

Utilization of Immersive 360 Degree Spherical Videos and Google Cardboard in Medical Training and Simulation: A Novel and Multi-dimensional Way of Learning

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Outline

- Generation X & Learning
- Experiential Learning
- 360 Degree Videos
- Google Cardboard Viewers
- Video Demonstration
- Pros & Cons
- Questions

Generation X, Technology, and Learning

Majority of anesthesia residents are Millennial students with divergent learning needs from their predecessors that desire interactive learning through **experiential** and **immersive learning**.

- Psychosocial influences
- Physiological changes of the brain that change the way information is processed



Generational difference in learning creates challenges for educators to teach trainees that speak a “different language”

Be aware of cognitive biases. Keil Centre.
<http://www.keilcentre.co.uk/news/cognitive-biases/>. Accessed:
1/3/2016.

(Chu, 2012)

To view video, search on YouTube App: “STA 2016 Abstract Demo” or go to https://youtu.be/yr5EDF_taa8

Educational Preferences of Millennials

- Learning and working in teams
- Structure with achievement-oriented goals
- Engagement and experience
- **Visual and kinesthetic educational modalities and environments**
- Learning about things that they feel matter to them

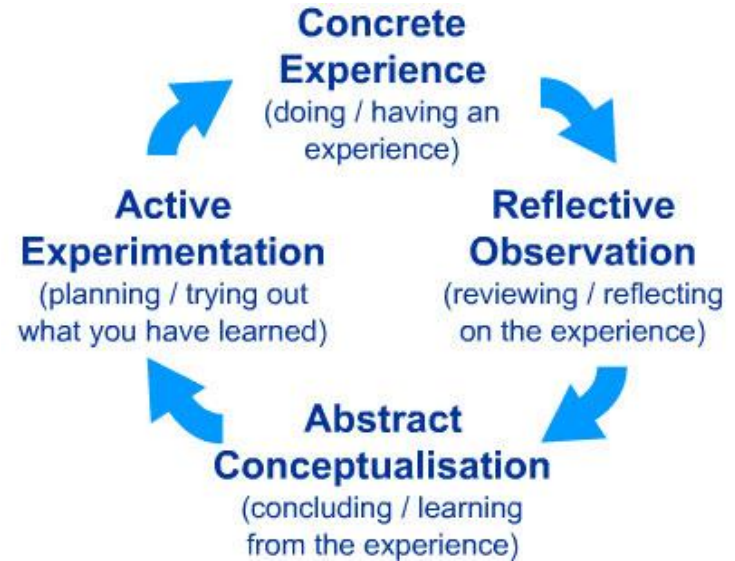
(Chu, 2012)

Experiential Learning

Experiential learning is referred to as learning through action, learning by doing, learning through experience, and learning through discovery and exploration.

The Effects:

- Deepens knowledge through repetition and then reflection on the action
- Develops skills through practice and reflection
- Supports the construction of new understandings when placed in novel situations
- Extends their learning as they bring their learning back to the classroom



Kolbs Learning Styles. Simply Psychology. <http://www.simplypsychology.org/learning-kolb.html>. Accessed 1/2/2016.

(Yardley, 2012)

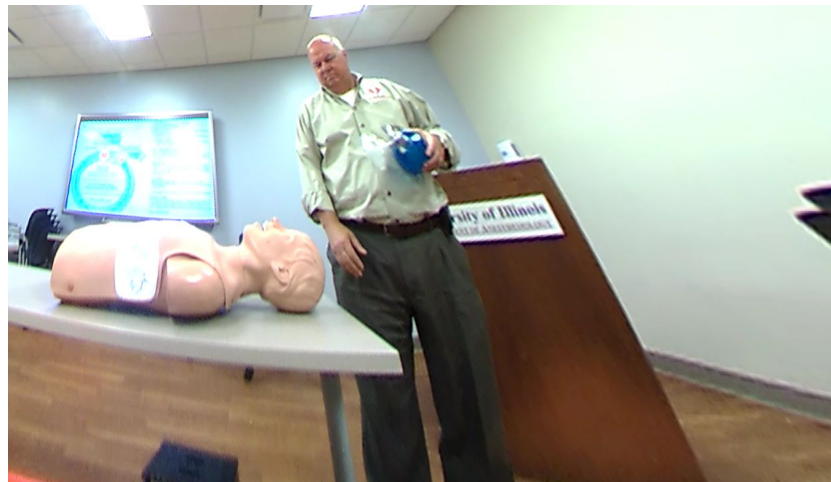
Challenges to Residency Education

- Multiple training sites- destandardization of didactics/educational experience within a program
- Work hour restriction, vacations, post call days off
- Financial constraints of a department
- Balancing needs of patient care/productivity with education

(Chu, 2012; Lateef, 2010)

Pros for Medical Simulators

- Trainees can repetitively practice at a skill, technique, or patient management scenario without any harm to a patient.
- Improved retention
- Proven improved clinical outcomes
- Offers ability to train in complex, unanticipated, and uncommon medical situations



(Lateef, 2010)

Cons for Medical Simulators

- Cost of equipment
- Labor intensive
- Can never fully replicate real life patient care
- Difficult to coordinate with resident workload and schedule



(Lateef, 2010)

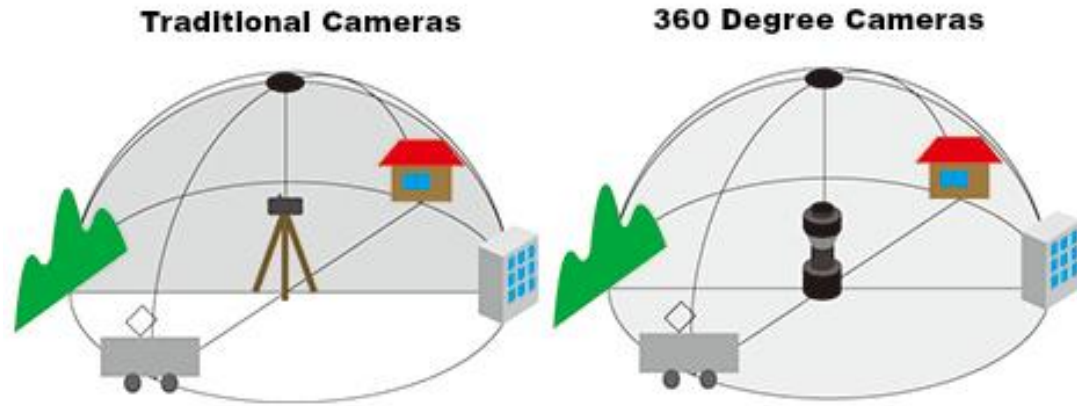
What about Video Based Learning?

- Improved case based learning in medical education and is preferred by both students and facilitators.
- Conveniently watch as many times as needed from anywhere with a digital device
- Cost Effectiveness
- More authentic clinical scenarios- emotion, body language and other non-verbal cues
- Allows learner to see through the eyes of the expert.

(Chan, 2012; De Leng, 2010)

What are 360 Degree Spherical Videos?

- A 360 video is created with a camera system that simultaneously records all 360 degrees of a scene.
- Viewers can pan and rotate a 360 video's perspective to watch it from different angles.
- Unlike traditional videos and cinema, the viewers have control over what they see and where they want the focus of the video to be



A camera that captures the world around you. Web Japan. <http://web-japan.org/kidsworld/hitech/360-degree/>. Accessed 12/29/2015.

How are 360 Degree Videos Recorded?

- Multiple cameras are linked
- Use special video editing software to stitch the videos into a single 360 degree video
- At times, multiple cameras are situated in specific locations to cover allotted areas, thus capturing every corner



Go Pro 360 Degree Camera Array Cool Things.<http://www.coolthings.com/gopro-360-camera-array/>. Accessed 1/2/2016.

3D Plug and Play Camera. 3D Print. <http://3dprint.com/559/amazing-3d-printed-plug-n-play-camera-holder-helps-360heros-make-the-guinness-book-of-world-records/>. Accessed 1/2/2016.

How are 360 Degree Videos Recorded?

- Special 360 camera that is a single unit with multiple lenses.
- Has proprietary built in software that automatically stitches the video together.
- Able to live view the recording using bluetooth on smartphones



360 Degree Cameras. Engadget. <http://www.engadget.com/2013/11/05/bublcam-360-degree-camera/>. Accessed 1/5/2016

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What is Google Cardboard?

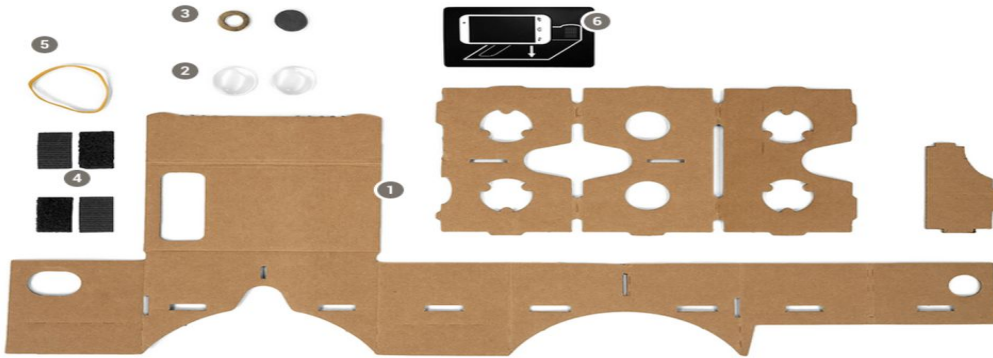
- Google Cardboard is a virtual reality platform developed by Google for use with a fold-out cardboard mount for a mobile phone.
- Stemmed from Google's 20% project, a company policy that allows employees to work on side projects in addition to their everyday duties
- It is intended as a low-cost system to encourage interest and development in VR and VR applications.



Google Cardboard Apps. App Dazzle.
<https://www.appdazzle.net/google-cardboard-apps-ios-iphone-ipod-ipad/>
. Accessed 1/4/2016.

What is Google Cardboard?

- A kit that utilizes a cardboard and a pair of 40mm focal distance lenses to turn your phone into a virtual reality headset.
- It also uses magnets, velcro, and a rubber band to keep everything in place.
- Templates available free by Google or completed kits made available for purchase from various manufactures.



How to make DIY headset at home.
Pocket Lint. <http://www.pocket-lint.com/news/129612-want-cardboard-here-s-how-to-make-or-buy-google-s-diy-vr-headset-at-home>. Accessed 1/3/2016.

How does it work?

- 3D glasses work by having two superimposed images on the cinema screen with separate image sent to each eye using a blue and red filters ensuring viewer's left and right eyes saw the correct image.
- Same concept is now done with polarized glasses in horizontal and vertical directions in current 3D movies.
- Smart phones app optimized for 360 videos bypass this by having a separate views for each eye.
- Moving your head around the images will respond as if you're in the same place as what's displayed on your screen



3D Glasses. Vennage. <https://infograph.venngage.com/p/61376/3d-glasses>. Accessed 12/30/2015.

Cardboard. Google Play. <https://play.google.com/store/apps/details?id=com.google.samples.apps.cardboarddemo>. Accessed 12/31/2015

Video Demonstrations



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360 Degree Videos for Simulation

Pros

- High economy surrogate for simulation
- Easy accessibility for everyone
- Beneficial in pattern recognition

Cons

- No tactile response for procedural skills
- Inability to interact with the environment
- Not used for interpersonal skills

Thank You!

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References

1. De Leng BA, Dolmans DHJM, van de Wiel MWJ, Muijtjens AMM, van der Vleuten CPM. *How video cases should be used as authentic stimuli in problem-based medical education*. Med Educ 2007; 41: 181–188
2. Chu L, Erlendson M, et al. *Information technology and its role in anaesthesia training and continuing medical education*. Best Practice & Research Clinical Anaesthesiology. Volume 26, Issue 1, 2012, Pages 33–53.
3. L.K. Chan, N.G. Patil, J.Y. Chen, et al. *Advantages of video trigger in problem-based learning*. Med Teach, 32 (2010), pp. 760–765
4. Lateef F. Simulation-based learning: Just like the real thing. *Journal of Emergencies, Trauma and Shock*. 2010;3(4): 348-352. doi:10.4103/0974-2700.70743.
5. Yardley S, Teunissen PW, Dornan T. *Experiential learning: Transforming theory into practice*. Medical Teacher. Vol. 34, Iss. 2, 2012

