

Virtual Reality (VR) Usage:

A Survey of Its Appropriateness for Learning

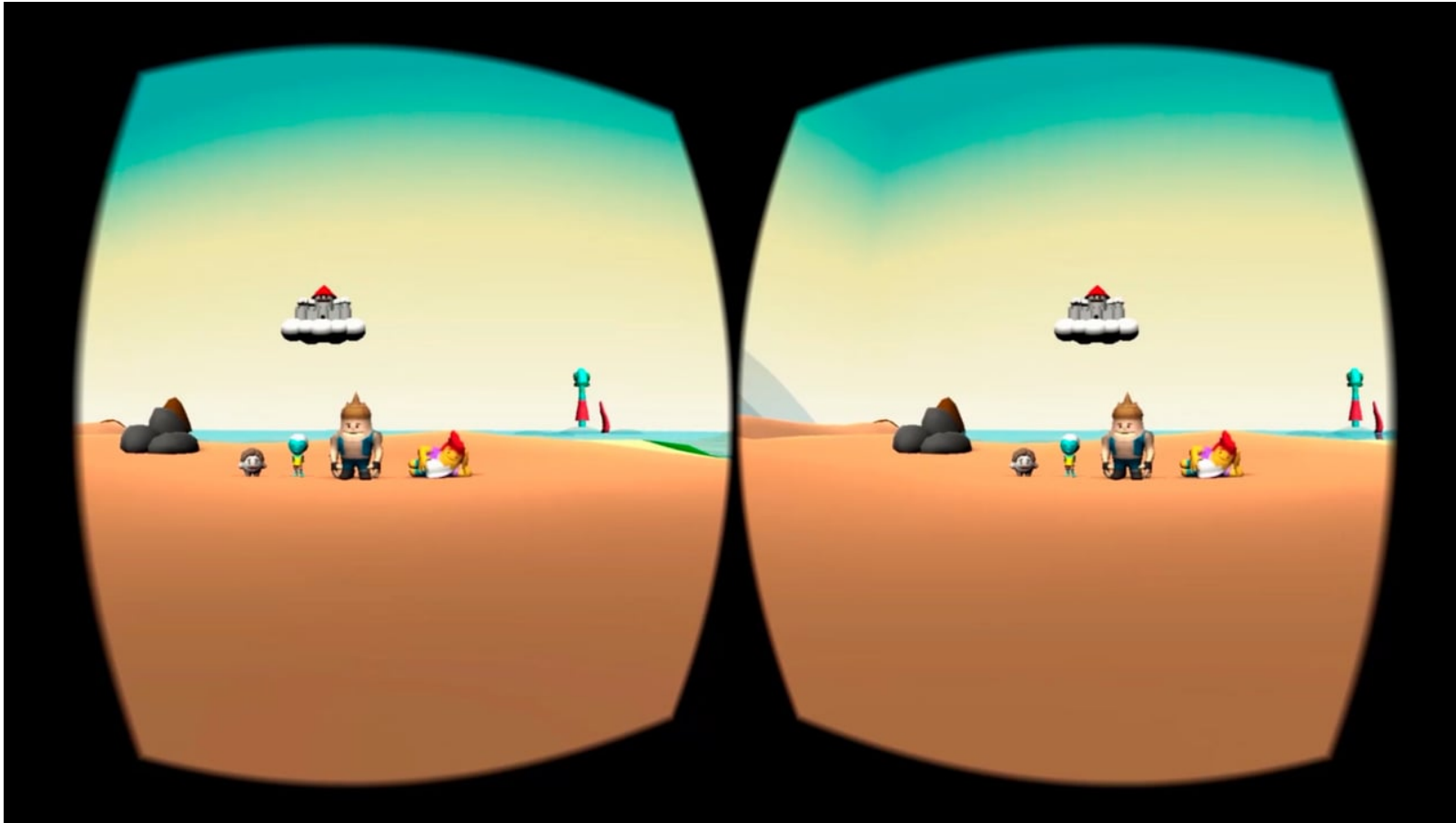
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A Survey of VR's Appropriateness for Learning

- What is Virtual Reality (VR)?
- How does VR Work?
- Does VR Support Learning Theories?
- What are the Disadvantage of VR?



What is Virtual Reality? *The Experience*



What is Virtual Reality? *The Equipment*

- Tethered
 - Computer support
 - Roomscale
 - Lighthouses
 - Inside-Out Tracking



What is Virtual Reality? *The Equipment*

TETHERED HEADSETS



	HTC Vive	Oculus Rift	Playstation VR
List Price	\$799	\$599	\$400
Platform	PC	PC	Playstation 4
Controller	Hand Controllers	Xbox One Gamepad/ Hand Controllers	DUALSHOCK 4 Gamepad/ Hand Controllers
Defining Features	15x15ft VR Space	Built-in headphones	Built-in mic for social gaming

What is Virtual Reality? *The Equipment*

- Untethered - Mobile
 - Smartphone
 - Quality
 - Stationary

GOOGLE DAYDREAM



What is Virtual Reality? *The Equipment*

UNTETHERED HEADSETS



	Google Daydream	Samsung GearVR	Google Cardboard
List Price	\$79	\$100	\$13
Platform	Daydream Phones, e.g. Google Pixel	Samsung Phones	Most Smartphones
Controller	Bluetooth Motion Controller	Trackpad on Headset	One Button on Headset
Defining Features	Exclusive Daydream VR Apps	GearVR Store	Compatible with iPhones

How Does VR Work?

- User is Protagonist
 - Retention quality of first-person experience

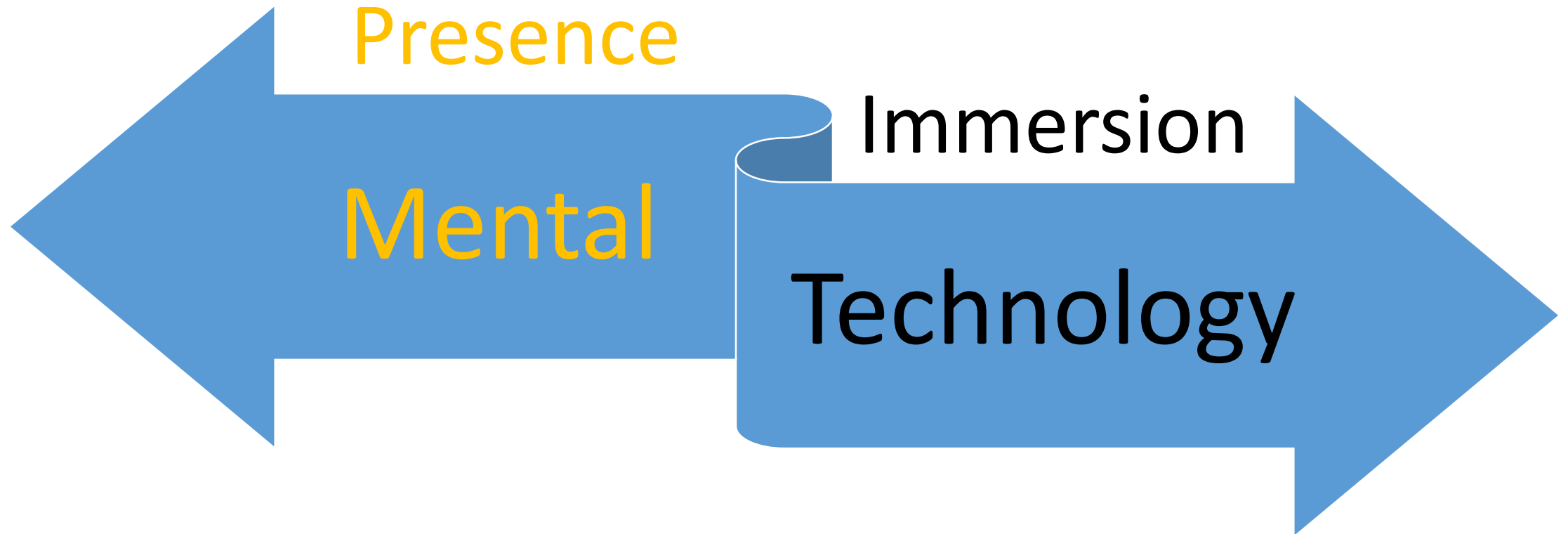


Source: <http://dltipton.com>

How Does VR Work?

- VR Capabilities
 - Real-time, Immersive 3D,
 - Complete Control over Experience,
 - Blocking Out the World,
 - Presence.

How Does VR Work? *Presence vs. Immersion*



How Does VR Work? *Presence vs. Immersion*



Does VR Support Learning Theories?

- Cognitive Load Theory
- Multi-Media Learning Theory
- Situated Learning Theory

Does VR Support Learning Theories?

Cognitive Load Theory

- Working Memory
 - Intrinsic - learning
 - Germane - reflection
 - Extraneous – irrelevant and distractions
- Concepts:
 - Reduce distractions
 - Emphasize effort on learning over doing
 - Enhanced by pointers & guided exercises
 - Worked and ‘faded’ example vs full problem solving

Does VR Support Learning Theories?

Cognitive Learning Theory

	Reduce Distractions	Learning over Doing	Pointers and Guides	Worked Examples
Immersive 3D			Real world 'sign posts' & avatar guides	
Control of experience		Self-paced & repeatable		Tutorials or 360 videos
Block out the world	Reduces distractions from surroundings			
Presence	Focus on task	Reflect on relationships		

Does VR Support Learning Theories?

Multi-Media Learning Theory

- Mind is multiple channel
 - Auditory
 - Visual
- Concepts
 - Use both channels
 - Do not use two channels for same information
 - Minimize distractions
 - 'Situate' learning in context

Does VR Support Learning Theories?

Multi-Media Learning Theory

	Use Both Channels	Minimize Distractions	Situated Learning
Immersive 3D	Show & Hear vs. Read		Completely believe context
Control of experience			Personalize context
Block out the world		Reduces distractions from surrounding	
Presence	Part of the 'action'		Become protagonist

Does VR Support Learning Theories?

Situated Learning Theory

- Learning in authentic context
- Model 'masters'
- Communities of practice

Does VR Support Learning Theories?

Situated Learning Theory

	Authentic Context	Model 'Masters'	Learning Community
Immersive 3D	Real-time, on location	'Live' tutorials, empathy	Avatars and others
Control of experience		Repeatability	Real-time evaluation by others
Block out the world			Co-locate with others (easily found)
Presence	Being there	Learning by doing (modeling)	'Conversations' with others

What are the Disadvantage of VR?

- Motion Sickness
 - Quality of visuals
 - Refresh rate
 - 28 frames/second
 - 90-120 frames/second



What are the Disadvantage of VR?

- Eye Tracking
 - Focus or attention

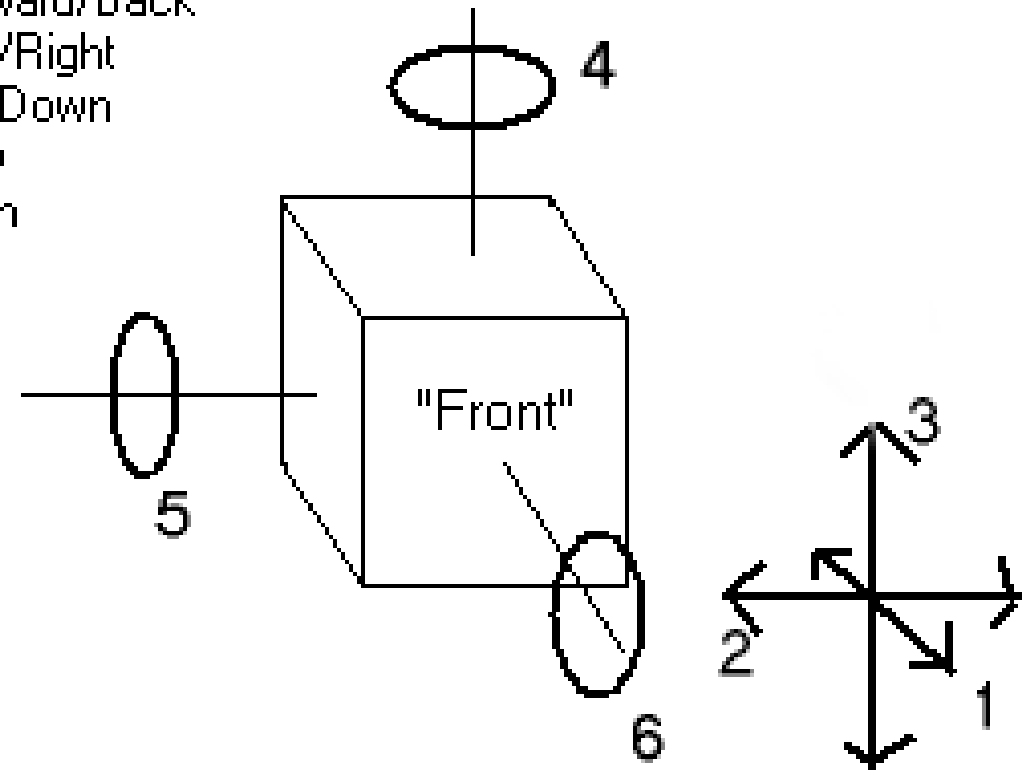


What are the Disadvantage of VR?

- Movement - Degree of Freedom

- Head Movement
- Hand Movement
- Body Movement

1 - Forward/Back
2 - Left/Right
3 - Up/Down
4 - Yaw
5 - Pitch
6 - Roll



The Six Degrees of Freedom

What are the Disadvantage of VR?

- Assessment
 - Record everything
 - SCORM vs xAPI



Conclusion

Virtual Reality = Total Control

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Works Cited available upon request