# Packet #23

Imagine you are working on a research paper about **how virtual reality technology is changing human communication**. Read the three information sources that follow this page and keep the CAARP model in mind as you review each source.

*Remember:*
C = Currency
A = Authority
A = Accuracy
R = Relevance
P = Purpose

For the third and final source you will see the address (URL) of a website. Click on that link to be taken to a website. Please review the website as a whole for your third and final source.

To complete your assignment, go to: http://library.uncw.edu/instruction/UNI_library_assignment. Login at the bottom of the page and follow the directions to answer questions about each information source.

Source #1



# Enjoyment Levels of Youth with Visual Impairments Playing Different Exergames

**Nicholas Boffoli, MS**
**John T. Foley, PhD***
State University of New York
Cortland, NY

**Barbara Gasperetti, MS**
The Jean Black School
Middletown, NY

**Stephen P. Yang, MS**
State University of New York
Cortland, NY

**Lauren Lieberman, PhD**
The College at Brockport
Brockport, NY

Abstract

One possible method to engage youth with visual impairments in physical activity may be exergaming. The purpose of this study was to measure differences in the enjoyment levels of youths with visual impairments playing three commercially available exergames. Participants ($n$ = 12) ages 9 to 16 years old with a visual impairment were randomly assigned one of three games on three separate nights and played each game for 10 minutes. Games played were *Dance Dance Revolution Extreme 2* (*DDR*), *EyeToy Kinetic*, and *Wii Boxing*. After each game participants filled out the Physical Activity Enjoyment Scale. The scores were summed for final analysis with a highest attainable score of 144. A Friedman's ANOVA was used to analyze the data. Players of the three different games showed no significant difference in their enjoyment between games. The consistently high mean scores attained by all three of the exergames (*DDR* = 129 [20.9], *EyeToy* = 127 [23.4], *Wii* = 137.67 [9.4]) indicate that the participants enjoyed playing these games. This result suggests that youth with visual impairments can enjoy being physically active through use of the exergames.

Keywords: physical activity, exergames, physical education, Physical Activity Enjoyment Scale

## Introduction

The U.S. Department of Health and Human Services (2008) has released the most recent physical activity guidelines for both adults and children. These

* Please address correspondence to john.foley@cortland.edu; john.t.foley@gmail.com.

Received February 1, 2011; Accepted August 25, 2011 

guidelines are based on an extensive review of the scientific literature and determined that children benefit from an hour or more of physical activity a day. A positive relationship between physical activity and cardiorespiratory fitness in youth has been suggested (Shephard, 1992; Payne & Morrow, 1993). Moderate physical activity has been shown to improve children's self-esteem and body image as well as reduce depression and anxiety levels (Bryant et al., 2010). Getting children active is critical since studies have shown that obesity in childhood may be a precursor to obesity in adulthood, and children who are physically active are more likely to become active adults who will benefit from exercise throughout their lives.

Wankel (1985) has suggested that enjoyment plays an important role in exercise and sport participation. A direct influence on behavior, enjoyment can provide an immediate reward for being physically active (Dishman et al., 2005). Therefore, it can be assumed that an increase in enjoyment could lead to an increase in physical activity. Enjoyment of an activity serves as a key determinant when one decides whether or not to allocate time toward that activity (Graves et al., 2010). In response to declining rates of physical activity among adolescents, more opportunities for physical activity that children enjoy must be discovered.

The increasingly sedentary lifestyles of children are setting them up for negative health outcomes including diabetes, hypertension, and cardiovascular disease (Stephens, 2002). Little has been done to successfully combat the lack of physical activity seen in adolescents. Nader and colleagues (2008, 2009) indicate that the average moderate–vigorous physical activity (MVPA) rate of children decreases between the ages of 9 and 15 years of age during both the weekday and weekend. While approximately 99 percent of 9-year-olds were engaged in at least 60 minutes of MVPA during the weekday, less than 32 percent of the 15-year-olds were engaged in 60 minutes of MVPA during the weekday. This ultimately brings children below the recommended amount of 60 minutes of MVPA. This is consistent with other data that suggest that two-thirds of adolescents did not reach the recommendation of at least 60 minutes of moderate physical activity, 5 days a week (Kerr, 2007).

While disparities in MVPA exist between youth with and without disabilities, they also exist between types of disabilities. Research by Longmuir and Bar-Or (2000) suggested that individuals with visual impairments tend to have lower physical activity levels than their peers with physical and chronic disabilities. Further, they concluded that only 27 percent of children with some visual impairment are habitually active. Hence, the greatest risk of a sedentary lifestyle is by youths with visual impairment. It is clear that more opportunities for physical activity for those individuals are needed.

Boone, Gordon-Larsen, Adair, & Popkin (2007) point to the growth in home technology for the increased sedentary behavior of youth today. Clocksin, Watson, and Ransdell (2002) have argued that sedentary leisure-time activities are gaining popularity among children and adolescents, and that these activities are linked to decreased physical activity and increased body mass index (BMI). It is believed that leisure-time sedentary behaviors can be addressed by reducing media use including television, nonacademic computer use, and inactive video game playing. Conversely, there has been research done that provides evidence that video games may be beneficial to both those with visual impairments and those without (Wang & Perry, 2006; Morelli, Foley, Lieberman, & Folmer, 2011). Certain video games can increase both visual field and reaction time of the participants (Green & Bavelier, 2003). Yang & Foley (2011) recommend exergames as a way to improve motor skills and increase physical activity levels of youth with disabilities.

Gasperetti et al. (2010) suggests that youth with visual impairments may receive health benefits by participating in exergames. Research by Morelli and colleagues (2010, 2011) provided evidence that youth with visual impairments can reach MVPA levels that provide health benefits while playing exergames specifically designed with a tactical interface. However, little information exists on whether youth with visual impairments actually enjoy playing exergames, specifically those with a graphic user interface. The purpose of this study was to investigate if youths with visual impairments experience different enjoyment levels after playing three commercially available exergames.

# Methods

## Participants

The youths attended a 1-week overnight sports camp in upstate New York for youth with visual

**Table 1.** Descriptive Data of the Participants

| | *M* | *SD* |
|---|---|---|
| Age (years) | 13 | 2 |
| Height (cm) | 148 | 14 |
| Weight (kg) | 48 | 14 |
| BMI | 22 | 6 |

*Note: Height, weight, and BMI are listed for 11 of the 12 participants.*

impairments. Prior to their arrival at camp, 15 youths were identified as being qualified to participate in this study. To limit confounding variables, inclusion criteria were the following: no orthopedic impairment, no intellectual disability, and a United States Association for Blind Athletes (2009) classification of B2 or B3. Athletes with a B2 classification have the ability to recognize the shape of a hand up to visual acuity of 20/600, and athletes with a B3 have a visual acuity between 20/600 and 20/200. Of those identified, seven males and five females volunteered to participate in the study. Parents signed consent forms and the participants signed an assent document that was offered in both large print and braille. Descriptive data of the participants can be found in Table 1.

## Procedure

The participants were randomly assigned to play three exergames previously modified for use in this study and others (Gasperetti et al., 2010). Games were projected on a large screen from a projector positioned overhead; this allowed the participants to stand approximately 6 feet from the screen. The interactive games used in the study were *Dance Dance Revolution Extreme 2* (*DDR*), *EyeToy Kinetic*, and *Wii Boxing*. All of the games provide the user with both visual and auditory feedback.

All of the campers had one-on-one counselors who were responsible for getting their athlete to the gaming area when the study was taking place. The participants played one of the three interactive games a night for 10 minutes. When playing *DDR*, participants were asked to choose five songs and were also allowed to pick the difficulty level at which they played. The *EyeToy Kinetic* game called *Breakspeed* runs for about 3 minutes at a time so the participants played the game three times. During *Wii Boxing* the participants were allowed to play as many rounds as they could within the allotted 10 minutes.

After playing each of the interactive games, which were played on separate nights, the camp counselor would ask the participant the questions that make up the Physical Activity Enjoyment Scale (PACES), which was developed by Kendzierski and DeCarlo (1991). The questions in the survey are meant to measure the enjoyment levels of physical activity in a given area or event. In this case, it measures the enjoyment levels of players who participated in the physically active video games. The 18 questions that make up the PACES are answered on a 1 (lowest) to 8 (highest) Likert scale. The scale was modified from a 7-point to an 8-point scale to force a positive or negative response.

In the original work by Kendzierski and DeCarlo (1991), they studied the construct validity as well as the internal consistency of the PACES with undergraduate students. Their results found a high internal consistency ($\alpha = .93$) and item correlations ranging from $r = .35$ to $r = .89$. Similar results were reported by Crocker, Bouffard, & Gessaroli (1995) with youth at a sports camp; they reported high internal consistency ($\alpha = .90$) and item correlations ranging from $r = .38$ to $r = .79$. The inductive nature of this study can shed some light on what types of physical activity opportunities youth with visual impairments enjoy or not enjoy physical activity, as we can draw from the experiences of the participants.

## Analysis

Data were analyzed using SPSS for Windows v.16 (SPSS Inc., Chicago, IL). Data from the surveys were entered into an Excel (Microsoft, Bellevue, WA) spreadsheet and converted to SPSS with STATtransfer (Circle Systems Inc., Seattle, WA). Scores were totaled by adding up the values from each question on the PACES. Each question can be answered on a score of 1 to 8, with 1 representing the least enjoyment and 8 representing the most enjoyment. The highest score a game could achieve was 144 and the lowest score a game could achieve was 18.

A visual check of histograms and boxplots of the data revealed a nonparametric distribution. Therefore to investigate the differences between groups, a Friedman's ANOVA was employed. Alpha was set at .05.

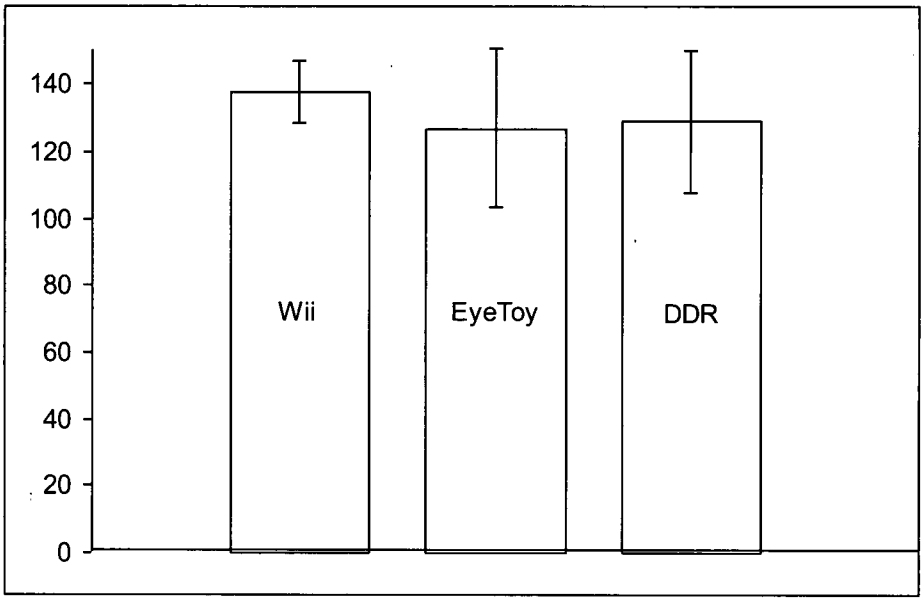



**Figure 1.** *Mean PACES scores for 1 each game played.*

# Results

The findings indicated that there was no significant difference in the enjoyment levels between *DDR* ($M = 129$, $SD = 20.99$), *EyeToy* ($M = 127$, $SD = 23.47$), and *Wii* ($M = 137.67$, $SD = 9.40$), $\chi^2(2) = 3.41$, ns. It is interesting to note that the least variability in scores, as measured by standard deviation, was found after playing *Wii Boxing* ($SD = 9.40$). That is half as much as the 20.99 in *DDR* and 23.47 in *EyeToy*. Overall, the results of this study, as seen in Figure 1, suggest that youths with visual impairments enjoyed being physically active through the use of exergames.

# Discussion

The purpose of this study was to measure differences in the physical activity enjoyment levels of youths with visual impairments after playing *DDR* on Playstation 2, *EyeToy Kinetic* on Playstation 2, and *Wii Boxing* on Nintendo Wii. The results showed that there was no significant difference in enjoyment levels of the participants after playing the three different exergames. While *Wii Boxing* had the highest mean score, although not significant, it also had the least amount of variability of enjoyment amongst the participants. High mean scores expressed for all three games indicate a high level of enjoyment for most, if not all participants. A score of 144 is the highest score attainable on the PACES.

Among youth with disabilities, youth with visual impairments are at greatest risk for a sedentary lifestyle (Longmuir & Bar-Or, 2000). Therefore, studies like this are important in furthering the understanding of potential opportunities for physical activity. Taking the enjoyment level of the participants into consideration is essential since it serves as a large motivating factor for children deciding to participate in physical activity and sports (Gill, Gross, & Huddleston, 1983). While there are issues surrounding the dynamic state of enjoyment, the PACES provides researchers with a way to measure the subjective feature. It is important to utilize the PACES in an effort to provide more enjoyable opportunities for physical activity for youths with visual impairments.

Studies have provided evidence that supports the idea that youth without visual impairments enjoy interactive games or exergames (Epstein, Beecher, Graf, & Roemmich, 2007). Epstein's study describes interactive gaming as combining exercise and entertainment and has coined the term "exertainment." The study was able to conclude that children may be motivated to be active if they are given the opportunity to play an interactive video game.

One of the limitations in this study was the small sample size of 12, which may have decreased our ability to detect a significant difference between games if one exists. Also, the participants played these games only at night and only for 10 minutes at a time. It would be interesting to see if enjoyment levels

decrease over time. There also was the fact that the participants spent all day being active at a sports camp so they may have already been tired when playing the games. Judging by the scores, we do not think this fatigue played a factor. Regarding the PACES, sometimes the language was not understood by the younger participants and had to be explained by the coaches, this may have affected the validity. Future research in this area should include more participants and research should be conducted over a longer period of time.

This study and others have provided evidence that exergames are enjoyable to the participant playing them (Epstein et al., 2007). Another study using a modified PACES found an enjoyment percentage ranging from 60 to 65 percent among adolescents who played an inactive video game, walked briskly on a treadmill, or jogged on a treadmill (Graves et al., 2010). The enjoyment percentages for the exergames used in this study ranged from 88 to 96 percent among adolescents. The importance of enjoyment in an effort to increase physical activity among children cannot be overlooked. Limited research has been done concerning whether or not exergames, which have a graphic user interface, are enjoyed by youth with visual impairments. However, the consistently high mean scores and the fact that there was no significant difference in the enjoyment levels expressed after playing these three exergames suggests that youth with visual impairments see exergames as an enjoyable way to be physically active.

# References


Boone, J., Gordon-Larsen, P., Adair, L., & Popkin, B. (2007). Screen time and physical activity during adolescence: Longitudinal effects on obesity in young adulthood. *International Journal of Behavioral Nutrition and Physical Activity, 4*, 26. doi:10.1186/1479-5868-4-26

Bryant, C., Courtney, A., McDermott, R., Alfonso, M., Baldwin, J., Nickelson, J., et al. (2010). Promoting physical activity among youth through community-based prevention marketing. *Journal of School Health, 80*, 214–224. doi:10.1111/j.1746-1561.2010.00493.x

Clocksin, B., Watson, D., & Ransdell, L. (2002). Understanding youth obesity and media use: Implications for future intervention programs. *Quest, 54*, 259–275. Retrieved from EBSCOhost.

Crocker, P.E., Bouffard, M.M., & Gessaroli, M.E. (1995). Measuring enjoyment in youth sport settings: A confirmatory factor analysis of the physical activity enjoyment scale. *Journal of Sport & Exercise Psychology, 17*, 200–205. Retrieved from EBSCOhost.

Dishman, R., Motl, R., Saunders, R., Felton, G., Ward, D., Dowda, M., et al. (2005). Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine and Science in Sports and Exercise, 37*, 478–487. Retrieved from EBSCO*host*.

Epstein, L.H., Beecher, M.D., Graf, J.L., & Roemmich, J.N. (2007). Choice of interactive dance and bicycle games in overweight and non-overweight youth. *Annals of Behavioral Medicine, 33*, 124–131. doi: 10.1080/08836610701307835

Gasperetti, B., Milford, M., Blanchard, D., Yang, S., Lieberman, L., & Foley, J. (2010). Dance Dance Revolution and EyeToy Kinetic modifications for youths with visual impairments. *Journal of Physical Education, Recreation and Dance, 81*(4), 15–17. Retrieved from EBSCO*host*.

Gill, D.L., Gross, J.B., & Huddleston, S. (1983). Participation motivation in youth sports. *International Journal of Sport Psychology, 14*(1), 1–14. Retrieved from EBSCO*host*.

Graves, L., Ridgers, N., Williams, K., Stratton, G., Atkinson, G., & Cable, N. (2010). The physiological cost and enjoyment of Wii Fit in adolescents, young adults, and older adults. *Journal of Physical Activity and Health, 7*, 393–401. Retrieved from EBSCO*host*.

Green, C.S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature, 423*, 534–537. Retrieved from EBSCO*host*.

Kendzierski, D., & DeCarlo, K.J. (1991). Physical activity enjoyment scale: Two validation studies. *Journal of Sport and Exercise Psychology, 13*(1), 50–64. Retrieved from EBSCO*host*.

Kerr, J. (2007, Fall). Designing for active living among children. *Active Living Research*. Retrieved from: http://www.activelivingresearch.org/files/Built_Design.pdf

Longmuir, P.E., & Bar-Or, O. (2000). Factors influencing the physical activity levels of youths with physical and sensory disabilities. *Adapted Physical Activity Quarterly, 17*, 40–53. Retrieved from EBSCO*host*.

Morelli, T., Foley, J., Columna, L., Lieberman, L., & Folmer, E. (2010). *VI-Tennis:* A Vibrotactile/Audio Exergame for Players who are Visually Impaired *Proceedings of the Fifth International Conference on the Foundations of Digital Games* (pp. 147–154). New York: ACM. doi:10.1145/1822348.1822368

Morelli, T., Foley, J., Lieberman, L., & Folmer, E. (2011). *Pet-N-Punch:* Upper Body Tactile/Audio Exergame to Engage Children with Visual Impairments into Physical Activity. *Proceedings of Graphics Interface* (pp. 223–230). New York: ACM. Retrieved from http://portal.acm.org/citation.cfm?id=1992954

Nader, P.R., Bradley, R.H., Houts, R.M., McRitchie, S.L., & O'Brien, M. (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association, 300*(3). 295–305. doi:10.1001/jama.300.3.295

Nader, P.R., Bradley, R.H., & Houts, R.M. (2009). Data error in study of moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association, 301*(20). 2094–2095. doi:10.1001/jama.2009.701

Payne, V., & Morrow, J. (1993). Exercise and VO2 max in children: A meta-analysis. *Research Quarterly for Exercise and Sport, 64*(3), 305–13. Retrieved from EBSCO*host*.

Shephard, R. (1992). Effectiveness of training programs for prepubescent children. *Sports Medicine, 13*(3), 194–213. Retrieved from EBSCO*host*.

Stephens, M. (2002). Children, physical activity, and public health: Another call to action. *American Family Physician, 65*(6), 1033–1034. Retrieved from http://www.aafp.org/afp/2002/0315/p1033.html

U.S. Association of Blind Athletes. (2009). IBSA Visual Classifications, Retrieved May 18, 2009, from http://www.usaba.org/Pages/sportsinformation/visualclassifications.html

U.S. Department of Health and Human Services, Physical Activity Guidelines Advisory Committee. (2008). Physical activity guidelines advisory committee report. Retrieved from http://www.health.gov/paguidelines/committeereport.aspx

Wang, X., & Perry, A.C. (2006). Metabolic and physiologic responses to video game play in 7- to 10-year-old boys. *Archives of Pediatrics & Adolescent Medicine, 160*, 411–415. Retrieved from EBSCO*host*.

Wankel, L.M. (1985). Personal and situational factors affecting exercise involvement: The importance of enjoyment. *Research Quarterly for Exercise and Sport, 56*, 275–282.

Yang, S.P., & Foley, J.T. (2011). Exergames get kids moving. In Gray, T. & Silver-Pacuilla, H. (Eds.) *Breakthrough teaching and learning: How educational and assistive technologies are driving innovation*. New York: Springer.

Source #2

1 of 1 DOCUMENT

The Observer (England)

August 3, 2014

# If you could only see the world through my eyes: Virtual reality has come of age at last, with Facebook and Google vying to buy up headset manufacturers and uses ranging from treating children with ADHD to helping reduce post traumatic stress. Time to try it out, says Kadhim Shubber: HOW VR IS CHANGING THE WORLD

**BYLINE:** Kadhim Shubber

**SECTION:** OBSERVER REVIEW DISCOVERY; Pg. 22

**LENGTH:** 1834 words

My body is in the Observer's offices in King's Cross, but my mind is in another world entirely.

Strapped to my head is the Google Cardboard virtual reality headset. Assembled from a handful of simple components, the cardboard contraption has whisked me away into a peaceful forest with red, orange and brown trees.

I am completely alone, except for an grey animated rat chasing after a large orange hat. I turn my head to watch as a gust of wind blows the hat and can't help but stumble after the rodent, arms outstretched like a toddler taking its first steps.

I look away and as I gaze upwards, the Samsung S4 smartphone in the headset detects my motion and the field of view moves with me. The forest canopy is captivating. When I return to the rat, he is where I left him - the storyline effectively paused when my attention was elsewhere. Eventually, the rat and his hat are reunited and I'm suddenly back in the real world. I am intensely aware that the bridge of my nose is being assaulted by the hard edges of the headset.

Windy Day is just one of the apps for Google Cardboard, together with Google Street View and Google Earth, but is certainly its most charming. Google's do-it-yourself virtual reality (VR) headset is designed to give the public a taste of the immersive possibilities of the virtual world for around £ 50 - if you have access to an Android smartphone and can find some cheap glass lenses.

But it's merely the crest of a growing wave of excitement about virtual reality, most famously led by Oculus VR, the company behind the Oculus Rift headset. Purchased this year by Facebook for $2bn, the Kickstarter that catapulted the company into fame in 2012 was one of the largest crowdfunding projects ever, raising around $2.4m. This is virtual reality's moment in the limelight; it's now time for the technology to deliver.

The early 90s saw a similar amount of excitement about the possibilities of VR, with visionaries such as computer scientist Jaron Lanier predicting a future where we worked and played in virtual reality environments online.

It soon became apparent that the technology wasn't ready. Virtual reality was a nice idea, but little more than that.

This time around it's different, says Professor Albert "Skip" Rizzo, director of medical virtual reality at the University of Southern California's Institute for Creative Technologies.

"It's 1994 all over again. It's the same thing. But this time it's real," he tells me.

Rizzo leads a team looking at the use of virtual reality environments in everything from classrooms for children with attention deficit disorder to exposure therapy for war veterans suffering from post-traumatic stress disorder.

Advances in graphics, computing power and interface devices such as the Nintendo Wii or Microsoft Kinect have opened the door to a new level of

sophistication of virtual reality, he says. Most important, though, has been the continuing drop in cost of virtual reality technology, a trend largely driven by the gaming industry.

"Right now, a headset is $2,000. . . if you could replace that with a $350 headset [such as the Oculus Rift] and have that be better then you're golden - that's the direction we're heading," says Rizzo, whose lab the Oculus Rift's inventor, Palmer Luckey, worked in before launching the headset.

Accompanying the improvement in off-the-shelf commercial technology has been a boom in military interest in virtual reality. Put simply, without the wars in Afghanistan and Iraq, virtual reality wouldn't be where it is today.

"The urgency of war required novel solutions," says Rizzo, noting that tens of millions of dollars of US military funding has "fed the scientists in my lab over the last few years". The reason for that funding is simple: virtual reality offers a means of rehabilitating war veterans effectively yet cheaply.

One method being pioneered by Rizzo involves taking a veteran through a traumatic incident by immersing them in a recreation of that incident in a virtual world. Clinical trials of the method are still continuing, but "so far all the data has been promising and positive", he says.

Just as virtual reality is being used to help soldiers reintegrate into society after returning from war, it is also being used to train them for fighting in the first place.

The Defence Science and Technology Laboratory at the Ministry of Defence is investigating how virtual reality technology can be used to give the British army an edge in the field. Andrew Poulter leads the research and says that virtual reality training has a number of advantages over traditional training in the field.

Take, for example, training soldiers driving in a convoy how to respond to an ambush or an improvised explosive device (IED) attack, as troops in Afghanistan have experienced. Recreating that experience in the field repeatedly requires a significant amount of time and resources. "In a simulation, you can reset back to the beginning and go straight away again," says Poulter. Indeed, research published in 2008, looking at US, Canadian and British forces, showed that soldiers appear to be better prepared for combat when they have been trained in a virtual reality environment as well as in the field. But Poulter is somewhat downbeat about the advantage immersive headsets have over simple desktop monitors, keyboards and mouses. "There's very little done with headsets," says Poulter, for the simple reason that a headset can also prevent the soldiers from performing simple tasks such as taking notes or operating a radio.

In truth, VR headset technology still has several failings.

The display resolution of virtual reality headsets is still far behind what can be achieved with digital monitors. Nausea is another issue; users of the Oculus Rift, including the CEO, Brendan Iribe, have reported feeling sick after using the headset, an issue the company says it's working to fix in future versions of the device. One sceptic of headset technology is Professor Robert Stone from the University of Birmingham, who has worked on virtual reality projects with everyone from local heritage sites to hospitals to the Ministry of Defence.

"I've been doing this for 27 years and we always get the question - what is the killer application for virtual reality? - and, to be honest, at the moment there isn't one, because the technology is letting the side down a bit," he says.

For him, new headset technology is still held back by the same limitations that scuppered VR in the 90s and the alternative, namely large HD monitors, is a much better means for involving a person in a task or game. Furthermore, he says, VR headsets can be actively harmful to the goal of treating patients, distancing the patient from their doctor or nurse. He is also sceptical of Rizzo's work using the technology to treat PTSD sufferers

In the gaming industry, you find little of Stone's pessimism about virtual reality headsets. The Oculus Rift should go on sale in 2015, Sony is developing its own headset, the Morpheus, and several other companies are trying to get in on the game.

Developers are taking note. In 2013, UK-based company nDreams began working almost exclusively on games designed to be played with virtual reality headsets, including an adventure game called The Assembly for Oculus Rift and Sony Morpheus.

nDreams CEO, Patrick O'Luanaigh, is optimistic about the future of headset technology, describing the terrifyingly real experience of playing space horror game Alien Isolation on the Oculus Rift at June's E3 games conference in Los Angeles.

"When the alien came for me, I ripped the headset off in fear because it is so scary," he says. "That's the sort of reaction I certainly have never had before with a video game." The only comparable shift in experience, says O'Luanaigh, was the move from 2D to 3D gaming. He estimates that by Christmas 2015, virtual reality headsets will have finally hit the mainstream consumer market in a significant way. And once people start using them, they'll realise why the experience is "so special".

After only an hour with Google's Cardboard headset, a low-budget and limited virtual reality experience, it's hard to disagree.

1) Flight simulators are perhaps the most recognisable form of virtual reality training, but the British army has a simulator for what happens when you jump out of a plane too. The parachute jumping simulator suspends soldiers from a parachute-like harness while they wear a VR headset that takes them through the entire experience of making a jump. It also allows them to learn what to do if something goes wrong. It's just one of a range of virtual reality training applications in the UK military, many of which are similar to ordinary video gaming.

2) Surgery is an area that could see a lot of benefit from virtual reality technology. Studies have long shown that surgeons who practise an operation in virtual reality perform better when they enter the operating theatre. It's a simple case of practice makes perfect. But VR has a role to play during surgery too. In a recent operation in Spain, a patient under local anaesthetic wore an Oculus Rift headset in order to whisk her away from the operating theatre and the stress of the procedure. To top it off, her surgeon was wearing a Google Glass headset, streaming the procedure live to students.

3) When patients are recovering from an operation, virtual reality still has a part to play. One trial currently underway at the Queen Elizabeth hospital in Birmingham involves placing large HD monitors by the bedsides of recovering patients in intensive care. The monitors are intended to be windows on to virtual simulations of the peaceful Devon countryside. It has long been known that patients with pleasant views recover faster than those without and it is hoped that allowing patients to also explore an environment will help boost this effect.

4) The most hyped area for virtual reality today is in gaming. Developers are combining technologies to create a full-body experience. Headsets let a player feel like they are seeing through the eyes of their character, while force-feedback gloves and even vests let them feel what their character feels. Combine that with omni-directional treadmills that also allow you to jump - they are similar to jumping seats for babies - and the dream of playing a video game almost literally as the character is slowly coming true. KS

Captions:

Slot in the eyepiece then fold the cardboard around it. This is perhaps the trickiest part.

Cutting the cardboard is the first challenge. Best to get it laser cut. We used Laser Make in north London.

Fold the eyepiece so that the lenses sit snugly between the two notched outer holes.

Apply some glue to the side flap so that the headset holds together.

BOXING CLEVER Kadhim Shubber models the Google Cardboard headset. Photographs by Katherine Rose

The NFC sticker will launch the 'cardboard' VR experience once your phone is in place.

Finally, slot your Android smartphone into place and you're ready to roll!

**LOAD-DATE:** August 2, 2014

**LANGUAGE:** ENGLISH

**PUBLICATION-TYPE:** Newspaper

Copyright 2014 Guardian Newspapers Limited
All Rights Reserved

Source #3

Click on the link below. Examine the website and answer the questions for “Source 3.”

http://agliotilab.org/