

# OER - SATLE Virtual Reality & Enhancing Pedagogy for Faculty of Business and Hospitality

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Figure 1: VR Headset, CC, photographer unknown



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## Summary

The aim of this project was to explore the potential of Virtual Reality (VR) technology in business higher education for a faculty with low levels of current use of the technology. The initiative involved purchasing VR headsets, providing training, and conducting workshops to assess the benefits and challenges of integrating VR into the Faculty's teaching methods.

The project underwent several phases, starting with a literature review that highlighted the positive impact of VR on education, also noting challenges around management, ethics and logistics.

The subsequent step involved designing and conducting a survey to gauge the knowledge, needs, interests, and motivations of lecturing staff and graduate students in the Faculty regarding VR technology. The survey results revealed a strong interest in adopting VR, along with potential benefits recognised by the participants.

Following the survey, VR headsets were purchased, and the necessary infrastructure for their use was set up, including logins, charging stations, and overall management. A training workshop was then organised and delivered to the Faculty staff. The workshop aimed to introduce lecturers to VR concepts, familiarise them with VR technology, provide hands-on experience with VR headsets and applications, address concerns related to VR implementation, and explore potential uses in the classroom.

The survey results indicated a positive attitude towards VR adoption, with respondents expressing interest in incorporating VR into various programs and years, such as Digital Transformation, Hospitality Management, Business Degrees, Accounting, and others. Specific modules, like Events Management, Culinary Leadership, Supply Chain Management, and Tourism Management, were identified as areas where VR could be beneficial. However, concerns were raised, including the cost of VR equipment and software, setup time, physical space requirements, and the need for training.

The pilot workshop results emphasised ten practical considerations for integrating VR headsets into classes, including defining clear learning objectives, assessing technical requirements, choosing appropriate content, considering accessibility, evaluating budget and resources, providing ongoing training, implementing a flipped classroom approach, addressing privacy and ethical considerations, evaluating learning outcomes, and staying informed about updates in VR technology.

Practical considerations included the need for individual logins for each headset, the potential cost and complexity of VR software, space and hygiene considerations, and the importance of charging headsets in advance. Focus group participants suggested additional applications of VR, such as educating sports coaches, resistance training exercises, anatomy and physiology, as well as potential uses for well-being.

The next steps in the project involve further exploration of VR applications in the classroom based on the feedback and insights gathered from the survey and pilot workshop. The focus will be on refining the implementation process, addressing concerns, and continuously evaluating the impact of VR on learning outcomes and engagement. The project aims to develop expertise in using VR technology within the Faculty of Business & Hospitality at TUS.

## Project phases

- 1) Literature review
- 2) Survey design to assess staff knowledge, needs, interests and motivations
- 3) Surveyed staff and analysed results
- 4) Purchased VR headsets
- 5) Set up VR headsets with logins, charging, management
- 6) Organised and delivered a training workshop

## Literature Review

Virtual Reality (VR) technology has gained significant attention in the field of higher education in recent years, offering possibilities for enhancing the learning experience in business education and training among many other disciplines. While the use of VR in education has been explored across various disciplines, its specific applications within the context of business studies have become a subject of growing interest.

- **Enhancing Learning Outcomes:** A systematic literature review conducted by researchers (Hamilton et al., 2021) explored the impact of immersive virtual reality on learning outcomes in education. The findings suggested a likely overall positive benefit of using VR, with increased engagement and improved comprehension of complex concepts. This has direct implications for business education, where a deeper understanding of theoretical frameworks, case studies, and real-world scenarios is crucial.
- **Improving Presentation Skills:** Researchers (McGovern et al., 2020) have identified the potential of VR in assisting business educators in enhancing students' presentation skills. The immersive nature of VR allows students to practice and refine their presentation abilities in a virtual environment before facing real audiences. This application is particularly relevant in business programs where effective communication is a vital skill.
- **Language Learning in Business Contexts:** Another area of exploration is the use of VR as a tool in language classrooms, including those within business education. Studies (Parmaxi, 2023) have demonstrated that VR can be invaluable in creating immersive language learning experiences, allowing students to practice business communication skills within simulated environments. This has implications for international business programs where cross-cultural communication is a key component.
- **Ethical Considerations:** As VR becomes more integrated into higher education, ethical considerations arise. Studies (Sholihin et al., 2020) have investigated the ethical implications of using VR in education, including issues related to privacy, data security, and the potential

impact on student well-being. In business education, where ethical decision-making is a core competency, understanding and addressing these concerns become crucial.

We also noted across media articles the cost and implementation challenges. While the potential benefits of VR in business education are evident, researchers have highlighted challenges associated with cost and implementation. The acquisition of VR equipment and development of tailored content can be expensive, and institutions may face hurdles in integrating VR seamlessly into existing curricula. Addressing these challenges is essential for widespread adoption.

In summary, the literature on VR use in higher education, specifically in the context of business studies, indicates a positive potential for enhancing learning outcomes, improving specific skills, and providing immersive experiences. However, challenges related to cost, ethical considerations, and implementation need to be carefully navigated to fully harness the benefits of VR in business education. As the technology continues to evolve, ongoing research will be vital in refining best practices and understanding the long-term impact of VR in higher education business programs.

#### [SATLE Virtual Reality & Enhancing Pedagogy Survey](#)

Through this project we will purchase Virtual Reality headsets for the Faculty of Business and Hospitality, facilitate training requirements, and test and learn with the equipment about some of the teaching and technology potential offered by VR headsets.

VR in education has been widely explored in the literature for some years, yet we have mostly not used the technology in the Faculty of Business and Hospitality to any great extent to date.

This survey is designed to gather insights from the Faculty of Business and Hospitality lecturing staff and graduate students on their knowledge, skills, and interests in the use of virtual reality (VR) technology in the classroom. Some sample research papers point towards:

- A likely overall positive benefit of using VR (from a meta-analysis of literature)

Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design

<https://link.springer.com/article/10.1007/s40692-020-00169-2>

- Potential for business educators in helping students enhance their presentation skills.

[https://www.tandfonline.com/doi/full/10.1080/08832323.2019.1703096?casa\\_token=Eos8fAm29LUAAAAA%3ArE6Cezc1mCdx4b4fck4eBAbKsChF5imYEcVSoZjc7aLRNOD9ZNViqtuTbbH7PwFgVZX7taWzC4r](https://www.tandfonline.com/doi/full/10.1080/08832323.2019.1703096?casa_token=Eos8fAm29LUAAAAA%3ArE6Cezc1mCdx4b4fck4eBAbKsChF5imYEcVSoZjc7aLRNOD9ZNViqtuTbbH7PwFgVZX7taWzC4r)

- VR is an invaluable tool in the language classrooms

[https://www.tandfonline.com/doi/full/10.1080/10494820.2020.1765392?casa\\_token=WQWyduiBF-cAAAAA%3AAphx33yX4SQ277005VLAov4SDXMffpXKS1aykevEEqIPtfQQQuBTBfJImvvyvzL1IWb\\_PFHJO1ld7](https://www.tandfonline.com/doi/full/10.1080/10494820.2020.1765392?casa_token=WQWyduiBF-cAAAAA%3AAphx33yX4SQ277005VLAov4SDXMffpXKS1aykevEEqIPtfQQQuBTBfJImvvyvzL1IWb_PFHJO1ld7)

- Implications for ethics

[https://www.sciencedirect.com/science/article/pii/S1472811720303955?casa\\_token=uscamYKQwAAAAA:dPO5FXdq2JrU6mVdJ-wozAlsYp7tW1Zi95EjHrsN8BhGite487AjzseHdt9ftm2iJwu0oqWPg](https://www.sciencedirect.com/science/article/pii/S1472811720303955?casa_token=uscamYKQwAAAAA:dPO5FXdq2JrU6mVdJ-wozAlsYp7tW1Zi95EjHrsN8BhGite487AjzseHdt9ftm2iJwu0oqWPg)

Through the funding awarded, we will be purchasing a small number of Virtual Reality headsets for the Faculty, which we will pilot in training workshops and seminars according to staff interests collated in this survey. This will allow us to develop over time expertise in the area. If you would like further information about the project please email [anthony.johnston@tus.ie](mailto:anthony.johnston@tus.ie). Many thanks for your time in completing the survey.

### Survey results

Overall, the survey indicates a strong level of interest in VR adoption, with potential benefits recognised, but challenges and the need for training being prominent themes. A summary of survey results is presented below with full responses on the next pages.

#### **1) Respondents' Positions:**

Majority identified as HOD/Senior Lecturer/Lecturer/Assistant Lecturer.

#### **2) Experience with VR:**

Only a few respondents had used VR in teaching. Interest in incorporating VR into classrooms was generally present.

#### **3) Interest in VR:**

Common motivations included improving student engagement, meeting learning outcomes, and staying updated with technology trends.

#### **4) Potential Program and Year of Use:**

Interest spanned various programs and years, including Digital Transformation, Hospitality Management, Business Degrees, Accounting, and others.

#### **5) Modules and Areas of Interest:**

Interest in using VR in specific modules like Events Management, Culinary Leadership, Supply Chain Management, and Tourism Management. Exploring areas such as virtual events, property showcasing, and sports leisure.

#### **6) Motivations for VR Use:**

Motivations included improving engagement, meeting learning outcomes, staying updated with technology trends, and personal interest in VR.

**7) Barriers and Concerns:**

Common concerns included the cost of VR equipment and software, setup time during class, physical space requirements, and personal knowledge/skill with VR.

**8) Training and Development:**

Most respondents had not received training related to using VR in education.

**9) Plans for Incorporation:**

A mix of responses regarding plans to incorporate VR in the next academic year, with some expressing uncertainty.

**10) Observations and Suggestions:**

Concerns included cleanliness of headsets, potential theft, and student injuries. Suggestions for strategic planning, entrepreneurship, and enterprise development.

**11) Additional Comments:**

Some expressed a lack of knowledge about VR, highlighting the need for training. A few mentioned the time investment required for research and setup.



## Workshop with Faculty Staff

### Workshop Objectives

- 1) Introduce lecturers to the concept of Virtual Reality (VR) and its potential applications in business education.
- 2) Familiarise lecturers with the basic principles and components of VR technology.
- 3) Provide hands-on experience with VR headsets and relevant applications.
- 4) Address common concerns and considerations associated with implementing VR in the classroom.
- 5) Try out three pieces of software
  - a. First Encounters
  - b. Browser with Google Maps
  - c. YouTube VR and try a sustainable development immersive video
- 6) Brainstorm and suggest some possible uses in the classroom

### Workshop structure

#### *1. Welcome and Introduction (10 minutes)*

- Overview of the workshop objectives and agenda.
- Brief discussion on the importance of staying abreast of technological trends in education.

#### *2. Understanding Virtual Reality (10 minutes)*

- Definition and explanation of Virtual Reality.
- Components of VR: Headsets, controllers, sensors, and software.
- Different types of VR experiences: Immersive simulations, 360-degree videos, and interactive applications.

#### *3. Hands-On Experience (40 minutes)*

- Participants will have the opportunity to try VR headsets.
- Guided exploration of a curated selection of VR applications relevant to business education.
- Demonstration of basic headset controls and navigation

#### *4. Addressing Concerns and Barriers (45 minutes)*

- Identifying common concerns and barriers related to VR adoption.
- Open discussion on potential solutions and strategies to overcome challenges.

#### *5. Q&A Session (30 minutes)*

- Participants can ask questions and seek clarification on any aspect of VR technology and its application in business education.

## Pilot workshop results

Integrating Virtual Reality (VR) headsets into TUS Faculty of Business and Hospitality Classes presents opportunities to enhance engagement, foster immersive learning experiences, and prepare students for working with new technologies. Below are 10 practical considerations we came up with from our workshops.

1. **Define Learning Objectives:** Clearly outline the learning objectives you aim to achieve using VR. The technology can seem a little over-whelming at first so you do need to go in with a clear plan. Identify specific skills or concepts that can be enhanced through immersive experiences, such as virtual business simulations, case studies, or real-world problem-solving. Keep it simple - for example – use Google Maps streetview and tour the centre of Athlone together, or a retail district, to discuss a town planning case study.
2. **Assess Technical Requirements:** Ensure that you take the time to ensure that your classroom can support VR integration. You'll need space and a good WIFI connection.
3. **Choose Appropriate Content:** Select VR content that aligns with the curriculum and enhances the learning experience. Look for applications, simulations, or experiences tailored to business education, such as virtual corporate environments, financial simulations, or marketing campaigns. These don't stay static so you should check the store now and again to see what has been added.
4. **Consider Accessibility:** Address potential accessibility issues by ensuring that VR experiences are inclusive and compatible with various learning styles. Check for features like adjustable settings, subtitles, and compatibility with assistive technologies.
5. **Budget and Resources:** When we looked at the software we noted straight away it could be very expensive and a little complicated to purchase much of the software. So take time and evaluate the budget required for VR implementation, including the cost of headsets, software licenses, and any additional equipment.
6. **Ongoing Training:** We used Meta Quest 3 - these are new as of 2024 but the technology will certainly change so keep up to date and try out new hardware.
7. **Flipped Classroom:** Ask students who are familiar with the hardware to demonstrate what skills and knowledge they have.
8. **Privacy and Ethical Considerations:** As we learn about the technology and its capabilities keep an eye on GDPR, ethics and privacy – e.g. don't let the students take photographs of each other without consent etc.
9. **Evaluate Learning Outcomes:** Implement a system to assess the effectiveness of VR integration. Collect feedback from both students and faculty to evaluate the impact on learning outcomes, engagement, and overall satisfaction.
10. **Stay Informed About Updates:** VR technology is evolving rapidly. Stay informed about updates, new applications, and advancements in the field. Consider how emerging VR technologies can enhance your business curriculum in the long run.

## What Apps Can You Use to Ease Users into the Experiences

- Google Maps (via the web browser)
- The Anne Frank House (free download)
- Conference and Collaboration Apps
- Sport Management Apps
  - E.g. XR Fitness

### **Practical Considerations**

- Each headset needs a login with Meta. This means each headset needs an independent Meta account and password. Each Meta account needs a unique email so if we have many devices we need a proper management system.
- Many of the software applications are expensive and each would be only one licence. We would recommend sticking to the free items, videos and web-based material for now to build familiarity.
- Space – considerations around risk, injury etc. I would recommend a full risk assessment before running it in class.
- Hygiene – recommend bringing sanitation wipes if headsets are shared.
- Charging – make sure headsets are well charged in advance and have spare AA batteries for handsets.

### **Focus group participants also suggested the following points:**

- VR could be a resource to educate sports coaches, people re resistance training exercises, anatomy and physiology (in particular anatomy).
- There may be possible uses re wellbeing.
- Is it possible to use a number of headsets and project what is happening on a flat screen for others in the class to see what is happening?
- Allows for innovative and creative classroom/learning environment
- Attract students' attention, particularly initially!
- May assist in motivation of students to get involved and engage with the subject matter
- Instruction would need to be well thought out and planned, exactly what, when, how, etc. and will this achieve the learning objective/experience
- Building time for VR use in a tight semester, module system
- It is possibly time consuming from several perspectives:
  - building lecturer familiarity with the technology
  - building pedagogical approach and capacity
  - building student familiarity with technology, its mode of use etc. prior to commencing its use for learning in the particular subject area
  - building time for monitoring and measuring the impact of its use on learning
- Consideration of its impact positive/negative on the learning environment. this may differ from class to class!
- Limited number of headsets possibly will require teamwork with one headset per team - issues of fairness/transparency of use etc.
- A set of rules/regulations pertaining to VR use in the classroom would need to be developed to ensure:
  - inappropriate use of same does not take place i.e. correct use of equipment, respect for same, not damaging it etc.
  - privacy of person, i.e. not using camera, video, except as part of particular learning project
  - privacy of data, how this is stored?
- Building confidence in both lecturer and students for VR use as an appropriate teaching/learning tool.

**Further feedback included:**

From a process analysis perspective, I can see many benefits for understanding complex or inaccessible industrial settings. For instance, I have been to Intel's manufacturing site a number of times but only ever permitted to view the production process through a glass wall from the corridor as access to the clean rooms is strictly managed. On YouTube VR, I found a 360-degree video of Intel's manufacturing process. Not only is this better than the "corridor" tour but it is possibly better than physically accessing the cleanroom as the camera gets inside some of the equipment and gives insight that couldn't otherwise be achieved.

From a data analysis perspective, something like 3D imaging of medical scan data does look beneficial but viewing high dimensional datasets, 3D barcharts or word clouds etc. in a VR environment don't appear to be practical or useful to me. I do see potential in using AR to show KPIs and other data over equipment as someone walks through a real-world production or retail environment. This is something that could be replicated in a VR space linked to a Digital Twin. Some work has been done on this but not sure how widely used it is.

From a simulation model development perspective, the functionality for determining boundaries and scanning rooms as experienced while using the First Encounters and First-Hand apps could be a great way for creating a 3d render of the workspace. Not sure if this data can be exported or if/how it could be imported into a simulation package. I have seen an example of a model built in Unity so that's something to explore.