




30 CREATIVE WAYS TO USE CLASSVR

Sharing Best Practice



The background of the image is a blurred photograph of several people in a meeting or classroom setting. The image is overlaid with a semi-transparent orange filter. The text is centered in the lower half of the image.

“ WE NEED TO EMBRACE
TECHNOLOGY TO MAKE
LEARNING MORE ENGAGING.
BECAUSE WHEN STUDENTS
ARE ENGAGED AND THEY ARE
INTERESTED, THAT’S WHERE
LEARNING TAKES PLACE ”

Introduction

Since we launched ClassVR in January 2017, it's been incredible to see how teachers all around the world have taken the technology and made it their own. This book gives you just a taster of the creativity we've seen develop as schools explore the possibilities that Virtual and Augmented Reality can offer in the classroom.

It's designed to be a practical and inspiring guide to using ClassVR as a teaching tool. You'll find out about how students of all ages have explored a wide range of content. Some lessons used 360 degree images, videos or interactive experiences as an incredible stimulus across the curriculum, from Antarctica to Ancient Maya and the Maldives to the Moon. Others gave students the opportunity to examine 3D models up close using Augmented Reality; imagine holding a snowy owl, Roman sword or distant planet in your hands!

But it's not just the ClassVR published resources that you'll see in this book – many teachers and students have begun capturing their own immersive content using 360 cameras, building 3D models, and crafting interactive worlds. They may have been built with a range of tools, but they've all been sent to the school's headsets using ClassVR's online portal, as you'll read in the following pages.

We hope that you'll enjoy reading about the ways VR and AR are having an impact in classrooms across the globe; who knows, it may even spark a lesson in your own. We've certainly enjoyed the process of supporting this community of schools to grow – and of course, we'd like to extend a massive thank you to the teachers who made this possible.

Hannah Davies

Head of Educational Services
Avantis Education

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Digital Cell Models

SCIENCE Age 6-12



Drewe Warndorff



Hartwell Elementary,
CPS, Cincinnati, Ohio

Learning Aims:

- Students will apply their knowledge of cells to create 3D models using digital software.
- Students will convert their files (.stl to .glb) and test their cell models using the headsets.

CONTEXT

This lesson can be done as enrichment or as a technology extension within the science curriculum. It is used to support the visual and conceptual understanding of cells and their organelles while adding a tech and design element. Students should have or receive background information on cells, plant and animal, as well as the organelles. The quantity of organelles and functions can be chosen according to the curriculum. Students should also have a basic understanding of CoSpaces or Tinkercad in order to design the cell digitally.

PRACTICAL SESSION

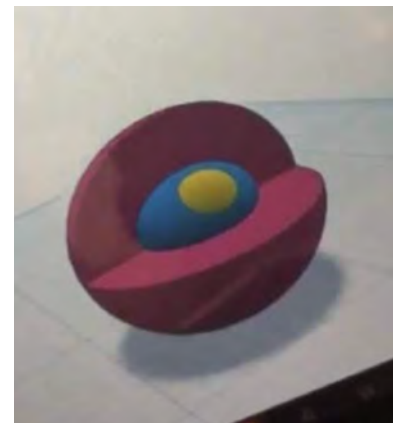
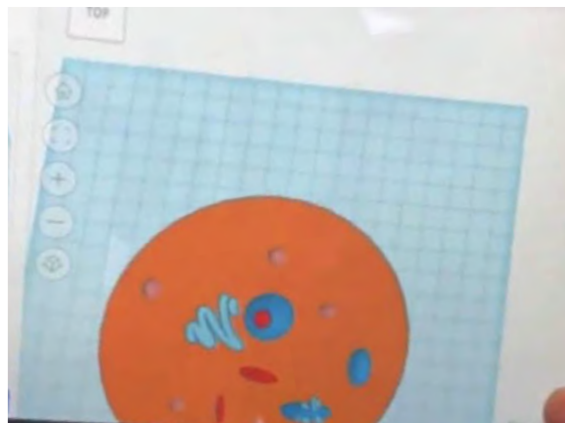
CoSpaces App

I outlined the objective of creating a digital 3D model of a plant or animal cell with five identifiable organelles. Next, I led a digital software tutorial, in which I gave a brief demonstration of how to use the digital design software, including how to add shapes, remove sections and modify size. We focused on 3D cell model creation, whereby the students used the digital software to create their individual cell models that meet the project requirements.

Following on from the students submitting their .stl files, I converted them to .glb format and then uploaded the files to the ClassVR playlist. I was able to provide an AR/VR 'cell experience', where the students viewed their completed cell models using the ClassVR headsets. The students were able to then identify any imperfections in their models in order to make modifications/edits to their original files. As an extension, students could then send edited .stl files to a 3D printer, as well as adding informational tags to the organelles when clicked (which can be done in CoSpaces).

IMPACT ON LEARNING

This lesson allowed students to gain a better understanding of the cell and its organelles. By applying their content knowledge to a digital format, they were solidifying their content understanding and gaining technological skills necessary for thriving in a 21st century environment.



Comparing Australia

GEOGRAPHY Age 14–15



Bryan Mortenson



New Braunfels High School, Texas

Learning Aims:

- To analyze the various terrain features of Australia.
- To compare and contrast coastal and central Australia.
- To explain how and why Australia has such a different landscape.

CONTEXT

Prior to viewing the Australia VR, students labelled a map of Australia and analyzed climographs of various cities in Australia. We wanted to explore and experience Australia in as much detail and depth as possible. The idea behind using ClassVR is to bring a multi-sensory, tangible experience to students' learning.

PRACTICAL SESSION

Australia Playlist

The lesson was organized into stations and students rotated through a ten-minute cycle using the ClassVR headsets. The other stations included map reading, colonial history of Australia, indigenous people, climate zones, and population distribution. The ClassVR station directly supplemented the other learning the students were doing, creating a holistic approach to the lesson.

During the use of the headsets, I asked various questions to encourage the students to analyze the landscapes and locations they were viewing. The students, in turn, asked their own questions about Australia, its geographical and human history, as well as sharing their thoughts on modern day Australia.

IMPACT ON LEARNING

In the days after the ClassVR experience, the students referenced to the images as we applied other geographic concepts to Australia. For example, when students discussed the population distribution of Australia they were able to give specific examples from the ClassVR session to justify their response.



Happy Places

READING INTERVENTION

Age 11–14



Amanda Hunt



Oak Run Middle School, New Braunfels, Texas

Learning Aims:

- To focus the mind and create a mindful space for students.
- To reduce test anxiety and create visual coping strategies.

CONTEXT

We have students in our reading intervention classes, as well as English Language Learners (ELL), who struggle with test anxiety. I put together what I called a “Happy Places” lesson of places and things in the ClassVR Portal that they could visualize during the test that might help calm some of their anxiety and provide them with coping strategies.

PRACTICAL SESSION



Happy Place Playlist – Find me in the Community Library



The objective was for students to visit a variety of locations; from the top of a snow-covered mountain, where it’s quiet and peaceful, to a sandy beach where they could hear the ocean waves, and many things in between. I organized it by choosing my favorite calming locations and what I thought the students would also find calming and enjoyable.

At the end of the lesson, they had to pick one and discuss or write about it so they would remember it for testing the following week. This process was part of the strategy in encouraging students to visualise a calming place to detach themselves from the immediate feelings of test anxiety. I chose images and videos from the ClassVR library.

IMPACT ON LEARNING

Students never would have been able to have this experience without ClassVR headsets and photos/videos preloaded. Describing something in words or even in a 2D image or video is nothing compared to the actual Virtual Reality experience. Students feel like they’re actually there and this cannot be created with anything else I’ve used in education thus far. Students were talking about this lesson for weeks. Teachers across the campus came to view and join in and we had students tell us after testing how much the lesson helped with their anxiety when they got stuck. They didn’t panic like usual, but imagined their “happy place” and were able to continue on with the test. That’s all the proof I needed to show how important and vital this lesson was and what an impact ClassVR has on our students, campus, teachers and myself in the library.



Cave Exploration

KINDERGARTEN Age 5-6



Brittany Korstanje



Kinnwood Central Public School, Forest, Ontario

Learning Aims:

- To use language to communicate thinking, reflect and solve problems.
- To ask questions for a variety of purposes.

CONTEXT

Our students first practiced using the VR headsets to explore hot air balloons. This was sparked after reading the story "Not a Box". After heavily investigating what a hot air balloon looked like up close, and how it moves, our class ended up building a hot air balloon and encouraging school community members to come and experience hot air balloon expeditions. The students learned lots of scientific language and how to operate the VR headsets. Next, they expressed interest in caves and requested that we look up various cave expeditions.

PRACTICAL SESSION

Rocks and Caves Playlist

We started by using 360 cave images, which provoked a wide variety of questioning, researching, discovering, creating, and writing. After exploring a cave with the headsets, our students had many questions: Why are there icicles hanging? How do caves form? How could animals live in the dark? When they went on the expedition a second time, they were excited to talk about stalactites, stalagmites and columns which they were seeing and eagerly searched for troglobites inside the cave. They recreated many of their own findings by building a large cave inside our classroom and creating paper and digital books. This extended to investigating water and ice caves, and researching animals that may live inside or on top of ice caves such as penguins. Students measured their height and compared it to these animals. Finally, they produced educational videos and provided QR codes to attach to the cave to add to this interactive experience when visitors arrived.

IMPACT ON LEARNING

We approach learning concepts by providing fun, interactive, authentic and rich experiences based on the interests and needs of our students. We are educators who listen, ask open-ended questions, wonder, problem-solve and discover WITH our students. We believe VR technology was the perfect learning tool to extend our students' ideas and promote analytical thinking. ClassVR engaged and inspired every student in our learning community. It added a third dimension to their learning experience that they could connect with and become inspired by.



The Plight of Refugees

SOCIAL STUDIES Age 10–11



Christine Beitti



Chris Fontenova



Yonkers Public Library,
Yonkers, New York

Learning Aims:

- To understand what a refugee is.
- To understand what asylum is.
- To understand what reasons people may have to flee where they live.

CONTEXT

The students were learning about conflict in different countries and watched the documentary "I'm Not Leaving". The following week, Carl Wilkens came to the school to visit and with the students discussed the documentary and the themes which featured in the programme. As a follow up, Mr Fontenova did a Friday Focus VR session on conflict and refugees.

PRACTICAL SESSION



Refugees Playlist



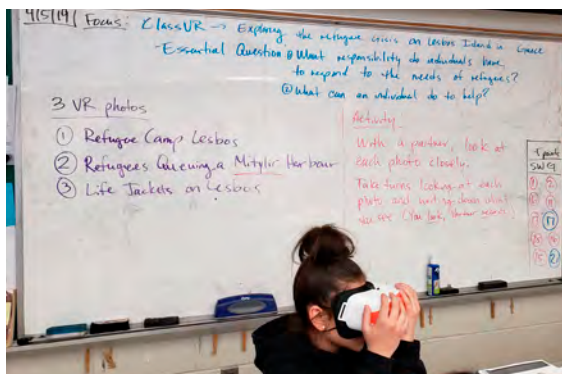
Escaping Conflict lesson plan

The children looked at several photos and watched a video based around the Escaping Conflict ClassVR lesson plan. The students were asked: What did you see? Did it look how you expected it to? What were the first thoughts that popped into your head when you imagined being in their situation? Were you surprised by what you saw? Why is this?

The discussion included why people are angry and scared; why the conditions are so crowded and dirty; and, whether it is better than where they were before. We then asked the students to consider balancing up whether it was worth it to leave the disaster zone and seek refuge elsewhere or whether the plight would be more dangerous than remaining. This prompted some excellent discussion and encouraged the students to reflect objectively on other people's living circumstances.

IMPACT ON LEARNING

The children saw first hand some of the things that happen during conflict and understood the terms 'refugee' and 'asylum seeker'. They were empathic to the children who were fleeing their homes, families, friends, schools, country, etc. They were also asked to list five things they would take with them if they suddenly had to flee their homes. It also started a conversation on human rights and if these people's rights are being met: waiting hours in line for a little bit of food, not being able to get clean water to drink or wash up. It was a very powerful learning experience and these students, at just 10 years old, were able to think very critically and objectively.



Inside "El Quijote"

SPANISH Age 15-18



MariSol Padilla



New Braunfels
High School,
Texas

Learning Aims:

- To understand and comprehend Spanish texts.
- To describe settings, characters and atmosphere skilfully.

CONTEXT

In my Advanced Placement Spanish Literature and Culture course, students are required to tackle a large quantity of required readings in the target language. An example of this is the required chapters to be covered from Miguel de Cervantes' El ingenioso hidalgo Don Quijote de la Mancha. It is a daunting task for teenagers to read and interpret literary works in archaic Spanish. As such, being able to incorporate Virtual Reality experiences such as those available in the ClassVR Library, combined with outside sources that I have found on my own and uploaded into my portal, allows me to customise my anticipatory set to really bring to life the world that inspired Cervantes' great masterpiece.

PRACTICAL SESSION – Focus on immersing the pupils in Spanish culture



Padilla / Cervantes Playlist

We began by immersing ourselves in the whimsical surroundings of authentic 360 degree photos from certain Spanish cities. We were also able to view a 360° 3D video narrated in beautiful Castilian Spanish inside the prison cell that is claimed to be where Cervantes created his work! Once the class had finished going over the "Códigos" (pre-reading discussions designed to provide historic and cultural background and insight into the works before we read them) I led students on a VR journey as described in my article. I then took my class amongst the windmills of La Mancha – another amazing VR experience – which truly enabled them to feel, see and appreciate a part of the landscape.

IMPACT ON LEARNING

To be able to take my students to the sites that inspired Cervantes truly piqued their interest in the subject and allowed them to more effectively internalize the challenging work of El Quijote. It should go without saying that this type of experience is beyond my wildest dreams of what I thought possible when teaching a unit on 17th century Peninsular literature. Breadth of descriptive vocabulary in the target language increased in both content discussions and essays.



Generation Ocean: Coral Reefs

GEOGRAPHY & SCIENCE Age 11+



Dr. Amanda
Waite



Megan
Hendrickson



ANGARI Foundation &
Academy of the Holy
Names, Florida

Learning Aims:

- To identify corals as animals and recognize their common forms.
- To describe how corals form reefs and understand reef composition and features.
- To explain a coral reef's geographical, societal, and scientific importance.

CONTEXT

Using Virtual Reality and 360 film, 3D printed and fossil coral specimens and related lessons, students were introduced to corals and reef ecosystems in preparation for a field trip to the Florida Keys. This served as important pre-learning and pre-exposure to these concepts, as it was the majority of students' first exposure to the topic. It helped students understand what to expect in the field, provided a solid foundation for deeper learning, and served as a springboard for discussions about the subject area.

PRACTICAL SESSION



Generation Ocean Video: Coral Reefs

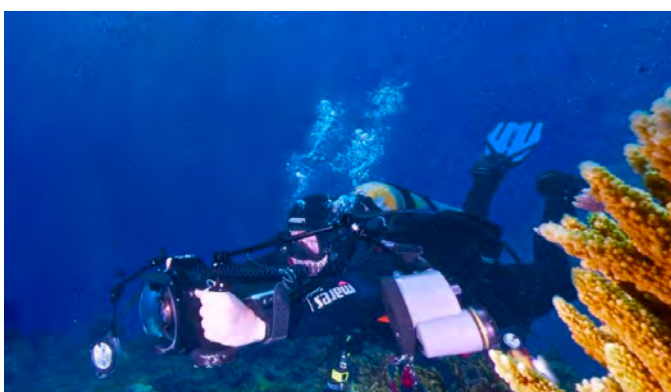


Underwater Playlist

First, students were introduced to corals, the reefs they form, and their local reef tract. The students were then given the opportunity to explore corals and reefs independently through a series of observation-oriented stations. At one station, the students accompanied coral scientists on a research expedition, both above and below water, via viewing of the 360 film *Generation Ocean: Coral Reefs in Virtual Reality*. The remaining stations asked the students to examine, draw/describe, and identify modern and fossil coral skeletons. The students were asked to compare what they learned of ancient and modern corals and the environmental history of Florida to better understand how Florida coral reefs have changed through time.

IMPACT ON LEARNING

The students were engaged, asked thoughtful questions, and readily drew connections to other topics that they'd covered in their courses. Their lab notebook pages demonstrated a strong attention to detail and accurate application of the introduced coral vocabulary. The Virtual Reality expedition helped the students understand and anticipate what they would see and experience underwater on the reef. This alleviated student apprehension about entering the water and resulted in a cohort of students that was eager to get into the field and apply what they'd learned. Once in the field, the students were immediately engaged and were able to make coral identifications while snorkeling in an unfamiliar environment.



Investigating Cells

SCIENCE Age 14-16



Susan



Rebecca



Irmo,
Richland, South
Carolina

Learning Aims:

- To introduce parts of a cell at the beginning of a unit on the parts and processes of a cell.
- The goal was to help students visualize microscopic particles that cannot be seen readily by the human eye.

CONTEXT

At our high school, the Digital Integration Specialist (DIS), Susan, co-planned with a STEM biology teacher, Rebecca, to determine what videos and/or photos would be best to use. Because this was designed to review cells with students, we found and imported a 360 video of an animal cell. We had seven different biology classes with three different teachers participate over the course of two days. Before each class arrived, the DIS had content loaded on the headsets and placed them and at each table. Each teacher brought his/her class in for about 35 minutes.

PRACTICAL SESSION

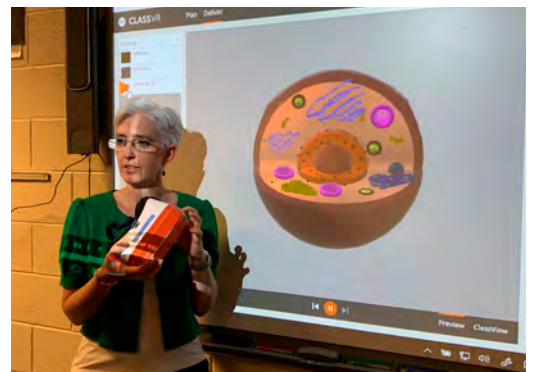
Animal Cell 3D

The DIS first reviewed a brief Google Slides presentation about the content we'd be viewing and the purpose of the day. At their tables, the students then drew and labeled diagrams of a cell and listed as many organelles as they could. We reviewed these organelles together to help anticipate what they would be seeing.

We first showed the video without sound. This was an intentional choice to let students see the parts of the cell and make an educated guess about the parts they were seeing. While the DIS handled the technology and troubleshooting, the biology teacher would ask the students questions. We also paused and use the ClassVR program to focus the students in on a particular part of the scene such as the Golgi apparatus (using the "dynamic point of interest"). Once we had been through the video without sound, we took the headsets off for some more reflection and discussion. In pairs, students shared what were the biggest/smallest organelles they had seen, which ones were moving, and what else they saw. We then reviewed as a whole class before watching the video again with the sound on so they could hear the narration. To conclude we let them independently look at the Animal Cell 3D model from ClassVR.

IMPACT ON LEARNING

Viewing the animal cell from the inside gave the students a clear picture of things that are normally too small for them to ever see. This activity helped them understand the different parts of a cell and how they move and work together. Being able to see the organelles in 360 made them come alive for the students and introduce them to the unit on cells. Next year, we plan to use the cell video both to introduce and review the unit on cells.



Lines & Angles

MATHEMATICS Age 14-15



Terri Gogola



Franklin High School,
Livonia, Michigan

Learning Aims:

- To identify a line and a shape (i.e. circle, square, triangle).
- To identify the attributes of lines, circles, and angles with equitant measure.
- To identify the attributes of perpendicular lines, parallel lines, and lines segments, angles, and circles.

CONTEXT

To begin this sequence of learning, we reviewed posters on different angles and lines to remind the students about key terminology. Then, we explored angles and lines around the classroom to enable students to have a tactile, first-hand experience of these concepts. Afterwards, we extended this to exploring for angles and lines around the school.

PRACTICAL SESSION

   **Angles, Lines & Modern Buildings Playlist – Find me in the Community Library** 

We began the session by reviewing the angles and lines posters; we then launched the lines and angles ClassVR playlist. To encourage students to apply their understanding, we had them find lines and angles on the projected architectural buildings on the board. Using digital ink and dry erase markers, we identified the different lines and angles on the projected buildings. Afterwards, the students put the ClassVR headsets on to explore all the lines and angles in the virtual world. We used the dynamic point of interest to help facilitate the group in the experience while collaborating about the different lines and angles in the 360 degree experience.

IMPACT ON LEARNING

The students were 100% engaged during the entire lesson on lines and angles. They love using the ClassVR headsets to enhance their learning experiences. The verbal communication and collaboration that took place throughout the lesson was incredible!



Exploring Spain

SPANISH Age 14-18



Thomas Silva



Stoughton High School,
Massachusetts

Learning Aims:

- To use Virtual Reality to enable students to explore Spain and its culture.
- To communicate in Spanish with ClassVR.
- To analyze Spanish landmarks and locations.

CONTEXT

Over the semester, we have been learning about various cultural topics of Spain and trying to embrace as much of the local culture as possible. Throughout this, we have used 2D items and photographs, but it isn't as engaging or realistic as a 3D models and 360 imagery. Language acquisition is complex and embracing Spanish in a multi-sensory approach enables students to learn all about the culture, whilst acquiring new language knowledge.

PRACTICAL SESSION



Spain Playlist

To provide students a truly reflective, realistic and immersive perspective of Spain and Spanish culture, we used the ClassVR headsets to explore various landmarks and localities. We started off by visiting the Guggenheim Museum in Bilbao Spain and I asked the students to describe in detail the sculpture in enough detail for their partner to draw the sculpture based on their description. We then analyzed an Easter Procession, investigating the seasonal climate, geographical location and interesting local landmarks. We repeated these questions and lines of investigation for Madrid – the Street of Toledo and the Museo Nacional del Prado. We finished the lesson off by exploring a cave with a bear skeleton and asked the students to describe the place and explain what they found interesting about this to their partner.

IMPACT ON LEARNING

The students were able to cooperatively work together to see amazing sites and locations. The best part was having the other students want to see what their classmate was describing and how the students were able to then apply what they had learnt with ease.



Submarine Inquiry

KINDERGARTEN Age 5-6



Brittany Korstanje



Kinnwood Central
Public School, Forest,
Ontario

Learning Aims:

- To inquire about and understand underwater life, habitats and materials.

CONTEXT

Our students' next inquiry was to learn about sea creatures. We left out books, pictures and provocations / learning invitations. They discovered different types of water transportation, such as submarines and how marine biologists research aquatic habitats. Some students requested to go scuba diving and others were determined to build a submarine. We gathered building materials but realized we did not know how a submarine was actually built.

PRACTICAL SESSION

Submarines Playlist

We viewed an image of the inside of a submarine. The students came up with lots of wonder questions after seeing so many panels, buttons and tanks. They sketched out what they saw, wrote down their questions and worked together to discover answers. They recorded their findings in their digital journal (e.g. the radar keeps track of objects under water, the ballast tank fills up or releases water so it will sink or float). Once the students constructed a radar, navigation system, and a ballast tank (made from everyday items), they were ready to submerge underwater and discover sea life up close.

Our class eagerly grabbed the VR headsets and we sent them on a Fish and Coral expedition. We discussed what they saw (e.g. how many sea creatures). The meaningful math conversations were exciting to observe. Next, students began plotting sea life they saw virtually onto their "radar" grid paper. We later asked students where different objects were on the radar to assess their letter/number recognition as well as their spatial awareness and comprehension of finding coordinates (e.g. "I see a scuba diver on B11").

IMPACT ON LEARNING

We believe this VR technology was the perfect learning tool to extend our students' thinking and promote analytical thinking. ClassVR engaged and inspired every student in our learning community. It added a third dimension to their learning experience that they could connect with and become inspired by. This technology sparked meaningful dialogue and brought our young learners together. As educators, we were excited to see so many FDK curriculum expectations and framework areas being addressed throughout these Virtual Reality expeditions.



Making Connections to Current Events

SOCIAL STUDIES Age 10-11



Paige Green



Countryside Elementary School, Barrington, Illinois

Learning Aims:

- To practice nonfiction text reading strategies.
- To strengthen students' ability to make connections to current events.
- To grow literate global citizens.

CONTEXT

My students recently completed a nonfiction, current events reading unit. Shortly after finishing the unit, I was shocked to see the spire above Notre Dame, engulfed in flames, crumble to the ground. This made me think about the opportunity my students had lost. While churning this over in my mind, I had an idea. I could help students unpack this tragic current event, practice their close reading skills, AND still give them the opportunity to visit Notre Dame in all its glory using VR technology.

PRACTICAL SESSION



Notre-Dame de Paris Playlist

Students discussed their prior knowledge on Paris, Notre Dame, and this new current event. Afterward, we created a KWL chart to document what they knew about the event, what they wondered about the event, and what they learned about the news event. I introduced the news article and asked students to read it using close reading strategies. At the end of our discussion, one student said she thought the fire at Notre Dame would be like the United States losing the White House or the Statue of Liberty. Another student stated, "I think people will be sad that they can never see Notre Dame again. Some people there have probably never seen it."

This comment helped me connect my current events lesson to using ClassVR technology. I asked students if any of them had been to Notre Dame and then told the students that they were going to be able to say that they saw it without even leaving the classroom! Each student placed a VR headset on and explored the three different views of Notre Dame. We analysed and evaluated the beauty, significance and history of the building and were able to answer and explore some of the students' key questions using the ClassVR experiences.

IMPACT ON LEARNING

ClassVR turned a current events lesson into a culminating experience; it connected them to the news events in a way that printed word or an online video could not do. Students were able to experience Notre Dame as it was before the fire. Adding Virtual Reality to my lesson also awoke my students' sense of empathy and helped them to understand this global news event in a more meaningful way. Afterward, a student said, "At least I can now say I saw it!"



Sharks VR

ENGLISH Age 10-11



Lauro Obando



Fairview Elementary School, Fairfield, California

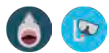
Learning Aims:

- To write a personal narrative/journal entry of a shark experience.
- To use descriptive words to explain their experience.

CONTEXT

Students have been researching sharks from all over the world. We have gone over key words and vocabulary related to sharks and students have then written an informational text about a specific shark and have become shark experts.

PRACTICAL SESSION

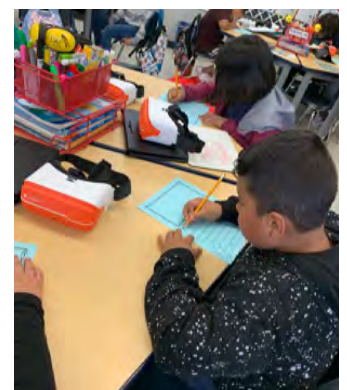


Underwater Playlist

I told my students that they will be writing a journal entry on a shark experience. They pretended they were divers looking for sharks. They used what we saw through ClassVR and/or used what we learned so far about sharks. We reviewed key words related to shark life, such as habitat, coral reef, and predator. I then walked students through their first VR experience. I played our first track "Adventures in Nature" and gave students thinking time to consider what they saw in the video. They paired up to share and discuss what they saw. We move on to "Diving with Sharks in Cuba" and "Shark in New Caledonia." This time students made a list of words (adjectives) that described what they saw. Next, I played the "Shark Experience" track. Students then shared with their group how they felt about what they saw. I gave students a graphic organizer to help them organize their thoughts. The graphic organizer includes: "What I saw", "Adjectives to describe what I saw", "How I felt" and "Vocab words to include." Students also had access to the "Great White Shark" track in case they want to use that shark in their writing. Once they organized their writing, they began to prewrite and ended with publishing their journal entry.

IMPACT ON LEARNING

Seeing and being able to explore sharks underwater truly made this lesson much more engaging for my students. They were able to see first hand the life of sharks, all from land. My class was very engaged and immersed in this lesson. They were quick to get their thoughts on paper and many students wrote more than they ever had. I truly believe without the VR experience my many students would have struggled with this writing assignment. They were able to be creative and very detailed thanks to the VR experience.



Descriptive Writing

ENGLISH Age 10-11



Tamara Letter



Hanover County
Public Schools,
Mechanicsville, Virginia

Learning Aims:

- Students will use a ClassVR Virtual Reality experience to enhance their background knowledge about sharks.
- Students will create descriptive writing reflections focused on their senses.
- Students will collaborate with a partner to review, edit, and revise their digital writing.

CONTEXT

Prior to this lesson, students were familiar with using Google Classroom and Google Docs for digital writing. They also had several lessons throughout the school year about how to create a descriptive writing paragraphs. This was the first experience students had using the ClassVR Virtual Reality headsets and their task was to write a detailed paragraph about the day they went swimming with sharks. We reviewed the five senses and how to include three of these senses in their writing. They struggled a bit to write accurately and completely as none had ever been in the ocean with sharks before. We acknowledged their struggles to include details in their writing, then revealed that today they would get an opportunity to virtually swim with sharks!

PRACTICAL SESSION

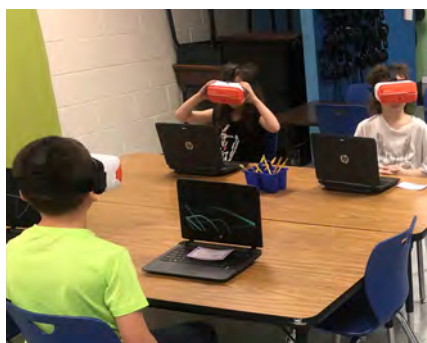


Underwater Playlist

Teaching staff created three senses charts to display on the wall for students to add their insights: "What did I see, What did I hear, What did I feel?". Students then viewed the Shark Experience through their headsets. We focused on exploring their immediate senses and being fully immersed within the moment to ensure they had lots of ideas to use after the VR experience. Following the Shark Experience, students shared their insights as they added descriptive words and phrases to our three senses charts on the wall. Then, students used these insights to add more details to their digital writing stories. In their next lesson, students worked with a partner to read, revise, and edit their digital writing before submitting to the teacher for review and feedback.

IMPACT ON LEARNING

Can students write a descriptive paragraph about swimming with sharks if they have no prior experience of swimming in an ocean or viewing sharks? Possibly, but it would be a struggle, as shown by students in the first part of our lesson. Providing students the opportunity to engage in a virtual learning experience they might never have in their real life, builds in background knowledge in a way that is innovative, powerful and relative. After viewing the Shark Experience, students' curiosity about sharks was piqued. They wanted to not only share their reflections about the experience, but to learn more about sharks living in the ocean, what they ate, and how they lived. By collaborating with others to hone in on specific senses engaged during the experiences, students were able to dramatically enhance their descriptive writing paragraphs.



Student-created 360 Videos

SOCIAL STUDIES Age 10-11



Dawn
Jones



St Andrew's School,
Boca Raton, Florida

Learning Aims:

- For students to engage in an in-depth collaborative inquiry to provide students with the opportunity to synthesize and apply their learning.

CONTEXT

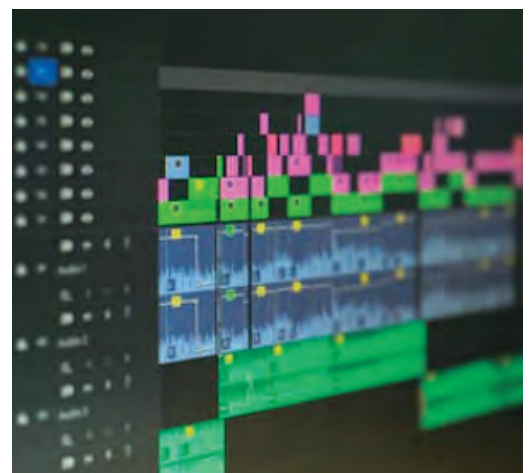
The student group researched why people have stress and anxiety and ways that people can help manage these feelings in many different outlets. The students wanted to showcase what it was like to be at a counseling session. The objective of the lesson was to enable students to choose an area of interest within a central idea and then find a global problem they want to research within the community. The Exhibition is the culminating, collaborative experience in the final year of the Primary Years Program for the International Baccalaureate Program.

PRACTICAL SESSION

As we wanted students to ask questions about the topic they were researching and investigate their own questions, we aimed to create a project which provided a platform for them to take action and create solutions to their line of inquiry. Hence, we purchased the Ricoh Theta 360 video camera and the students used the camera to record their experience from their time at the psychologist office. The student group then edited the video in iMovie and exported the file to the teacher's computer, who placed it the ClassVR portal. During their Exhibition, in addition to their verbal facts for visitors to their Exhibition Table, the students had four ClassVR headsets for visitors to have an immersive experience of being at a clinical session. This in-depth, real-life example of psychology in action enabled students to analyze and dig deeper into their own action research project and provided a fantastic stimuli for immersive and multi-sensory learning.

IMPACT ON LEARNING

Students were able to take a typical tri-fold folding board presentation to an in-depth virtual field trip. Their presentation skills were stretched by adding the ClassVR headset component and the best part of this was that it was totally student-driven! They figured out how to use the 360 camera, used their prior editing skills in iMovie, and then I showed them how to push it through the ClassVR portal.



Interconnected Systems

SCIENCE Age 10-11



Eloise Feltham



Knox Grammar Preparatory School, New South Wales

Learning Aims:

- To examine how the environment affects the growth, survival and adaptation of living things.
- To define problems and design, modify and follow algorithms to develop solutions.

CONTEXT

Throughout this Year 5 unit of inquiry on 'interconnectedness', students conducted an investigation into living things. They were tasked with the question, How do living things adapt to suit their changing environments? Students began by exploring rainforest biomes and conducting a research project into the different biomes found on the Earth and their similarities and differences. Students researched the human impact on different environments, made future predictions of human impact and explored how animals have adapted.

PRACTICAL SESSION



CoSpaces



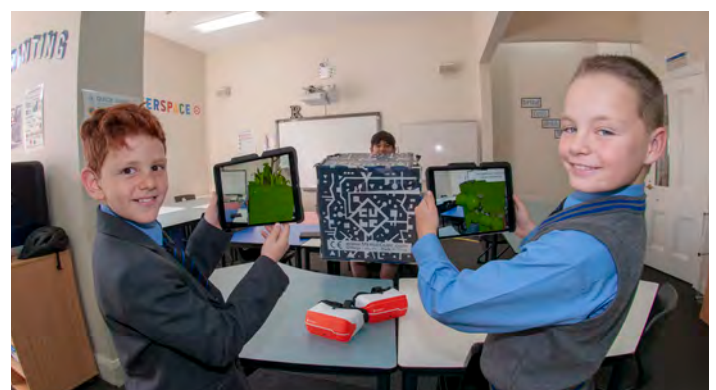
ARCube

We explained to the children that they were scientists, interested in the impact humans have on a variety of environments on Earth. They were tasked with researching one particular environment, identifying its key features and classification, and assessing the impact humans have had on that environment over time. We introduced the ARCube and explained to students that they will present their findings through the creation of an interactive ARCube.

CoSpaces was used to design the different perspectives/environments on each of the six sides. Voice overs were used to incorporate English outcomes and sequencing skills. The students followed this broad outline when designing their ARCube: introduction to the rainforest environment, including four biomes and labelled plants and animals; how humans have impacted the rainforest environment; individual research of their own environment (deep sea, coral reefs, deserts etc.), identifying its unique features and outlining why it is important; explaining how the environment has been impacted by humans and/or animals in some way; and finally, students choose one animal that has had to adapt to suit its chosen environment.

IMPACT ON LEARNING

Creating an ARCube engaged all learners, even those with no technological experience! It is a fun, hands-on and interactive platform that allows students to develop and extend their coding skill-base at all levels. It provided students with the opportunity to demonstrate knowledge and understanding at a level appropriate to their needs and is therefore a personalised assessment tool that produced a deeper understanding of content. The impact of utilising Virtual and Augmented Reality in the classroom has contributed to immense student growth in all key learning areas.



Spanish Vocabulary

SPANISH Age 9–10



Frankie Smith



Granard Primary School, London

Learning Aims:

- To develop and refine vocabulary and pronunciation in order to describe settings.
- To put vocabulary into context and understand its meaning.

CONTEXT

The idea of this lesson is to allow students to read, speak and familiarise themselves with Spanish vocabulary. As part of our Spanish scheme of work, the children studied a unit called 'La Casa'. In this unit, the children explored objects in the house and how to describe a room; ask questions about a room; and explain and describe the objects. I taught this lesson at the beginning of the 'La Casa' unit to introduce the children to new vocabulary that they would come across. They then used this experience to generate a word bank in their books, which they annotated in English, adding pictures to represent the words.

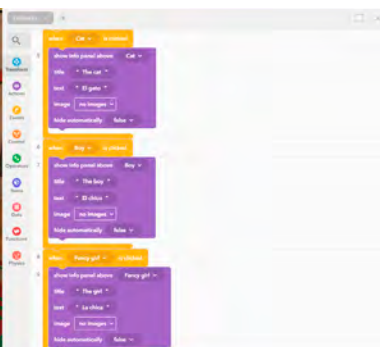
PRACTICAL SESSION



I created a CoSpaces world based on our current unit of work; we created a house with everyday objects that the students might come across. The objects in the CoSpaces world were labelled with both the English and the Spanish. Students worked in groups of three in order to collect, share and use new vocabulary. It also meant that the person using the headset had someone to help guide them around the classroom. The children were free to explore the CoSpaces world at their own leisure. They shared the new vocabulary they discovered with each other and compiled a list of new vocabulary. I encouraged the students to say the Spanish words aloud to their partners. Their partner could then give the English translation (if they've been taught it); guess what the English might be (if they have yet to learn the vocabulary) and/or check the pronunciation.

IMPACT ON LEARNING

Learning a foreign language can be off-putting for some children so this immersive, hands-on approach removed those barriers through an exciting stimulus. They all wanted to take part, have a go and share their new vocabulary with their peers. The children were willing to share what they've learnt and were excited to support others in saying their new vocabulary. When we did say the words altogether as a class, it wasn't as challenging as the children had seen the words before and attempted to say them. The vocabulary was understood at a deeper level and the children were able to embed and use these words more effectively in following lessons and pieces of work. To be able to put pictures to the Spanish (both written and spoken) meant that all of my students were able to access the lesson and were engaged from the start.



Minecraft Meets ClassVR

COMPUTING Age 7–11



Mark Savery



Emmanuel College,
Queensland

Learning Aims:

- To develop digital technology skills.
- To learn how to be a good citizen within a digital world.
- To communicate design ideas for their designed products, services and environments using modelling and simple drawings.

CONTEXT

Students have been invited to join a Minecraft server hosted by the teacher to build individual homes from a central path. The students need to build in a manner which shows how to be a good digital citizen, recognising their footprint and that everything that happens in the world can be seen. From their individual builds, the students then work on collaborative building tasks to construct something for the village to use collectively (for example a park/ playground, school, library, supermarket, church, farm/factory business).

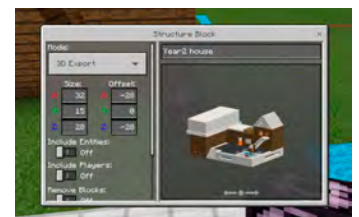
PRACTICAL SESSION

Paint 3D

Within Minecraft, students chose either a house or a building that they built collaboratively. Students used a Minecraft structure block to export their building as a 3D object (Structure blocks in Minecraft). Students opened Paint 3D and using the 3D shape and text tools, students wrote their name with a background rectangle as an embossed plaque on their collaborative build. When finished, students then exported their work from Paint 3D as a 3D object (*.glb file type). These 3D objects were then loaded into the ClassVR Portal and uploaded to the ClassVR headsets and viewed by the whole class (including being able to explore the objects fully through the use of the ARcubes).

IMPACT ON LEARNING

Students were excited to be given building challenges in Minecraft as game-based learning, but they took a further pride and ownership of their creations when they were able to bring their work from the digital world into their physical environment and then manipulate it through the use of ClassVR. Students were able to share their work with other students and staff beyond the Minecraft environment and reflect on their designs, seeing every aspect fully as a 3D object, and collaboratively discussing how they may improve their designs in future builds.



VR Worlds

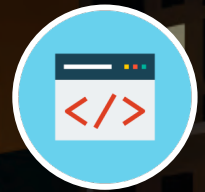
COMPUTING Age 9-10



Laura Woods



Neree Sale



Elm Park
Primary School,
Hornchurch, Essex

Learning Aims:

- To create a complex game using code and go beyond tutorials.
- To use skills already developed to create content using unfamiliar online technology.
- To save a document/file in various formats.

CONTEXT

The students explored the virtual world and how it can be used in the classroom. Over a period of six lessons, they built their own virtual worlds using CoSpaces. Some of the key vocabulary we explored in this unit of was Virtual Reality, server, visual coding, z-axis, MP3, cloud, password, virtual world, and story map. Online Safety also formed part of the focus and this enabled the students to understand a bit more about file saving and organisation works.

PRACTICAL SESSION

Students had one or two headsets on each table. The students began by creating small sections of their own virtual worlds on the desktop application CoSpaces. After students finished each phase of the virtual world, they then scanned the QR code to experience their world and test its functionality; if it had errors, mistakes or could be improved, then they undertook the computational process of debugging – to remove the errors and replace it with fully-functioning code. They also asked one or two other students on their table to view their world and then give feedback on both what they enjoyed and suggestions on how it could be improved.

IMPACT ON LEARNING

Using the Virtual Reality headsets, the children could immerse themselves in the worlds they and their peers created; this enabled them to improve, critique and debug their worlds in a collaborative and constructive manner. One student commented, *"We have made VR worlds before, but when we used the headsets it made it real. Seeing it I could see what worked and where I needed to make changes and could improve my world."*



Weather & The Seasons

GEOGRAPHY Age 5-6



James Tromans



Prince Albert Primary School, Birmingham

Learning Aims:

- To become immersed into different extreme weather scenarios.

CONTEXT

Children had previously looked at the four seasons and what they associated with each season. They had looked at weather and what weather to expect in each season; we explored simple reasons as to why certain weather is more common at various points in the year and what kind of temperatures, sensations and noises you might hear in the different seasons. This then led on nicely to what might be considered as normal weather and extreme weather.

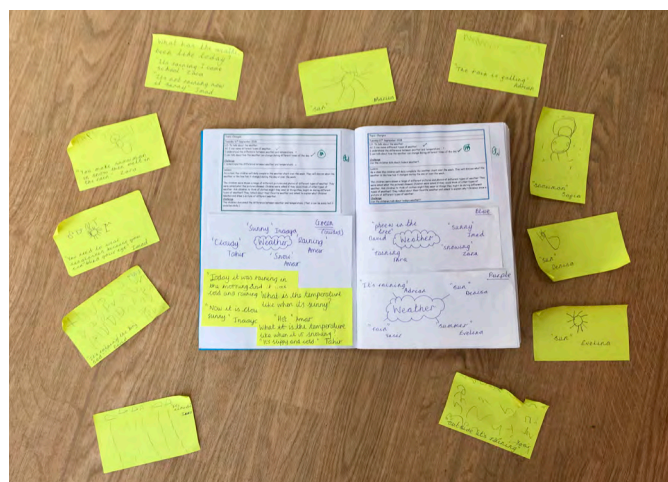
PRACTICAL SESSION

Seasonal Changes Playlist

During the session children were exposed to extreme weather conditions. They were immersed into a tornado and they looked at a frozen gorge and the northern lights. Following each immersive experience, the children were given the time to discuss what they had just seen, how it would have felt to have been there at the time, and what clothes and equipment would have been appropriate for that extreme weather condition. From this the children created a mind map of each immersive experience and wrote down all of the vocabulary that they generated. This then formed the basis of their next Literacy lesson where they used these mind maps to create sentences and explain what they had seen.

IMPACT ON LEARNING

Many of our children will never get to see or experience the extreme weather conditions that they saw using the ClassVR headsets. By using the immersive headsets, the children got a real feel for the weather and through the use of the visual and auditory elements, they were able to accurately describe what the weather condition was like and how it made them feel. The language generated by the experience was far superior to what would have been generated by simply looking at photos or watching a standard video and formed the basis of a fantastic writing stimulus. The ClassVR immersive experience also allowed the teachers to bring to gather Science, Geography, Literacy and Computing into one lesson, creating a cross curricular experience that took learning to the next level.



The Future is History

HISTORY & COMPUTING

Age 12–13

A ghetto is a part of a city in which the members of a minority live, typically as a result of social, legal, or economic pressure.



Phil Nottingham



Daniel McKune



Joseph Cauldwell



The Mosslands School, Merseyside

Learning Aims:

- To be able to understand and explain significant events of the Holocaust.
- To be able to design and create a 3D world.
- To use computational language to improve the usability of the 3D world.

CONTEXT

After meeting with several departments, I developed a cross-curricular project between history and computing. By using 'CoSpaces', alongside the ClassVR headsets, pupils were able to create their own virtual world. A piece of work by which they could demonstrate both their understanding of a historical concept, and the effective use of coding and design to create an engaging digital space. After initially creating worlds to explore the coding, the students were given their brief for the creation of a Virtual Holocaust Museum: a space that a visitor could explore, that not only conveyed the creator's understanding of the topic material but also engaged the viewer through effective use of CoSpaces.

PRACTICAL SESSION



In pairs, the students built their worlds using CoSpaces. Over the course of six weeks, students had a range of both history and computing lessons to embed the depth of historical knowledge and learn the technicalities involved with the computer science aspect of creating a fully-functioning 3D world on CoSpaces. In week three, students learnt about the rise of Nazism and the final solution, as well as starting to create their space which reflected this series of chronological events. In week four, we introduced the headsets: this involved the students pulling together the various worlds they had created on CoSpaces to then test, trial and debug any coding or design errors. The final week involved sharing the spaces and providing peer feedback – evaluating both the technical computing elements and the historical accuracy of their content.

IMPACT ON LEARNING

The work the students produced was not only of an excellent standard but also of an incredible variety. Some students had chosen to create a traditional "gallery" with information adorning the walls of the space, while others had chosen to create enclosed spaces to simulate the conditions of the transport and accommodation of the camps involved in the events of the time period. After six weeks and approximately 8-10 hours working on the projects, the final session allowed pupils to explore each other's spaces. Many students commented on how students had effectively used the VR setting to create a sense of immersion, particularly long corridors and cramped train compartments.



Jacobites

HISTORY Age 9-10



Simon
Luxford-Moore



ESMS Junior School,
Scotland

Learning Aims:

- To understand the key events of the Battle of Killiecrankie.
- To show a basic understanding of different types of historical evidence and bias.
- To understand how the Jacobites' defeat at Culloden impacted on Scottish life/culture.

CONTEXT

Video and still footage was taken at Killiecrankie at the site at which Donald McBane allegedly leapt 5.5 metres across the raging River Garry whilst escaping his Jacobite pursuers. I also visited Culloden Battlefield and took footage of the Memorial Cairn, the Jacobite and Redcoat lines, the crofter's cottage which was commandeered as a field hospital for the British troops and the battlefield itself to highlight the terrain. Children read the story of the battle(s) and discussed the order of events.

PRACTICAL SESSION

After reading and discussing the battles (individually) and gaining an understanding of events, the headsets were introduced to help reinforce key points such as the distance between the two lines of armies at Culloden and how the famous Highland Charge would need to be maintained for some distance over heather moorland before reaching the organised ranks of Redcoat artillery and infantry. Children were then invited to add more thoughts to their discussion points, mindmap and plans, based on experiencing the actual battlefield, including the sound of the wind over the moor. This deepened their appreciation for the stamina involved and, based on how tired the Jacobite troops were from their forced march through the night, how their charge was futile. This is also the case with the Soldier's Leap video footage. As an extension, groups were invited outside to see how far they could leap, as if pursued by soldiers, and then discuss the enormous difficulty in jumping 5.5 metres. The discussion on bias and early propaganda can be raised here and children can debate the feasibility of Donald McBane's efforts.

IMPACT ON LEARNING

Children gain a far deeper understanding of the events having 'witnessed' the conditions first hand and seen the terrain which is not clear in textbooks. So too with the "Soldier's Leap" in which the actual distance is far more realistic with the headsets than from an account in a book, or a diagram. Seeing the river rushing by between the rocks adds a whole level of appreciation, or disbelief. Importantly, every child enjoyed the lesson because of the enhancement from the headsets and therefore will better understand and remember the learning outcomes.



Virtual Reality Tour of Our School

CROSS-CURRICULAR Age 10–11



Susie Grant



Brooklands Primary, London

Learning Aims:

- To experiment with new technologies.
- To use the technology to aid writing.
- To take responsibility of the new technology and share with the younger students.
- To describe the setting.

CONTEXT

The overall school topic was “This is me. This is us!” The class were asked what this title meant to them and we decided to make a virtual tour of the school, which tied in with our Design and Technology project. In DT, the class were making different sections of the school; each group were given responsibility of a specific section. The class were introduced to the ClassVR headsets, and they were used to aid a descriptive piece of writing. This piece of work sparked their interest around the headsets, so we wrote instructions on how to use them and even used ClassVR for a still life drawing.

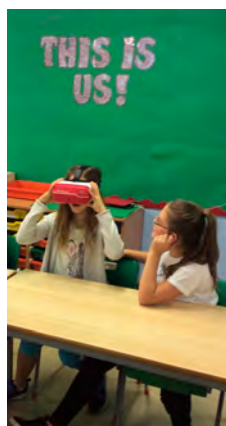
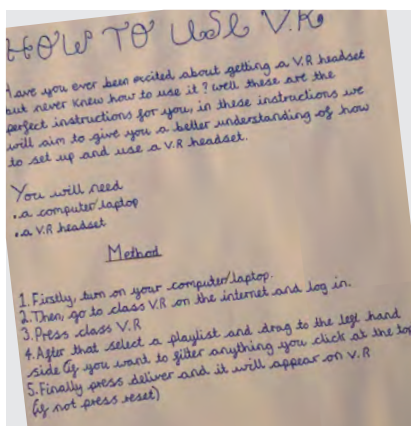
PRACTICAL SESSION

Ricoth Theta

The class were shown the 360 camera, and the Theta app. As a class we took a picture and talked about the process. We discussed how we could make the picture better; for example, using the tripod not our hands for stability and greater focus, hiding so we weren't in the picture to give the image a professional look, and positioning the camera in a sensible part of the room so it captures all corners and sections in as much detail as possible. Each group had a go at taking the pictures and using the device to capture various parts of the school. We then came back together to share some of the images the children had captured and were able to share these images as a Playlist on the ClassVR Portal and headsets.

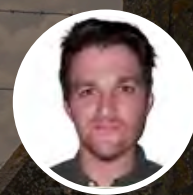
IMPACT ON LEARNING

It was important for my class to see that all the small parts combined together made something which everyone was impressed by. The children loved seeing the VR map next to their models at the showcase. They really enjoyed showing their work to the other classes, which allowed every class to experience the school tour. They have really enjoyed using the headsets and their engagement in the task was increased because of the active nature of both image capture, but also appreciating their own collaborative VR tour.



Experiencing the Trenches

HISTORY Age 10–11



Anthony Isaac



Crowlands
Primary School,
Essex

Learning Aims:

- To understand and explain some of the major events during World War One.
- To write in first person from the perspective of a soldier.

CONTEXT

This year marked the 100th anniversary of the ending of World War One, and Year 6 pupils at Crowlands Primary School marked the occasion by writing a piece from the point of view of those brave soldiers in the cold, unforgiving trenches. The anniversary is a hugely symbolic time and as such, we wanted this topic to be made even more personal, immersive and experiential. Most children started the unit of work with a limited conceptual understanding about life in the trenches and how a typical day would be; we therefore wanted to provide a learning experience to broaden and deepen their understanding and appreciation of the conditions and expectations which soldiers endured.

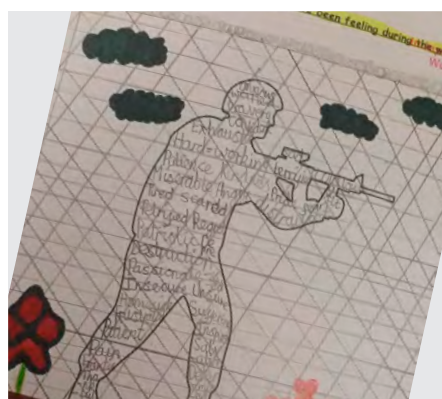
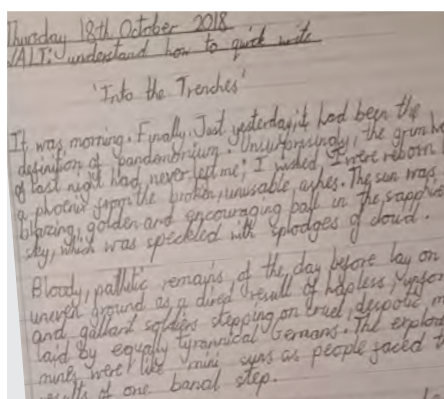
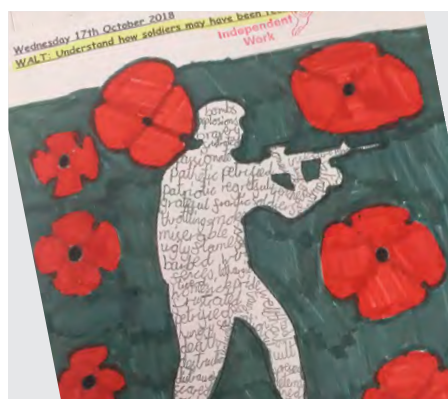
PRACTICAL SESSION

WW1 Trenches Experience

Firstly, the children had to come up with emotions of the soldiers and an outline of the settings using all five senses. To provide the most real, tangible experience possible, the children were given the headsets with the WW1 Trenches Experience loaded up; they then explored the 360 video, focusing on the grime, mud, rain and sobering surroundings. As the video has background audio projecting distant battlefield cries and warzone explosions, the children were given further food for thought and this fed nicely into expanding their choice of language and vocabulary. Whilst viewing the video, pupils were able to ask and pose questions to each other and raise further points to explore in groups and as a class. To codify and bring together this experiential learning, the pupils then removed the headsets and decorated a silhouette of a soldier with words and phrases that could describe what it might have been like to fight in the trenches.

IMPACT ON LEARNING

As 10-11 year olds, they really struggled to step into the footsteps of people that lived over 100 years ago. ClassVR helped the children to engage with the task and gave them inspiration for how to describe the sights, sounds and smells of the trenches. The children were astonished at what the soldiers had to go through even though we had already covered trench life as part of our World War Topic and had a brand new understanding and empathy for the millions of courageous soldiers that gave their lives to fight for this country. This immersive nature of VR helped them think more creatively and their work was imaginative and detailed.



Polar Exploration

SCIENCE & COMPUTING Age 9–11



Emma Hardy



Exning Primary School, Suffolk

Learning Aims:

- To understand how creatures have adapted to their habitats.
- To be able to explain why certain features are crucial to surviving in challenging environments.

CONTEXT

We start every topic with a 'sparkling start' to engage the children; for our 'Explorers' topic, we used the ClassVR headsets to look at different environments to immerse the children in such a way that they could really explore and compare each setting. The children followed the journey of the Nimrod expedition, using the interactive map and using the links to the actual photographs, artefacts and diary entries. Equally, with the Terra Nova expedition story, we were able to captivate their children's interest in comparing Robert Scott's survival kit with that seen by a modern day explorer.

PRACTICAL SESSION

Gentoo Penguins in Antarctica

Linking to our science 'Evolution' topic, we explored the Gentoo penguins project video; this enabled the children to see the penguins in their natural environment and analyse their surroundings, behaviour and habitat. We challenged the children to identify features of the penguins and how these support their habitation in such a cold and tough environment. In addition, we then used CoSpaces to create our own Antarctic world – focusing on the environment features which would be appropriate for this setting and using the coding options to incorporate computing into the science-led topic. The children then created their own creature and added it to the Antarctic setting which they had earlier created. The children were then able to use CoSpaces' share feature and provided collaborative feedback to each other about the science and computing within their projects by viewing and experiencing their worlds and creatures through the ClassVR headsets.

IMPACT ON LEARNING

These resources brought the explorations and expeditions to life for the children and removed many layers of abstraction from their learning to give them a more tangible grasp of these huge, mammoth events. Further to this, the headsets supported children in moving their learning forward by giving them the access to viewing and unpicking environments which they and their peers had created. Their level of enthusiasm, engagement and resilience in this topic was greatly increased and we were very impressed with the children's retention and ability to apply their understanding across the board. The high levels of cognitive engagement and achievement during the topic would not have been possible without these amazing new opportunities provided by the digital technologies.



Creating in CoSpaces

COMPUTING Age 5-7



Sheela Yadav



Grange Primary School, Harrow

Learning Aims:

- To create a 360 degree virtual space.
- To be able to use computational thinking, algorithms and debug code.

CONTEXT

Students were exposed to Virtual Reality for the first time during their lesson on 'Space'. They had the experience of viewing the individual planets and the solar system as a whole in 3D. These experiences facilitated the students to better understand the concept of space. During these lessons one of the students curiously asked, "We are actually not on the moon but how, just using this headset, can we see and feel as if we are on the moon?" This led to explaining what programming is in computer language and made the student even more curious thinking that what he is seeing is actually possible to create.

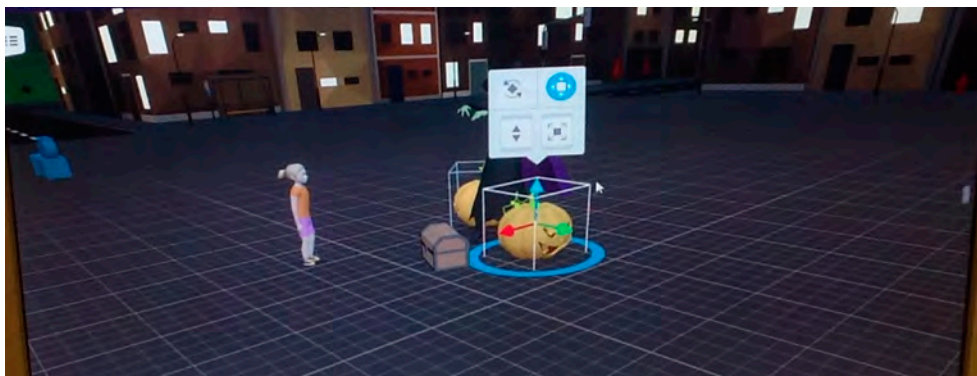
PRACTICAL SESSION

CoSpaces

I asked the children to go onto the CoSpaces gallery and explore some of the pre-published creations; in conjunction with this, I also copied some of the links onto the ClassVR Portal, so students could view the example creation via the ClassVR headsets. The students' ideas of creating space started to change and they wanted to create different worlds with different foci. I gave the VR Club support in getting themselves registered and then, after this point, they were left to explore all the tools they had and how to use them independently. Initially, they were tasked with coding their characters/objects to move and speak. This was challenging for some of them, as one student explained, "I want this witch to speak but it is not working!" students were introduced to the concept of 'debugging' and how important it is to check the steps they were taking to perform the desired action. At this point, I asked them to share their unfinished creation with me and I showed their work via a ClassVR headset; they explained why they chose that specific world, how they created it and what they wished to add further. Some students wanted to move two objects at the same time, e.g. a car and the sitting man, a boat and a man standing on it. This was set as their homework to find out how to get two algorithms running concurrently.

IMPACT ON LEARNING

The students learnt how a 3D world can be created and then shared with their peers. They felt that they could be teleported to any world through their imagination and hard work, without having to even leave home/school. They learnt to solve complicated problems through reasoning and that if the sequence in coding is not correct, then the desired action is not accomplished. The use of the headsets provided a platform for the children to publish their work on and enjoy experiencing other children's work too.



Creating 3D Shapes

MATHEMATICS Age 9-10



Chris Bass



Educational Specialist
Avantis Education

Learning Aims:

- To identify 3D shapes from 2D representations.
- To draw shapes using given dimensions and angles.
- To create content using a range of programs.

CONTEXT

Before I started working for Avantis I was a Year Five teacher for three years and I was always looking for new ways to embed computing across the curriculum. One really exciting way to do this is using Paint 3D to create 3D models of shapes that can then be viewed and checked using ClassVR headsets. Giving students the ability to actually create their own shapes using simple computer software deepens both their understanding of the properties of shape and their digital literacy skills.

PRACTICAL SESSION

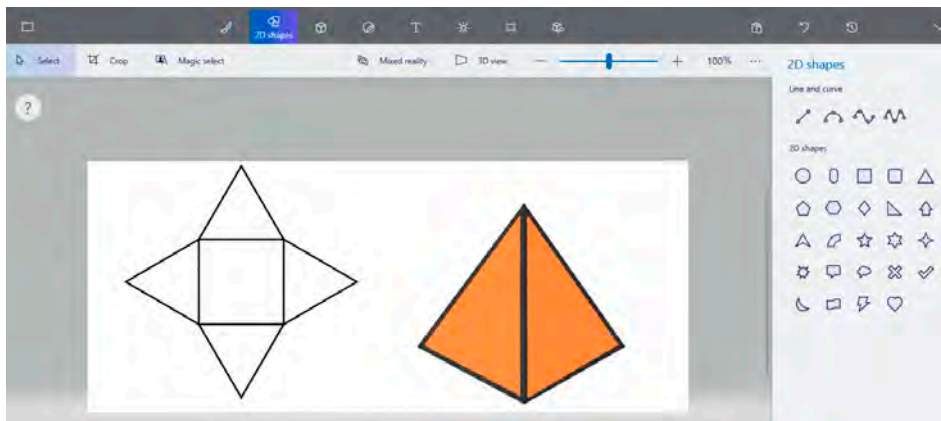


Paint 3D

To start this session I talk with students about the differences between 2D and 3D shapes and how they relate to one another. We then look at how a net relates to its 3D counterpart using a printed cube net – I like to use the ARCube net for this, as it can then be used with the resultant 3D models! After introducing the basics of using Paint 3D I then challenge students to create 3D models of some pre-prepared nets. These can be grouped to differentiate for varying abilities or completed in mixed ability pairs. As the students complete their shapes, I can upload them to My Cloud on the ClassVR portal and upload the model directly to them for evaluation. Does it look correct? Is it symmetrical? Do you need to edit it? The students can then use their ARCube to manipulate their creation and study it from all angles before deciding if they need to do any further editing.

IMPACT ON LEARNING

Exploring shape in a new and exciting way using Augmented Reality gives students a broader depth of experience and a greater frame of reference when facing challenges in the future. When it comes to solving problems relating to 3D shape they will have a tangible first-hand memory of creating shapes from nets. Even more importantly, they are experiencing and using new technologies to help them understand the world and simultaneously improve their overall digital literacy. While Paint 3D is a relatively simple modelling program it can lead into all sorts of other digital forms of expression and allows for creativity in an exciting and innovative new medium.



The Science of Flight

PHYSICS Age 11-13



Red Arrows



Red Arrows Royal Air Force

Learning Aims:

- To identify the forces affecting an aeroplane.
- To describe forces using force diagrams.
- To create Virtual Reality experiences based on prior learning.

CONTEXT

A big aim of the Royal Air Force Aerobatic Team is to inspire the next generation - potential future pilots, engineers and technicians. The Red Arrows is one of the world's premier display teams and has provided great footage from inside the cockpit to ClassVR. This offers a fantastic opportunity to bring the science of flight to life. This lesson will require a moderate level of digital literacy and a core understanding of CoSpaces – the ability to create an environment, add objects and code them using block coding or Javascript will be required to get the most from the session.

PRACTICAL SESSION



Red Arrows Video



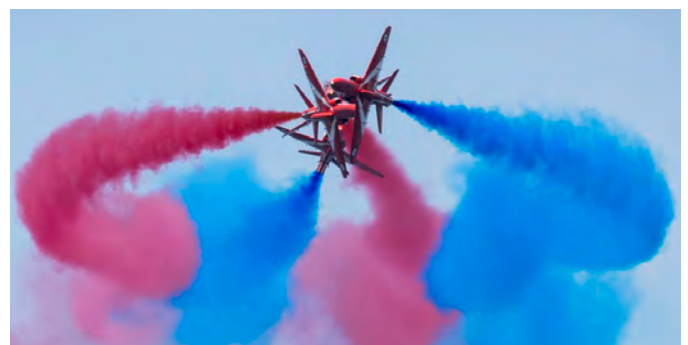
CoSpaces

This session explores the key forces that are involved in flight, specifically when looking at the Hawk jet used by the Red Arrows. To begin, use the ClassVR portal to play the video and discuss with students how they think the plane is able to stay in the air. This is an assessment opportunity for prior knowledge and a great time to discuss the forces in play on a plane in flight – thrust, drag, lift and weight. After explaining and demonstrating these forces, introduce students to the 3D model of the jet and ask them to identify key features of the vehicle, as well as any specific design aspects which make them aerodynamic and fit for purpose.

Afterwards, introduce the students to the CoSpaces website and instruct them to create and code a working model of a Hawk jet with accurate labels to demonstrate their understanding. Students with a more advanced understanding of coding can create an interactive model that changes based on the forces acting upon it using more advanced variables from either the CoBlocks or Javascript options. Finally, use the CoSpaces app within the ClassVR portal to explore the students' interactive models and collectively debug the code that was used.

IMPACT ON LEARNING

Using a tool like CoSpaces is an incredible way to help embed learning into a students' long-term memory – by experiencing the content directly through Virtual Reality footage and then creating new content to explain key concepts. In doing so, students are using advanced cognitive recall techniques that give a genuine, first-hand memory to draw upon when they need to either remember a specific topic or build upon their knowledge later in the year.



Animals and Their Adaptations

SCIENCE Age 6-7



Hannah
Davies



Head of Educational
Services
Avantis Education

Learning Aims:

- To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.

CONTEXT

This lesson works really well as part of a sequence where students have already begun to think about animals they're familiar with from their own environment, in small habitats nearby (e.g. a school pond or garden, or even a large tree). It's also helpful for students to have a basic understanding of simple food chains and the idea of predators and prey.

PRACTICAL SESSION – Focus on working with a partner



Animal 3D Models

For this session, you'll need printed ARcubes; these are available to download from the ClassVR Portal. Make a playlist of the animals you'd like to send, or use the Animals 3D pre-made playlist. Decide which animal you'd like students to focus on first, then use the play button to send it to all the headsets simultaneously. This can work really well if students are in mixed-ability pairs, with one student using the headset and the other asking questions or recording ideas. It can also be really useful to have a scaffolded worksheet or prompts for students at this point, to focus their thinking. Students can hold the animal in their hand using the cube (don't forget, to make the model appear larger, swipe up on the panel at the right of the headset). Try prompting students to discuss these questions: What kind of habitat does this animal live in? How does this animal move around? What does it eat for food? Is it prey for any other animals?

IMPACT ON LEARNING

The ability to closely examine creatures of all kinds from all angles – without any risk of harming them (or of being harmed, in the case of the lion!) – gives students a fantastic opportunity. They can spend as long as they need looking carefully at the features of each animal, dipping in and out of using the headset as they find out more about its habitat. A fantastic activity to follow up on this session could be for students to design their own imaginary creature that has adaptations suited to a given environment. You'll be amazed what they'll come up with!



The Human Body

BIOLOGY Age 10-11



James Tromans



Heathfield Primary School, Birmingham

Learning Aims:

- To have an awareness of the different parts of the human body.

CONTEXT

This was the children's first lesson in their Science topic – The Human Body. The idea was to immerse them in learning which would hook their interest in how various parts of the body functioned and worked. The medium term plan was make sure the children understood exactly why certain parts of the body were designed in such a way and how the shape, size and structure of different aspects of the human body contributed to a healthy human being.

PRACTICAL SESSION – Focus on exploring the different parts of the human body

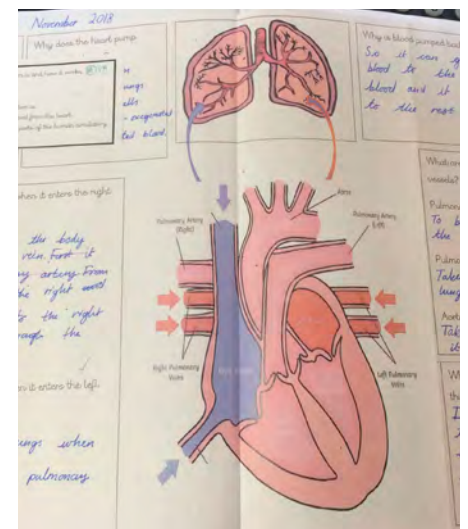
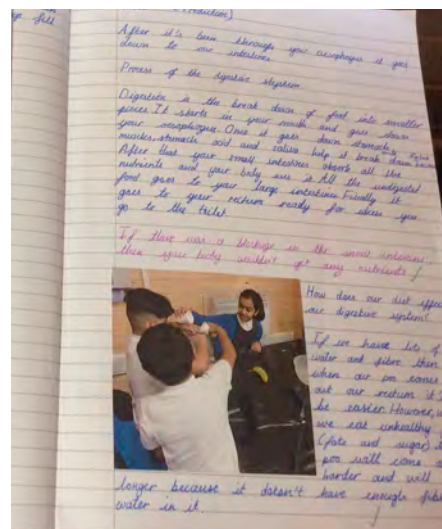
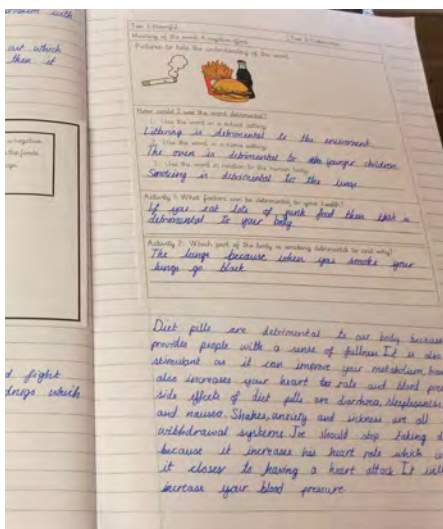


Human Anatomy Playlist

During the session, the children were given the opportunity to take a 360-degree virtual tour of the human body using the ClassVR headsets. We used the Human Anatomy Playlist to explore different sections of the body and provide a detailed view of body parts for the pupils to interrogate and ask questions about. Following the experience, children wrote down as many body parts, facts, questions and key words that they could, based on what they had experienced. For example, we looked at how the skull was shaped and structured to provide protection to the brain; we also looked in more detail at how the skeleton was formed to provide protection to the vital organs within the torso.

IMPACT ON LEARNING

This VR experience formed the starting point to their topic. It generated questioning, which allowed the teacher to tailor future lessons to meet the children's needs. It exposed students to language that they might not have experienced normally and gave the children the chance to explore the human body in a safe and purposeful way. Following this lesson, the children then explored the heart in more detail using the ClassVR headsets, looked inside a beating heart and explored its job within the body. This was the perfect starting point for the heart dissection that took place the lesson afterwards, as children already had an understanding of the heart's role, and what they should expect to see inside it.

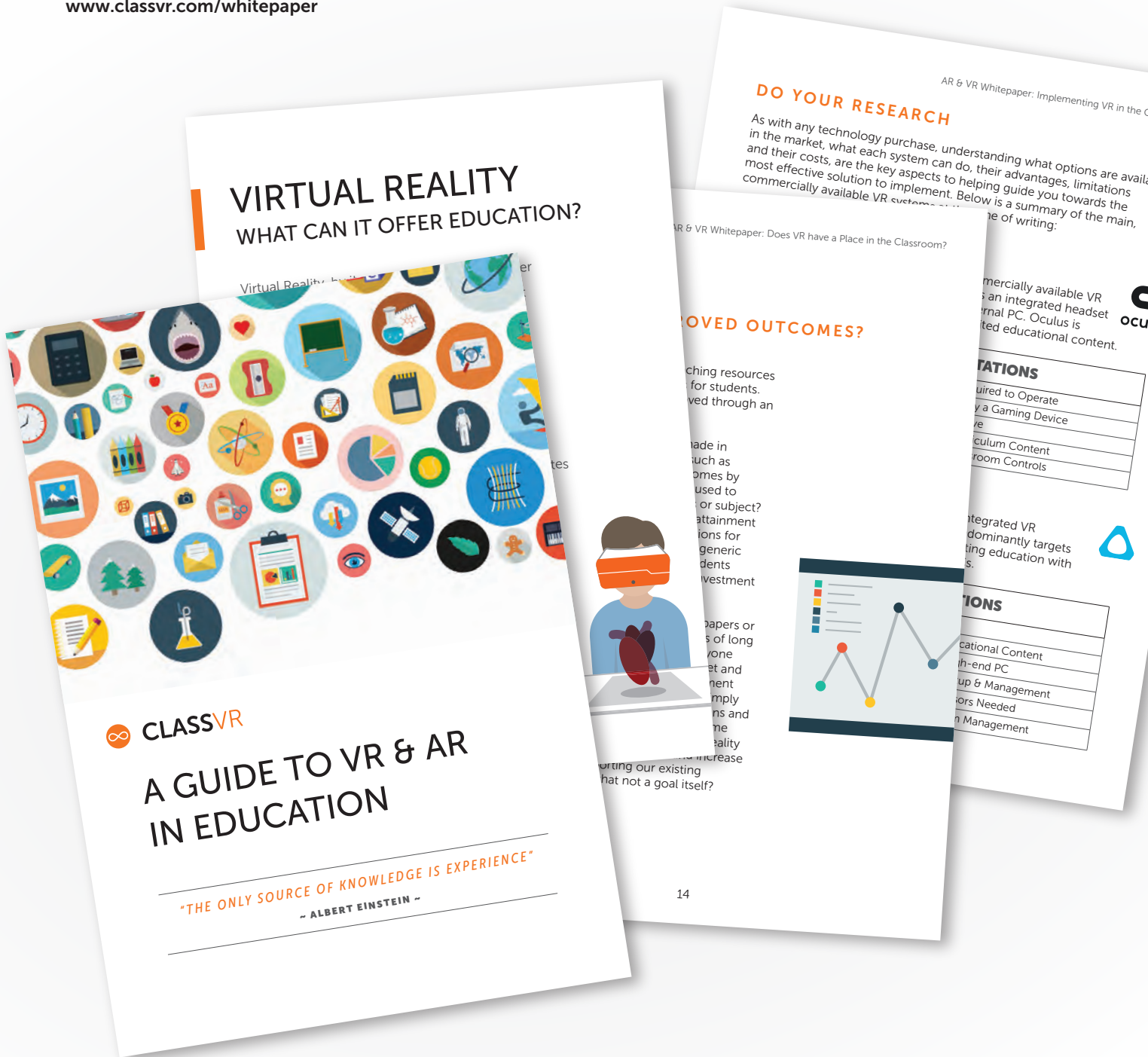


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OF KNOWLEDGE IS
EXPERIENCE”

Albert Einstein

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