

VR/AR Education Kit



Transforming education with immersive learning.

With the VR & AR Education Kit (Virtual Reality and Augmented Reality), you can take your class on virtual excursions around the world, help students to visualise and interact with abstract concepts, enable them to experience different perspectives, provide training in work and life skills, and empower learners to become 3D thinkers and content creators.

All these experiences are designed to promote immersive learning, an increasingly important part of education and industry practices.



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What is **VR/AR** Learning?



Immersive Learning is a pedagogical approach that focuses on the use of immersive technologies to present educational experiences within artificial, digitally-created environments that mimic or incorporate real world environments. These technologies are **Virtual Reality, Augmented Reality, and Mixed Reality.**



Virtual Reality



Augmented Reality



Mixed Reality

Using VR for Immersive Learning facilitates deeper learning and higher order thinking in students



Using VR for Immersive Learning facilitates deeper learning and higher order thinking in students (Southgate, 2020, 39). Studies have shown that using Extended Reality (XR) technologies for educational purposes offer several positive benefits, including higher intrinsic motivation, improved learning outcomes, aiding students' ability to understand abstract and complex concepts and topics like molecular biology (Reen et al., 2021), as well as architecture and engineering (Radiantia et al., 2020, #). Studies also reveal that under the right learning and training delivery, virtual skill acquisition using VR can successfully transfer to real world applications and scenarios (Hamilton et al., 2020).

Similarly, the use of AR and MR technologies are becoming more useful in education and industry as they encourage student engagement and inquiry learning through immersive learning.

Preparing For Your VR/AR Lessons

Before you get started with using the AR/VR kit within lessons and units of work, make sure to take some time to become familiar with the technology. Play, explore, and experiment!

Allocate time for onboarding teaching and technical support staff, as well as learners, before using the AR and VR equipment. This should include sessions that discuss safe and responsible use of the devices. You may refer to Lumination's VR/AR Safety poster as a guide. It is good practice to create your own school and/or classroom-wide guidelines for AR/VR use in your setting.

Make sure to keep hand sanitisers and disinfectant wipes with the IMVR kit and encourage students to sanitise their hands before and/or after using the headset.



Age Restrictions

There is currently no consensus when it comes to age restrictions for using AR and VR technologies. The Lumination AR/VR kit includes handheld VR headsets, mobile devices, Merge Cubes, and a 360° camera, with no specified age limits for their use. Since technologies used in immersive learning is still in its infancy, existing scientific studies have shown limited evidence on the effects of AR and VR use with children.

For example, in this limited case study entitled 'Health and Safety of VR by Children in Educational Use Case' (Rauschenberger & Barakat, 2020, #), VR was used in a structured and limited way for students aged 10 to 12 years old for 30 minutes a day, for five consecutive days and researchers did not find any adverse visual, spatial representational, or balance aftereffects, or that it causes undue nausea, oculomotor discomfort, or disorientation.

As such, based on relevant research and anecdotal evidence based on experience, Lumination recommends that VR usage may be used by students 10+ years of age in a structured and limited way within an educational setting.

Most of our VR lessons are geared for students in Years 5 to 10, with some resources available for senior school students (Years 11 and 12) and middle primary students (Years 3 and 4). At this stage, we do not recommend VR use for junior primary school students or younger. Our AR lessons, on the other hand, cover all year levels. Younger students may benefit from the use of AR in a limited capacity and guided approach.



Lumination recommends that VR technology may be used by students 10+ years of age.

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VR/AR Education Kit Checklist

When running learning experiences using the VR/AR Education Kit, teachers are encouraged to check the following before every lesson to ensure a smooth immersive learning session:



All devices are in working order, with batteries fully charged and devices are not faulty.



All required apps are installed and working on all the devices and/or the apps are updated with the latest versions.



All required log-in information to devices and apps should be made accessible to students, if required.



Devices are cleaned and sanitised.



Students are organised in pairs and/or small groups to encourage collaboration and communication.



Learning centres may be required, especially if there are fewer devices than students.



Students are prepared in advance on how to use the devices and access resources.



To manage student devices, make sure Lumination's LeadMe EDU app is installed on all devices. Scan QR or visit bit.ly/leadmesetup

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Integrating XR Technologies

Overview

Augmented Reality (AR) and Virtual Reality (VR) are tools and systems that may be integrated across the eight (8) core learning areas in the Australian Curriculum. Lessons also address various student Competencies and General Capabilities.

Resources

There is a growing number of XR applications that may be used in the classroom - from various AR experiential apps like **Apollo's Moon Shot AR** to using **Merge Cubes** for learning and creating, and VR repository apps like **Within** and **Expeditions Pro**, as well as the **Google and Arts Culture** app that has several AR and VR experiences. Lumination has a list of AR and VR apps that would be useful in the classroom.



XR Classroom Learning System

To help guide you in developing your immersive learning lessons using XR technologies, here's a planning process guide that you might find useful:

Consider your starting point.

Depending on your site's planning frameworks, you could begin preparing for your immersive learning lesson by considering which specific topic/theme/subject, unit of inquiry, or Australian Curriculum strand that you are looking to address. This is your starting point.

Find relevant resources.

Once you've got your starting point, you can check various places to see if there are relevant AR and VR resources for the focus topic. Here are some common ways to search for these resources:

Google Play Store This is where you can look for AR and VR apps that work with the mobile devices that come with your AR/VR kit. There is also a Play Store app installed in your device where you can search for relevant apps.

YouTube 360' Videos You can check the 360' videos channel for relevant videos. Or, you can do a general search via YouTube on the web or the app and then filter the search results to show only VR or 360' videos.

AR/VR Resources Repositories If you check apps like Within, Expeditions Pro, and Google and Arts Culture, you will find different VR and/or AR resources on various topics.

Web-based AR and VR apps There are a multitude of web-based apps that support AR and VR learning that you can use with your kit.



Plan the learning outcomes/ task intentions and activities.

Using XR Technologies in the classroom is exciting. But, it is important to make sure that these technologies are integrated in a meaningful manner.

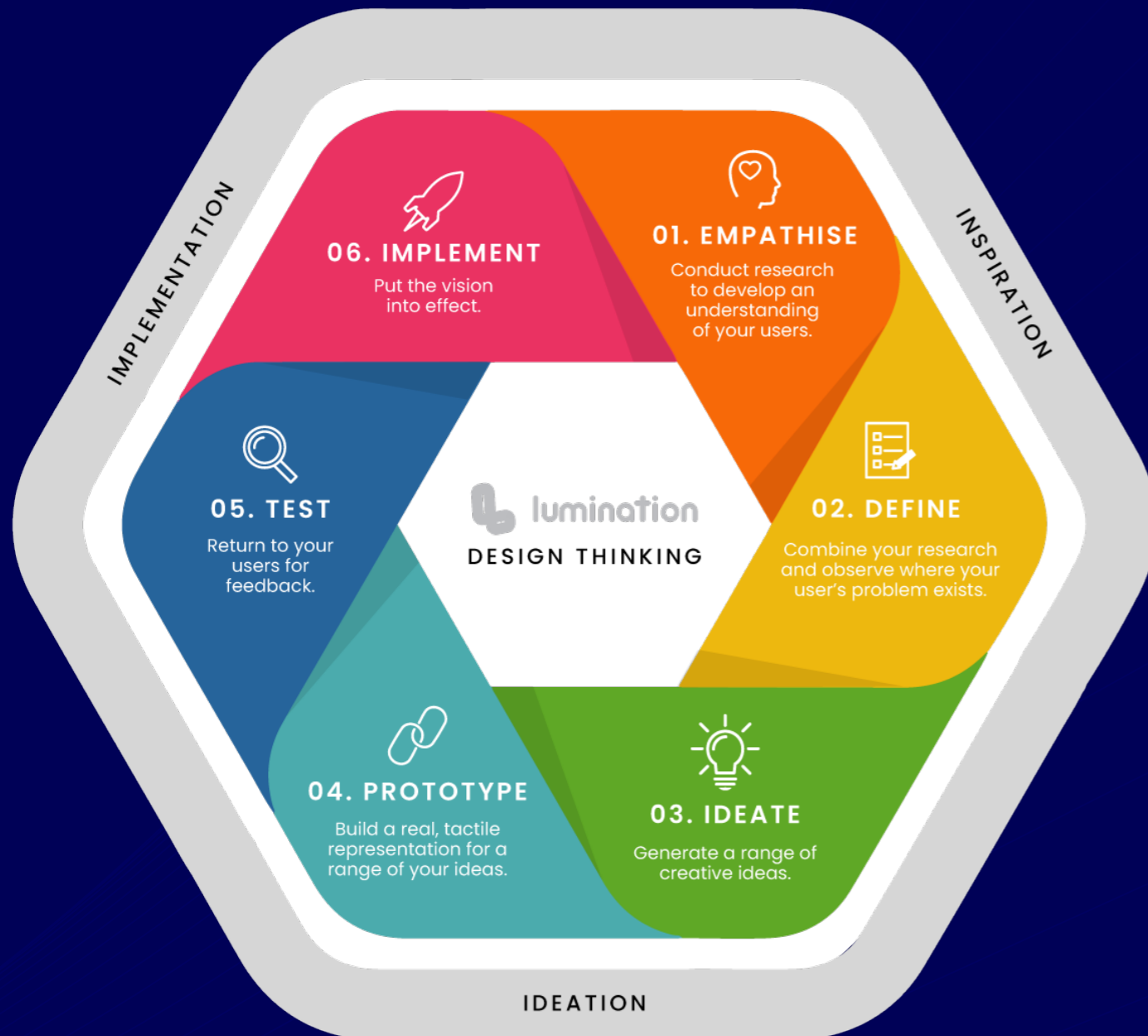
Viewing VR videos or playing a VR or AR game with no associated tasks that are engaging will not provide students a full immersive learning experience. As such, when watching VR videos or engaging with any immersive learning activity, it would be beneficial to use a learning framework and/or additional learning tasks that tie-in with the activity that uses XR Technologies.

Design thinking framework.

At Lumination, we primarily focus on using the Design Thinking Framework in our programs. This approach may be adapted in the classroom. The framework that we use is focused on Inspiration, Ideation, and Implementation. The students are given one 'real world problem' to work on and then guided through these steps on the following page.

Design Thinking Framework

To help guide you in developing your immersive learning lessons using XR technologies, here's a planning process guide that you might find useful:



01. Empathise

Students are given the opportunity to delve deep into a problem, challenge, or issue that they are learning about. This is where we use immersive learning experiences to enable students to have a good understanding of the real world problem. Students can go on virtual excursions, simulate experiences, and engage in many more learning experiences that may usually be limited without XR technologies.



02. Define

Once students have had their immersive experience, they can identify a specific issue or point that they wish to address in a project. Get students to think about more than one potential issue or point and guide them on how they can choose one that would fit best.



03. Ideate

Students can then brainstorm various potential solutions to the problem that they're working on. This is where we encourage a 'blue-sky thinking' approach. Empower students to come up with as many ideas as possible. This should encourage students to engage in critical and creative thinking.



04. Prototype

Studies have shown that the most meaningful immersive learning experiences usually include some type of creation component (Southgate, 2020). AR and VR content creation are highly encouraged, as this would have the additional benefit of building various useful skills by students, including 3D thinking skills. However, other types of creation may also be useful.



05. Test

Getting students to share or showcase their prototypes enables students to think of how to create for an audience. This should also encourage students to take part in a feedback loop amongst their peers. There are many ways to structure feedback loops. For example, "I like..., I wish..., What if...".



06. Implement

Many classroom projects may not get to the implementation stage of the design thinking process. However, it can be beneficial for students to see their prototypes celebrated or used in some way. For example, AR or VR creations may be displayed for student-led conferences, parent-teacher evenings, school exhibits, etc.

Reflect on the immersive learning experience.

Get students to reflect on their immersive learning tasks using XR Technologies. Teachers could also benefit from reflecting on the session or unit of work.

Student reflections:

- What did the students like about the AR/VR experience? What didn't they like? Why?
- What was their favourite part?
- What was one thing that they have learnt from the experience?
- How can they relate their immersive learning experience with a real life learning experience?
- Did their opinion or knowledge change based on their AR/VR experience? How? Why?

Teacher reflections:

- What worked best during the immersive learning experience?
- What were the biggest challenges? How did you overcome the situation?
- What was your favourite part of the immersive learning session? Why?
- What would you do differently in a future immersive learning session?
- What would you improve?
- What new ideas did you have for other immersive learning experiences?

Additional learning task ideas.



Here are some additional learning task ideas that may be useful to use as part of the immersive learning experience. Please feel free to check out Lumination's Resource Library for lesson ideas using XR technologies by scanning the QR code or visit bit.ly/lumiresources

- Providing guiding questions or tasks while viewing the VR videos.
- Working in pairs or small groups and creating collaborative activities or boards using Google Jamboard or Microsoft Whiteboard.
- Running digital scavenger hunts.
- Using Thinking Routines tasks.
- Creating digital notebooks using Google Slides or Microsoft Powerpoint.
- Filling out forms, spreadsheets, quizzes, polls, and/or surveys.
- Running Kahoot activities or something similar.

AITSL Standards

If you're an educator, you can log your time using this guide as part of your Professional Development.

Standard 2.6 Information and Communication Technology (ICT)
Standard 3.4 Select and use resources
Standard 4.5 Use ICT safely, responsibly and ethically
Standard 6.2 Engage in professional learning and improve practice

References

Hamilton, D., McKechnie, J., & Edgerton, E. (2020, July 11). Immersive virtual reality as a pedagogical tool in education: a systematic literature review of quantitative learning outcomes and experimental design. Springer. Retrieved 2021, from <https://link.springer.com/article/10.1007%2Fs40692-020-00169-2>

Maryville University. (n.d.). Augmented Reality in Education: Interactive Classrooms | Maryville Online. Maryville University Online. Retrieved January 28, 2022, from <https://online.maryville.edu/blog/augmented-reality-in-education/>

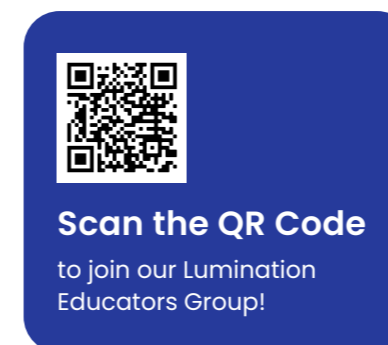
Project Zero / Harvard Graduate School of Education. (2016). PZ's Thinking Routines Toolbox | Project Zero. Project Zero. Retrieved June, 2021, from <http://www.pz.harvard.edu/thinking-routines>

Radiantia, J., Majchrzaka, T. A., Frommb, J., & Wohlgenannt, I. (2020, April). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. Computers & Education, 147. <https://www.sciencedirect.com/science/article/pii/S0360131519303276>

Reen, J., Jump, O., McSharry, B. P., Morgan, J., Murphy, D., O'Leary, N., O'Mahony, B., Scallan, M., & Supplett, a, B. (2021, May 21). The Use of Virtual Reality in the Teaching of Challenging Concepts in Virology, Cell Culture and Molecular Biology. Frontiers. Retrieved January 11, 2022, from <https://www.frontiersin.org/articles/10.3389/frvir.2021.670909/full>

Southgate, E. (2020). Virtual Reality in Curriculum and Pedagogy: Evidence from Secondary Classrooms. Taylor & Francis Group.

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SUPPORT

We're here to help you get the most out of your Lumination Learning Lab. If you have any issues, questions or feedback, please get in touch.



lumination.com.au/help-support

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