Using VR For Teaching and Learning -Tips and Tricks (Version 3)

By Craig Frehlich

Learning Unleashed

Variety in Your Instructional Delivery

Differentiated Uniform ecture Lecture Video Worksheet **VR** Simulation Worksheet Worksheet Ai Chatbot

Do you remember when the first multicolor pens came out? I do!

The excitement of writing with a multi-colored pen as a student was truly unparalleled, especially compared to the mundane experience of using a standard single-color pen. The ability to click a button and magically switch colors brought a level of engagement and creativity to my writing tasks that was simply unattainable with a basic blue pen. Whether it was crafting a vivid story or taking colorful notes, each click of the pen was like opening a door to a new realm of possibilities. The assortment of colors not only made my writing visually appealing but also helped in organizing thoughts and emphasizing important points. This simple yet innovative tool transformed the act of writing from a routine task into an adventure, where each word could be a different hue, adding depth and personality to my work.

Using a multi-colored pen instead of a single-color one is an apt analogy for the benefits of utilizing diverse teaching strategies compared to a singular method in education. Much like how different colors in a pen can make notes more engaging and organized, varied teaching approaches address different learning needs and interests, keeping students more engaged and aiding in a deeper understanding of the subject. While a uniform single-color pen is limited in expression, a one-dimensional teaching style can fail to capture the full spectrum of a student's learning potential, underscoring the importance of adaptability and variety in teaching methods.

In a more progressive model of teaching, the incorporation of a multitude of experiences, such as Virtual Reality (VR and AI chatbots, can significantly enhance student engagement and unlock deeper understanding, much like adding various colors to a palette in art.

Virtual Reality allows students to step into environments or situations that would be impossible or impractical in a traditional classroom setting. For example, VR can transport students to historical sites, distant planets, or inside th human body, providing a rich, multi-sensory learning experience. This deep immersion can lead to a more profound understanding of the subject matter, as students are not just passive recipients of information, but active participants in a virtual learning environment.

Al chatbots, on the other hand, offer personalized, interactive learning experiences. These chatbots can adapt to individual student's learning paces, styles, and needs, much like a tutor. They can provide instant feedback, clarify doubts, and even guide students through complex concepts at any time of the day, making learning more accessible and tailored. This is similar to having a tool that adjusts its function based on the user's needs, enhancing the learning experience.

Incorporating these technologies in education represents a shift from a one-size-fits-all approach to a more dynamic student-centered learning model.

By Craig Frehlich

IMPOSTER SYNDROME

A Strategy for.....

Using Ai Avatars in Virtual Worlds





By Craig Frehlich

Have you ever delved into the classic board game Clue, immersing yourself in the suspense of uncovering a mystery? Now, imagine elevating that experience to an extraordinary level with the power of virtual reality (VR) and AI avatars. Picture yourself not just playing a detective but truly embodying one in a world where your decisions shape the story. In this realm, every glance, question, and deduction brings you closer to unravelling a compelling historical conundrum.

With the use of Ai avatars in virtual worlds this is possible. Enter "Imposter Syndrome". A learning journey about communication, inquiry, engagement and immersion.

If you were studying history, the war and Winston Churchill, you could create an "Imposter Syndrome" experience around thi topic.

Picture this example, "Imposter Syndrome for Winston Churchill" is a captivating VR learning experience set in the 1940s, where players take on the role of a private investigator tasked with identifying the real Winston Churchill among two identic claimants. Through immersive VR technology and AI avatars, players interact in a historically accurate setting, using yes-or-no questions to discern truth from deception. The game challenges players to use their observational skills and knowledge of history to uncover subtle inconsistencies and reveal the imposter. This interactive experience combines elements of mystery, history, and technology, offering a unique and engaging way to explore a significant historical figure area.

Engaging in a VR learning experience like "Imposter Syndrome for Winston Churchill" offers a vastly different and more immersive experience compared to reading about Winston Churchill in a history textbook. While textbooks provide valuable factual information, they often lack the interactive and emotional depth that a VR experience can offer. As they interact with characters representing Churchill and his imposter, players are thrust into the heart of a pivotal era, experiencing the atmosphere, challenges, and nuances of the time. This direct engagement deepens understanding and appreciation of historical context, bringing to life the complexities of Churchill's personality and the period he lived in. The VR environment, coupled with Al avatars, allows players to explore details and scenarios that a textbook could never convey, fostering a personal connection with the past that is both educational and profoundly memorable.

A learning experience like "Imposter Syndrome" could easily be deployed into a virtual world at a fraction of the cost of an expensive game development studio with the advent of "chatGPT" plug-ins. No code platforms like EngageVR, VictoryXR a FrameVR are already making this type of integration easy to do for teachers and educators.

Not interested in Winston Churchill?

The narrative and characters could be adapted to a plethora of curriculum topics: Characters within a novel, Famous Scientists, Patients in a healthcare setting



Align experiences explicitly to the curriculum

Ensure the learning outcomes are enhanced by VR

Curate a variety of different types of experiences: simulation, immersive stories, serious games In the past three months, our school's virtual reality lab has experienced a big surge in interest and growth among teachers, and it's clear that this remarkable evolution can be attributed to several factors. Although these are not the only principles, here are three key ones that have been instrumental in our growth:

Firstly, we've emphasized the importance of aligning virtual reality experiences with our curriculum, ensuring that every VR activity directly contributes to the educational goals set by our teachers.

Secondly, we've strived to make sure that the learning outcomes are significantly enhanced through the use of VR, creating an immersive and engaging environment that fosters deeper understanding and retention of subject matter.

Lastly, our commitment to curating a diverse range of VR experiences, including serious games, simulations, immersive worksheets, narrative stories etc., has enriched the learning journey, catering to a variety of student and teacher preferences.

This holistic approach to integrating VR into our educational framework has not only captured the imagination of our educators but also transformed the way our students engage with their studies, making the virtual reality lab an indispensable tool for immersive learning.

"If you build it, they will come" – a timeless adage from the movie "Field of Dreams" – aptly encapsulates the remarkable journey our school's virtual reality lab has undertaken in the past three months. Just like the protagonist in the film who transformed a cornfield into a baseball diamond, our commitment to fostering immersive learning experiences has yielded tremendous results. The surge in interest and growth among our teachers and students alike is a testament to the transformative power of this innovative tool, proving that when you create a sustainable environment for immersive learning, they will indeed come – eager, engaged, and ready to embark on a new era of educational exploration.

Anatomy of An Immersive Learning Lesson

Topic- refugees and migration.



By Craig Frehlich

Have you ever tended a garden, nurturing each plant to ensure it thrives? This is much like the role of a teacher in the classroom. Just as a gardener understands the unique needs of each plant, teachers recognize the diverse needs and requirements of their students. They meticulously plan lessons with a variety of experiences, akin to providing the right amount of sunlight, water, and nutrients, to ensure every student grows and flourishes in their educational journey.

I was recently consulted to help the English department at a school. They really wanted to use VR.My initial pushback was, "Why do you want VR?".

After a great discussion, we unravelled the real problem. Students from this affluent school could not connect deeply with the plight of the refugee characters within the novel they were reading. So what next?

The core objective was to enlighten students about the complex realities faced by refugees and migrants. However, as the unit progressed, the teachers were facing a signific ant challenge: the students were grappling with the factual and historical aspects but needed help to engage with the emotional and human dimensions of the topic.

It became clear that to truly resonate with the students, the unit of study needed to adopt a greater perspective, one that emphasized empathy. This would enhance their understanding and foster a deeper, more meaningful connection. We came up with 3 key learning principles that we felt needed to be enhanced in the unit:

i) Provide greater Context- we wanted students to be given more examples of real-world situations involving refugees and migrants.

ii) Include Active Learning- we realized that giving students more agency in their learning might get them to connect with the narratives.

iii) Provide Transactional Learning- involving the students in the learning process through interaction and exchange might lead to a deeper understanding.

Armed with these three principles we curated a 40-minute experience that utilized VR and an Ai chatbot. Here were the parts of the student's learning journey:

-Clouds Over Sidra- a VR documentary that offers an immersive insight into the life of Sidra, a 12-year-old girl living in the Za'atari refugee camp in Jordan.

-Custom VR Experience in EngageVR- we built an experience whereby students had to navigate an island and witness the coming of refugees to the island from boats. However, some of the villagers on the island were not very welcoming.

-Ai Chatbot - we programmed a chatbot to take on the persona of a teenage refugee and students used iPads to talk with the chatbot and ask them questions.

Each element - the VR documentary, the EngageVR experience, and the AI chatbot - nurtured their growth, akin to providing sunlight, water, and nutrients to plants. Through this nurturing educational experience, the students blossomed, emerging not only more knowledgeable but also empathetic, mirroring the vibrant growth of a well-tended garden.





"The Unrecognized Potential of Comic Books and Virtual Reality"



Do you remember your first comic book? I do!

Since discovering Spider-Man comics, my life has been intertwined with Peter Parker's adventures. The excitement of diving into each comic was transformative, making Spider-Man a central figure in my life. This influence extended to Spider-Man themed birthdays and Halloween costumes, where I embraced the thrill of being a superhero for a day. Through these experiences, I absorbed lessons of bravery, resilience, and integrity from Spidey's world.

Despite my deep-rooted passion for reading and learning sparked by comic books like Spider-Man, it's disappointing to see their lack recognition as valuable literacy and educational tools. This contrast highlights a societal hesitation to appreciate the educational wor of comics. Often seen merely as entertainment, their ability to offer rich narratives and engage a diverse range of learners is underestimated.

Similar to the undervalued role of comic books in literacy and education, the use of VR in learning environments is facing a parallel fa VR is often sidelined in educational contexts despite its immersive and interactive capabilities. This cutting-edge technology has the potential to revolutionize the way students engage with and comprehend complex subjects, yet it struggles to gain widespread acceptance as a legitimate teaching tool.

Here are some criticisms of both:

1. Youth-Centric Stereotype: Comic books and Virtual Reality are often misperceived as primarily for young audiences, despite the depth and sophistication present in many graphic novels and the educational potential of VR. This view neglects their ability to engag and educate people across all age groups, overlooking their broader applicability in learning and literacy.

2. Perceived as a Gimmick: Just as comic books are often seen as mere entertainment, VR is sometimes dismissed as a gimmick or novelty, rather than a serious educational tool. Its association with video games and leisure activities contributes to this perception, overshadowing its educational potential.

3. Lack of Proven Pedagogical Models: The relative novelty of both Virtual Reality (VR) and comic books in educational settings contributes to a scarcity of established pedagogical models and comprehensive studies demonstrating their effectiveness, especially when compared to traditional teaching methods.

The time is ripe to embrace the immense potential of Virtual Reality (VR) and comic books in education, recognizing their unique strengths. These mediums can vividly transform complex ideas into engaging experiences, offering new perspectives for learners. Integrating comic books' narrative-driven approach with VR's experiential learning can deeply enhance understanding of intricate subjects. As we continue to explore their effectiveness, VR and comic books have the potential to revolutionize education, catering to diverse learning styles and making learning a more engaging journey for all ages.

How Virtual Worlds can help the... "UN-THINKERS"



In the dynamic landscape of a classroom, a silent narrative unfolds daily.

Picture this: the "thinkers," that (according to a recent EdSurge interview with Dr. Peter Liljedahl) fill roughly 20% of our classes, whose hands eagerly soar to the sky, ready to grasp the knowledge that's presented before them. They lean in, eyes alight with curiosity, embodying the very essence of engaged learning.

In stark contrast, lurking in the periphery are their counterparts, the "un-thinkers"—the "Slacker," whose spirit of inquiry seems to have taken an indefinite hiatus; the "Mimic," whose own academic voice is an echo of their peers; and the "staller," who masters the art of the strategic retreat to any haven but their desk. These students present a challenge as compelling as any academic subject, a puzzle that, when solved, could transform the very fabric of educational engagement.

The Slacker: a) Engagement Level-Demonstrates low engagement and appears disinterested in class material.; b) Approach to Learning-Tends to do the bare minimum, avoiding effortful engagement with the content.; c) Coping Strategies-Often pretends to work, may daydream, or distract others; d) Impact on Learning-Results in superficial learning with poor understanding and retention of information.

The Mimic: a) Engagement Level-Conditionally engaged; participation is often a mirror of peer behavior.; b) Approach to Learning-Relies on imitation, copying the work of others; c) Coping Strategies-Frequently seeks help from peers, taking cues from more engaged students without true comprehension.; d) Impact on Learning-Lacks personal understanding, heavily reliant on others' insights; critical thinking skills remain undeveloped.

The Staller: a) Engagement Level-Engages in avoidance behaviors to escape active participation in learning activities.; b) Approach to Learning-Uses evasive tactics to avoid direct engagement with learning materials.; c) Coping Strategies-Regularly requests to leave for bathroom breaks or engages in other tasks like sharpening pencils to stay off-task.; d) Impact on Learning-Experiences frequent knowledge gaps due to consistent inattention and missed learning opportunities.

Traditional teacher rituals and routines can unintentionally neglect the needs of "un-thinkers" by enforcing a one-size-fits-all approach that often prioritizes order and compliance over engagement and critical thinking. Such methods may stifle students who are deemed "un-thinkers".

Can Virtual Reality play a role in helping the "un-thinkers"? My pragmatic side would say, "Yes".

Have a look at my poster that outlines how VR might save the "slacker", "staller", and the "mimic".

Check out Dr. Peter Liljedahl book, "Building Thinking Classrooms in Mathematics, Grades K-12: 14 Teaching Practices for Enhancing Learning"

RESEARCH VS PRAGMATISM

For Virtual Reality



Research

2. VR causes greater learning

retention (debatable)

3. VR evokes greater empathy

(debatable)

Pragmatism

- 1. VR causes more learning and faster (debatable) 1. People learning in VR are usually amazed.
 - 2. People learning in VR usually want to come back for more.
 - 3. People learning in VR seem more curious about the experience.

By Craig Frehlich

Have you ever been in a situation where you just know based on intuition or gut response, something that no amount of data could have revealed to you? This intrinsic sense of understanding, often honed through years of experience, can be the guiding light through complex situations.

In the movie "Sully," during a courtroom scene, Captain Sully, portrayed by Tom Hanks, challenges flight simulator data presented by the National Transportation Safety Board. The data suggests he could have returned to the airport safely, instead of landing on the Hudson River. Sully argues that the simulations didn't account for human response time and real-world stress, which were critical factors in his decision. Upon his request, the simulations are re-run with adjustments for human reaction time, validating Sully's decision to land on the Hudson as the safer choice.

The courtroom scene from "Sully" illuminates a broader discussion concerning the balance between research (or data) and pragmatism (or practical experience) in decision-making. Finding a balanced approach as to when to rely on research vs pragmatism is always complex.

Take the use of VR as a tool to enhance learning. There are many debatable claims regarding the power of using VR as a tool for learning. Here are three: 1. VR causes more learning and faster; 2. VR causes greater retention.; 3. VR evokes greater empathy.

A great rebuttal by Heather Dodds, Ph.D. on the myths vs realities of XR for learning can be found here, https://lnkd.in/gEZun2tf.

Alas, not every "way of knowing" should be the domain of research.

I have spent over 10 years working with people in various VR labs around the world and have seen and heard some amazing things. Whilst the stories and vignettes (mostly good but some bad) will be saved for another day, I can tell you that I have collected enough qualitative evidence to firmly believe that VR is a tool that can make a positive impact on learning. I have heard countless comments from people who finish a learning session in a VR environment and say things like:

1. "Wow, I was just blow away at how impactful that was for me."

- 2. "When can I come back for more."
- 3. "Seeing things from this perspective has made me more curious about..."

Should we discount these experiences and stories? I hope not!

While researching the effectiveness of technology tools like VR in education presents its set of challenges, the endeavour is crucial. Given the growing integration of technology in learning environments, it's imperative to have these insights. Alas, this journey must also be balanced with stories from practitioners who are working in the field and sharing stories and insights into what they are observing.



Imagine you're tasked with building a house and you have very little experience.

In the world of Discovery-Based Learning, you're handed a pile of bricks and tools and left to your own devices, navigating through potential pitfalls and inefficiencies.

Discovery-based learning when you are just beginning to learn something new can have several pitfalls. Without structured guidance, students might arrive at incorrect conclusions or develop misconceptions that can be challenging to rectify later. Additionally, students may take a long time to grasp concepts that could be quickly understood with more direct instruction.

Contrast this with Explicit/direct Instruction, where an expert builder stands beside you, guiding you step-by-step, ensuring each brick is laid correctly and every nail is hammered with precision. Explicit instruction provides clear and structured guidance. This clarity minimizes confusion, ensures that foundational concepts are thoroughly understood, and reduces the likelihood of misconceptions developing.

In education, just as in construction, explicit instruction lays a robust foundation, setting the stage for learners to confidently innovate and expand upon their knowledge in the future.

Virtual worlds can be a great place to orchestrate Explicit instruction. They can present unique opportunities that can enhance learning that may not be feasible in a traditional physical classroom. However, be careful when designing virtual worlds to be used for explicit instruction.

What should you Do?

1. Provide clear learning goals and directions- clear learning goals and directions are crucial to anchor students' focus and optimize their learning journey. Such clarity ensures efficient navigation, bolstering purpose and motivation while preventing aimless wandering. It also facilitates effective time management, self-regulation, and teamwork by setting clear benchmarks.

2. Activate Prior Knowledge (with Posters)-activating prior knowledge through posters on the walls is advantageous due to their ability to swiftly engage learners with visual and succinct content. These posters act as immediate visual anchors, reducing cognitive load in an environment already demanding navigation skills. Unlike prolonged lectures or videos, posters allow students to process information in bite-sized chunks and at their own pace.

3. Using 3D assets to model examples of good and bad practices- In virtual worlds, 3D assets offer a superior learning experience over traditional methods like videos or PowerPoint slides. These assets allow for dynamic interaction, granting students a hands-on exploration that may foster deep understanding.

4. Give Immersive Feedback- Avoid providing feedback with pop-up screens that break immersion. Providing ongoing feedback on behaviour using virtual avatars in a virtual world holds distinct advantages over 2D pop-up screens, primarily due to the immersive nature of these environments.



From an educator's perspective, the integration of open virtual gaming platforms like Roblox and Fortnite into educational initiatives has brought a dynamic shift in how we engage with students in the classroom. Whilst having these options is opportunistic from an economic perspective, it is a careful dance from an educator's point of view. It's fascinating to witness how these popular gaming environments can be harnessed as tools for learning and pastoral care.

A recent announcement regarding the alignment of Lego (a very innocent and wholesome brand) and Fortnite (known for a more aggressive brand) has stirred some emotion within the educational community. Some key questions that should be asked when aligning these platforms to educational communities are:

1. What measures can they implement to ensure the safety of young users, including online etiquette and cybersecurity?

2. How can you foster a positive learning community within the platform?

3. How can teachers be integrated into the platform to provide guidance and support?

4. What is the revenue model for the platform, and how do we protect students from this system?

3-WAYS TO ENSURE POSITIVE EMOTIONAL LEARNING IN VIRTUAL REALITY



Joe Rohde, Disney Imagineer.

Do you remember your first trip to a Disney theme park?

For me, stepping into a Disney theme park for the first time was like diving into a storybook where every page sprung to vivid life. The familiar melodies, the iconic characters, and the meticulously crafted landscapes enveloped me in a world of wonder and awe. Every corner held a promise of a new adventure, evoking emotions so intense they etched themselves onto my soul. That first visit was more than a day out; it was an unforgettable emotional odyssey.

Should learning be any different?

According to Nick Shackleton-Jones, what we learn is closely tied to how we feel about the information and the context in which it is presented. Shackleton-Jones posits that traditional learning models, which often focus solely on cognitive processes, miss the mark by ignoring the emotional aspects of learning. He suggests that we are more likely to remember and internalize information that has emotional resonance or significance for us.

How do we supercharge our learners to ensure they develop emotional resonance and significance in our lessons? How do we enable them to feel learning?

Virtual Reality offers a unique platform for creating emotionally resonant learning experiences, aligning well with Nick Shackleton-Jones' concept of "affective context." These technologies allow for the creation of immersive environments that can evoke real emotions, thereby enhancing the learning process.

Getting them to a place of positive emotional engagement requires careful consideration, and is often referred to as a state of "Flow".

Flow, as conceptualized by Mihaly Csikszentmihalyi, is a state of deep absorption and enjoyment in an activity where individuals lose track of time and are fully immersed in the task at hand. Achieving flow in a VR learning experience involves the consideration of several factors. Here are three:

1. Have Clear Goals - The learner should know what they are trying to achieve. Goals should be broken down into smaller, achievable tasks to maintain engagement and provide a sense of accomplishment. The task or activity should be matched to the learner's skill level. If it's too easy, they'll get bored; if it's too hard, they'll become frustrated.

2. Provide Engaging Content- Use the power of VR to create immersive and interactive scenarios that can't be experienced in traditional learning environments. Allow the learner to be active and

incorporate storytelling elements to make the experience more relatable and memorable.

3. Reduce Extraneous Cognitive Loads- This can be accomplished through intuitive design, clear navigation and instruction. The VR interface should be user-friendly, with easy-to-understand controls. Moreover, ensuring physical comfort is crucial. Make sure the VR headset is comfortable to wear for extended periods and participants have an opportunity to sit down

Have Clear Goals





BY CRAIG FREHLICH

Why Do I Need a Digital **Twin For Learning?**



Has this ever happened to you?

As an avid traveller. I was thrilled to explore the vibrant streets of Barcelona. Before every adventure, I always took a digital photo of my passport, a tip I'd learned from my father. One evening, while savoring tapas at a local bar, my bag with my passport and valuables was stolen. Distraught, I reported the theft and headed to the Canadian embassy. Thankfully, I had the digital copy of my passport stored in my email. The embassy quickly verified my identity and issued a temporary travel document. The loss was a setback, but the digital backup was my saving grace, allowing me to continue my journey with peace of mind. This experience reinforced the importance of digital preparedness.

In education, creating a virtual twin of a building, school, or workplace for the virtual world offers numerous advantages. It provides an immersive learning environment, allowing students to interact with the infrastructure in ways that might not be possible in the physical world, thus providing several benefits. Here are three:

1) Reduce Anxiety, Stress and Discomfort- A virtual twin, a digital replica of a physical space, can significantly ease the transition for students entering a new environment. Allowing students to explore the institution's layout and facilities before arrival, reduces first-day uncertainties.

2) Accessibility- ensuring that students from different geographical locations can access the same resources and experiences without the need for physical presence. This can be a game-changer for remote learning, making education more inclusive.

3) Unlimited Opportunity to Practice- an exact digital replica of a physical environment, which offers unparalleled opportunities for skill development from home. It ensures 24/7 accessibility, allowing learners to practice at their convenience. The virtual setting ensures risk-free experimentation, especially in fields where errors can have serious consequences. With realistic simulations, instant feedback mechanisms, and cost-efficiency, learners can immerse themselves in diverse scenarios without the constraints of the real world.

While virtual worlds offer unparalleled opportunities to transport learners to contextually relevant environments, enhancing immersion and engagement, there's undeniable value in replicating real-world elements within these digital realms. Replicating real-world environments provides learners with a familiar foundation, making the transition to virtual learning smoother and less intimidating.

By Craig Frehlich

and Discomfort

To Improve Accessiblity

To Allow Unlimited

Practice

What is Active Learning?

Pseudo-Active Learning

Fun with Limited Purpose



Greek paper mâché



Math Number Hunt



Engaging with High Purpose



Visit Virtual Greece To Explore Artifacts



Solving Building Heights Using Trigonometry

In the nostalgic hallways of our school memories, many of us fondly recall the joy of tackling word searches. Those intricate grids of letters, where words played hide and seek, provided a delightful diversion from the routine of classroom lectures. We'd eagerly scan each row, feeling a rush of triumph every time we spotted a hidden word. Yet, as time-consuming and entertaining as they were, one can't help but wonder: did these puzzles truly offer any substantial educational value? Or were they just a clever way to keep us occupied?

While word searches might masquerade as an active learning technique, their contribution to genuine learning outcomes is arguably minimal. At first glance, they seem to engage students in a task that requires focus, pattern recognition, and vocabulary recall. However, the depth of cognitive engagement they offer is superficial. They don't necessarily challenge students to think critically, apply knowledge, or connect concepts in meaningful ways.

Additionally, I recall an experience with a student teacher named Eric, who had planned a unit on ancient Greek culture. The main activity had students creating Grecian urns using papier-mâché. While it was fun, it didn't align with the intended learning outcomes. See also, this blog, https://lnkd.in/gGAZ9QYZ

I have also seen this in virtual world experiences.

For example, recently I used a blaster to shoot numbers to learn my multiplication facts and teleported through an intricate maze as part of an elaborate scavenger hunt for meaningless facts.

The visual and kinesthetic elements of such activities could be seen as a departure from traditional rote memorization. However, from an instructional design standpoint, this method still falls short of true active learning.

Here's why:

-Surface-level Engagement: Shooting at numbers might engage the learner's motor skills and provide immediate feedback, but it doesn't necessarily engage higher-order cognitive skills.

-Lack of Contextual Relevance: Active learning emphasizes the importance of context. Learning times tables by shooting numbers lacks a real-world context or relevance. Without understanding the practical application or significance of multiplication, the learner might not grasp the underlying concept or its importance.

True active learning goes beyond mere participation in a task. It emphasizes deep engagement, where students are not just passive recipients of information but are actively involved in constructing knowledge. This can be achieved through strategies like problem-based learning, where students tackle real-world problems; and reflective practices, where they introspect on their learning journey. These methods require students to analyze, synthesize, and evaluate information, fostering a deeper understanding of the subject matter. In contrast to the fleeting satisfaction of finding a word on a grid or shooting a number in the air.

By Craig Frehlich

VR For Conceptual Understanding



Teaching and Learning in Virtual Worlds

VR and It's Superpowers

We have learnt a lot about how the brain works in the last decade. And,more importantly, why some learning activities result in more robust understanding that promotes long-term memory whilst others do not. Learning that is "sticky" requires time and careful consideration.

Our brain stores information and organizes facts better when it is connected as a bundle or schema. This is best done through providing learners with conceptual understanding related to "big ideas" like power, systems, and identity. Teaching facts in isolation through rote memorization and note taking will minimize the possibility of it becoming part of our long term memory. However, taking the time to solidify facts through concepts will provide a greater probability that the learning is stored for future use.

Virtual reality can play a big role in building conceptual understanding. We may begin our instructional journey by providing mico-learning of low level facts, but VR can help cement these isolated bits into a more memorable bundle. For example, we might teach students in biology about valves, artia, ventricles and arteries, but then use VR to allow them to practice through a game like "surgeon simulator". Or, we might teach students about the parts to a hero's journey and send them into a VR narrative experience like "Manifest 99" whereby they have control and agency over the plot of the story to fully understand character identity.



Imagine walking into a gourmet kitchen. The chef doesn't use a cleaver to peel an apple, nor does he choose a paring knife to chop a thick slab of meat. In the world of education, the scenario is strikingly similar. Just as that chef understands the nuances of each knife and its purpose, educators must discern which tools best fit the learning outcome at hand.

Review and retrieval practices are not one-size-fits-all. Some learning outcomes may benefit from the precision of a short quiz, akin to the delicate work of a paring knife, while others might require immersive depth, much like the broad strokes of a chef's knife.

In both the kitchen and the classroom, mastery comes not just from skill, but from matching the right tool to the task, ensuring every endeavour is a recipe for success. So how do we align our curriculum to the right tool?

Worksheets have been a staple in classrooms for decades, and for good reason. They are particularly effective for certain types of learning outcomes:

1. List-Worksheets provide a structured format for students to list down points, whether it's the causes of World War I, the symptoms of a disease, or the phases of the moon. This structured format helps in organizing thoughts and information in a linear manner.

2. Define- When students need to understand and remember specific definitions, worksheets are an excellent tool. They allow students to write down definitions in their own words, aiding retention.

While worksheets excel in knowledge acquisition, immersive VR offers an entirely different set of advantages:

1. Hands-on Learning- VR provides an interactive 3D environment where students can practice skills in a safe and controlled setting. Whether it's a medical student practicing a surgical procedure or a trainee pilot navigating a flight, VR offers a hands-on learning experience.

2. Empathy and Caring: One of the most profound advantages of VR is its ability to foster empathy. By immersively placing students in scenarios, they can see the world through another's eyes. For instance, experiencing the life of a refugee or the daily challenges faced by someone with a disability can cultivate deeper understanding and compassion.



Do you remember Michael Jackson's song, "Man in the Mirror"...

"I'm starting with the man in the mirror I'm asking him to change his ways, And no message could have been any clearer, If you want to make the world a better place, Take a look at yourself, and then make a change"

The song emphasizes the importance of looking inward and evaluating one's own actions and beliefs. It suggests that change starts with the individual, advocating for personal responsibility in making the world a better place.

Alas, exploring one's own identity is not easy. Especially if you are trying to do it in a mirror!

One tool that might be neat to explore and help learners interrogate their changing identity could be using a digital twin AI avatar. Interacting with an AI avatar of yourself in a virtual world could offer several learning benefits. However, the extent of these benefits would depend on the capabilities of the AI and the design of the virtual environment. Here are some potential advantages:

Interacting with an AI avatar of yourself in a virtual world may offer a multifaceted approach to personal growth and learning. The avatar could serve as a mirror for self-reflection, providing feedback on your thoughts and actions while analyzing your past behaviour to offer actionable insights. It may act as a training ground for enhancing communication skills and emotional intelligence, allowing you to practice active listening and emotional response management. The AI's computational abilities might be harnessed for problem-solving and data analysis. Beyond cognitive benefits, the avatar might offer unique emotional support, understanding your preferences and thought patterns to provide stress relief and personalized motivation. It can also be a platform for ethical and moral development, facilitating debates on ethical dilemmas and offering moral support based on your own value system.

Giving an AI avatar in a virtual world information related to your own persona might be a unique and motivating way to embark on self-reflection and identity exploration. However, it has it's potential risks some of which are:

-The potential for AI to reinforce existing biases and Over-reliance on the AI for emotional support could be problematic. Or, The AI's understanding of you would be limited to the data it has, which may not fully capture the complexity of human experience.



As a teacher with a daughter who has severe allergies, I've always felt a heightened sense of responsibility regarding EpiPen training. This isn't just a professional development box to tick; it's a matter of life and death that hits close to home. I've already spent countless hours researching anaphylaxis, understanding its triggers, and practicing how to administer an EpiPen. I've even had the unfortunate experience of using it in a real-life emergency. So, when I walk into a training session, I'm looking for something simple in the form of a checklist to guide my training.

This is a stark contrast to some of my colleagues who are just being introduced to the concept. They will need to be taught why it is important to care about the training and build empathy. Additionally, they need to start with the fundamentals, like how to recognize the signs of an allergic reaction and the step-by-step process of administering an EpiPen. They need to embark on learning how to confidently and safely deploy an EpiPen for the first time.

Given my extensive experience with severe allergies—both as a parent and as someone who has had to administer an EpiPen in a real-life emergency—I already possess a high level of care and confidence in using the device. For me, the tactile, emotional, and cognitive aspects of handling an anaphylactic situation are not theoretical; they are part of my lived experience. I've navigated the stress, the urgency, and the relief that comes with successfully using an EpiPen, so the immersive experience that Virtual Reality (VR) training offers wouldn't necessarily add a new layer of understanding or skill for me.

On the other hand, my colleagues who are less familiar with the severity of anaphylactic reactions could greatly benefit from a VR training experience. Virtual Reality can simulate the urgency and gravity of a real-life situation in a way that a lecture or a pamphlet cannot. It can help to bridge the gap between theoretical knowledge and practical, hands-on experience, providing an emotionally charged, realistic scenario that demands quick thinking and precise action. This kind of immersive training could be invaluable for instilling a sense of urgency and care, helping them move from a state of low confidence to one of assured competence. It's one thing to know the steps in theory, but it's another to have "experienced" it, even if that experience is virtual. Therefore, while I might not gain much from a VR training module, it could be a game-changer for those who are new to the concept and responsibilities of handling an EpiPen.



Imagine walking down the streets of New York, lost in thought about your upcoming exams and wondering if all the hard work will ever pay off. Just as you're about to cross the street, you bump into someone. You look up, and there he is—Bill Gates, the tech visionary you've always admired. You apologize, expecting him to rush off, but instead, he smiles and asks what's on your mind. You share your worries about your education, and he offers a piece of advice that resonates deeply with you: "Remember, failure is an option here. If things are not failing, you're not innovating enough."

That brief encounter becomes a pivotal moment in your life. You go back to your studies with renewed vigour, embracing challenges as opportunities for innovation. Years later, you find yourself leading a team of engineers, and that chance meeting still serves as your guiding star.

Now, imagine if educational experiences could capture even a fraction of that inspiration and personal connection. What if learners had the chance to interact with the people who have shaped history, technology, or culture? The impact would be immeasurable, turning mere interest into lifelong passion and transforming educational journeys into unforgettable adventures.

Wouldn't you want to be part of such a transformative learning experience?

In today's rapidly advancing technological landscape, the dream of recreating transformative encounters like meeting Bill Gates on a New York street is becoming a reality. Thanks to the development of conversational AI avatars in virtual worlds, we can simulate such life-changing interactions, bringing a new dimension to educational experiences.

Incorporating socially important people such as key historical figures and individuals with high social status into learning design can have a profound impact on learner motivation and emotional engagement. Here are 3 benefits:

1. Real-World Connection-Learning often becomes more meaningful when it is tied to real-world applications. The lives and achievements of socially important people provide concrete examples of how theoretical knowledge can be applied in practice, making the learning experience more relevant and relatable.

2. Emotional Connection-Stories of struggle, success, and innovation from key figures can evoke emotional responses that make the learning experience more memorable. Emotional engagement is a key factor in long-term retention and application of knowledge.

3. Personal Connection-Interacting directly with these individuals allows learners to form a personal connection, which can make the learning experience more emotionally impactful. Emotional connections often lead to better retention and a deeper understanding of the subject matter.

HOW TO STRENGTHEN LEARNING

Imagine this: You've just visited a bustling pottery market for the first time, mesmerized by the intricate designs and the expert craftsmanship of the potters. Inspired, you decide you too want to become an expert potter.

You go home, eager to create your own masterpiece. You set up your pottery wheel, gather your clay, and start spinning. But despite your enthusiasm, your first attempts are far from the elegant pieces you saw at the market. Frustrated, you realize you've practiced very little, focused only on making bowls, and did so in a makeshift corner of your garage, far removed from the inspiring atmosphere of a real pottery studio. What went wrong?

In the quest for effective learning and long-lasting retention, three science-backed strategies stand out: Spaced-Out Practice, Varving the Type of Practice, and Practicing in Context.

Spaced-Out Practice-Instead of cramming all at once, this approach advocates for distributing learning sessions over a period of time-days or even weeks. The psychological spacing effect comes into play here, reinforcing neural pathways each time you revisit the material, making it easier to recall later.

Varying the Type of Practice- This strategy involves mixing different topics or skills in a single study session, rather than focusing on just one. Interleaving enhances your brain's ability to differentiate between similar but distinct concepts, thereby improving retrieval and application of knowledge.

Practicing in Context-This involves practicing in an environment closely mimicking the real-world context where the skill or knowledge will be applied. Learning in context creates strong associations between the information and the environment, making it easier to remember and apply when you're in that setting again.

So, if you're tired of spinning your wheels and ready to shape your destiny, why not consider adopting tools that might support these 3 powerful strategies?

Virtual Reality (VR) and Virtual Worlds offer innovative ways to enhance key retrieval strategies for effective learning. VR's adaptive and varied scenarios allow for a mix of challenges that require different skills or knowledge areas, thereby enhancing the brain's ability to differentiate between concepts. Furthermore, VR's immersive environments provide the perfect setting for contextual learning, mimicking real-world conditions to improve both retention and application of knowledge. Coupled with the engaging nature of VR and the instant feedback it provides, these platforms offer a comprehensive and effective approach to mastering the art of retrieval.

Retrieval Strength



Retrieval Strength



By Craig Frehlich

Practice Experiences



spaced practice

variable practice

contextual practice

limited practice

Learning

Experience

The Old Model: A Relic of the Past-As someone who has spent years in the educational system, both as a student and as an educator, I can't help but feel frustrated at times by the outdated model that continues to dominate some of our schools and universities. This model, which emphasizes rote memorization, standardized testing, and a one-size-fits-all approach, lacks variety and engagement. It perpetuates a cycle of boredom, fear, and anxiety, leaving little room for creativity, critical thinking, and an opportunity to appreciate and enjoy more personalized learning.

The Problem with Rituals-The rituals of traditional education—tests, lectures, excessive homework—are not inherently bad. They were designed with the intention of standardizing knowledge and skills. However, they have become so deeply ingrained in our educational culture that we have lost sight of their original purpose: to facilitate learning. Instead, these rituals have become the end goal. Students cram facts into their heads for the sake of passing a test, not for the sake of understanding.

The New Model: Learner-Centric, Implicit, Playful, Context-Driven- It's time for a bit of a paradigm shift. We need to move away from an education system that is heavily teacher-centric, explicit, and decontextualized, and towards a greater balance that is learner-centric, implicit, playful, and context-driven.

Learner-Centric-In a learner-centric model, the focus is on the individual needs, interests, and abilities of each student. This means more personalized learning paths, more choice, and more agency for students.

Implicit Learning-Implicit learning occurs naturally, without conscious effort. Think about how you learned your first language or how to ride a bike. No one gave you a multiple-choice test on grammar rules or bike parts. You learned by doing, by making mistakes, and by gradually improving. Our educational system should make room for this kind of learning.

Playful Learning-Play is not just for preschoolers. Playful learning can and should be a part of education at all levels. When students are allowed to explore, experiment, and be creative, they are more engaged and more likely to retain what they learn.

Context-Driven-Learning doesn't happen in a vacuum. It is always influenced by context—cultural, social, historical, etc. By making learning context-driven, we make it more relevant and meaningful for students.

The Way Forward-The shift to a new educational model won't happen overnight, and it won't be easy. It will require a collective effort from educators, administrators, policymakers, parents, and students. It will require us to question long-held beliefs and to be willing to try new approaches like AI, Virtual worlds and Virtual reality.

But the rewards—a more engaged, more creative, more well-rounded generation of learners—are well worth the effort.





It's time to reduce the days of chalk and talk, and say hello to a universe of immersive learning. With VR, you're not just a teacher; you're a tour guide to new dimensions of understanding.

2D Assets vs. 3D Assets

a) Traditional Classroom: 2D Assets -In a traditional classroom, you're often limited to 2D assets like textbooks and PowerPoint slides. While these can be efficient, they often lack the depth and engagement that come with more interactive forms of learning. Students see flat images and texts that they must interpret and visualize in their minds, which can be a barrier to understanding complex concepts.

b) Virtual Reality Classroom: 3D Assets- Here, students can walk around a historical monument, explore the inner workings of a machine, or even traverse the human circulatory system. The 3D environment allows for a more comprehensive understanding, making abstract or complex ideas easier to grasp.

One Direction of Learning vs. Transdirectional Learning

a) Traditional Classroom: One Direction of Learning- In a conventional setting, learning is often unidirectional—from the teacher to the student. The teacher imparts knowledge, and the students passively receive it. While there may be some opportunities for questions and discussions, the flow of information is primarily one-way, which can limit student engagement and understanding.

b) Virtual Reality Classroom: Transdirectional Learning -Not only do students learn from the teacher, but they also learn from interacting with the virtual environment and each other. They can explore, experiment, and even make mistakes in a safe, virtual space, gaining different perspectives that enrich their understanding. The teacher becomes more of a facilitator in this learning ecosystem, guiding students through multi-directional information flows.

Sit and Listen vs. Try and Do

a) Traditional Classroom: Sit and Listen- The age-old "sit and listen" model has students in rows, attentively (or not so attentively) listening to a lecture. This passive form of learning relies heavily on the student's ability to focus, take notes, and hopefully retain the spoken information for later use. It's a model that has worked for centuries but is increasingly criticized for not engaging or effective enough for modern learners.

b) Virtual Reality Classroom: Try and Do- Students are not just passive recipients of information; they are active participants in their learning journey. They can practice surgical techniques, conduct virtual chemistry experiments, or recreate historical events, all while receiving real-time feedback. This hands-on approach enhances engagement and significantly improves retention and application of knowledge.

While traditional classrooms have their merits, the advent of virtual reality in education offers an immersive, interactive, and multi-directional learning experience that is hard to match. So, are you ready to take your teaching into the next dimension?



Imagine a classroom where every student receives personalized instruction from a teacher who never tires, adapts to individual learning styles, and is available 24/7. This isn't science fiction; it's the future of education, powered by AI avatars in virtual worlds. Welcome to a revolution in learning where the boundaries of time, space, and pedagogy are redefined.

In traditional classrooms, one teacher is responsible for the education of a diverse group of students, each with their own unique learning needs, styles, and paces. The teacher must divide their attention, often leaving some students feeling left behind while others are not sufficiently challenged. But what if we could level the playing field? What if every student could have a 'personal tutor' designed to meet their specific educational needs? That's where Al avatars in virtual worlds come into play.

Ai virtual avatars are no longer found in the realm of science fiction movies, they are now part of the landscape of many virtual world platforms

Here are 3 Ways AI Avatars are starting to disrupt learning:

1. Greater levels of student comfort in asking for help: Students may feel more at ease asking an AI tutor in a virtual world for help over a real teacher due to a range of factors. The anonymity and non-judgmental nature of AI can alleviate fears of ridicule or judgment, allowing students to ask questions freely. The absence of social pressure, immediate feedback, and 24/7 availability make AI tutors highly accessible and responsive. Additionally, the consistency and customization capabilities of AI can offer a tailored learning experience that adapts to individual needs. While not a replacement for human teachers, AI tutors can offer low-stakes and personalized educational support.

2. Reduce Teacher Workload: An AI tutor avatar in a virtual world could significantly alleviate teacher workload by automating various educational tasks. These include automated grading and immediate feedback, providing personalized learning paths for students, and being available 24/7 for student queries, thereby reducing the teacher's administrative burden and time spent on answering questions outside of class. The AI can also offer data-driven insights to inform teaching strategies, generate additional learning materials, and engage students in a way that minimizes classroom management issues. By handling these routine tasks, the AI allows teachers to focus on more complex and personalized aspects of education, such as fostering critical thinking and emotional support.

3. Role-Play agents for a variety of Situations- An Al tutor avatar with a persona in a virtual world can offer a unique and immersive way to role-play real-world situations, thereby enhancing the educational experience in several ways. For example, they might play historical figures like Abraham Lincoln or Marie Curie. Or, they could play a victim in a medical disaster scenario.



As education increasingly embraces VR, the battle for student attention in the learning space is intensifying, and not just among traditional educational platforms. Gaming companies like Roblox, RecRoom and VRchat are emerging as unexpected competitors in this arena.

As an expert educator observing the trends in virtual learning spaces, it's fascinating to see how students are taking advantage of these platforms for educational purposes. However, there are several reasons why unsupervised experiences in these virtual worlds may be less effective compared to guided, traditional educational experiences. Here are some reasons:

1. Lack of Structured Learning-In traditional educational settings, the curriculum is designed to be sequential and structured to ensure that students gain a comprehensive understanding of the subject matter. In open-ended virtual worlds whereby the learning goal is not supervised by the teacher, students may adopt incorrect or incomplete understandings of topics.

2. Social and Emotional Development-Teachers play a significant role in the social and emotional development of students, including fostering a classroom culture and resolving conflicts. Unsupervised virtual environments may not provide the same level of emotional and social guidance.

3. Consumerism and Materialism-Constant exposure to in-game advertising and purchasing options may encourage a materialistic outlook, where the acquisition of virtual goods becomes a priority or status symbol among peers.

4. Conflict-Without adult supervision, children may be exposed to inappropriate content or interactions in virtual worlds. Teachers act as a safeguard against this, ensuring that the educational content and social interactions are appropriate and safe.

Both physical classrooms and educational virtual worlds should be supervised to ensure a safe, structured, and equitable learning environment. In the classroom, teachers provide real-time feedback, enforce safety measures, and offer a balanced curriculum while helping students develop social, emotional, and ethical competencies. These roles are equally crucial in virtual worlds to guard against risks like cyberbullying, exposure to inappropriate content, and educational inequities. Just as legal guidelines mandate supervision in physical educational settings, similar oversight should be considered essential for maintaining the quality and integrity of educational experiences in virtual worlds.

My recommendation is to focus on virtual world learning experiences that are carefully curated by educators who have been intimately involved in the classroom and learning process. Having educators in the same space as learners is key. Closed virtual world products like *WirtoryXR*, Imedu, Zoe, Edumetaverse, EngageVR, Kabuni and others that do not allow students to enter a space without educators being present or aware of who is going into the space are the gold standard.



Have you ever had to teach or explain something really difficult? Take driving for example. You can not teach the complex nuances of how to drive using just a textbook or lecture. We call this type of knowledge, Tacit Knowledge.

Tacit knowledge is a form of knowledge that is difficult to articulate, formalize, or share in a concrete way. It's often contrasted with "explicit knowledge," which can be easily documented, communicated, and taught. Tacit knowledge is deeply personal and rooted in individual experience, context, and intuition. It often involves skills, ideas, and experiences that one may not be consciously aware of. For example, the ability to read social cues in a negotiation, the craftsmanship skills like those possessed by a master carpenter, or the intuitive understanding of a complex system, all fall under the umbrella of tacit knowledge.

Teaching tacit knowledge is like trying to bottle intuition—it's an elusive wisdom that often defies explicit instruction.

It requires the skills of a magician or alchemist who prides themselves on the learning journey. The alchemical process is not just about the end result; the journey or the transformation is seen as equally important.

One essential tool the teacher alchemist has at their disposal to teach elusive and difficult tacit knowledge is Virtual Reality. Here are some examples of how VR can help teach various types of tacit knowledge:

1. Driving-Virtual reality allows learners to practice driving in a safe, controlled environment, free from the dangers and pressures of real-world driving. This can be particularly useful for beginners who are not yet ready to navigate actual streets. Furthermore, VR can simulate various driving conditions such as rain, snow, or heavy traffic, enabling learners to practice and adapt to different scenarios they may encounter on the road.

2. Medical Diagnosis-VR can create highly realistic patient scenarios where medical students can practice diagnosing a variety of conditions without any risk to actual patients. Virtual environments can provide immediate, detailed feedback on diagnostic choices, helping students understand the consequences of their decisions and improve their diagnostic skills iteratively.

3. Negotiation Tactics-In a VR setting, you can role-play with virtual characters programmed to emulate different negotiation styles and tactics. These characters can range from cooperative to confrontational, allowing the learner to practice different strategies.

4. Traditional Practices- (le. Farming) VR can emulate various weather conditions, soil types, and seasons, allowing farmers to practice making judgments under different scenarios, such as when to plant or harvest.

By simulating real-world scenarios and conditions, VR bridges the gap between theory and practice, helping learners internalize the intuitive skills that are difficult to teach through traditional methods.

CERTRINTY VS VARIETY			
A Typical Progression of Learning			
Day 1 (Lecture)	Day 3 (Practice: Worsksheet #1)	Day 5 (Practice: Worsksheet #2)	Day 7 (Practice: Worsksheet #3)
A New Progression of Learning			
Day 1 (Lecture)	Day 3 (VR: Review Session)	Day 5 (VR: Simulation)	Day 7 (VR: Serious Game)
New Topic			
By Craig Frehlich			Frehlich

Do you go to church? I sometimes do. And I usually sit in the same spot every time.

Many humans love routine and continuity. Why is this?

The inclination towards continuity over variety arises from a confluence of multiple factors. Individuals naturally lean towards the comfort of the known and familiar. Additionally, opting for continuity demands less cognitive exertion compared to the perpetual pursuit of novelty. Venturing into uncharted territory introduces an element of uncertainty and potential risk. Furthermore, embracing continuity can foster heightened emotional bonds with specific experiences.

Choosing continuity over variety often holds true for teaching.

Take lesson design as an example.

We know from research that after teaching new content we should review that information over a period of time: spaced practice. Yet, it is not typical to see teachers deploy a variety of different strategies or tools to engage students in spaced practice. The common method in the schools I have seen is the dreaded worksheet.

Yet, differing the type of practice may lead to greater levels of interest and engagement.

For example, after delivering new content why not take students into a Virtual World to view information from a new perspective via an immersive review session, simulation and/or serious game?

Incorporating a range of active immersive learning retrieval practice methods in place of worksheets can create a more dynamic and effective learning environment, where students are actively involved, motivated, and better equipped to retain and apply their knowledge.



As an adult have you ever sat through a training session that was boring and highly ineffective?

Enduring unengaging training sessions composed of irrelevant lectures that offer minimal practicality to our everyday lives can be extremely painful and a significant misuse of our time.

Learning experiences should be catered to their audience. Although we may not have the opportunity to do a deep dive into the detailed characteristics that make up our target group of learners there are some general personalities that define many. Take adult learners as an example.

Andragogy is a theory of adult learning that was developed by educator Malcolm Knowles in the 1970s. It focuses on the unique characteristics and needs of adult learners and proposes principles for effective adult education. Andragogy is often contrasted with pedagogy, which refers to the teaching methods and approaches used with children.

Here are some common characteristics of Andragogy:

1. Adults bring a wealth of life experiences to the learning process.

Adult learners often have busy schedules due to work, family, and other commitments.
They thrive when they can apply what they are learning to real-world practical situations.
Adult learners are more self-directed and autonomous in their learning compared to children.

When we look at this list and think of what makes VR and Virtual World experiences so powerful, we can see huge connections and compatibility.

Andragogical principles seem to align well with virtual learning superpowers. To ensure that the design and delivery of education align with the unique needs, motivations, and preferences of adult learners, why not consider adding VR and Virtual Worlds to the learning journey?

This compatibility has the potential to create a strong learner-centred approach that promotes effective learning outcomes and a positive educational experience for adult learners.

TWO WAYS VR CAN BE USED **TO IMPROVE LEARNING AND** PERFORMANCE VS SPACED OUT FLOODING VS SINGLE CONTEX **BY CRAIG FREHLICH**

Still trying to convince others that VR or Virtual Worlds have a place in education? Is there research that provides valid and reliable data beyond a small localized sample size and is not survey-based?

These pivotal inquiries challenge many individuals when contemplating the utilization of immersive learning technologies like VR and virtual worlds.

Yet, rather than adopting a narrow perspective, why not broaden our outlook?

Let's contemplate this... There exist numerous established educational practices that have proven effective, and VR and Virtual Worlds could potentially contribute to reinforcing and elevating learning and performance related to these research-backed practices.

Here are two.....

1. Spaced Practice- If tasked with watering the lawn, which option would you choose? a) Water it extensively on the first day, running the sprinkler for several hours to saturate the area, and completing the task for the entire week. b) Water it every other day, spending shorter intervals of around 30 minutes each time, gradually using the hose to add small amounts.

While the second approach demands greater exertion, it is likely to result in a lusher, more vibrant, and healthier lawn.

The same is true for learning. Spacing out learning over time is a more effective learning strategy compared to trying to learn something all at once. Each time you retrieve information, you reinforce the neural connections associated with that information, making it easier to remember in the future. However, finding ways to space out the learning experiences so it is interesting and engaging can be difficult. Many educators begging and end with a lecture. Why not start with a lecture and expose students to a virtual world simulation or case study?

2. Varied Context- Varying the context of learning has been shown to be more effective than teaching and learning in a single context due to several cognitive and psychological factors. When context varies, learners must actively engage with the material to discern the appropriate approach for each context. Varying the context encourages learners to identify the underlying principles or patterns that link different concepts or skills which leads to deeper understanding. Many educators deliver learning experiences in the classroom setting. Why not start there and then take them on a virtual field trip tosomewhere amazing!

Virtual reality (VR) and virtual worlds offer educators an additional valuable asset to enhance their expanding collection of pedagogical tools. This resource aids teachers in crafting an engaging learning experience that incorporates captivating practice sessions that are spaced out over time and exposes learners to diverse contexts throughout their educational journey.



Have you ever had to teach something? Easy right?

Find the information you need to deliver, review it, and deliver it!

Teaching and learning are far from being this BLACK AND WHITE.

There is a tug of war in regard to the many competing factors that determine an excellent learning journey. And, having a deep understanding of how to balance these factors is key!

In the world of education, contradictions can arise due to the complexity of the learning process and the various factors that need to be considered. Here are a few:

-Content Depth vs. Time Constraints: There is often a tension between covering in-depth content and the limited time available for instruction. Instructional designers must decide how much content to include without overwhelming learners or sacrificing depth and understanding.

-Knowledge vs Inquiry: Knowledge acts as a foundation for inquiry. Without a basic understanding of key concepts and principles, students may struggle to formulate meaningful questions or make informed judgments during the inquiry process. Moreover, inquiry-based learning encourages students to actively participate in the learning process by asking questions, exploring ideas, and seeking answers.

-Standardization vs. Personalization: Designing standardized learning experiences ensures consistency and ease of implementation, but it may not address individual learners' unique needs and preferences. Striking a balance between standardization and personalization is essential to accommodate diverse learners.

-Cognitive Load vs Engagement: Designers aim to create engaging learning experiences, but they must also be mindful of the cognitive load placed on learners. Too much complexity or multimedia elements can overwhelm learners and hinder comprehension.

-Ease of Use vs Challenge: When a learning experience is too easy, learners may become disengaged and lose interest. On the other hand, if it is excessively challenging, learners may feel overwhelmed and discouraged. Striking the right balance keeps learners engaged and motivated to continue learning.

-Beginner Learner vs Expert Learner: If the learning experience is too advanced for beginners, they may feel frustrated and discouraged. On the other hand, experts might become frustrated if the content is too rudimentary for their level of expertise.

Effective teachers seek to create cohesive and meaningful learning experiences by finding the right balance between these conflicting elements.



Do you remember the Covid Pandemic?

We were asked on several occasions to inject our bodies with vaccines that would help our immune system to protect us against the disease. But, why so many booster shots? Why does our immune system forget?

Unfortunately, our immune system contains cells that decline in numbers and forget over time what certain invaders look like so we need boosters to help improve our immune response.

This is true for learning.

Forgetting a huge chunk of what we learned, especially if it is new is not:

-Laziness -ADHD -Or some other learning disorder

It is a sign that the brain is working as it should. In short, our brain is wired to forget.

The brain only holds on to what is relevant, useful and interesting!!!!!

Thus, Virtual worlds and VR can play a huge role in this situation.

VR can provide relevant content by affording environments that are contextually appropriate

VR can provide hands-on experiences that are meaningful and engaging.

Providing learners with a "booster shot" that engages them in previous content from a new perspective will help them with the confidence, feedback and motivation needed to continue on the path toward life-long learning.



By Craig Frehlich

Have you ever watched a learner who lacked the self-esteem and self-confidence to continue the learning journey? Low self-confidence can have a significant impact on learning.

When someone lacks self-confidence, they may doubt their abilities and potential. This can lead to a decrease in motivation to learn and pursue new challenges. The fear of failure or not measuring up to expectations can make learning seem daunting and unattainable.

Low self-confidence can lead to negative thoughts and self-doubt, which can be distracting during learning activities. Instead of focusing on the subject matter at hand, individuals may focus on their perceived inadequacies or worry about what others might think of their performance.

As an educator passionate about empowering students, there is remarkable potential for Virtual Reality (VR) in building learner confidence. VR can revolutionize the learning experience. Here are four crucial elements that VR can provide to build learner confidence:

1) Repeated Practice: VR allows learners to engage in repetitive exercises, honing their skills and knowledge through practice, practice, and more practice! Repetition is key to mastering any subject, and with VR, learners can confidently immerse themselves in various scenarios until they feel fully competent.

2) Private Learning Spaces: The power of VR lies in its ability to create a safe and private environment for learners. By practicing concepts away from the judgmental eyes of others, learners can freely explore and experiment without fear of embarrassment. This promotes a positive and self-paced learning experience.

3) Real-life Context: Gone are the days of learning in abstract spaces! VR brings the real world into the classroom, providing learners with practical, real-life contexts to apply their knowledge. Whether it's simulating a scientific experiment or practicing public speaking in a virtual auditorium, learners build confidence by seeing the direct application of their skills in the world around them.

4) Active Learning: Learning should be a dynamic, engaging process! VR facilitates hands-on experiences that capture learners' attention and encourage active participation. Through interactive simulations and role-playing, learners can deepen their understanding while enjoying the thrill of learning by doing.

By incorporating Virtual Reality into educational practices, we empower learners to confidently step out of their comfort zones and embrace new challenges. The impact of building this self-assurance extends beyond the classroom, enabling learners to approach real-world situations with resilience and adaptability.

THE ASSEMBLY LINE OF LEARNING





By Craig Frehlich

"I never teach my pupils, I only provide the conditions through which they might learn." (Albert Einstein)

Have you ever worked on an assembly line? This fast-paced and high-stress environment can sometimes be very challenging and demanding.

What about an assembly line of learning?

As teachers we want our students to enjoy the challenges of a learning journey and feel confident and engaged as they progress through an experience.

So how can we provide the conditions necessary for them to be efficient learners on the assembly line of learning?

Learning efficiency refers to how effectively and quickly an individual can acquire new knowledge or skills. It measures the rate at which learning occurs relative to the resources invested in the learning process. A higher learning efficiency means that a person can grasp and retain information more easily and can apply that knowledge effectively.

There have been statistics thrown around regarding the quantitative differences between learners in VR compared to traditional learning modalities like videos. For example, according to a study by PwC learners can be trained up to four times faster. Whilst I have my reservations regarding the validity and reliability of their data and study, I do have some thoughts and predictions about why VR might have the potential to be a valuable tool to improve learning efficiency. Here are three reasons why VR has to potential to increase learner efficiency:

1. Distractions-VR can reduce the number of distractions because the HMD blocks out most of the unwanted visual "noise" around us. When learners put on a VR headset, they are transported to a virtual world that is specifically designed to align with the learning objectives. This immersive experience can help students stay focused and reduce the likelihood of external distractions.

2. The Use of Visual Cues or Signposts- Visual cues or signposts are visual elements that provide guidance, direction, or information to aid in understanding and processing information. Common examples of these in education are arrows and numbers. They help learners associate new information with existing knowledge and can make learning more engaging and interactive. Learners are more likely to pay attention and stay focused when the content. In VR, the strategic use of these elements is much more prevalent than in traditional learning.

3. The rewards associated with learning- Rewards associated with learning can be both intrinsic and extrinsic. Intrinsic rewards come from the enjoyment of learning itself, while extrinsic rewards are external incentives that encourage and reinforce the learning process. In VR we can heighten the intrinsic motivation by providing emotional experiences that spark awe, wonder, curiosity and exploration. Moreover, we can design learning experiences that provide instant extrinsic feedback in the form of audio and visual cues when a learner has successfully performed a learning engagement.

WORKED EXAMPLES

In Virtual Worlds



How are you using virtual worlds to enhance your teaching and learning? One common example is scavenger hunts and virtual museums. Whilst these are great ways to start your journey into adopting virtual worlds into your curriculum, I want to present another creative way to use virtual worlds in this article.

Research supports many effective teaching strategies, which can assist learners in transcending the monotonous and unstimulating pattern of merely attending lectures and undergoing testing routines. According to (Neelen and Kirschner), worked examples are one such strategy.

Worked examples are teaching tools that provide step-by-step demonstrations or solutions to problems or tasks. They are carefully designed to guide learners through the process and help them understand the underlying concepts and strategies employed by experts in a particular domain.

Worked examples are an effective teaching strategy for several reasons:

1. Cognitive Load Reduction: By presenting the solution in a structured and organized manner, learners can focus their attention on understanding the problem-solving process rather than struggling with the mechanics or details.

2. Scaffolding Learning: They offer a clear and structured model that learners can follow, breaking down complex tasks into manageable steps. This scaffolding helps learners gradually develop their skills and understanding, building a foundation for independent problem-solving.

3. Error Identification and Correction: By analyzing worked examples, learners can compare their own problem-solving attempts with the correct solution. This allows them to identify and understand their mistakes, misconceptions, or gaps in knowledge.

4. Transfer of Learning: By exposing learners to various examples that illustrate different problem-solving scenarios, they develop the ability to apply their knowledge and skills to new and unfamiliar situations.

5. Expertise Development: Studying worked examples allows learners to observe and internalize the thinking patterns and strategies employed by experts in the field. By repeatedly engaging with well-designed examples, learners can develop their expertise, acquire problem-solving heuristics, and develop a more nuanced understanding of the subject matter.

Virtual worlds can be an excellent medium to expose learners to worked examples.

Case studies, which are a type of worked example, can be presented to a learner inside a virtual world exposing the participant to a real-life situation in 3D. The learner must then analyze the situation and come up with a decision.

Having a coach or instructor follow up on the outcome and process is a key element in the learning experience. This might be facilitated through video or face-to-face discussion.

Neelen, Mirjam, and Paul A. Kirschner. Evidence-Informed Learning Design: Creating Training to Improve Performance. P 210-213. 2020.

3 Ways to Move VR Beyond DELIVERY



Goals or Learning Outcomes



Knowledge|Content

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Feedback on the Journey

By Craig Frehlich

LEARNING

Have you ever sat through a training video wishing there was a button to fast-forward or skip the information or content?

Many multimedia presentations like videos still seem to miss the mark when it comes to capturing student interest and engagement. Why is this the case?

These mediums are merely delivery trucks or tools that are charged to carry/deliver the content/information to the learner. They need to be dependent on many other factors. These trucks need to know where they are going, have a competent driver and give feedback to others on the journey.

Virtual reality and virtual worlds are no exception, they serve as tools or mediums for delivering/transporting knowledge and content. To ensure an effective learning experience with any technological device, it is essential to possess a profound understanding of learning design and instructional practices.

We need to curate our content to guarantee the student is provided with learning experiences grounded in research based on learning science.

To that end, make certain learning experiences are highly effective by:

1. A Stellar Driver- Supporting the learning with an avatar guide or "content coach"

- 2. Key Sign Posts- Providing a clear direction through learning outcomes
- 3. Important Signals/Lights- Provide timely feedback on their thinking and choices.

It's time to revolutionize the way we learn and make it an exciting journey of discovery and growth. Well-designed virtual experiences are key to this journey.

If you are looking at adopting VR and virtual worlds in your classroom make sure you take the time to keep the truck on the road and headed in the right direction. Let me know if you need driving lessons.



Have you ever been to a Museum? How did you move about and explore the content and space?

In a world where haste and impatience often dominate, museum curators invite you to slow down, take a breath, and embrace the beauty of immersing yourself in the extraordinary tales that lie within. We want museums to be an extraordinary journey that transcends the realms of time and space.

I have been to some museums whereby I could have stayed until they kicked me out. Alas, there were some museum memories that made me feel like I wasted my money because I was in and out in record time.

Margaret Kerrison's book "Immersive Story Telling For Real and Imagined worlds" talks about three types of people who visit museums and other immersive spaces.

1. The Scholar- is totally engrossed in the experience and usually stays the longest. They are not only familiar with the content of the experience they are passionate about it.

2. The Stoller- is mildly interested in the content and will spend a few minutes at various spots or stations within the exhibit. They usually move from one thing to another based on what interests them. They will often "pick" or graze on information out of a sense of duty. They pay enough attention as long as it holds their interest.

3. The Streaker- move quickly through stations and exhibits and gather short quick impressions about the place and space. They have short attention spans and have a difficult time getting influenced by the information.

Do these categories sound vaguely familiar? If you work in education you have probably related to these 3 groups of learners. When it comes to designing immersive learning experiences in virtual worlds, we want our learners to get the most out of the environments and subsequently the learning journeys we provide.

So how can we support the Scholars, Strollers and Streakers? Whilst there are a plethora of ways to differentiate and support these types of learners in our virtual worlds. Here are three ways I have found to be effective in order to make learning more impactful for these 3 groups:

1. For Scholars- give them a more enriching experience by challenging them with hidden bits of information within the Virtual World in the form of "easter eggs".

2. For Strollers- we need to give them extra help finding meaning in the experiences. So providing 3D objects that are enhanced through animations may provide them with that extra jolt of curiosity.

3. For the Streakers- this group needs help slowing down and taking the time to reflect and ruminate on content. In the virtual world, providing podiums with buttons to push based on questions we ask them and then giving them immediate feedback in the form of a sound ("ding" for correct) when a button is triggered will not only slow them down but give them a hit of dopamine to keep them engaged.



Teaching and Learning in Virtual Worlds

The VR Learning Lobby-

When designing a VR learning experience consider developing a general space for all your learning experiences similar to an entrance or lobby to a building or hotel. I call it a "Learning Lobby".

The learning lobby might have:

1) General Onboarding- These might be key introductions, setting the backstory to the learning engagement or establishing general learning outcomes.

2) Company Branding- A space to add your logo, mission, vision, company motto or slogan.

3) Introduction to Learning Assets- show the learning assets on a table or shelf ahead of the learning experience can spark curiosity and wonder.

4) Ask the User How They Are Feeling- gathering emotional data before and then after the learning experience can give the instructor and learning designer key attitudinal metrics.



Teaching and Learning in Virtual Worlds

The VR Omelette

I often get asked how one might implement VR into their instructional design practices.

Knowing when to take the time to use and design VR experiences depends on several factors.

Using the analogy of an omelette might help make this clear.

We know the foundation of an omelette is eggs. Similarly, the foundation of using VR is to enhance the interactivity and engagement of the learning material.

Additionally, we may have different types of omelettes (cheese, onion, ham, mushroom etc.) depending on the needs and desires of our customers. And, for VR we might have targeted instructional practices that work extremely well in immersive virtual reality spaces, some of these might be scenarios, gamification, creation and procedural learning.

However, seldom would we have someone order a strawberry omelette, it just doesn't work well with eggs. Furthermore, we would rarely want to use lecture methods as an instructional practice for VR.


An Example...... When will rising temperatures prevent us from feeding our community?



Context

Farming and food production as a result of climate change



Challenge

When will rising global temperatures cause crop yield to prevent us from feeding our communities?



Activities

Observing, calculating, and predicting crop yield percentages as global temperatures rise over the years.



What can farmers do to increase seed viability as a result of warming temeratures?

Teaching and Learning in Virtual Worlds

I often have deep conversations with people regarding what the best use-cases are for using VR in education.

Whilst there are many, solving authentic real-world challenges is one of the most powerful use-cases for any learning journey.

Instructional designers need to be careful to ensure they:

1. Start with a compelling context.

2. Give the learner a real world challenge or problem to solve.

3. Scaffold the learning activities inside VR to ensure learners have the tasks necessary to lead them toward a successful solution.

One example of this might be to have learners consider the issue of climate change and how it is tied to food production. In the recent world climate talks many countries around the world were hoping to slow the rate of global warming to 1.5 degrees celsius. This could be the basis for an enduring VR experience. Check out my poster for more details.

<u>Prisms of Reality</u> developed, Pandemic, <u>https://lnkd.in/qA_wpfAZ</u>, which is another good example of a well-designed VR learning experience. They ground the learning in an interesting context (ie. The Pandemic) and they design the learning journey around an authentic problem (ie. When will our hospitals become over capacity?). Kudos to <u>Anurupa Ganguly</u> and her team for providing such a powerful and satisfying learning experience worthy of doing a VR headset



Tips for Teaching and Learning With Virtual Worlds

Maintaining an educational program that uses VR as a tool to enhance teaching and learning isn't easy. One concern is sustainability. Once a school has purchased headsets and curated/purchased some fantastic applications, how do we continue to keep the program moving forward? As many people say in the VR world, "Content is key".

Having access to a variety of content that aligns well to the curriculum will provide options for teachers and students to differentiate and personalized learning experiences. Relying solely on vendor produced content may not be the answer. This strategy can prove to be very costly and often the vendors may not be able to keep up with producing the content necessary for your growth plans.

Think of content like a recipe for baking a cake.

- 1. Mostly Flour (Micro-lessons)
- 2. A few Eggs (Simulations)
- 3. A small amount of Butter (Soft Skills)
- 4. A pinch of Salt (Serious Games)
- 5. A tablespoon of Sugar (Wellness experiences)
- 6. Sprinkles (Other)

Have an approach to your educational VR content which relies heavily on micro-lessons and some vendor content will position your school toward a path of sustainability. The micro-lessons can be produced using low-code or no-code platforms like EngageVR or FrameVR. Because the teacher or instructors are usually intimately involved in helping design the micro-lessons there may be greater agency and therefore buy-in by teachers regarding the use of VR.



The number of companies starting to build platforms that offer 3D virtual worlds to enhance curriculum is growing.

As a consultant, I get many questions and opportunities to help teachers navigate these spaces and align them to their school learning outcomes.

Since teachers are so busy, they tend to value templates that invite them to revamp or adapt existing virtual worlds.

So what are some important characteristics of immersive virtual worlds that will enable practitioners to use them on an ongoing basis?

Ensuring the space provides a strong contextual backdrop for the learning experience and having the ability to use 3D assets to learn activity are two key elements.

Another key factor might be how "Interdisciplinary" is the 3D virtual space. Being able to connect the learning to a variety of subjects and disciplines will make the 3D space more usable and desirable.

For example, a 3D virtual grocery store has huge potential. There is so much that can be taught in this versatile real world context. Have a look at my graphic to see how a virtual 3D grocery store might connect to a variety of concepts and disciplines.

Multimedia Learning

Mayer, Richard E.. Multimedia Learning. United Kingdom, Cambridge University Press, 2020.



I have been reading and ruminating a lot over an interesting book by Richard Mayer called "Multimedia Learning". See citation in the image.

Whilst I do not agree with everyone he claims in his book, here are two big takeaways so far.....

1. Do 2d images combined with text improve learning compared to text alone?

According to Richard Mayer in his "Book Multimedia Learning" this was a resounding "YES". He went on to say that educators who are relying on text alone in their instruction should consider ways to incorporate graphics into their lessons.

2. Do high-immersive 3D environments (inside HMD) make learning better compared to low-immersive 3D environments (on the computer)?

According to Richard Mayer in his "Book Multimedia Learning" people do not necessarily learn better with high-immersive media than with low-immersive media and states that there is no strong rationale to call for large-scale conversion of multimedia lessons from delivery on 3D computer screen to delivery in 3D immersive virtual reality.

There are large caveats within his book on the immersive learning claim. One relates to the fact a lot of the research he reviewed and conducted on immersive VR focused on short term studies. Moreover, subjects involved in research where unfamiliar with immersive virtual reality so more research was needed with learners who are comfortable with this medium. Richard did find that Immersive 3D environments caused greater motivation amongst learners.



Teaching in 3D Virtual Worlds

Having the ability to vary and adapt the learning environment in which we teach and practice concepts is one of the superpowers of using Virtual Worlds to engage students in learning outcomes. Why?

One reason is Novelty.

Novelty is one of the primary ingredients for keeping the brain agile and responsive. Each time you undertake a new activity, learn a new skill or dive into a new situation, this leads to moderate levels of stress and improved memory. (Horvath PhD MEd, Jared Cooney . Stop Talking, Start Influencing: 12 Insights From Brain Science to Make Your Message Stick (p. 255).)

For example, if we are teaching biotic and abiotic factors of ecosystems. We might take students into four different environments (Desert, Mountains, Ocean, and Tropical Island) to get them to practice identifying these key features within ecosystems.



Using Virtual Worlds to Increase Perspective Taking With the Help of AI Avatars

When we grow in our abilities to understand people and situations from various perspectives, we cultivate greater critical thinking skills.

Since the unleashing of ChatGPT3, developers have found new ways of incorporating more advanced AI tools into avatars. It is now much easier to make a NPC (non-player character) more interactive thanks to recent developments.

This is good news for teachers and instructors who use low-code or no-code platforms to enhance their curriculum using virtual worlds. Some no-code platforms are offering NPC/Avatars with Chat GTP-like capabilities. For example, EngageVR will be releasing "Athena". Athena will be an AI powered virtual employee prototype capable of interacting to voice inside virtual worlds. This will open up a number of instructional scenarios for teachers and instructors:

1. More Compelling and Customized Case Studies- instead of relying solely on vendor scenarios, instructional designers will be able to more easily customize the learning scenario to meet the exact curriculum aligned needs of the school or institution and personalize the learning at a high level.

2. Enhanced Story-telling Capabilities- good lesson design is about telling a dynamic story. Interesting lessons are built on mystery and curiosity and draws the learning into a situation that deserves full attention. Doing this will be much easier when we can assign avatars specific personas and enable them to be more than just static/passive participants in no-code and low code virtual worlds.

These are exciting times on the horizon for teachers and instructors to make learning fun and impactful. Moreover, giving teachers the ability to connect learning experiences with Al avatars (without the help of a Unity developer or programer) will afford students many opportunities to build mean-making skills that link directly to their existing curriculum. TEACHING IN VIRTUAL WORLDS

Ways to Reduce Cognitive Load



SIGNALING



Teaching in Virtual Worlds

Best Practices

When a learner might otherwise be tempted to focus on extraneous material in a virtual world lesson, here are two strategies to help keep the learner engaged on the intended outcomes and lower their cognitive load:

1) Graphic Organizers- a powerful visual learning tool that uses words and symbols to help organize the lesson for a learner, much like a map.

2) Signaling- using visual cues like arrows, letters and numbers can cue and guide the learner's attention and reduce their cognitive processing.

Stories to Introduce Learning in Virtual Worlds

3 Controversial Personal Historical TYPES OF STORIES

Teaching and Learning in Virtual Worlds

Story matters when it comes to connecting learners to content. The power of storytelling can help us engage in concepts and develop an emotional connection. This connection can motivate learners to devote time and energy to the journey. It is part of an intimate process called "neural coupling" and it drives a resonance between the content and the learner. Having the ability to use virtual worlds to recreate the narrative or story can be a powerful way to start the learning process.

There are several types of narratives that can be used to prime learners for the content ahead. Here are three:

1) A personal Event- take learners into a story that is connected to your life. This might be an emotionally charged event or something that gives you deep connection to the learning outcomes.

2) A Historical Event- tell learners how the procedure or product you are selling was discovered or evolved over time.

3) A Controversial Event- tell learners how the product might be polarizing right now in society and what that struggle is all about.



Pause, Predict and Ponder Using 3D Immersive Worlds



The Ocean Before a Disaster



The Ocean After a Disaster



A Farm After a Disaster



A Farm Before a Disaster

Teaching and Learning in Virtual Worlds

3D Virtual Worlds as Time Machines

Some of my favorite movies are the ones that start in the future and you have to unravel the plot and story by visiting pieces of the past.

This "back to the future" approach leaves the viewer engaged in the plot because their brain is actively trying to pause, predict and ponder.

Pause, predict and ponder can be a great instructional strategy for teachers. Predicting forces our brain to invest in the learning journey and often triggers an emotional connection. When we are asked to pause and predict, we become curious regarding the outcome.

The use of 3D virtual worlds can help set the stage for a pause, predict and ponder situation.

Highly immersive worlds can be designed to represent a circumstance or event in the future like a disaster and learners can view this world in order to pause and make predictions; How and why did this happen? What questions should we ask?

Then, after much discussion and rumination, students can be taken to a virtual world that might represent the past to help them understand the circumstances that have led to the event.



ACTIVE IMMERSIVE LEARNING "SHAKE THE TREE"



Legend has it that a young Isaac Newton was sitting under an apple tree when he was bonked on the head by a falling piece of fruit, a 17th-century "aha moment" that prompted him to suddenly come up with his law of gravity.

Although history does not give an exact time on how long poor Isaac sat there patiently waiting, watching, and hoping something amazing was going to happen to elicit this incredible learning moment, I doubt today's learners would have the same tenacity, reliance and fortitude.

We need to invite them to get up and "shake the tree". We should be asking our students to take ownership and agency over the learning experience by getting closer and more personal with the content and concepts that are part of the lesson and the learning outcomes.

When we design immersive learning experiences, we want to instill curiosity, wonder, and awe. And, this will happen more readily if we invite learners to engage in a learning content. Getting students to pay attention and participate in what is key and important in a lesson is easier done through active "hands-on" engagement.

In virtual worlds this can be accomplished by staging your virtual environment with 3D models that invite students not just to "look" or "observe" but to lean forward and participate by sorting, ordering or critiquing the environment. We should be placing objects in areas that require them to "fix" a situation or move and sort to make better sense of the contextual problem they are trying to understand.

VR'S TIME TO SHINE

By Craig Frehlich



Teaching In Virtual Worlds

Is this the push VR and Virtual Worlds needed for greater mass adoption in education?

The discourse and concern around the use of Chat GPT in education over the last few weeks has been massive. Block it! Bann it! And/Or, make it create some sort of Watermark that we can track and filter! These are all predictable reactions to new technology.

It is an emotional roller coaster for many busy teachers. Teaching is hard and many educators have established amazing assignments and assessments which embrace current curriculum outcomes, and now they have to reinvent the wheel, not next year, but right away! Impossible!

I believe instructors will adjust and revamp what they ask their students to produce as evidence of learning beyond a simple essay, but this will take time.

Now is the time to start pushing curriculum outcomes in a different direction that focuses on experiential learning.

What might this look like?

Enter the virtual world experience. We know that ChatGPT does not do well with personal responses. So one adaptation to existing assessments and assignments is to use experiential learning experiences inside a virtual world to act as a catapult to new perspectives and assessments.

Virtual worlds can be customized and tailored to allow for personalized responses to learning experiences. So, creating a virtual world that is an adaptation of a chapter in the famous novel, Lord of the Flies and asking the student to enter the world and provide an in-depth personal reflection of this experience is not something ChatGTP will be able to churn out. Moreover, designing a virtual field trip to a highly customized underwater adventure whereby the learner needs to reflect on and write about what was accurate, inaccurate and challenging about the experiences is not easy for Chat GPT.

David Kolb published a lot of work about the experiential learning cycle. In his work he emphasized the need to discover new things through experience, reflecting on this journey and conceptualizing this information. I think we can draw on his work and use virtual world experiences to draft new ways to assess students' understanding of curriculum.



Get your learners off the bus!

Students in classrooms and lecture halls filled with desks in neat tidy rows often feel compliance and even disengagement in the industrial model of education.

This might be akin to taking students on a field trip and never letting them off the bus!

Is it time to get them off the bus and onto a more active learning journey using immersive learning in virtual worlds?

Using virtual worlds to enhance curriculum and instruction can improve student learning experiences by:

1. Increasing Agency- giving them greater control and agency over their learning means they can make more choices and decisions regarding the learning landscape.

2. Greater Context and Authenticity- learning is "stickier" when we are able to connect learning outcomes to real-life situations and environments.

The traditional model may be more efficient and scalable for the teacher, but is it what is best for student engagement and motivation?



Learning Outcomes and Food



user be like? Pilot.

the kitchen?

Teaching and Learning in Virtual Worlds

From the kitchen to the VR space. "Cooking up" a quality VR experience is akin to slaving away in the kitchen to make an amazing meal.

There is so much to consider when designing an educational VR experience. It is like being a chef in a kitchen. Where do you start? What will you make? It is no wonder so many people like to order in or eat out.

VR content developers who program in unity and unreal engine can't do it on their own. It is crucial that experienced instructional designers are part of the conversation when developing educational VR applications. <u>#vrineducation</u>



Teaching Tips with Immersive Learning

How do we become an expert and develop a deep and clear understanding of content such that we are able to transfer knowledge and understanding to new and novel situations?

In short, repetition resilience and hard work thanks to the help of using a diversity of learning modalities.

Using virtual worlds and VR should not be thought of as a complete substitute for the variety of ways content is delivered to students in order to be an expert at learning outcomes.

The adoption of immersive learning tools like VR and virtual worlds is meant to complement a plethora of other teaching strategies and content delivery methods.

Learning to be an expert at anything is a journey. When the learner is a novice they might start with a lecture or textbook to develop a basic understanding and key vocabulary. Then, the learner might use video to understand more examples and strengthen thought processes. Additionally, the learner might use immersive learning like VR and virtual worlds to build and develop deeper conceptual understandings or be exposed to experiential retrieval practices.

By no means is this learning journey meant to be linear. As students are exposed to a variety of these experiences they might go back and forth to revisit misunderstandings and strengthen areas that do not make sense.



How to Prevent Your VR Space From Dying a Quick Death

When a VR lab is first set up at a school or educational setting, there is usually a lot of hype and excitement regarding the new tool. In some cases, a champion in the school introduces a few powerful apps to educators who are early adopters and risk takers.

But, the challenge is how do we make these immersive tools sustainable and an integral part of the learning landscape beyond the initial "honeymoon period"?

Here are a few strategies I have learnt over the years:

1. Work closely with instructors and educators on how to integrate Virtual Worlds that connect to bigger concepts within their curriculum.

2. Refrain from "type-casting" the VR lab and headsets to just one department or section within your school.

3. Scale up professional development that teaches educators how to use and build no-code virtual worlds and experiences and how to connect these to learning outcomes.

4. Develop a "learning in 3D" academic policy that outlines the mission and vision around how , when and why VR can enhance learning.

TEACHING IN VIRTUAL WORLDS

Introducing a lesson with "THE CRYSTAL BALL"



Teaching Tips in Virtual Worlds

One key way to get students to engage in a lesson is to get them "hooked" at the start of the lesson. Developing a strong sense of curiosity through mystery is a wonderful teaching strategy instructors might deploy to do this.

In virtual worlds, this might be accomplished through a technique dubbed "The Crystal Ball". This technique challenges students to look inside the "crystal ball" and pull out 3D objects or artifacts that are essential to the upcoming lesson. Once the students have revealed the artifact they can make predictions as to how the item or items might play a key role in the content of the lesson. As more and more objects are revealed students might be asked to refine their predictions.



Tips for Teaching and Learning in Virtual Worlds

Unnecessary features introduced by virtual world environments may hinder learning. There is a rule developed by researchers like Richard Mayer called the Coherence Principle of Multimedia, which states that people learn better when extraneous words, sounds and pictures are excluded from the student learning environment to avoid distraction.

Easier said than done in a Virtual World.

Immersive virtual worlds are usually filled with "eye-candy" and the user has a large amount of agency and control over their behaviour. Although we may not be able to completely avoid distraction, there are ways to not overwhelm learners with too much information that can limit their capacity to cognitively process the learning experience and make sense of the learning. Here are a few tips and tricks to prevent the learner from diverting their attention from the important material.

1. Declutter your scenes- try not to do too much in one area of scene. This might be accomplished by sectioning the learning into stages using portals or different rooms.

2. Use Sign Posts- Have small letters or numbers to highlight key 3D objects within the virtual world.

3. Limit the Number of Learning Outcomes- VR experiences that are shorter in duration and limited in the number of curriculum outcomes will make the experience more coherent.

4. Stick to the Context- try and align the relevance of the virtual environment as closely as possible to the content.

SUSTAINING AN IMMERSIVE LEARNING PROGRAM

"Navigating the Waters of Innovation"



How do we Sustain an Immersive Learning Program or more specifically a VR Program ?

Many schools start up a Virtual Reality program and in the first year struggle to move past the hype cycle that comes with the novelty and zeal of a new innovation.

Like a captain trying to steer a giant ship through a field of icebergs, there are so many hidden things to consider under the surface.

Here are three possible questions to consider as your school moves forward with their virtual reality program that might affect the longevity and sustainability of the program:

1. How do we get Faculty and Staff Buy-in? In the first year many schools adopt a few "killer" applications like amazing simulations, but it is key to grow beyond these to a variety of use cases.

2. Have you considered a comprehensive Immersive Learning Policy? Having a policy regarding why and how virtual reality and immersive learning tools are used will be a key driver to ensure consistency.

3. How do we ensure our VR and immersive learning tools are aligned to key curriculum outcomes? VR content may not completely align to curriculum outcomes and learners will need bridges to allow them to explicitly understand how the VR experiences and applications connect to core learning outcomes.

There are so many things to consider for schools and one would hate for their program to suffer the same fate of the Titanic.



Drawing

Teaching Tips For Virtual Worlds

Many Virtual Worlds allow the teacher to set up whiteboards for learners in these spaces.

How might we effectively use these tools to enhance teaching and learning?

To ensure content and concepts are moved from a learner's working memory into their long-term storage system, teachers can engage students in generative learning activities.

During the learning experience students can engage in using the whiteboard for specific learning engagements. They might be:

1. Summarize the experience- this could be writing down point form notes and keywords

2. Mapping- this could be a concept map or a graphic organizer

3. Drawing-this involves asking learners to create graphic depictions of key elements.

These engagements are intended to prime and guide the learners cognitive processing during the learning. Essentially, they help learners by guiding them to:

-Select important information for further analysis

-Mentally organize material into a coherent structure

-Integrate the material with key prior knowledge



"People learn more deeply when a multimedia message is presented in learner-paced segments rather than as a continuous unit. The rationale is that segmenting allows people to fully process one step in the process before having to move onto the next one. " (Mayer, Richard. "Research-Based Principles for Designing Multimedia Instruction." Harvard Initiative for Learning and Teaching (HILT), <u>https://hilt.harvard.edu/</u>.)

When we watch LinkedIn learning videos we see this segmentation in practice all the time, but have we considered it when designing Virtual World experiences? Especially, if we are designing asynchronous content?





Many working in the VR industry probably remember the first time they put on a headset and entered a virtual world experience. This "light-bulb" moment undoubtedly stirred a passion and motivation to learn more about how we might harness the superpowers of VR and virtual worlds for learning. But, what about others? How can we help pull them along this journey when they may not have the same zeal? We want to be mindful that not everyone will want to go at the same pace. Identifying and understanding various stages that teachers might progress through as they learn to see and potential of VR and virtual worlds as a tool for learning might be helpful.

I recently listened to a podcast interview whereby Chris McGlone identified four possible stages based on his work as a learning and development expert. They were Awareness, Exploration, Competency, and Mastery. I like these stages and want to provide some possible explanations of how we might use these to safely progress and pull educators along in their journey to use VR in their teaching and learning.

Awareness- At this stage, we might expose educators to simple applications like Meta's "First Steps" and "Mission: ISS" to help those brand new to VR understand the affordances and ultimate potential.

Exploration- At this step, we might expose teachers to low-code or no-code platforms like EngageVR and <u>FrameVR.io</u> to see how contextual environments and 3D assets might enhance their instructional practices. Furthermore, we might teach them how and when to align VR experiences to key curriculum outcomes.

Competency-At this crucial stage, we might provide a micro-credential course for teachers that gives instructions and greater detail VR world-building as well as gives them exposure to other more advanced applications like simulations and serious games. It might be key to work closely with them to help them align/map various VR learning experiences directly to curriculum outcomes. We also might support educators as they adopt and use VR learning experiences in a few of their curriculum areas within courses or units they teach. As a final progression of this stage, we could invite educators to teach an entire course or unit that incorporates VR and virtual worlds more consistently into their curriculum. Teachers may spend a lot of time at this stage so patience will be key.

Mastery- At this stage, the teacher may be ready to teach and preach to others how to use VR to enhance teaching and learning and curriculum outcomes. They may be ready to help teach the micro-credential course and hopefully, they are now independently and consistently using and considering VR and virtual worlds for their curriculum. Although these are not the only stages or steps that one might consider for VR adoption by educators in schools, they do provide a reasonable pathway to help in the successful adoption of VR and virtual worlds.

SIX QUESTIONS TO CONSIDER WHEN USING A VIRTUAL WORLD FOR IMMERSIVE LEARNING

BY CRAIG FREHLICH



Teaching and Learning in Virtual Worlds

With a growing list of virtual worlds becoming available to educators, here are some key factors I ponder when picking a Virtual World to design an asynchronous learning experience.

The list is by no means exhaustive.



With careful thought, using 3D virtual spaces to enhance your teaching and learning can generate greater learner satisfaction and engagement. Here are a few things to consider:

Avoid these Practices

- 1. Using virtual environments that are unrelated to the content and concepts
- 2. Focus on teaching that gets students to mimic your material
- 3. Heavy use of videos and slideshows
- 4. Focus teaching on "TELLING"
- Adopt These Practices:
- 1. Design the lesson around a compelling story or narrative
- 2. Use the plethora of virtual worlds to provide context to the learning

3. Use a variety of 3D assets to engage the learner in the space by allowing them to interact, sort, arrange, and organize objects

- 4. Break learning topics into smaller chunks
- 5. Focus the teaching on "DOING"

6. Use a variety of different teaching/learning practices



Education Needs to Take more Action-----

I often get questions from learning leaders about what the research says regarding the efficacy of using 3D immersive spaces to improve learning. Whilst there are a growing number of studies out there, we need more time to collect data. And, even as learning scientists build greater understanding of this new medium, humans are complex systems that do not always follow the reliability and ideology of research.

For example, we know in medicine that certain prescriptions have proven to be effective in the treatment of health problems. Antibiotics usually work to kill bacterial infections, ritalin often works to help calm people with ADHD, and ibuprofen in many cases will act as a painkiller. Alas, not always do these research based remedies work.

In the physical classroom, there have been several highly researched methodologies that produce great learning gains in many students around the world. Some of these are using retrieval practices, mixing up or interleaving curriculum outcomes and providing dual coding opportunities when content is presented. Again, these strategies come with a caveat. They may not work for all classrooms all the time. Human learning is a complex system.

As we embark on newer mediums for learning like 3D immersive worlds, we need to keep these examples in mind. Research helps us identify a higher probability of increased gains when using the methodology, but it does not guarantee 100% success.

Recently, a study done by PWC, <u>https://lnkd.in/gNEG4FkN</u>, garnered attention. Some praised the study for providing quantitative data that sang the praises of the use of VR as an effective tool for learning soft skills. Others criticized it for not being a properly controlled study.

This should not halt our pursuit to innovate, experiment and tinker. We have been experimenting with retrieval practices in the classroom since 1909. Instead of waiting for research to prove that a particular teaching and learning practice is effective, education needs to take more action to help research gather more and more evidence.

Bridging the Gap



Bridging the Gap with Micro-Learning in Virtual Worlds

Some institutions that have adopted VR are craving more content in order to provide their learners a steady and consistent diet of immersive learning engagements over time.

One pain-point for some educational institutions in their journey to scale VR is finding ways to use VR beyond the fantastic vendor purchased learning experiences that expose learners to complex scenarios that encompass a variety of concepts. These may be in the form of full simulations or even serious learning games. Hiring external developers to design and build these wonderful immersive learning experiences is a great approach to broader curriculum objectives.

Alas, relying solely on these vendor developed experiences may leave a lull or gap in your institution's ability to sustainably use VR and virtual worlds to catapult and enhance teaching and learning. And, the cost to scale a large part of your curriculum that is appropriate for VR can prove costly.

Enter Micro-Learner Experiences in VR or Virtual Worlds

Micro-learning experiences are shorter VR or virtual world learning journeys that might be designed in no-code platforms. We can expose learners to VR or virtual worlds in order to give them shorter yet effective practice on already taught learning outcomes.

The 3D immersive nature of these experiences gives students a new perspective on a topic and may help them unlock misconceptions. For example, we might design a virtual field trip to have them see what it looks like along the streets of ancient Rome. Or, we could take learners inside the human body to see the structure and function of key organs. The level of polish, fidelity and engagement of these no-code virtual worlds may not be as high as an experience produced by a professional VR developer; however, the experience is still very worthwhile. The learning curve to teach others how to design these experiences is very low.

Whilst not all learning outcomes may be appropriate for VR or virtual world experiences, there is an opportunity to give instructors more agency to design smaller, more frequent learning experiences in VR or virtual worlds, that enable students to review and revise already taught learning outcomes.

ACTIVE LEARNING IN VIRTUAL WORLDS "USING VOCABULARY BLOCKS" cat fish water ish **Related Concepts Related Concepts** bird plant dog dog By Craig Frehlich

Active Learning in Virtual Worlds

The idea that learning is more effective when one spends effort on the material instead of using more passive types of review is well recognized in the field of education (e.g., Thomas & Rhower, 1986).

One practical way to facilitate this in 3D virtual worlds is using 3D vocabulary blocks. These can be designed in a simple 3D modelling program like Blender.

Once a teacher has taught a lesson inside a 3D virtual world they might invite the student to order, sort and arrange the key vocabulary concepts or terms into specific parts of the virtual space ie. a rug on the floor.

Not only does this help learners build stronger connections to the information being taught, it also acts as a formative assessment tool for both the student and the teachers.



Immersive Learning in 3D Virtual Spaces

If you live in variable climates, then you understand the need for a coat. If it is raining, windy, or cold we all rely on the comfort and superpowers of having a coat to provide us with joy. Alas, we don't always need a coat. On beautiful hot sunny days, coats can be kept in the closet.

A reliable and effective coat will contain several characteristics: waterproof, windproof, breathability, and warmth are just a few key traits.

The same goes for virtual learning experiences. We should rely on the powers of 3D immersive worlds to help us in times of need. Teaching big ideas and difficult concepts trigger us to go into our instructional design closets and pull out a C.O.A.T.

In the immersive learning world, an effective C.O.A.T relies on several characteristics: having the right context, providing order and structure, giving the learning agency and including several 3D assets are key properties of an effective immersive learning C.O.A.T.

But, be cautious, as we don't always need to use or put on a C.O.A.T. when teaching every curricular outcome.



STRATEGY

The highlighter







Virtual Worlds

POTENTIAL IMPACT ON MEMORY



Is it time to trade the highlighter for a well-designed virtual world?

There have been several ways we have invited students to retrieve knowledge and concepts we have taught in a course in order to store it in long term memory for use later.

1) Highlighting Text- this strategy, although used a lot by many students, has been shown to provide little impact on our ability to remember key ideas in order to use them later. The highlighted words and phrases have little context to our overall understanding of the broader learning outcomes.

2) Worksheets- this strategy has been proven beneficial, especially if the problems and questions are low stakes and allow students to be pushed or challenged on reviewing and recalling the material. However, most worksheets do not have much contextual connection to the content making them less engaging and more difficult for students to make larger connections to deeper more holistic learning.

3) Virtual Worlds- whilst there is not a lot of direct evidence yet to provide strong support for this emerging strategy, research on cognitive science indicates that the closer we connect the context of the learning experience with the content the greater likelihood the learner will engage in the material. Well-designed virtual world learning experiences that explicitly and overtly stage the content inside a relative learning environment may also trigger a stronger emotional connection to the learning. Furthermore, by allowing the learner inside a virtual world to interact and engage with 3D assets in order to think deeper about their connections may strengthen the probability that students will remember the learning content.



Using Virtual worlds for Teaching and Learning

When designing the instructional activities for learners using virtual worlds and VR, it should be a balancing act.

One good practice around the design of a learning experience is to set up your lesson as follows:

1. Introduce the concept, access prior knowledge through discussion and outline expectations when inside the virtual world or VR.

2. Provide a virtual world experience that is contextually appropriate to learning outcomes and helps catapult active learning.

3. Allow learners time to reflect and unpack the virtual world learning experience via discussions and other follow up activities.

Not all the learning needs to happen inside the virtual experience.

ANATOMY OF A VIRTUAL WORLD TO FOSTER GOOD TEACHING



Tips for Teaching in Virtual Worlds

The parts or anatomy of a virtual world that necessitates good teaching and learning.

1. A Character or Persona-your virtual avatar may represent someone who will be a key person in your lesson like a doctor, fireman, or nurse.

2. A Setting or Virtual Environment that is Contextually appropriatethe virtual world should be a setting that is consistent with and reinforces the learning outcomes of the lesson.

3. Props or 3D Assets-in order to support your lesson plan including assets that learners can interact with to think more deeply about the lesson. Invite learners to play with the assets through sorting, ordering and integrating them.

4. A Story-line-"With a good story, anything is possible." You should guide your learners through an interesting learning journey with a clear introduction, micro-learning, scenario and conclusion.



Ah, the Ikea experiences. The cheap hot dogs, the inexpensive Poäng chairs, what's not to love.

So, what can the immersive learning designers take away from the "Ikea Experience".

1. The Furniture Self Assembly system- having customers take home furniture in flatpack boxes and put it together at home helps create a psychological effect that is usually beneficial to the organizations. The process of putting invested time and effort into the building of the piece of furniture capitulates a stronger emotional attachment to the product. This will usually translate into greater customer satisfaction.

The same might be said for strategically using 3D assets in immersive virtual worlds. When we allow participants to interact with these objects to grab them, sort and order them we create work of the learner that can translate to a stronger emotional attachment to the learning experiences.

2. The Store labyrinth Journey- An Ikea store is not a maze, as mazes are puzzles with hidden turns and dead ends whereby the customer could end up lost forever. The Ikea store is a purposefully built labyrinth which takes the customer on a vision quest. As they are carefully navigated through various sections customers are compelled to follow and imagine what their home could look like as they see the many displays. This leads them to buy more products.

This might be analogous to a well designed Virtual experience whereby the context is aligned to the learning outcomes and the learning journey is crafted in the form of a real-life problem. The stage is set for a carefully orchestrated labyrinth that guides the learning toward discovery.



What is the difference between Deeper Learning VS Surface Learning?

Here is a visual to represent the difference between surface learning and deeper learning.

As educators we are so lucky to have access to a variety of tools to help students in their journey toward DEEP LEARNING.

One of those is using Virtual Worlds to allow students to:

-Make CONNECTIONS to a variety of concepts-Provide rich CONTEXT to the learning-Allow students to see CAUSATION (ie. before and after scenarios)



The Virtual World Gauge

Some thoughts on when to use a Virtual World for learning.



Cognitive Apprenticeship in Virtual Worlds

According to the cognitive apprenticeship model, learning involves more than just receiving information from a teacher or other expert. It also involves actively participating in the practices, observing and interacting with skilled members of the community, and receiving guidance and feedback from those members. This process helps learners to develop a deep understanding of the skills, knowledge, and values of the community, as well as the ability to apply those skills and knowledge in a variety of contexts.

Virtual worlds can be a great place to develop cognitive apprenticeship activities to help learners hone their knowledge, skills and understandings. Here are two ways to facilitate this in a virtual world:

1. "Repeat after Me"- Once a learner has built up a basic understanding of a concept they can jump into a virtual world to practice and reinforce their learning by watching a 3D recording of an expert or teacher conducting an exercise or procedure and then inviting the learner to repeat the activity.

2. "Identify the Mistakes"-Additionally, the cognitive apprenticeship activity could invite the learner to watch a subject matter expert or teacher carry out an activity or procedure whereby they are making mistakes or errors and invite the learner to point out the deliberate mistakes once the 3D recording has been completed.

It should be noted that not all virtual worlds offer the ability to record cognitive apprenticeship performances in 3D. Having the ability to walk around a recording in full 3D affords the learner embodiment and greater perspective that might unlock misunderstandings and misconceptions.



Our learners come to us with a mosaic of different needs, wants, experiences and skills.

Therefore, when we use immersive learning tools like 3D environments, we want to be mindful of this and adjust or differentiate our approach to teaching and learning accordingly.

If a swimming coach was teaching a diverse setting of swimmers, he/she might find different ways to engage their participants.

They could challenge the expert by putting them in the deep end on the diving board.

They could take steps to ensure the new swimmer was not overwhelmed by giving them a "floaty" and gently introducing them to swimming by taking them to the shallow end of the pool.

They could put the intermediate swimmer in a lane to practice different strokes.

Teaching is never a "one-size-fits-all". If we want our unique set of students to enjoy learning in immersive environments we should consider a differentiated approach to these wonderful spaces.

Check out my poster to learn more ways to adjust our approach when teaching in 3D immersive spaces.





Tips for Teaching in Virtual Worlds

There are several different types of instructional experiences we can provide in VR or virtual worlds for our learners. Some experiences utilize 360 images and videos, whilst others may offer the ability for the user to move around, grab and manipulate 3D objects. As an instructional designer, who has watched 100's of students use VR for learning, I prefer the latter.

Although more interactive virtual world scenes may take more time to build and design than 360 images and video, there are several reasons why this time might be well worth the effort. Here are two.

Giving the user the ability to interact within the scene allows them more control, immersion and agency.

1. If the user is asked to learn by doing, there is a greater chance that the information is moved from their working memory and stored into their long-term memory.

2. When the learner is asked to be more involved and active in the lesson, there is a greater opportunity to provide formative feedback on whether they are learning and understanding the content.
Supporting Teacher Adoption of VR for Immersive Learning





Provide cost-effective TPD and support systems for Immersive Learning tools

Three Ways to Help



Support teachers on how to build no-code virtual worlds that allow students to solve problems

Help teachers align VR experiences to big ideas related to conceptual understanding

Teaching and Learning in Virtual Worlds

Navigating the complex system of using VR as a tool for immersive learning can be overwhelming. Like many new technologies ongoing support and guidances is the key to scalable and sustainable use.

The poster outlines three key topics to address when supporting teachers as they learn to use VR in their classrooms.



Teaching and Learning in Virtual Worlds

Advanced organizers are great instructional design tools to ensure learners have the necessary basis for what they are supposed to learn in a lesson. Essentially, advanced organizes can help learners acclimate to the lesson. They can be presented before the learning event to help form a conceptual framework of the learning of new information.

When used effectively, advanced organizers can connect prior knowledge, organize information and help modify and create new schema to new knowledge. Whilst there are several ways instructors might use advanced organizers, one way to effectively do this in a 3D virtual world is by using 360 degree photos on a timeline. Here are examples of what this might look like in various subjects:

1. Science- students could view various steps or stages to a cycle like ecological succession.

2. Language Arts/English- students would view events that might unfold in a novel or story.

3. Geography/History- students could view scenes or events in a specific area that demonstrates change or development over time.

Additionally, instructors could rearrange the 360 degree photos in a virtual world and students might have to put them back in order at the end of the lesson.