possible barriers to using social VR in an organization.

#### Strengths:

- the amount of content and interactions
- multi-user environment
- content creation tools

#### Weaknesses:

- complex to use
- usability

#### **Opportunities:**

- all-in-one learning platform for educators

Recommendations for further reading into subject

#### Threads:

steep learning curve may drive away some learners and educators

Further reading

Sources

SWOT

https://engagevr.io/



## 6. Edorble



Source: www.edorble.com

Organisation	Edorble Inc		
Technical frameworks &	The application works on PC, Mac, and virtual reality technology.		
key data	VR platforms: Windows MR, Oculus, Steam, and Vive.		
	Support for standalone VR devices (Oculus Quest, PICO G2, Vive Focus) coming "soon"		
Description (purpose and target group)	Edorble is a social VR (i.e. multi-user) platform that is specifically aimed at education, training, meetings and events. Edorble 3D design tools enable virtual world creation and customization.		
	Target group: educators, trainers and virtual teams.		
Basic Features	<ul> <li>Multi-user environment</li> <li>Multiple virtual locations</li> <li>Avatar creation</li> <li>Avatar customization</li> <li>Virtual World creator and editor</li> <li>Content library for presentations and articles with link to Dropbox storage</li> <li>Voice Communication</li> <li>Media streaming (Youtube etc)</li> <li>Session Scheduling</li> </ul>		
Prior Knowledge	Basic skill VR skills are necessary to use the application:		
	setting up the VR equipment, downloading the software and using basic controls when navigating and interacting in a virtual space.		



Hosting events and content creation in Edorble requires skills that are more advanced. There is ready-made content in content libraries available

Edorble offers the ability to create your own 3D object and develop your won Virtual spaces, which requires skills beyond basic.

Learning Outcomes (knowledge, skills, and competences) Basics of multi-user VR:

- Creating an Avatar
- Customizing an Avatar
- Navigating in virtual space
- Interacting with virtual objects
- Interacting with other users

Content creation:

- Importing 3D objects from library
- Importing files for presentation from dropbox
- Using and displaying webbrowser and videos

Setting up a VR multi-user session:

- Scheduling and hosting an event
- Giving presentations
- Group communication and interaction

HEI Added Value	<ul> <li>Ready-made VR spaces and facilities for hosting lessons</li> <li>Ready-made Library of 3D objects and content</li> <li>Upload of files, presentations, online articles for presentation to group of users.</li> <li>High immersion rate for users</li> <li>May substitute videoconferencing (or other communication tools) in virtual teams due to enhanced collaboration capabilities and presentation tool</li> <li>Avatar-based interaction leads to a hands-on learning</li> <li>Enhanced informal interaction</li> </ul>	
Learning Content	The diverse set of features in Edorble enable users to learn how to use social VR and host social VR events (training, education, etc.). There is a library of 3D objects and content. Much of the learning Content is dependent on the content that is uploaded by users/hosts.	
Practical Work Content & activities	Users must learn the basic skills of using social VR as detailed above. User can also create and customize their avatars (also based on real facial information). User also can learn how to add objects to the environment and interact with objects. Users learn how to choose content from the content library. Users learn how to host, record and stream an event in social VR.	



Recommendations	Edorble is a multi-user application. Therefore, it allows the tutor to accompany the learner into the VR space.
	It is helpful if the tutor creates and prepares a VR space in which to invite the learner. In this setting, the user can earn the basics of using social VR.
	Slowly the tutor can introduce new features such as movement, spatial sounds, adding objects, and loading the video wall or a presentation.
	Once the learner is competent, the tutor can invite more avatars to the VR space to demonstrate the group features and the dynamics that accompany a group interaction.
	Finally, the tutor can ask the user to host their own event and invite other avatar to their space, and begin t create their own 3D objects and virtual spaces.
Further reading	Recommendations for further reading into subject
Sources	https://www.edorble.com/
	Demonstration
	https://www.youtube.com/watch?v=BQoLo4AidrQ

## 7. Firefox Reality



Source: blog.mozilla.org

Organisation

Mozilla

Technical frameworks & key data

The application supports the following VR platforms: Viveport, Oculus Go, Oculus Quest and Google Daydream





Description (purpose and target group)	Firefox Reality brings the web content of the well-known Mozilla Firefox browser to Virtual Reality headsets. The application is mostly suitable for educators, trainers, students, general public. Firefox Reality is a "browser for VR"
Basic Features	
Prior Knowledge	No prior knowledge is required to use this application. The basic navigation skills with an environment would be helpful.
Learning Outcomes (knowledge, skills, competences)	<ul> <li>Knowledge:</li> <li>Learn the basics of how to use VR</li> <li>Learn how to navigate in a VR app and use the available features</li> <li>Skills:</li> <li>bookmark pages you liked the most</li> <li>Use your voice for quick and easy web searches</li> <li>Competences:</li> <li>being able to find appropriate and relevant material in the web</li> </ul>
HEI Added Value	The application is a learning platform, which allows users to experience web browsing in a new immersive format and is available in different languages (Chinese, English, French, German, Italian, Japanese, Korean, Russian and Spanish). Great viewing experience for all users.
Learning Content	Firefox Reality brings the best and freshest content from the web that you know and love to Virtual Reality headsets. The application provides an open, accessible and secure way to explore the web, allowing also transition from 2D to 3D immersive modes.
Practical Work Content & activities	The application is highly suitable for HEI as an introductory practice example because it is easy to get started as a user. This is mostly a learning platform where users can interact with web content in an immersive way.
Recommendations	-Prepare your lesson in advance and know exactly what the additional value of the application will be -predefine from the start when is best for users to explore the web and let them explore and find the relevant material



Requirements	<i>The application offers a single user experience per device.</i> The applications requires internet connection to use it.
SWOT	<ul> <li>Strengths</li> <li>The large library with any kind of content available</li> <li>user friendliness</li> <li>available in more than 10 languages</li> <li>No prior knowledge is needed</li> </ul>
	weaknesses
	<ul> <li>The content is shown in a too big screen so its tiring for users to use for a very long time</li> <li>Applicability level is not very high that can sustain continuous interest by users</li> </ul>
	Opportunities
	<ul> <li>Flexibility in content</li> <li>quick results and interactions</li> <li>Go beyond the 2D web and enjoy immersive experiences directly from Firefox Reality.</li> <li>Move seamlessly between 2D and 3D web pages so that you are always presented with the best possible experience.</li> </ul>
	Threats
	- Gamification level is very low
Further reading	Recommendations for further reading into subject
Sources	https://www.oculus.com/experiences/quest/2180252408763702 & https://play.google.com/store/apps/details?id=org.mozilla.vrbrow ser&hl=en

### 8. Google Expeditions

Google Expeditions is an immersive education app that allows teachers and students to explore the world through over 1000 virtual-reality (VR) and 100 augmented-reality (AR) tours. You can swim with sharks, visit outer space, and more without leaving the





Source: <u>https://edu.google.com/products/vr-ar/expeditions</u>

Google	
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Organisation	Google
Technical frameworks & key data	<ul> <li>Each expedition is made up of various scenes that include 360-degree panoramas and 3D images</li> <li>Smiling faces on the guide's screen indicate where the students are looking at.</li> <li>You can direct students to a specific area of the scene.</li> <li>An annotations tool allows a guide to draw within a scene using a finger.</li> </ul>
Main Target Group	Who was this example originally designed for?
	Teachers and students
Prior Knowledge	<ul> <li>Required knowledge to allow learning (e.g. VR Knowledge, Pedagogical experience, technical know-how) <ul> <li>Make sure that the tablet and all HMD's are connected to the same wireless network.</li> <li>knowledge about the topic</li> </ul> </li> </ul>
(knowledge, skills, competences)	<ul> <li>skills to navigate through expeditions</li> <li>familiarizing with the context</li> </ul>
HEI Added Value	Added Value for HE business Management studies:
	A HE business management teacher/professor can create and/or show virtual tours at companies, distribution centers, stock exchanges, markets, business contacts, fairs, conferences, sales talks with customers,





Learning Content	Main Content part, please describe the contents of the best practice example:
	The content (space, seas, human body, musea, volcanos, ancient places,) is provided by Google and partners such as WNET, PBS, Houghton Mifflin Harcourt, Pearson, the American Museum of Natural History, the Planetary Society,
Practical Work Content &	Describe the activities or any exercises included:
activities	<ul> <li>Install the app</li> <li>Get the kit</li> <li>Connect</li> <li>Select your adventure</li> </ul>
Recommendations	how to apply best, instructions for preparation and mentoring, do's and don'ts:
	<ul> <li>There may be technical challenges to getting everything up and running, so be sure to test your network and technology before rolling this out with a full class.</li> <li>Motion sickness can be a real issue with some students using VR, so be sure to take frequent breaks and remind students that they can take the headset off their eyes at any time.</li> <li>Getting enough connected devices and managing a classroom full of VR-toting students can prove challenging.</li> </ul>
Requirements	<i>VR hardware and software:</i> HMD, internet connection, internet browser, Android 4.4 KitKat or later, at least 1 GB of RAM, a HMD with gyroscope and accelerometer, essential for orientation and to see images shifting in a VR viewer
	Number of participants: limited by the number of available HMD's and the ability of the teacher to manage a whole classroom full of VR toting students.
	Headphones: not necessary
	Internet connection: yes, needs a Wi-Fi-connected tablet, smartphone or HMD. Once an expedition has been downloaded by the guide, it can be viewed off-line by the students.
	Smart phone: is one of the options
	App download: The Expeditions app is currently only available for Android devices but an iOS app is promised to be available soon.
	Online registrations: yes if you want to create an Expedition
	Logins:
	Anything needed to carry out the activity:
Further reading	Recommendations for further reading into subject: https://cpb-ca- c1.wpmucdn.com/learningnetwork.setbc.org/dist/e/233/files/201 7/01/GoogleExpeditions-1-1n8h67x.pdf https://support.google.com/edu/expeditions/answer/6335093?hl= en&ref_topic=6334250 https://www.academia.edu/36440194/Around_the_World_with_ Google_Expeditions
Sources	Link to source of best practice example:





### Website: https://edu.google.com/products/vrar/expeditions/?modal\_active=none

#### YouTube:

<u>https://www.youtube.com/watch?v=IUJePwRS9iA</u> (teacher guided learning session)

SWOT analysis

#### Strenghts:

- Expeditions is a free app.
- Over 1000 VR expeditions (and 100 AR tours) are available to be explored.
- Google Expeditions has been updated with more tools: Annotations lets you draw within a scene just by using your stylus or finger.

Weaknesses (limitations):

- Google Expeditions isn't designed to be used with children under 7 years old.
- It's generally recommended to limit each expedition to 5 to 20 minutes.
- It's also best to have students sit while using Google
   Expeditions, which will keep them from bumping into something and getting injured.

Opportunities:

- The app allows to filter by different category areas or to search for a specific tour.
- You can develop your own expeditions using Tour Creator web application and then publish them on Poly.
- Can be viewed with Cardboard from Google or with Daydream View on a Daydream-ready phone.
- With stunning scenes and a flexible delivery method, your students will thank you for journeying together through space and time.

Threats:

- There may be technical challenges to getting everything up and running, so be sure to test your network and technology before rolling this out with a full class.
- Motion sickness can be a real issue with some students using VR, so be sure to take frequent breaks and remind students that they can take the headset off their eyes at any time.
- Getting enough connected devices and managing a classroom full of VR-toting students can prove challenging.





## 9. Prospect



Source: help.irisvr.com

Organisation	IrisVR
Technical frameworks & key data	The application supports the folowing Headset:
	Oculus Rift, Oculus Quest, HTC Vive, or Windows MR
	It also supports he following PC systems:
	OS: Windows 7 SP1 64 bit or newer
	GPU: NVIDIA GTX 1070 equivalent or faster
	CPU: Intel i5 equivalent or faster
	Memory: 8GB RAM
Description (purpose and	Prospect is a one click solution for displaying designs in Virtual reality.
target group)	The application is primarily designed to display 3D architecture
	models in VR setting and allow for multi-user meetings. These models
	are first generated in standard CAD and /or BIM software and then
	transferred into the Prospect VR platform.





**Target group:** Designers and Managers from Construction Industry, Engineering, Architecture as well as HE Educators & Students

Prior Knowledge Basic experience with VR headset is advantageous to use this application, knowing how to set up the VR equipment, downloading the software and using basic controls when navigating and interacting in a virtual space.

> Hosting events and content creation in Prospect require skills that are more advanced. The application is primarily designed to display 3D architecture models in VR setting and allow for multi-user meetings. These models are first generated in standard CAD and /or BIM software and then transferred into the Prospect VR platform. Therefore the users needs to possess and be familiar with standard CAD software in order to create content. Software such as:

- Navisworks
- Revit
- Rhino
- SketchUp
- Grasshopper
- OBJ
- FBX

Learning Outcomes (knowledge, skills, and competences) Basics of multi-user VR:

- Navigating in virtual space
- Interacting with virtual objects
- Interacting with other users
- Scheduling and hosting meetings
- Giving presentations
- Switch between numerous navigation menus
- Capture screenshots (with 360degree option)

#### Content creation:

- Importing 3D objects (3D-models, 2D-screens, etc.)
- Importing files, presentations and videos
- Import CAD files into VR space
- Import BIM metadata into VR
- adding plugins to standard VR software





	<ul> <li>create and navigate project library</li> </ul>
	3Dmodel/VR space customisation
	<ul> <li>Scaling 3D Models to size and Rescale</li> </ul>
	- Modifying 3D models
	- Customise virtual space (lighting, import objects)
	- Geo locating of model (sunlight, shadowing)
HEI Added Value	- True 3D environment
	<ul> <li>Increased spatial understanding</li> </ul>
	- High rate of immersion
	<ul> <li>The ability to visualize and demonstrate the complexity of design processes and business workflows in the lecture theatre.</li> </ul>
Learning Content	All content is imported by the user and therefore all content is dependent on the users/hosts. Content in the form of 3D models most first be generated in standard CAD and /or BIM software and then imported into the Prospect platform.
Recommendations	Prospect suits well in engineering, construction, etc. studies, because it is an actual industrial tool used in some companies. Besides learning technical knowledge, Prospect enables students to learn more about remote collaboration / remote project management.
	All content from the platform needs to be uploaded from is standard CAD and /or BIM software. It is therefore advisable to download pre- prepared sample 3Dmodels from CAD programs and CAD libraries (such as Sketchup) and these can be uploaded in the platform by the tutor prior to a demo session with learners
	There are 3 different user menus in the platfrom
	- Navigate menu
	- Model Modify menu
	- Modify Section
	It is recommended that the Tutor explain each menu and the possible functions. Prospect is a multi-user application which
	allows the tutor to accompany the learner into the VR space.
	Slowly the tutor can introduce new features such as navigation, movement, presentation, meetings scheduling and importing of content.





Once the learner is competent, the tutor can invite more users to the VR space to demonstrate the group features and the dynamics that accompany a group interaction.

Further reading	Recommendations for further reading into subject
Sources	https://irisvr.com/prospect
Links	Hosting a multi-user meeting https://blog.irisvr.com/blog/multiuser-meetings
SWOT	<ul> <li>Multi-user to cater for numerous learners</li> <li>Usability (drag and drop functions)</li> <li>Importing external content</li> <li>Free trial period</li> <li>Immersive collaboration</li> <li>Oculus Quest compatibility</li> <li>Data visualizations (BIM conversion)</li> <li>Weaknesses: <ul> <li>Content dependent on CAD software</li> <li>This works only as a presentation and design review tool</li> <li>Alterations to content made in VR space do not feed back to original content in CAD software</li> <li>All alterations need to be performed in the CAD software</li> </ul> </li> <li>Demonstrates to learners a highly practical application in a business setting, and how VR is facilitating major decision making in business</li> <li>Multi-user allows meetings with user from business and education from anywhere in the world</li> <li>Data visualizations could be used in other industries as well Threats: <ul> <li>No streamlined integrations with existing information systems (mismatch between VR models and CAD/BIM models may lead to communication problems )</li> </ul> </li> </ul>



# 10. Job Simulator – The future of molecular design and exploration



Organisation Technical frameworks & key data	<ul> <li>© 2019 Owlchemy Labs</li> <li>Available for HTC VIVE, Oculus Touch/Quest, PlayStation, VALVE Index</li> <li>First launch in 2016</li> <li>\$ 19,99</li> </ul>
Description (purpose and target group)	Job Simulator is a fun and engaging game that illustrates the capabilities of "more serious" VR training.
	Target group: the general public, persons/students/pupils interested in the professions of convenience store clerk, office worker, gourmet chef and auto mechanic.
Prior Knowledge	Basic knowledge in handling VR equipment, software and navigation
Learning Outcomes (knowledge, skills, competences)	<ul> <li>Knowledge: <ul> <li>Overview of four different professional profiles</li> <li>Good insight into the possibilities that apps currently offer in the field of vocational training and further education.</li> </ul> </li> </ul>
	<ul> <li>Skills:</li> <li>Basic insight into what basic skills are required in the four different professions</li> </ul>
	<ul> <li>Good training for understanding instructions and work instructions in apps and handling the controllers</li> </ul>
	Competences: - Analysis of complex work processes
	<ul> <li>Analysis of the status quo and potential of apps as a practical learning tool in vocational education and training</li> </ul>
HEI Added Value	For HEI, this is interesting because the simulation of work environments will become one of the most important applications page <b>30</b> of <b>74</b>



	in vocational training. This applies to the initial and further training of students in both university and professional fields. These developments will have a lasting effect on the training and professional world. Lecturers should therefore get familiar with these developments as quickly as possible.
Learning Content	<ul> <li>The basic idea of the app is that you are in the year 2050, in which there are no more professions, because all the work is done by machines. Within the app you can take a trip back in time to the "past of professions" and practically experience what a convenience shop clerk, an office worker, a gourmet chef and a car mechanic did all day long in 2019.</li> <li>Through instructions and work tasks, one is confronted with the most diverse activities in every profession and learns how complex and diverse the respective fields of activity are (including customer contact, billing, stress situation by annoying superiors or robbers).</li> <li>At the same time, one learns all the possibilities offered by the operation of the controller.</li> </ul>
Practical Work Content & activities	<ul> <li>Many practical applications have already been described above, Oculus itself describes the practical work and activities as follows: <ul> <li>Throw a stapler at your boss!</li> <li>Learn to 'job' in four not-so historically accurate representations of work-life before society was automated by robots!</li> <li>Use your hands to stack, manipulate, throw, and smash physics objects in an inexplicably satisfying way!</li> <li>Aggressively chug coffee and eat questionable food from the trash!</li> <li>Able to juggle tomatoes in real life? Do it in VR! Unable to juggle? There's no cleanup required in VR!</li> <li>Gain valuable life experience by firing new employees, serving slushy treats, brewing English tea, and ripping apart car engines!</li> <li>Work the never-ending night shift with Infinite Overtime mode!</li> </ul> </li> </ul>
Recommendations	One need some time to get through all the activities! There are really a very large number of different activities and instructions that are very fun to implement. You can also learn a lot about the professions and the different areas of activity. The app has received many awards, which also speaks for its quality.
	Job Simulator could be recommended as an example of occupational training in VR. Although it is a game, the similar logic applies with professional training applications and their possibilities.
Requirements	NA
Further reading	NA
Sources	Website: <u>https://jobsimulatorgame.com</u>



YouTube (demo for convencience store clerk): https://www.youtube.com/watch?v=k6oWdMWj8oU YouTube (demo for office worker): https://www.youtube.com/watch?v=jF6RzK50fDs YouTube (demo for gourmet chef): https://www.youtube.com/watch?v=qZX\_WVhL3eg YouTube (demo for convencience autoc mechanic):

https://www.youtube.com/watch?v=yUrPA6A3pMs

#### SWOT

#### Strengths:

- Varied activities and objectives
- Insight into four professional profiles
- High entertainment value

#### Weaknesses:

- Liable to pay (\$19.99)
- Although a great deal has already been achieved in this respect, there is still room for improvement in terms of realism
- The Learning factor could be further increased

#### Opportunities:

 This type of app is very important because it can play a very important role in vocational education and training in the future. It is therefore extremely important that university lecturers, educators and future managing directors (especially of SMEs) familiarize themselves with this technology as early as possible

#### Threats:

- In order to be used as a fully-fledged learning and training instrument, the app would have to become more serious, realistic and application-oriented. At the moment the fun and entertainment factors still predominate. This must change in the future (professional training applications will surely be more "serious")!





## 11. Labster



Source: labster.com

Organisation	Labster ApS
Technical frameworks & key data	Labster supports Lenovo Mirage Solo and Google Daydream ecosystem. Desktop mode for PC/Mac is also available.
Description (purpose and target Group)	Labster provides a set of science laboratories (STEM, chemistry, biology, etc.) for educators, also for higher education. Currently, Labster does not have all of its assets available in VR. Labster has a great promise when it comes to laboratory related VR training, but some question marks remain relating to VR technology support. At the moment, Labster supports only Lenovo Mirage Solo and Google Daydream devices. However, Google has dropped its support for Daydream devices, and next VR ecosystem for Labster is still pending.
Basic Features	<ul> <li>Multiple different laboratory simulations for different fields of science</li> <li>True-to-life scenarios (e.g. the use of an MRI machine)</li> <li>Features are context dependent (interactions are</li> </ul>
	customized based on the simulation)
	- Animations
	- Interactions with Lab equipment





- Perform experiments
- Quiz questions
- Prior Knowledge Basic knowledge of VR required (how to use and set-up Lenovo Mirage Solo or Google Daydream devices)
- Learning Outcomes Learn how to set up a virtual laboratory (knowledge, skills, and - Learn how to visualize and simulate different information
- and learning content
- HEI Added Value
   Range of virtual laboratories substitute (or enhance the use of) costly physical laboratories
  - Learning by doing
  - Safe environment (training with risky scenarios, e.g. in chemistry laboratory)
- Learning Content Learn how to use VR simulations in learning. Understanding the power of situated learning ("learning by doing"). Set-up a pre-lab exercise (train in a virtual laboratory before proceeding into a physical one)
- Practical Work Content &-Set up a virtual laboratoryactivities-Learn how to visually experience complex topics from
  - Facilitate home assignments (Labster has a desktop mode, so that tasks could be accessed without VR as well)
- Recommendations Labster is a potential solution for many different fields of education, especially chemistry, biology, etc. However, Labster supports only Lenovo Mirage Solo and Google Daydream VR devices and, therefore, lacks immersion that is beneficial in fostering student's motivation to learn.

different fields of science

SWOT

#### Strengths:

- A lot of content, multiple laboratories
- Many how-to guides and material that help with technology adoption
- Multiplatform (VR and desktop mode)
- Standalone devices supported (Lenovo Mirage and Google Daydream)

Weaknesses:



	<ul> <li>Supports only Lenovo Mirage Solo and Google Daydream</li> <li>VR devices, which are already a bit outdated technologies</li> </ul>
	<ul> <li>Lack of immersion: 3DoF instead of 6DoF, poor resolution (e.g. text is hard to read) and poor frame rate</li> </ul>
	- Not possible to create own content
	Opportunities:
	<ul> <li>Potential all-in-one solution for different simulations and training scenarios</li> </ul>
	Threads:
	<ul> <li>Outdated: E.g. Google does not continue the support for Google Daydream</li> </ul>
	- Content creation is provided by Labster
	- Support for other VR devices needed
Requirements	Lenovo Mirage Solo, Google Daydream compatible mobile phone or HMD, internet connection. PC/Mac for desktop use.
Further reading	Whitepapers: <u>https://www.labster.com/whitepapers/</u>
	Guide to virtual laboratories: <u>https://www.labster.com/the-</u> complete-guide-to-virtual-labs%e2%80%8b/
	Research of virtual laboratories: https://www.labster.com/research/
Sources	https://www.labster.com/




## 12. Make VR Pro

Organisation	VIVE studios
Technical frameworks & key data	VIVE, VIVE Cosmos.
Description (purpose and target group)	MakeVR is a 3D content creation experience with a natural style of interaction that lets anyone, regardless of age or experience level, step into a professional CAD engine and start building 3D objects and worlds on Day One. Target group: 3D designers, the general public.
Basic Features	<ul> <li>MakeVR Pro is a CAD based fully immersive 3D content creation experience that provides precision tools that allow objects to snap to grids, rulers, or any other object in the scene and slide over their surfaces, all the while maintaining their depth and angle relative to the surface of the object on which they're tracking.</li> </ul>
Prior Knowledge	<ul><li> 3D modelling basic knowledge.</li><li> Use of VR equipment</li></ul>
Learning Outcomes (knowledge, skills, and competences)	MakeVR's 3D Multi-Touch is the next logical step in the evolution of interfaces, the perfect interface for the next generation of users who already expect a greater level of interaction. It's a way of interacting with 3D content that is so natural and intuitive anyone can do it.
	<ul> <li>VR 3D modelling:</li> <li>How to translate (move), scale and rotate your environment in the same way you use 2D.</li> </ul>

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	<ul> <li>How to position yourself anywhere in the environment, so always working in your comfort zone.</li> <li>How to set a VR space for 3D modelling.</li> <li>How to set grids, rulers, jigs, object snapping and tracking, and mirroring, all of which allow for positional and rotational accuracy of your content in the virtual world.</li> </ul>
	Content creation:
	<ul> <li>How to import .stl files for immersive preview before printing.</li> <li>How to build precision models while immersed.</li> </ul>
HEI Added Value	<ul> <li>User-created private rooms for friends to interact in VR. These rooms are created on behalf of, and owned by, a user who can invite friends to join. When everyone has left a room, it is destroyed.</li> <li>System-moderated rooms that are persistent, server created, server moderated and maintained rooms.</li> <li>True 3D modelling environment and fully immersive 3D content creation.</li> <li>Active learning through virtual interaction with 3D models.</li> </ul>
Learning Content	The diverse set of features in the 3D modelling environment enable users to learn how to use modelling tools and strategies to develop design own models.
	The learning content depends on the content that is created by the users. Users can create 3D models' content to share with learning groups.
Practical Work Content & activities	Users must learn the basic skills of using 3D models as detailed above. User also can learn how to create their own models, imports objects, share with other and interact with 3D objects makers.
Recommendations	
SWOT	<ul> <li>Strengths:</li> <li>Extremely low learning curve because you use your own two hands as they were meant to be used.</li> <li>Natural and intuitive</li> <li>Always working in your comfort zone.</li> <li>Possibility to send the 3D model to a 3D printer or to a printing service.</li> <li>Multi-Touch interface.</li> <li>Built-in CAD engine</li> </ul>
	<ul> <li>More content needed (textures, models, etc.)</li> </ul>



- Few VR equipment available at the moment.

### **Opportunities:**

- all-in-one learning platform for 3D modelling

### Threads:

 Other 2D/3D traditional design companies already established in the market (Dassault Systems,...) can force their business.

### Further reading

Sources

VIVE Port Home: <u>https://www.viveport.com/apps/9e94a10f-51d9-4b6f-92e4-6e4fe9383fe9/MakeVR\_Pro/</u> You tube video: <u>https://www.youtube.com/watch?v=ZRFkeCwmxoo</u>

## 13. Mozilla Hubs



flexibility (can be used almost via any device). Mozilla Hubs allows

Source: blog.mozilla.org

OrganisationMozilla LabsTechnical frameworks &<br/>key dataMozilla Hubs is an open-source social VR platform based on<br/>WebVR. Desktop/mobile supported as well. Used via a browser.Description (purpose and<br/>target Group)Mozilla Hubs is free to use open source platform. Aimed at general<br/>use. Hubs could also be used in enterprises as well (such as<br/>downloading and interacting with different 3D-models). The<br/>biggest strength of Mozilla Hubs is easy of use, scalability and



high amount of different features and integration possibilities. As a trade off, Hubs does not have that high immersion.

### **Basic Features** Scene Browser. Five built in virtual spaces to choose from Spoke: content creation tool for customized Scenes Lobbies and Rooms Create a Room Invite users, receive invitations Chat tool (for users in a Room) Notifications that alert when another user enters the room (also mobile and desktop notifications supported) Avatar customization (light) Custom avatar for advanced users (via URL) Grow and Shrink commands (changing the Avatar size) Smooth navigation/ teleporting / flying Muting other users Adding video / audio / 3D models / images Moving/rotating/scaling objects Menus (e.g. blocking users, removing rotating and pinning objects) Camera with a share function (via URL) Focus and Track feature for Camera (Camera will point towards or follow an object) Pen (different colours) Desktop/webcam/phone sharing **Prior Knowledge** Only basic knowledge of VR required (how to set-up VR devices) Advanced users may customize virtual spaces, download their own avatars or modify the Hub's source code Learning Outcomes Learn how to set up a virtual meeting (knowledge, skills, and Learn how to use different tools in a virtual meeting (see competences) Features)

- Learn how to facilitate multiplatform meeting (VR, desktop/mobile)



HEI Added Value	Highly flexible and free-to-use platform for remote collaboration. High scalability. Participant's don't have to own a VR headset. VR with enhanced immersion could be used whenever fostering student's motivation to learn and use platform (general socializing and routine use could be done via desktop or mobile as well).
Learning Content	Understanding the basics about social VR and multiplatform applications. Learning content focuses on how to facilitate and manage different technology mediated communication processes.
Practical Work Content & activities	<ul> <li>Create a virtual Room</li> <li>Invite Users</li> <li>Chat with others</li> <li>Download and share 3D objects / video for others</li> <li>Interact with 3D objects</li> <li>Share a desktop</li> <li>Try out the Proteus effect by choosing Avatar of different size (do you feel the difference?)</li> <li>Use the Camera and share a picture</li> </ul>
Recommendations	Mozilla Hubs is highly recommended platform for trying out and experimenting with social VR. Advanced users may experiment with Hubs as it is an open source platform that could be freely customized. However, other VR applications are recommended when there is a need to demonstrate the immersion and presence that VR provides (Hubs is graphically modest)
SWOT	<ul> <li>Strengths:</li> <li>Free to use</li> <li>Multiplatform</li> <li>Open source</li> <li>Usability</li> <li>The amount of features</li> <li>WebVR</li> <li>Weaknesses:</li> <li>Low immersion</li> <li>Lack of features for taking notes when in a meeting Opportunities:</li> </ul>



	<ul> <li>Mozilla will probably continue to develop Hubs as the technology (WebVR, faster internet connections, better standalone HMDs, etc.) evolves</li> </ul>
	<ul> <li>In the Future, Hubs may connect with Spatial Web ("3D internet")</li> </ul>
	Threads:
	- Playfulness may distract "serious" enterprise users
Requirements	Any VR device (or PC/Mac/Mobile). Internet connection.
Further reading	FAQ: <u>https://github.com/mozilla/hubs/wiki/Frequently-Asked-</u> Questions
Sources	https://labs.mozilla.org/projects/hubs/

## 14. Nanome



https://www.youtube.com/watch?v=beYyi0p0L5Y

Organisation Technical frameworks & key data © 2019 Nanome Inc.

- Available for VIVE and Oculus Rift/Rift S (not yet for Quest)
- Minimum system requirement: Windows7 / i5-4590 processor / 4GB RAM / GTX 1060
- Recommended system requirement: Windows 10 / i7-4790 processor / 8GB RAM / GTX 1080

Description (purpose and<br/>target group)Nanome is aimed at students, professional researchers and<br/>scientists in the fields of chemistry, molecular biology and related<br/>areas. The focus is on molecular design and exploration. Nanome<br/>has multi-user interactions that enable real-time tutoring,<br/>mentoring and collaboration. VR workspaces may also be<br/>customized and saved for future presenting or collaboration.Prior KnowledgeAdvanced knowledge in the scientific fields of question

Basic knowledge in handling VR equipment, software and navigation



VRinSight	Co-funded by the Eastware Programmer of the European Union
Learning Outcomes (knowledge, skills, competences)	<ul> <li>Knowledge: <ul> <li>Structure and set-up of individual molecules</li> <li>Understanding of set-up of complex molecules structures</li> <li>Accessing online-databases and importing molecules from different sources</li> </ul> </li> </ul>
	<ul> <li>Skills:</li> <li>Designing of molecules and their structures</li> <li>Grabbing, rotating, enlarging, measuring etc. molecules</li> <li>Competences: <ul> <li>Analysation and exploitation of structures</li> <li>Joint collaboration with a global community of scientists</li> <li>Customising of virtual paces</li> <li>Planning and implementation of scientific and research</li> </ul> </li> </ul>
	work based on app - Integration of app at HEI learning
HEI Added Value	Huge innovation step in exploring, understanding, modifying molecules; it allows students, researchers and scientists to gain holistic in-sight to the structure and set-up molecules and, therefore, a totally new approach in innovation development and planning.
	The app is an absolute useful tool for any kid of company/institution dealing with R&D in many different fields of chemistry and molecular biology and related areas such food industry, health etc.
	Out of both reasons, HEIs should get familiar with this tool asap and forward their knowledge and experience to students.
	A special academic offer is available for \$125/year, a Holiday Classroom Bundle (including 30 academic licenses) costs \$750/year.
Learning Content	<ul> <li>Personal license (for free):</li> <li>Host structures from RCSB</li> <li>Load structures from RCSB</li> <li>Host public workspaces</li> <li>Join public workspaces</li> <li>Basic molecular views</li> <li>Basic editing features</li> <li>Load up to 2 molecules at a time</li> </ul>
	Academic license (\$125/year):
	<ul> <li>Includes everything in Personal (see above)</li> <li>Load from RCSB, PubChem, and Drugbank</li> <li>Load from your local computer</li> <li>Host a password protected room</li> <li>Join private rooms</li> <li>Save VR workspaces</li> <li>Assign presenter &amp; block users</li> </ul>

Multi SDF Ligand support -



- Electron Density Map Support (CCP4 & DSN6)
- Load unlimited molecules

Commercial license (pricing on request):

- Includes everything in Personal (see above)
- Private server deployment
- Plugin server deployment
- Plugin integration support
- Offline mode
- Internal database integration
- Custom development
- Premium customer support

### Practical Work Content & Generally, the app was built for researchers and scientists who activities want to work collaboratively to innovate faster by the following: Small molecule & protein visualization: Import molecules from public databases such as the RCSB Protein Data Bank, Pubchem, Drugbank, or your own computer. Protein design and minimization: Mutate through the most common amino acids and rotamer conformation or minimize your structure. Measure in 3D space: Grab, rotate, or enlarge your molecules and measure distances or angles between atoms with your hands. Analyze and explore structures: Analyze your structures and binding sites or explore the fit of different ligands. Collaboration with global members: Share a virtual lab in real time with colleagues across the globe. Or join VR sessions via a 2D interface. Customize your virtual workspace: Customize your virtual workspace and save you VR sessions for future presenting or collaboration Recommendations VR learning in the field of chemistry and biology. Further reading NA Sources Website: https://nanome.ai/nanome/ YouTube (general information): https://www.youtube.com/watch?time continue=10&v=6g7 HZrT xSo&feature=emb logo YouTube (example for drug discovery): https://www.youtube.com/watch?v=beYyi0p0L5Y You Tube (example for Caffeine, Adenosine etc.) https://www.youtube.com/watch?v=KUE9sRYhjnk You Tube (create a Adenosine Quad Phosphate) https://www.youtube.com/watch?v=mKyOkmduEuk SWOT Strengths: High target-group orientation Innovative and creative approach to understanding and \_ working with molecular structures

- Good graphic resolution



- Multi-user

Weaknesses:

- Price (but actually, it is not very high)
- Not made for the general public (too much professional knowledge is needed to understand the value of the tool)

**Opportunities:** 

- Scientists report the app offers a total new dimension of scientific cooperation and joint developments
- Very good learning support for students to understand abstract realities and constellations

## 15. Oculus Rooms



Source: www.oculus.com

Organisation	Oculus
Technical frameworks & key data	The application supports the VR platforms: Oculus and Samsung Gear VR
Description (purpose and target group)	Oculus Rooms is a social VR platform for entertainment, education and virtual meetings. However, Oculus Rooms is able to deliver content only via Oculus/Facebook. Social interaction is highlighted due to lack of interactions and features. However, Oculus Rooms have different games for, e.g. informal grouping sessions. Oculus Rooms will most likely be replaced by Facebook Horizon in early 2020.
	Target group: entertainment, educators, trainers and virtual teams.
Basic Features	<ul> <li>User-created private rooms</li> <li>System-moderated rooms</li> <li>page 44 of 74</li> </ul>





- User-created matchmaking rooms
- Multi-user environment
- Multiple virtual locations
- Content library (3D objects, sound effects, special effects)
- Media streaming
- tabletop games
- watch TV and movies
- Listen to music
- Share photos or jump into other apps together.

Prior Knowledge To be able to use some of the app's basic features you need to know how to use VR e.g. how to use basic controls when navigating and interacting in a virtual space.

Learning Outcomes (knowledge, skills, and competences) Basics of multi-user VR:

- Navigating in virtual space
- Interacting with virtual objects
- Interacting with other users
- Inviting others to join you

Content creation:

- Creating your own rooms
  - Importing 2D/3D objects (3D-models, 2D-screens, etc.)
- Importing files, presentations and videos

### Competences:

- Basics of setting up and using social VR
- Hosting an event in social VR

HEI Added Value

- User-created private rooms for friends to interact in VR.
   These rooms are created on behalf of, and owned by, a user who can invite friends to join. When everyone has left a room, it is destroyed.
- System-moderated rooms that are persistent, server created, server moderated and maintained rooms.
- User-created matchmaking rooms These are created on behalf of a user, and used by the Matchmaking service for friends to participate in multiplayer game sessions.
- Multi-user game mode
- True 3D environment
- Increased spatial understanding
- High immersion
- Engagement with different stakeholders (e.g. User-Centered Design)
- May substitute videoconferencing (or other communication tools) in virtual teams due to enhanced collaboration capabilities
- Enhanced informal interaction



	<ul> <li>100s of relevant ready-made 3D objects for import (Science, Geography, History)</li> <li>Active learning through learner participation and virtual interaction</li> </ul>
Learning Content	The diverse set of features in Oculus Rooms enable users to learn how to use social VR and host social VR events (training, meetings, events, etc.).
	The learning content depends on the content that is created by the users/hosts. Users can create presentation style content to share with learning group.
Practical Work Content & activities	Users must learn the basic skills of using social VR as detailed above. User also can learn how to create their own customisable space, share media with other and interact with objects. Once the learner is competent, the trainer can invite more friends to the VR space to demonstrate the group features and the dynamics that accompany a group interaction.
Recommendations	Oculus Rooms is a multi-user application. Therefore, it allows trainers and learners to join together a customisable VR space and interact. It is helpful if the tutor creates and prepares a VR space in which to invite the learner. In this setting, the user can earn the basics of
	using social VR. Slowly the tutor can introduce new features such movement, spatial sounds and sharing of documents and media.
SWOT	Strengths:
	<ul> <li>the amount of content and interactions</li> <li>multi-user environment</li> <li>customisation based on the needs of users</li> </ul>
	Weaknesses:
	<ul> <li>usability: needs to learn how to use the features of the app</li> </ul>
	- its limited to Facebook media and not to other platforms
	Opportunities:
	<ul> <li>all-in-one learning platform for educators</li> </ul>
	- connects with Facebook from where you can share media
	Threads:
	<ul> <li>steep learning curve may drive away some learners and educators</li> </ul>
Further reading	Recommendations for further reading into subject



Sources

https://developer.oculus.com/documentation/platform/latest/con cepts/dg-rooms/ & https://www.oculus.com/experiences/go/1101959559889232/?lo cale=en\_US

# **16. Presentation Simulator**



Source: <a href="https://www.youtube.com/watch?v=prOhqi6JikY">https://www.youtube.com/watch?v=prOhqi6JikY</a>

Organisation	Fiboni v.o.f.
Technical frameworks & key data	Oculus Rift or HTC Vive and, best of all, it's free (they ask for a \$9,99 donation)
Description (purpose and main target group)	Presentation simulator is aimed at business people, students, teachers, politicians, leaders, or anyone who from time to time has to give a speech or a lecture, and wants to get over his nerves before. Presentation Simulator is the simplest of the alternatives for VirtualSpeech. It only offers public speaking simulation. There is no feedback, no courses for instruction and only a few venues to choose from.
Prior Knowledge	How to make an appealing presentation. No advanced technical knowledge required.
Learning Outcomes	Practical knowledge about public speaking
(knowledge, skills,	Presentation skills
competences)	confidence
HEI Added Value	Added Value for HE business Management studies:
	Presentation Simulator provides a simple, affordable and immersive virtual reality exposure experience. It allows to practice your own presentation in a virtual environment in front of a virtual audience in order to overcome speech anxiety step by step.
Learning Content	Main Content part, please describe the contents of the best practice example:





No courses included but the website provides some practical knowledge about:

- **Presentations Skills** How To Make a Presentation Presentation Tips Overcome your Fear of Public Speaking with VR Overcome Speech Anxiety with Virtual Reality Exposure Therapy Public Speaking tips to reduce Fear Features in the Presentation Simulator app to help improve your soft skills: \_ Presentation Simulator contains three conference rooms representing typical business environments. The three rooms range in size from small (up to 8 people, flatscreen television for presentation slides), medium (up to 20 people, large presentation canvas) to a large conference room (up to 100 people, wide presentation canvas a lectern with a microphone) Presentation Simulator enables to upload your own presentation that will be visible in virtual reality on the digital TV or projection canvases The characters from the audience show different emotions that can be visible during the presentation. They can be classed as positive, neutral and negative with each class having its own sub set of specific behaviors to mimic real life situations. Practical Work Content & Describe the activities or any exercises included: activities Upload your own presentation Select an environment (small, medium or large conference room,...) Give a presentation Don't be distracted by reactions from the audience. \_ Recommendations How to apply best, instructions for preparation and mentoring, do's and don'ts: Prepare your presentation in advance and upload it to the app Use a VR headset with a trigger/activation button. This allows you to enter environments, setup the presentation and change slides. Recommendations for further reading into subject: Further reading http://www.presentationsimulator.com/presentation-skills/ http://www.presentationsimulator.com/fear-public-speaking/ Sources Link to source of best practice example: Website: <a href="http://www.presentationsimulator.com/">http://www.presentationsimulator.com/</a> YouTube: https://www.youtube.com/watch?v=prOhgi6JikY YouTube: https://www.youtube.com/watch?v=GOle5jN08EA SWOT Strengths: Usability
  - Price (free, \$9.99 donation asked)





Weaknesses:

- Pedagogical orientation and standards
- Very basic:
  - Only 3 venues: small, medium and large conference room
  - Only to train presentation skills
  - No accompanying courses, only some practical presentation guidelines on the website
  - No tracking of eye contact, voice attributes, speed of delivery, use of filler words, mic placement, hand movement
  - No evaluation and feedback features

Opportunities:

- Gamification level
- Overcoming the fear of public speaking

Threats:

- Applicability level

## 17. Samsung VR Videos



Source: play.google.com

Organisation	Samsung Electronics America - Content & Services - Dallas
Technical frameworks & key data	The application supports Oculus (GO), Gear VR, and Samsung devices or you can directly stream them from your media server (DLNA, Plex, PS3).
Description (purpose and target groups)	Samsung VR videos is a platform for 180 and 360 videos with "fresh" daily content. Users are also allowed to stream their own video content via the platform.
	Main target group: the general public. Also for educators, trainers, students.



Basic features	360 video files
	<ul> <li>- media streaming: connect with your media server (DLNA, Plex, PS3)</li> </ul>
	<ul> <li>-VR movie trailers, live concerts , travel videos and news from around the world</li> </ul>
Prior Knowledge	No prior knowledge is needed in relation to this application.
Learning Outcomes	Competences
(knowledge, skills, and	<ul> <li>- Learn the basics of how to use VR</li> </ul>
competences)	<ul> <li>- Learn how to navigate in a VR app</li> </ul>
	Learn how to download content
	Subscribe in particular content of interest
	<ul> <li>Create a VR social circle by following specific categories and channels</li> </ul>
	<ul> <li>-basic of setting up and using VR</li> </ul>
	<ul> <li>- importing files and videos</li> </ul>
HEI Added Value	This application provides a simple, free and immersive virtual reality exposure experience. It allows users to experience in a VR form, one of the largest libraries with videos in the worlds. There are videos of all subjects and themes.
	true 3D environment
	<ul> <li>- increased spatial understanding</li> </ul>
	high immersion
	available in multiple languages
Learning Content	The application is a learning platform, which allows users to experience high quality 360 degree videos, by accessing one of the largest high-quality libraries in the world.
Practical Work Content & activities	Select a learning content relevant to your field. Embed in your lesson plan opportunities for users to access the VR application and watch relevant experiences (such as relevant news, 360 videos, etc.).
Recommendations	-Prepare your lesson in advance and know exactly what the additional value of the application will be -predefine from the start which videos is best for users to watch or let them explore the libraries and find relevant content



SWOT	Strengths
	- The large library with any kind of content available
	- 360 experience of videos
	- Available in more than 25 languages
	<ul> <li>You can follow channels or categories to personalise your VR experience</li> </ul>
	Weaknesses
	- Single user game mode
	- internet connection required for downloadable contents
	Opportunities
	- Subtitles available
	<ul> <li>you can download content to view later</li> </ul>
	You can choose to watch among movie trailers, live concerts, travel videos and news from around the world
	Threats
	<ul> <li>Applicability level for education purposes not very high since you can use it for specific instances only</li> </ul>
Requirements	The application can be downloaded to the device directly from the search engine.
	The app supports a single user mode. Internet connection is required for downloadable contents.
Further reading	Recommendations for further reading into subject
Sources	<u>https://www.oculus.com/experiences/gear-</u> <u>vr/837075486363650/?locale=en_US</u> & <u>https://play.google.com/store/apps/details?id=com.samsung.dayd</u> ream.vrvideo&hl=en





VRi

9	VIRTUAL TRAINING GAMIFICATION GAMIFICATION SAVI INSTRUCTOR
	REMOTE AUDIENCE COLLABORATIVE LEARNING

Source: <a href="https://www.innovae.eu/savi-training/?lang=en">https://www.innovae.eu/savi-training/?lang=en</a>

Organisation	Innovae
Technical frameworks & key data	Oculus and VIVE
Description (purpose and target Group)	SAVI is a gamified VR platform for the training of professionals through virtual experiences in industrial environments that enables monitoring and evaluation of trainees. SAVE includes multiple different training scenarios, such as Crane Simulator, welding tasks, safety training for working in high places, truck driving simulator, etc. Multi-user interactions are also available. Tools for participant activity monitoring and evaluation are also provided.
	Target group: industry, marketing, sales
Basic Features	<ul> <li>SAVI is a multiplatform solution compatible with state-of- the-art devices with high performance that enable a high quality and interaction immersive experiences.</li> <li>It allows to integrate real devices of machinery handling to provide simulators of high level of realism.</li> </ul>
Prior Knowledge	- Basic knowledge of VR required.
	- Industrial basic knowledge in the module selected.
Learning Outcomes (knowledge, skills, and competences)	<ul> <li>SAVI enables the efficient training of professionals in the handling of industrial machinery, risk activities and prevention of occupational risks. Crane simulator, welding task, ORP in heights, truck driving, overhead crane in warehouse, forklift,</li> </ul>
HEI Added Value	
	- Students interact in a VR industrial environment for the acquisition of technical skills.
Learning Content	SELF-LEARNING: Guided experiences with step-by-step instructions for autonomous learning.
	GAMIFICATION: Gamified evaluation system based on achievements, milestones and certifications.



	MULTI-USER: Simultaneous interaction of several users for multi- station tasks. Valid for facilities up to 120 square meters.
	HISTORICAL AND MONITORING: Record of the activity of each user for monitoring and evaluation of the evolution of trainees.
Practical Work Content & activities	Crane simulator, welding task, ORP in heights, truck driving, overhead crane in warehouse, forklift,training modules.
	SAFETY - Increase safety at work and avoid occupational risks during training
	EFFICIENCY - Reduce learning time and training cost.
	OPTIMIZATION - Improve understanding and assimilation of knowledge with immersive experiences.
	PERSONALISATION - Personalise training sessions adapted to the learning pace of each user
Recommendations	SAVI could be recommended to use in the technical fields, such as engineering, or in context of different vocational training. The app enables students to learn about technology, occupational knowledge (welding, etc.) and the potential of VR in these fields.
SWOT	Strengths:
	<ul> <li>Specific industrial VR training simulations in different technical aspects.</li> </ul>
	- Many industrial cases
	Weaknesses:
	<ul> <li>It's not a flexible environment. All aspects are programmed in advance.</li> </ul>
	<ul> <li>Professional industrial VR environment, so student need to acquire some knowledge before.</li> </ul>
	Opportunities:
	<ul> <li>Possibility to use VLAB INDUSTRY 4.0 is dedicated and oriented toward businesses and industry with the goal of promoting and fostering the use and application of new technologies like virtual and augmented reality within professional work environments.</li> </ul>





Requirements	Oculus and VIVE. Tech knowledge
Further reading	A demo can be requested.
	Industry 40 cases: <u>https://www.innovae.eu/business-</u> areas/industry-4-0/?lang=en
	https://www.innovae.eu/successful-cases/?lang=en
Sources	Web page: <a href="https://www.innovae.eu/savi-training/?lang=en">https://www.innovae.eu/savi-training/?lang=en</a>

# **19. VILEARN**



Source: <a href="https://www.youtube.com/watch?v=7FjhETtM95k">https://www.youtube.com/watch?v=7FjhETtM95k</a>

Organisation	University of Würzburg
Technical frameworks & key data	Supports commercially available VR glasses such as Oculus Rift, Rift S and HTC Vive (Pro). Participants who do not have a VR headset can fall back on the desktop variant and thus participate to a limited extent in learning scenarios. In the future, mobile VR glasses such as Oculus Quest or HTC Vive Cosmos will also be used.
Description (purpose and target Group)	ViLeArn develops and explores situated virtual learning environments based on presence and social interaction. The goal is the promotion of competences and the increase of learning success with special consideration of availability, participation and inclusion. Teachers and learners interact live.
Basic Features	<ul> <li>Embodied by virtual avatars, participants enter into a social interaction during the teaching-learning process and thereby use the whole range of socially effective signals,</li> </ul>



	especially for attention control, positive reinforcement and a sense of belonging.
	<ul> <li>Agent technology supports teachers and learners by simulating the positive behaviour of virtual agents.</li> </ul>
	<ul> <li>Within virtual learning environments, available digital media (image, sound, video, web) are seamlessly embedded.</li> </ul>
	<ul> <li>In ViLeArn you can already meet virtually in a seminar room and a multitude of technical functionalities are implemented.</li> </ul>
Prior Knowledge	- Basic knowledge of VR required.
Learning Outcomes (knowledge, skills, and competences)	<ul> <li>ViLeArn integrates digital media as the focus of competence development with VR technologies as didactic tools and combines the advantages of distributed learning with the advantages of classroom teaching.</li> </ul>
	<ul> <li>Promote the competence of teacher training students in classroom management.</li> </ul>
HEI Added Value	- Range of virtual classroom substitute.
	<ul> <li>Teachers and learners interact live in hybrid avatar-agents teaching-learning scenarios.</li> </ul>
	<ul> <li>In a virtual learning scenario, teachers and students meet in real time to collaboratively work on challenging topics.</li> </ul>
Learning Content	Learn how to design a learning environment in Virtual Reality so that an action-oriented use of media is possible, teaching students - in addition to the indispensable classroom teaching - in relevant teaching-learning scenarios acquire significant media education skills.
Practical Work Content & activities	<ul> <li>Set up a learning environment</li> <li>Learn how to use media content in VR scenarios.</li> </ul>
Recommendations	ViLeArn could be recommended to foster remote learning and collaboration via social VR. Avatar-based interaction with 3D visualizations enhance the potential of eLearning significantly. The app is recommended in managing remote learning, discussions, dialogue, problem solving, tutoring/mentoring, etc.
SWOT	Strengths: - You can already meet virtually in a seminar room and a
	multitude of technical functionalities are implemented.



	<ul> <li>Supports commercially available VR glasses such as Oculus Rift, Rift S and HTC Vive (Pro).</li> <li>Developed by a university.</li> </ul>
	Weaknesses:
	- Although in ViLeArn you can already meet virtually in a seminar room and a multitude of technical functionalities are implemented, the project is still in its infancy.
	Opportunities:
	<ul> <li>Potential all-in-one solution for different challenges scenarios between teachers and students.</li> </ul>
Requirements	VR glasses such as Oculus Rift, Rift S and HTC Vive (Pro).
Further reading	Not Alone Here?! Scalability and User Experience of Embodied Ambient Crowds in Distributed Social Virtual Reality
	Marc Erich Latoschik, Florian Kern, Jan-Philipp Stauffert, Andrea Bartl, Mario Botsch, Jean-Luc Lugrin
	IEEE Transactions on Visualization and Computer Graphics (TVCG), Vol. 25 (5), pp. 2134-2144. 2019.
	Virtual Reality In Teacher Education: Exploring Student Teachers' and Teacher Educators' Requirements.
	Greger, Gabriela, Tiede, Jennifer, Grafe, Silke
	Presentation at ECER Conference 2019, Hamburg, 36.9.2019
	You tube video showcase:
	https://vilearn.hci.uni-wuerzburg.de/en/about
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Sources

Web page: <u>https://vilearn.hci.uni-wuerzburg.de/en/index.html</u>



# 20. VirtualSpeech



### Source:

https://www.youtube.com/watch?v=LwqgCiYqx0M&feature=emb
\_title

Organisation	Nanome
Technical frameworks & key data	<ul> <li>VirtualSpeech includes online courses and live feedback but lacks hand gesture simulation and mic placement tracking. It is available only for Samsung Gear VR, Oculus Go and Daydream View at around \$150 for 12 months.</li> <li>Currently, sideloading VirtualSpeech for Oculus Quest is also possible (probably there will be an official release soon)</li> <li>Ovation is a similar app, available for Oculus Rift or HTC Vive, includes hand gesture simulation and mic placement tracking but lacks online courses and live feedback. It has a monthly subscription price of \$19.99 for individuals and \$49.99/user for organizations.</li> </ul>
Description (purpose and main target group)	VirtualSpeech offers different training scenarios for taking speeches. VirtualSpeech offers ready-made scenarios and courses, such as public speaking, sales pitch and closing, train the trainer, and learning english for business. VirtualSpeech is used via standalone devices, such as Oculus Go, and no advanced technological knowledge is required. VirtualSpeech enables admin controls (e.g. monitoring learning progression). Integrations with other Learning Management Systems (LMSs) are also provided.
Prior Knowledge	Required knowledge to allow learning (e.g. VR Knowledge, Pedagogical experience, technical know-how)
Loarning Outcomos	Knowledge:
(knowledge, skills, competence)	<ul> <li>presentation hints</li> <li>communication strategies and techniques</li> <li>personal improvement opportunities</li> <li>Skills:</li> </ul>
	<ul> <li>presenting, explaining, convincing, training, applying for a job, selling</li> </ul>



Competences: confidence **HEI Added Value** Added Value for HE business Management studies: During 12 months, access to full online curriculum, access to VR training scenarios, feedback on voice and eye contact performance, public speaking case studies and more for \$150 During 12 months, everything in standard as well as detailed speech feedback from the VirtualSpeech team and a comprehensive public speaking playbook for \$250 Main Content part, please describe the contents of the best Learning Content practice example: Courses to choose from: **Essential Public Speaking** Sales Pitch and Closing \_ Train the Trainer Workplace Mindfulness **Business Networking** Learn English for Business Managing Workplace Stress **Delivering Presentations Crisis Communication: Airlines** Job Interview Preparation Media Training **High Impact Presentation** Leadership Communication **Presentation Skills Training Business Storytelling** Interviewing for Recruiters \_ Features in the VirtualSpeech app to help improve your soft skills: Speech analysis: Receive feedback on your speech after you have delivered it. You'll receive feedback on eye contact, pace of speech, hesitation words, volume and other aspects. Record and save speeches: Record the audio of your speech and save it to the device so that you can listen back to it later. Live feedback: Receive feedback on your speech as you deliver it. You'll see prompts in the virtual room if any areas of your delivery need to be improved (e.g. speak faster, look more towards the right side of the audience,...) Send speeches from app: Send the audio recording of your speech to your learning portal, where you can listen to it, download or send to a colleague or trainer for detailed feedback. Speech insights and audience perception: The app applies linguistic analytics and personality theory to infer attributes from your speech after you have delivered it. Understand better how

**Add presentation slides**: Upload your presentation slides into the VR app, so that you can practice delivering a presentation in VR with your own slides.

you are being perceived by the audience.



**Autocue notes**: View your notes in the virtual room with you. The notes automatically scroll at a speed which can be changed.

**Custom questions**: Record your own questions and upload the audio to the app. Questions are then asked by an avatar to the user in specific rooms (e.g. specific questions during a press conference).

**Branched questions** (new!): Avatar questions change depending on the user's response, based on keywords the user has spoken.

**Listenability score**: receive a score, based on the Flesch–Kincaid readability tests, and summary description on how easy your speech was to listen to.

**Scene distractions**: enable audio based distractions (mobile phones going off, audience coughing, microphone feedback,...) to test your delivery skills under difficult conditions and certain room audience members reacting to the quality of your delivery (looking around, talking to each other,...) if your delivery is poor.

**Track progress**: Determine how you are improving over time with the speech analysis feature.

**Screen casting**: mirror your VR headset screen to your mobile device, so that other people can view on the mobile device what you are seeing in VR.

Practical Work Content & activities	<ul> <li>Describe the activities or any exercises included:</li> <li>Upload your own presentation.</li> <li>Select an environment (classroom, meeting room,)</li> <li>Give a speech, presentation, elevator pitch, lecture,</li> <li>Don't be distracted by (unexpected) events or reactions from the audience</li> <li>Answer questions from the audience</li> <li>Read feedback generated by the app</li> </ul>
Recommendations	how to apply best, instructions for preparation and mentoring, do's and don'ts:
	<ul> <li>Prepare your presentation in advance and upload it to the app</li> <li>Use a VR headset with a trigger/activation button. This allows you to enter environments, change slides, activate speech analysis, etc. with a press of the trigger, without having to wait 3 seconds for hover activation.</li> </ul>
Further reading	Recommendations for further reading into subject: https://virtualspeech.com/resources/whitepaper/vr-soft-skills- training-whitepaper.pdf
Sources	Link to source of best practice example:
	Website: <u>https://virtualspeech.com/</u>
	YouTube: <u>https://www.youtube.com/watch?v=j1bCetzpav4</u>
	YouTube: <u>https://www.youtube.com/watch?v=LwqgCiYqx0M</u>
	YouTube VR: <a href="https://www.youtube.com/watch?v=RgfROqQqKkc">https://www.youtube.com/watch?v=RgfROqQqKkc</a>
SWOT	Strengths:
	<ul> <li>Wide variety of courses and training simulations</li> </ul>





- Evaluation and feedback features
- Tracks eye contact (via head orientation), voice attributes, speed of delivery and use of filler words.
- surround sound

### Weaknesses:

- Timely use: only 12 months
- Does not currently have tracking for hand movement
- Lacks mic placement tracking

### **Opportunities:**

- Be better prepared for business contacts
- Can be added in SCORM format to company LMS

### Threats:

21. VR Chat



Source: www.vrchat.com

Orgai	nisation	
Orgui	insution	

VR Chat Inc.

Technical frameworks & key data

The application supports the following VR platform: Oculus Rift, Oculus Quest, Steam

Description (purpose and main target group)

VRChat is a free-to-play massively multiplayer online virtual reality social platform. High amount of community created virtual worlds available (more than 50.000 worlds, build with Unity SDK). Full 6DoF with spatial sound.



	Target group: the general public. Also suitable for students, educators, trainers, and virtual teams to some extent (VRChat is engaging, but highly informal).
Basic Features	- Multi-user environment
	- Avatar creation
	- Session Scheduling
	- Massively multiplayer online platform
	- Customisation of your own world
	- Add friends and chat with them from all over the world
Prior Knowledge	Little or no prior knowledge is required to use effectively this application. Basically, it require basic skills of using VR (how to download, set-up, navigate).
	The application can be downloaded directly from the store. Basic navigation skills with a virtual environment would be useful to effectively use all of the application's features.
Learning Outcomes	Basics of multi-user VR:
(knowledge, skills, and competences)	- Create an avatar
	- Navigating in virtual space
	- Interacting with other users
	- How to create and customise an avatar
	- Create your own personalised virtual space
	- interaction with virtual objects
	Competences:
	- Basics of setting up and using social VR
	- Hosting an event in social VR
	- basic communication with other users
	- groups interaction with other users
	- overcome of social anxiety
HEI Added Value	The application allows multiple user interaction, which means that different users can connect and interact together via this VR application, enabling group interaction. For example, a trainer can interact with the learners in its classroom. The feature of group interaction also demonstrates the dynamics of communication.



	Interaction and pedagogical opportunities VR offers for education. The app also provides high immersion and engagement level.
	- high immersion
	- multiple user interaction
	- group interaction
Learning Content	The VR Chat app is a social VR platform for education, training, meetings and events. It gives you the opportunity to build your own worlds and invite people to them. You can experiment with identity by trying new avatars and express yourself.
Practical Work Content & activities	<ul> <li>A trainer or the user its own can create a virtual environment and invite the other people of the team to interact together in the content they choose from</li> </ul>
	- The content of the learning depends on the content that is created by users or hosts/trainers, as they can customise everything (from VR environment/world, to avatars, objects, etc.)
	- At a later stage, the trainer can also ask participants to create their own VR space, customise even more their avatars and experience with different objects.
Recommendations	Since VR Chat is a multi-user application, it is advisable that for a first time experience, the trainer creates a relevant "VR world) in the application and invite the users to join.
	The trainer can slowly introduce more and more features to their content and demonstrate the dynamics of the group interaction environment.
SWOT	Strengths:
	- multiplayer game mode
	- supports 360 degrees experience and front facing
	<ul> <li>customised avatars and animation for personalised experience</li> </ul>
	- User friendliness
	- Amount of interactions
	Weaknesses:
	- the application is only available in English



- there is not a tutorial to get you started and explain the main features and opportunities you have

### **Opportunities:**

- you can design and create your own environment and invite others
- gamification level
- Interact with people all over the world
- Easy communication and interaction with other users

#### Threads:

- threat of playing this app for hours in a row due to its endless opportunities to explore in terms of words
- Requirements The application supports must VR devices and hardware, and has a single/multi-user capability- this means that a user can play without knowing anyone or join together with other people that he/she knows. Internet connection is required to use the application.

Further reading	Recommendations for further reading into subject
Sources	https://www.oculus.com/experiences/rift/997678176960598/?loc
	ale=en_US & https://www.vrchat.com/

## 22. 365 Dynamics Layout



Source: https://www.youtube.com/watch?v=9viR6U-D2Co

Organisation

Microsoft





Technical frameworks & key data	365 Dynamics Layout is built upon Windows MR ecosystem
Description (purpose and target Group)	Microsoft 365 Dynamics Layout is SaaS (software as a service) aimed for enterprise use. The purpose of the application is to streamline conceptual design and remote collaboration processes that includes the use of different 3D-models. Main target group: STEM professionals.
Basic Features	<ul> <li>Interactions via virtual reality (VR) and augmented reality (AR)</li> </ul>
	<ul> <li>Requires Windows MR HMD's + PC or Microsoft Hololens for augmented reality</li> </ul>
	- Integrations with existing information systems
	- Import 3D-models
	- Pre-loaded with 3D models
	<ul> <li>Drag, drop, resize, rotate and copy 3D models in VR (or holograms in AR)</li> </ul>
	- Security features (e.g. AAD authentication and sign-on)
	- Custom floorplans
	- Spatial mapping of floors, walls, and ceilings
	- Video streaming for easy sharing
Prior Knowledge	- Expert knowledge of VR required
	- Expert Knowledge of 3D models required
	- Knowledge of Microsoft Ecosystem recommended
Learning Outcomes	- Advanced skills of industrial engineering
(knowledge, skills, and competences)	- Creating, importing and reviewing of 3D models
	- Advanced co-design and collaboration processes
HEI Added Value	HEI added value comes from the fact that many enterprises (especially big ones) already use 365 Dynamics Layout in their daily work. Acknowledging the potential and benefits of these applications is in the core of the question "Why to use VR in an organization?" In STEM field, learning the use of these enterprise VR applications is just as crucial as any other general software skills. The practical knowledge acquired via the use of these applications could be especially beneficial for Universities of Applied Sciences that collaborate closely with industry.



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	However, to reap these benefits HEIs must put much resources (effort, time and money) when integrating the use of these applications with their curriculum.
Learning Content	Learn how to use an enterprise level VR software. Learn how to handle virtual remote collaboration. Learn how to streamline communication processes and handle communication bottlenecks in a project.
Practical Work Content & activities	<ul> <li>Create 3D models (with some other software) and upload them into 365 Dynamics Layout</li> </ul>
	- Import Existing 3D models
	- Get familiar with different interactions
	- Host a remote collaboration sessions
Recommendations	365 Dynamics Layout is recommended for STEM field (AEC or engineering) that already use some kind of 3D models. Integrating the use of VR software with the use of other conventional software (CAD, etc.) could be beneficial when leveraging student's knowledge of remote collaboration, industrial design, etc. processes.
SWOT	Strengths:
	<ul> <li>Integrations with other software and information systems (emphasizes Microsoft ecosystem)</li> </ul>
	- Supports multiple 3D model file types
	- High quality Enterprise VR
	- Compatibility with AR
	Weaknesses:
	- Requires advanced skills
	<ul> <li>Expensive (although it may be possible for HEIs to get discounted licences from Microsoft)</li> </ul>
	Opportunities:
	- Students learn how to actually use enterprise-level VR
	<ul> <li>Enables close collaboration with industry (HEIs streamline their curriculum with the software and remote collaboration processes that already exist in the industry)</li> </ul>
	Threads:
	- Locking up with Microsoft Ecosystem
	<ul> <li>Lack of experts that are essential with the technology adoption</li> </ul>

GRinsight	Co-funded by the Erasmuse Programme of the European Union
Requirements	Windows MR headset, PC, internet connection The use of 3D model software recommended
Further reading	Recommendations for further reading into subject
Sources	https://dynamics.microsoft.com/fi-fi/mixed-reality/layout/

# 23. Nvidia Holodeck



Source: <a href="https://www.youtube.com/watch?v=KcWZFpjjD34">https://www.youtube.com/watch?v=KcWZFpjjD34</a>

Organisation	Nvidia
Technical frameworks & key data	The application supports HTC Vive, HTC Vive Pro, Oculus Rift
Description (purpose and target Group)	Nvidia Holodeck is a high-end collaborative design software for STEM professionals. Holodeck provides photorealistic simulations for designs. It is currently at beta phase and used only by certain selected customers such as Nasa and Toyota.
Basic Features	<ul> <li>Importing 3Ds via Holodeck Exporter (current support for 3Ds Max and Maya 3D modelling programs)</li> </ul>
	<ul> <li>Interactions with objects (exploded view, turning, rotation, etc.)</li> </ul>
	- Highly photorealistic models
	<ul> <li>Synchronous and asynchronous multi-user environment (avatar-based interaction, model annotations, embedded videoconferencing, etc.)</li> </ul>
	- Creating private sessions



	<ul> <li>Workflow management and system integrations</li> </ul>
	- Beacons for quick navigation in large 3D-models
	<ul> <li>Whiteboards, drawing tools, measurement tools, video and 360-image capturing tools</li> </ul>
	- Live recordings
	- Integrations with Google Hangouts (session participation)
Prior Knowledge	- Expert knowledge of VR required
	- Expert Knowledge of 3D models required
Learning Outcomes	- Advanced skills of industrial engineering
(knowledge, skills, and competences)	- Creating, importing and reviewing of 3D models
	- Advanced co-design and collaboration processes
HEI Added Value	Nvidia Holodeck is an example of high-end SVR (social virtual reality) design software. The use of Nvidia Holodeck may not be easily integrated into higher education, except maybe with certain STEM fields such as architecture or industrial design. However, it is crucial for HEIs, especially in fields of STEM and business management, to understand the potential of this technology.
Learning Content	Learn how to use an enterprise level VR software. Learn how to handle virtual remote collaboration. Learn how to streamline communication processes and handle communication bottlenecks in a project.
Practical Work Content & activities	<ul> <li>Create 3D models (CAD, etc.) and upload them via Holodeck Exporter</li> </ul>
	- Import Existing 3D models
	- Get familiar with different interactions
	- Host remote collaboration sessions
Recommendations	Nvidia Holodeck is recommended for STEM field (AEC or engineering) that already use some kind of 3D models. Integrating the use of VR software with the use of other conventional software (CAD, etc.) could be beneficial when leveraging student's knowledge of remote collaboration, industrial design, etc. processes.



SWOT	Strengths:
	<ul> <li>Integrations with other software and information systems</li> </ul>
	- Supports multiple 3D model file types
	- Photorealistic quality
	- Variety of interactions
	Weaknesses:
	- Requires advanced skills
	<ul> <li>Not yet available for testing</li> </ul>
	Opportunities:
	- Students learn how to actually use enterprise-level VR
	<ul> <li>Enables close collaboration with industry (HEIs streamline their curriculum with the software and remote collaboration processes that already exist in the industry)</li> </ul>
	Threads:
	<ul> <li>Holodeck is at beta phase, full future support is not guaranteed</li> </ul>
	- Lack of people who can use the software
Requirements	High-end PC and HMD, internet connection
	Nvidia Exporter
Further reading	Holodeck user-quide:
	<u>https://docs.nvidia.com/holodeck/holodeck-user-</u> guide/index.html
Sources	https://www.nvidia.com/en-us/design- visualization/technologies/holodeck/





## 24. Google Earth



Source: <u>https://geoawesomeness.com/google-earth-pro-is-now-available-for-free/</u>

Organisation	Google Inc.
Technical frameworks & key data	The application supports HTC Vive, Oculus Rift, Windows MR (via Steam)
	Browser-based Google Earth (non-VR)
Description (purpose and target Group)	Google Earth combines satellite images and location-based data to create 3D presentation of the Earth. Google Earth provides many featured locations that highly accurate rendering. Flight mode (birds eye perspective) and street-view mode supported. Mars and Moon modes are also available.
	Target group: educators, students, general public
Basic Features	<ul> <li>3D imagery</li> <li>Street view (egocentric)</li> <li>Birds eye view (exocentric)</li> <li>Tours and location guides</li> </ul>
	<ul> <li>Location search</li> <li>Daylight visualizations</li> </ul>
	- Browser-based Google Earth (non-VR)





Prior Knowledge	<ul> <li>Only basic knowledge of VR required</li> </ul>
Learning Outcomes (knowledge, skills, and competences)	<ul> <li>Basic skills of using VR</li> <li>Being able to navigate in both street view and birds eye view modes</li> <li>Knowledge of how egocentric and exocentric viewpoints differ conceptually and pedagogically</li> </ul>
HEI Added Value	Easy to use and really high-quality tool for learning about our planet Earth in VR. Boosts student's motivation to learn about geography.
Learning Content	Learn how to navigate in different Google Earth locations and use both street view and birds eye view effectively.
Practical Work Content & activities	<ul> <li>Get familiar with different Google Earth locations</li> <li>Get familiar with pedagogical aspects of egocentric (street view) and exocentric (birds eye view) viewpoints</li> </ul>
Recommendations	Google Earth is recommended as one of the very first VR experiences in HEIs. It is an easy-to-use introduction to the potential of VR. Google Earth is highly visual and connects with real-world navigational data and locations. Therefore it is especially beneficial with learning task that relates somehow relate geography.
SWOT	<ul> <li>Strengths:</li> <li>Visuality</li> <li>Free</li> <li>Easy to use</li> <li>Wow-effect</li> </ul> Weaknesses: <ul> <li>No support for standalone devices</li> <li>No multi-user tours</li> </ul> Opportunities: <ul> <li>Highly motivational tool for learning about our planet Earth</li> <li>Unveils the potential of VR</li> <li>Excellent first VR experience</li> </ul>





Requirements	Oculus Rift, HTC VIVE, Windows MR (via Steam), internet connection
Further reading	https://en.wikipedia.org/wiki/Google_Earth
Sources	https://www.google.com/intl/fi/earth/

# 25. Wakeone Platform



Source: <u>https://www.wakeone.co/immersive-learning-and-</u> coaching-environments-farewell-for-stickies

Organisation	Wakeone
Technical frameworks & key data	The application supports all major VR platforms (Oculus, VIVE, etc.). Integrations with AR devices.
Description (purpose and target Group)	Wake XR provides immersive learning and coaching environments, business process gamifications, and product marketing solutions. Wake XR supports both VR and AR. Wake XR's Immersive internet also enables scalability for multiple business purposes (browser- based VR/AR interactions).
Basic Features	- Importing existing 3D models to VR/AR
	- Avatar-based interactions with versatile nonverbals


	- Scalable with AI and scripted learning assistants
	- Immersive internet (browser-based VR/AR)
	- Role-playing simulations
	- Conferencing tools
	<ul> <li>360-video embedded with virtual environments3D imagery</li> </ul>
Prior Knowledge	<ul> <li>Ranges from basic VR knowledge (basic user, such as client) to expert VR knowledge (e.g., session admins)</li> </ul>
Learning Outcomes (knowledge, skills, and competences)	- Creating, importing and reviewing 3D models
	- Interacting with 3D objects
	- Advanced co-design and collaboration processes
	- Hosting different training scenarios
	- Understanding the potential of gamification in VR
HEI Added Value	Physical training scenarios in fields such as STEM. Flexibility: supports both VR and AR, and immersive internet (browser-based XR). Remote collaboration and gamifications. Upcoming support for standalone devices (Oculus Quest) enhance scalability and usability for HEIs/SMEs.
Learning Content	Learn how to use an enterprise level VR software. Learn how to handle virtual remote collaboration. Learn how to streamline communication processes and handle communication bottlenecks in a project. Learn how to host training in VR.
Practical Work Content & activities	<ul> <li>Create 3D models (CAD, etc.) and upload them via Holodeck Exporter</li> </ul>
	- Import Existing 3D models
	- Get familiar with different interactions
	- Host remote collaboration sessions
Recommendations	Wake XR is recommended especially for STEM field (AEC or engineering) that already use some kind of 3D models. Integrating the use of VR software with the use of other conventional software (CAD, etc.) could be beneficial when leveraging student's knowledge of remote collaboration, industrial design, etc. processes.



SWOT	<ul> <li>Strengths:</li> <li>Support for both VR and AR</li> <li>Immersive internet (browser-based VR/AR)</li> <li>The quality of avatar-based interactions and nonverbals</li> <li>Versatile gamifications and training scenarios</li> </ul>
	<ul> <li>Support for Oculus Quest</li> <li>Weaknesses:</li> </ul>
	<ul> <li>Not yet available in Oculus Store (beta phase)</li> <li>Opportunities:         <ul> <li>Students learn how to use enterprise-level VR</li> </ul> </li> </ul>
	<ul> <li>Enables close collaboration with industry (HEIs streamline their curriculum with the software and remote collaboration processes that already exist in the industry)</li> </ul>
Requirements	All major VR HMD's supported, Oculus Quest (coming soon), internet connection
Further reading	https://www.wakeone.co/immersive-learning-and-coaching- environments-farewell-for-stickies
Sources	https://www.wakeone.co/



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