



Teacher's guide to Immersive Technologies (Secondary)

What are Immersive Technologies?

New technologies are being released every day and the immersive technologies are expanding rapidly. These technologies also known as Extended Reality integrate virtual digital content with the physical environment to enable the user to engage with a blended experience of the real, and the virtual. Examples include:

AR – Augmented Reality is an interactive experience of placing digital content (text or images) over a physical environment to provide additional information to users. This occurs through the camera of a handheld device. Well-known examples are Pokémon Go and Wizards Unite.

VR – Virtual Reality is an artificial simulated environment that can be explored in 360 degrees. It is experienced through a headset with virtual scenes and objects that appear to be real and replaces the user's physical environment making them feel immersed in their surroundings. Popular headsets include Oculus Quest and PlayStation VR.

MR – Mixed Reality is the combination AR and VR with digital content blending with the physical environment that appears as an extension of reality. The virtual objects are superimposed over the real world and move and act as though they are real such as with the Microsoft HoloLens headset.

AI – Artificial Intelligence is the development of computer systems (machines) that require human intelligence and capabilities such as reasoning, learning, planning and creativity to perform a task. These systems can process large amounts of data in ways that humans cannot. Some recent online generators include ChatGPT and DALL·E.

Why use them?

Immersive technologies offer a unique ability to immerse students in highly interactive sensory experiences in a stimulating environment. Students can engage and connect through touch, sound and visual content that has the capacity to transform learning. It offers a different way of visualising complex concepts and interact in a more realistic way. These new technologies can provide practical training opportunities in a safe environment. For example, medical students can learn using realistic representations of the human body and practice medical procedures virtually. Firefighters, police, and pilots can learn in a controlled environment. Consumers can choose furniture for their home; test drive a car or choose a travel experience.

How to start?

- Develop a plan, have goals, and choose the tool to fit the purpose of what you are teaching.
- Move from 2D into 3D learning with the following examples that provide an opportunity to explore the different types of immersive technologies available and how they could integrate into your teaching and learning program across various learning areas of the Australian Curriculum.

Please note: This is a small selection of the multitudes of available tools available. It is not exhaustive and could be used as a starting point for exploring immersive technology in the classroom.



McGraw Hill AR

GeoGebra 3D

AirMeasure

Maths VR



McGraw Hill AR (free) explores concepts in Geometry/Space and Algebra with interactive 3D models and activities.

Students can view and manipulate shapes, animations, and everyday objects, brought to life against a backdrop of their desk or table.

Example activities include:

- Discover cross sections in geometry by slicing a 3D pyramid, battery.
- Calculate slope to help an animated skateboarder.
- Understand net and surface area.
- Solve equations by dragging blocks and different weights to balance equations on an actual scale.
- Apply the Pythagorean Theorem to a 3D pyramid.
- Solve brain teasers through interactive, animated math word problems.

More information available at [McGraw Hill | AR](#).

GeoGebra 3D Calculator (free) encourages learners to explore geometry in the world around them through the use of AR.

Previously known as Geogebra AR, this app allows users to place geometrical objects on any flat surface and explore from all possible angles.

Solve 3D maths problems, create geometric constructions, and graph functions. With Augmented Reality enabled, you can place maths objects on any surface and walk around them!

The [GeoGebra website](#) contains an array of lesson plans and guided activities to learn about the principles of Geometry / Space through AR objects.

AirMeasure (\$1.49) has 18 unique tools to measure items in the real world.

Previously known as AR Measure, this tool provides access to a virtual tape that measures in both imperial and metric modes.

AirMeasure enables users to measure objects around them through a mobile device camera.

Use this app in Mathematics to calculate the length of objects or the perimeter of spaces. Investigate the dimensions of a room or packages to send.

Measure the height of people, trees and buildings. Other useful features include a 3D trajectory, laser level, and 3D cube.

Math VR (free / paid) enables visual learners to interact with abstract maths concepts in a 3D environment.

The app has over 100 models to choose from including solids, graphs, volume, trigonometry, diagrams, vectors and 3D scenarios.

It allows for both independent, individual modes of learning as well as a virtual classroom setup.

It works by printing the downloadable [Math VR Marker](#), selecting a model and viewing via the marker.

The demo section provides four free models and then if interested you can join for a variety of monthly subscription fees to access all the other models.

[McGraw Hill AR](#)

[GeoGebra 3D](#)

[Air Measure](#)

[Maths VR](#)

Boulevard AR



Boulevard AR (free)

This Augmented Reality App provides arts-based experiences brought to life through virtual, augmented, and mixed reality technologies. Developed by curators, educators and engineers the Boulevard App delivers an immersive architecture and cultural experience.

Place paintings and objects in your space, get close to them and discover aspects of their stories you never considered. Discover the narratives behind history's greatest works of visual art and iconic architecture along with innovative design movements and how some of our everyday items came to be.

BLVRD Features (free) is an additional and complimentary app that delivers a stream of single-serving episodes unpacking the magic and meaning of important works of art.

BBC Civilisations AR



BBC Civilisations AR (free)

Discover history's treasures through AR and learn about historical artefacts from different civilisations.

The collection was developed by the BBC and has more than 30 artefacts from museums across the United Kingdom.

AR technology allows users to explore the collections from different angles and at different scales.

Each artefact can be viewed in lifelike 3D with interactive features. Examine the secrets of Ancient Egypt, the hidden layers of Renaissance masterpieces and where these treasures come from.

This App supplements the BBC Civilisations documentary series.

Chemistry AR+



Chemistry AR+ allows students to view atoms and molecules from the first ten elements of the periodic table in Augmented Reality.

Combining Chemistry and AR allows students to explore atoms, molecules, and compounds by visualizing these concepts in a 3D environment. Explore the inside of an atom and discover structures such as protons, neutrons, electrons and their movement.

Examine how atoms interact in real-time through molecular geometry. 12 molecules available, including water, ammonia, and carbon dioxide.

Developed by a chemistry teacher for students, there is also a support website that includes free downloadable worksheets.

[Atomic structure inquiry resources.](#)

Discovery Education



Discovery Education (free)

provides two augmented reality apps that bring immersive learning experiences to the classroom.

Sandbox AR allows students to create, share and inhabit virtual environments. Add models to your sandbox from history, space exploration through to the natural world and develop a virtual world to experience and share. You can even scale it up to life-size, take photos or record a video with voiceover to share what has been learnt.

Timepod Adventures lets students immerse themselves in 3D storylines and travel through time to visit locations and solve problems as they go - like a Dr Who Tardis experience.

[Boulevard AR](#)

[BBC Civilisations](#)

[Chemistry AR+](#)

[Discovery Education](#)

Arts / HASS / Science

360 Schools

Google Arts & Culture

Government House VR

Luma AI & Imagine 3D



360 Schools (free)

Immerse your students into a world of VR through panoramic photos of historical, cultural and geographical places from around the world. Use the search function from a world map view or type a word in the search box to find a location in the world. Share panoramas via URL, QR code or Google Classrooms.

Take your students on an interactive guided tour of Ancient Egypt or Coral Reefs with a supporting Teachers' Guide.

Then begin to create your own tours with the Guided Tour editor and build your own interactive immersive journeys. These tours can then be embedded into a class blog, LMS and other websites to enhance educational activities. Use them on computers, mobile devices and VR headsets.

Google Arts & Culture (free)

Discover treasures, stories, and knowledge from cultural institutions in 80 countries.

Wander through galleries and get up close to artworks, experience culture in 360 degrees, tour famous sites and landmarks, go on guided tours with experts, take a virtual tour of world-class museums, and try out the translate button to read exhibits in English.

With hundreds of AR tours this app is a example for teachers and students to create and explore the art history, people and wonders through interactive, virtual environments.

More information available on the [Google Arts & Culture](#) website.

Government House VR (free)

Virtual Reality tours of Australian Government Houses have been created for students to explore these historically significant buildings. Cities such as Canberra, Sydney, Darwin, and Brisbane have Virtual Reality tours.

Headsets are not required as these tours are available from an internet browser. They provide an overview of historical perspectives, interesting features and current uses.

Northern Territory

The NT tour has a collection of educational materials from F-8 including a Minecraft platform, books, teacher guides and lesson plans.

ACT

NSW

Queensland

Luma AI + Imagine 3D (free / paid)

Create lifelike images of objects, landscapes and scenes through a simple 3D model through the scanning process.

A series of images are captured and then a finished product is generated within the app as a neurally learned 3D scene NeRF (Neural Radiosity Field).

The interactive result lets you move around the captured 3D model to any angle and then place it into any scene.

Free access allows 10 scene credits with costs involved for more access.

In development is the new **Imagine 3D** text-to-3D option where you can type in text and a fully solid 3D model with full-colour texture will appear. No need for 3D modelling software.

[360 Schools](#)

[Google Arts & Culture](#)

[Government House AR](#)

[Luma AI & Imagine 3D](#)

Virtual Reality and Artificial intelligence

Reality composer

Halo AR

MyWebAR

CoSpaces



Reality composer (free)

Students can build a scene using the content library or import their own files. It has the capacity to anchor the AR to a floor, wall, image, face, or object.

Assets can be added from the content library with the simple drag and drop features. These can be manipulated in position, scale and rotation. It also allows changes to colours, textures, patterns, materials and apply physics.

Animations can also be added to emphasis a wiggle or spin motion. Audio interactions can be set up through tapping objects or creating triggers.

By developing several scenes students can set up portals to visit different rooms.

Halo AR (free)

This app is a replacement for HP Reveal and Aurasma and ideal for those new to creating augmented reality.

It is the quickest AR creation tool available.

Take a photo of any flat object, choose a photo, video, or 3D model to overlay it on top of.

Then scan the object and watch the AR overlay come to life.

This is a simple way to add augmented reality to a book, poster, postcard, label or just about anything else.

MyWebAR (free)

Design and publish augmented reality through a web browser with this easy-to-use platform.

Be inspired with the pre-built templates and personalize content to publish your scene.

Design AR for printed images, product packaging, curved images, QR codes and the real-world environment.

With the Sketchfab integration users can access assets from the 3D model library or from a range of images for education. Create voice-overs to accompany your inventions.

Each project developed gets a unique QR code for quick access. A most recent update is the option to load 360 degree photos.

CoSpaces (free and paid)

A platform that enables users to create and engage with mixed reality. It works as a website inside the browser and is a downloadable app.

Students can get creative through building, coding and exploring their own designs. There are free downloadable lesson plans available for teachers to use and customize for their classes.

It also contains an education platform with easy-to-use features.

Reality Composer

Halo AR

MyWebAR

CoSpaces

Create with Immersive Technologies



**Produced by the Computer Science Education Research Group (CSER) The University of Adelaide
as part of the Supporting Artificial Intelligence in Schools Initiative - an Australian Government Department of Education program
aimed at engaging students and supporting teacher professional development.**



<https://csermoocs.adelaide.edu.au/>