Virtual Reality in the 19th Century – The Stereograph

Current Educational practices strive to make learning more valuable for students. Educators are always looking for ways to make learning more meaningful, practical and relevant for learners. Current technologies support learning environments which create virtual realities for students to engage in. We don't have to look too far back into our technological history to find other examples of how educators have tried to simulate or create virtual learning experiences for students. In this documentary we will explore technology that was widely used in education in the early 1900's, the stereograph and stereoscopes.

The Stereograph, or stereo card, was the 19th century's polaroid with imaginative flair (American Antiquarian Society, n.d.). The stereograph began as two almost identical drawings or photographs, side by side, to be viewed with a Stereoscope.

The Stereoscope is an instrument which cheats our senses to produce the appearance of reality by making the surfaces of two photographs look solid, or as what some refer to as 3-D. It is a binocular instrument in which two flat images, or stereograph, are combined to form a single image with the illusion of depth. Our eyes see everything from slightly different angles, and with the use of a stereoscope, our brain processes two images into a single image that has spatial depth and dimension. (Spiro, 2006)

"All pictures, in which perspective and light and shade are properly managed, have more or less the effect of solidity; but by this instrument that effect is so heightened as to produce an appearance of reality which cheats the senses with its seeming truth (Holmes, 1906, p.16)."

The term "stereo" originated from the Greek word for "solid" which represents the way we view images through this instrument. The first stereoscope was invented in 1838 by Charles Wheatstone and

the technology preceded the invention of the photograph. Wheatstone came up with the idea that by presenting 2 slightly different images to the eyes using reflecting mirrors, the two images combined produced a 3-D depth perception (Turing Institute, 1996). For example, if one image was of a bird and was reflected to the left eye, and the other image was a bird cage reflected to the right eye, the result was a fusion of the two images resulting in the perception of a single image (Joyce & Baker, 2008) His first stereographs were used with drawings and later adapted for use with photography.

By the 1850's, Sir William Brewster invented an inexpensive version of the stereograph called the lenticular stereoscope, otherwise known as the Brewster Stereoscope. This captured the attention of the public after a demonstration at the Great Exhibition of 1851 as it was admired by Queen Victoria, and businesses such as the London Stereoscopic Company started mass producing stereographs (Spiro, 2006). Stereo photography reached its peak around the turn of the century giving way to the emergence of movies and film.

Originally stereographs were created by taking one photograph, then shifting the camera to a new position to take another. They stereograph eventually progressed to using cameras with multiple lenses. By the 1950's the ViewMaster emerged which used a round disc that displayed seven images and was a popular tourist souvenir and later a popular children's toy.

Wheatstone's original stereoscope allowed the viewer's right eye to reflect one image to the viewer's right, and the mirror for the left eye to reflect an image on the left. The mirrors were placed at a 45 degree angle to the line of sight. The use of the mirrors allowed the brain to fuse images together and create the perception of depth. This was a rather large and awkward technology but was able to handle images that were quite large.

Brewster's stereoscope is known as the lenticular stereoscope. Rather than use mirrors for reflection, the lenticular scope used prisms, or lenses to refract the images. The use of the lenses made

for a much more compact device as the focal length between the images and the eye could be much

shorter. The lenses directed the two images separately to the two eyes and could be perceived as a 3-D

image (Joyce & Baker, 2008).

The most well-known version of the stereoscope was invented by Oliver Wendell Holmes in

1862 and is known as the stereopticon. This technology could be found almost anywhere well into the

20th century. It was often the only way people could view photographs until photographic printing was

invented. Holmes' stereopticon consisted of a wooden hood-like arrangement which covers the

viewer's eyes, with a holder for the stereo card fixed at a set distance from the hood (Hannavy, 2013).

By the 1930's, Harold Graves and William Gruber created the stereoscope for ultimate

entertainment, the ViewMaster. Although a toy, it functioned much like the Holmes stereopticon, but

held 7 pairs of photographic images on a circular disk that is rotated by a lever, one pair of images at a

time. The images are projected to each eye creating a three dimensional color image (Joyce & Baker,

2008).

When Oliver Wendell Holmes popularized the stereograph in the 1860', stereograph libraries

emerged (Spiro, 2006). The technology was used in homes, schools, churches and more bringing almost

every subject matter to life.

"The first effect of looking at a good photograph through the stereoscope is a surprise such as no

painting ever produced. The mind feels its way into the very depths of the picture. The scraggy branches

of a tree in the foreground run out at us as if they would scratch our eyes out. The elbow of a figure

stands forth as to make us almost uncomfortable." Holmes, 1859 (A.A.S., n.d.)

Stereographs were in high demand by the early 1900's because the photographs reached across class

lines to the general population. Its affordability made it a widespread phenomenon spanning over sixty

years (A.A.S., n.d.). Stereograph collections included images from the mid 1850's and beyond. Genres included historical events, popular travel destinations like the Niagra Falls, landscapes and city scenes, celebrations, paintings, sports and more. This technology had significant implications for education as it was used to teach children about geography and history as well as other subject areas. Between 1906 and 1921, The Keystone View Company started producing stereograph sets that aligned with school curriculum (Ent, n.d.). The most popular educational stereograph set was called the *600 set* including views to teach geography, social studies, history and reading. Later, in 1929, the Keystone views company issued *the 1200-view Tour of the World* contained in an oak storage cabinet including teaching manuals, offering "virtual mobility" for learning about places without actually having to be there (Ent, n.d.). William Bagley, a professor at Columbia University, wrote an educationally based essay arguing that experience is the best teacher. In his essay he supported the use of stereographs as a method to reduce the distance between classrooms and concrete experiences (Ent, n.d.).

The Keystone View Company teacher manuals that accompanied the stereograph sets followed a four-step lesson sequence; Approach, Preparation, Expression and Review of Organization. The manual suggested that stereographs can be used to create scenes and settings for stories, provide advanced organization for an upcoming lesson, included seat work and group work, aided in visualizing historical problems, increased student vocabulary and helped to improve expression in oral and written communication (Ent, n.d.). Stereographs in education made instruction visually appealing and more engaging to students. "Keystone View Company capitalized on the medium and offered a wide selection of images that would virtually transport learners to foreign places, learn trades, and experience culture" (Ent, n.d.). The introduction to this technology did not come without its challenges. Many argue that teachers weren't trained properly in the use of the stereograph lessons and did not practice effective teaching with the tool. From today's educational practice, this story is familiar. The stereograph of the 19th century offered the virtual learning experiences that current technology allows for the 21st century

learner, but many argue that available technology is not implemented properly and that teachers are not trained properly or effectively in the uses of these tools. The virtual learning challenges and benefits of the 19th century are the same as the virtual learning challenges and benefits now. Establishing an effective pedagogy and delivery system for the educator is just as important or even more so, than the end user group of the student body it is intended for.

Virtual learning experiences have been in existence, as shown by the evolution of the stereoscope, since the turn of the century. As a society we have gravitated towards the visual stimulation of paintings, engravings, photographs, and moving pictures to enhance our understanding of the world around us. It is increasingly important to insure that these visual 'facts' are presented to the learner in ways that make them meaningful and educational and not merely entertainment. As technological advances in imaging continue to make information gathering and education about our world available to significantly larger percentages of our population, it is clear that the dissemination and distribution of that information needs to be presented to our educators carefully and thoughtfully so that they can make the most of it for their students.

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