

Extempore Emergency Response Technique with Virtual Reality Gaming

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Abstract. This paper provides an overview of Vietnam's technology penetration and the games industry, together with the social and cultural factors and issues, to propose the idea of integrating the gaming logic and attraction with Virtual Reality technology to improve Extempore Emergency Response Technique (EERT). The key research methodology is secondary research through journals, reports, statistics, as well as local news and updates. From the social perspective, Vietnam struggles to reduce the fatal consequences of increasing disasters and accidents in both rural and urban areas year by year. However, people's awareness of safety and appropriate emergency response remains minimal. From the technical perspective, this country is the global highlight with wide internet penetration, quick adoption of new technology, and being one of the biggest and fastest-growing markets for the games industry. The future development of smartphone games, especially VR games is expected to be tremendous in Vietnam, which facilitate various game design to combine with EERT training. Hence, implementing entertaining training solution would not only provide users with entertainment moments, but also uphold society's awareness of self-protection skills.

Keywords: Virtual reality · Augmented Reality · Vietnam · Games · Emergency response · Training

1 Introduction

This paper discusses the potential of integrating the gaming appeal into Virtual Reality training for Extempore Emergency Response Technique (EERT), a method that employs and utilize minimal investment of resource and equipment for maximal outcome on emergency response training.

VR application in emergency training is not a new concept. However, it limits the interest in formal and expensive trainings for limited audiences such as the military or firefighters. While the vast majority of civilians, typically in developing countries, are exposed to several disasters and accident as fire, earthquakes, flood, and stampede, there are limited training opportunities to this group. In particular, by November 2015, Vietnam had recorded 2694 cases of fire and explosion, 86 deaths with 283 people injured. It is also a country of widely available and low-cost internet, plus the significant growth of the gaming industry. Hence, applying advanced VR technology and gaming attraction to disaster response training is commercially potential in Vietnam as well as other countries.

2 Key Findings

2.1 History of Virtual Reality in SBT (Simulation-Based Training)

The idea of virtual reality was seeded in the 1930s in a science fiction story by writer Stanley G. Weinbaum, which described a user experienced a fictional world through holographic, smell, taste, and touch by wearing goggles. The real beginning of VR started from 1965 with Ivan Sutherland's doctoral thesis which presented a concept that a computer hardware would be used to create a virtual world which user can realistically interact with that environment. The first VR/AR head mounted display that was connected to the computer was invented by Ivan and his student. However, the name "Virtual Reality" was only created in 1987 by Jaron Lanier, founder of the visual programming lab (VPL) [9] (Fig. 1).

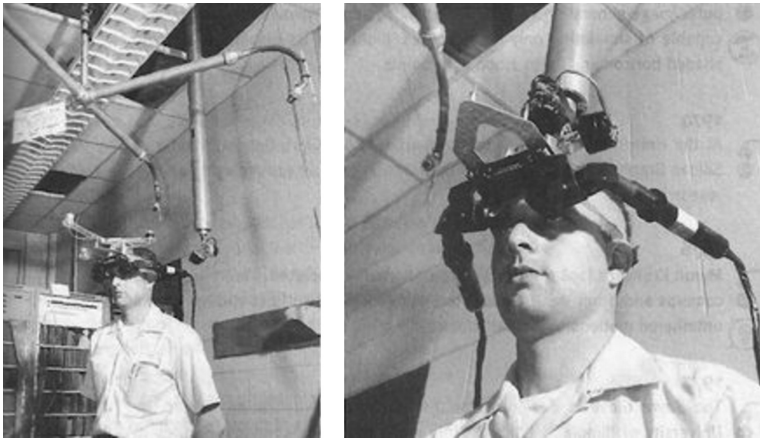


Fig. 1. VR head mounted display invented by Ivan Sutherland

The 21st century remarks with tremendous development of the VR technology, including investment of the leading technology names as Samsung Gear VR, Sony's PlayStation VR, HTC Vive, Google's Cardboard, Facebook Oculus Rift, and the Japanese's Fove [10] (Fig. 2).

2.2 Virtual Reality (VR) vs. Augmented Reality (AR)

Two most confused terms in the rising technology discussion topic are Virtual Reality (VR) and Augmented Reality (AR) both use the same coding language and similar technicality. However, VR creates a complete virtual world that users can interact with while AR blends the virtual contents and objects into the real world, which users can identify the differences. AR has achieved more commercial success than VR so far [3].

Two typical characteristics of VR is the ability to create presence and immersion. As creating a virtual world, it aims to make the user feel that he is actually present in



Fig. 2. Present popular VR headsets

the virtual environment though the level of immersion depends on the computer hardware, equipment, and the user's acceptance [12].

2.3 Application in Simulation Based Training (SBT)

VR application in simulation-based training is not a new idea since it has been adopted by the military for dangerous situations combat and aircraft training [21]. The eye-tracking technology is believed to evolve user interaction in the virtual environment [13], which facilitates trainings for individual or group response in disasters.

VR training systems can be monitored by human instructors or a computer-based simulator. Without the present of an experienced instructor, the simulator can correct the trainee to appropriate response to a situation [12]. In particular, a research to examine firefighters training results has demonstrated that the firefighters group trained with VR or blueprints before outperformed the control group (no training) in both time and accuracy [4]. If proper setting and implementation of virtual reality is applied broadly to simulation-based training, more lives can be saved from emergency situations.

3 Extempore Emergency Response Technique (EERT)

EERT advocates the use of regular readily available day to day household or body items as emergency supply to mitigate or resolve emergency situations; examples include cutting bed sheets to use as strips for bandages, using trash bag to collect water and socks as water filter can be the only option in certain emergency situations, or using ropes and water pipe to escape from a high floor fire. EERT can be a determining factor between life and death when there is a lack of availability of the necessary tools or resource in the case of an emergency or disaster. It encourages the minimalist approach to problem solving in the case of an emergency or disaster.

In Vietnam, the concept of EERT has only been noticed in the last few years when the number of death and injured people in preventable accidents considerably increases. The popular mean is via instructing articles, video clip or human training like in the picture below. However, the fundamental of emergency response technique is not only the knowledge that a person has, but also the calmness of that person in the situation. According to a local newspaper, both response knowledge and emotional reaction of Vietnamese in the emergency remains zero due to the lack of proper society attention on the matter and effective training approach [17] (Fig. 3).

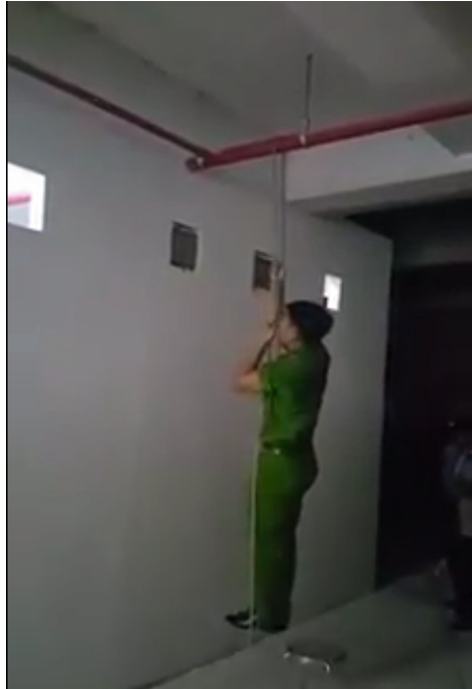


Fig. 3. A police officer provides EERT in an apartment building [11].

The authors see an opportunity to replicate quick and efficient EERT in Vietnam to address the lack of sufficient emergency personnel both in the urban and rural areas. The cheap and wide coverage of internet and smartphone and the commercial success of gaming in Vietnam facilitate a new form of training EERT via the combination of VR technology and gaming logic.

3.1 Vietnam Review

There are various reasons why a developing country such as Vietnam would benefit from Virtual Reality as a training platform for Extempore Emergency Response

Technique (EERT). The first and obvious being cost saving since it advocates the use of the most basic equipment for life saving emergency situation.

3.2 Cultural Factor

Rebuilding the country after long period of war, Vietnam has chosen to sacrifice quality and healthy development to achieve huge capital investment which embraces the capitalists' exploitation of both urban and rural workers. According to the Ministry of Labor estimates, every year Vietnam lost around 2,500 people killed in workplace accidents. The whole country only has 496 labor inspectors in 2008 [16]. Accepting passive exposure to accident risks has become a common attitude of both Vietnam's regulators and people.

The high collectivism culture also hinders people to easily accept new thinking and behavior. One of the authors used to be laughed by her own friends for wearing the helmet while riding motorbike because people are not enforced by law to do that a few years ago. Similarly, there has been a social media debate when a girl escaping from a fire karaoke bar in Hanoi with her bra covering her nose in Sep 2016. Despite several praises that she was smart to properly respond in emergency, the majority criticized her for her "funny reaction" [6].

The close-minded perspective in self-protection requires an innovative approach to improving people's knowledge and attitude toward EERT, which technology development can provide (Fig. 4).



Fig. 4. Hanoi fire incident in a Karaoke bar

3.3 Social and Environmental Factor

Delay in emergency response and first aid care after an accident; coupled with the lack of readily available paramedic training is a growing concern in Vietnam.

By November 2015, Vietnam had recorded 2694 cases of fire and explosion, 86 deaths with 283 people injured. The total value of damage is estimated VND876 billion (US\$38.6 Million) according to the general statistics office of Vietnam. One of the most recent fatal fire happened in Ho Chi Minh City killing three entire family members, as the family could not escape from three layers well-locked doors in their home [24]. This incident and the fatal outcome of the fire in Hanoi indicates the limitation of emergency response in Vietnam and the need to adequately address the situation void of cultural and social constraints.

Nevertheless, Vietnam is easily a buffet receipt for preventable accident and disaster. Per Viet Nam Emergency Response Plan, “at least one-third of Vietnam’s 63 provinces are affected by El Niño-induced drought, with 18 provinces in the South Central, Central Highlands, and Mekong Delta regions severely affected”, (Viet Nam: “Emergency Response Plan 2016/17”, 2016). The continuous drought has threatened safe water supply for millions of people in these regions. However, drought is only one of several emergencies affecting Vietnam on a frequent basis, often leaving the local population without knowledge on how to respond and thus leading to medical emergencies.

Formal training in emergency response is relatively uncommon with most useful resources available only in foreign languages such as English and as such is difficult to understand by the local population. The issue with the inadequate distribution of resource and dissemination of information is also an impending factor. Website articles and television programs have been used; however, it has shown not to be attractive enough to generate enough interest amongst the population.

3.4 Vietnam – Wide, Cheap Yet Low-Quality Internet

Vietnam’s internet quality is ranked below more than 100 other countries; however, it is the paradise for free and cheap Wi-Fi. The widely available internet is not only popular among cities, the rural areas also experience the strong growth of the internet and computing practices. In relatively low-income rural regions, locals who cannot afford their own computers can visit Internet Cafes with considerable numbers of computers [18] (Fig. 5).

In parallel with the internet, smartphone penetration is a tremendous trend in Vietnam. Among 48% population using the internet, half of them access the internet via their mobile devices [2]. Vietnam is also a quick adopter of technology. The availability of low-cost VR solutions such as Cardboard VR or Sky VR which costs VND200,000 (US\$9) [21], provide cost-effective tool for young people to experience VR. Affordable smartphone is now allowing VR-based training to reach everyone, whether with or without access to Internet Cafes or personal computer (Fig. 6).



Fig. 5. An internet-shift café in Vietnam

Virtual reality glasses: now for the masses

Update: March, 06/2016 - 14:18



Another dimension: Two students at VNU University of Engineering and Technology have designed a new model of virtual reality glasses to help more people access VR technology. — VNS Photos Đoàn Tùng

by Minh Trang

Two students at VNU University of Engineering and Technology have designed a new model of virtual reality (VR) glasses "Made in Việt Nam" to help access VR technology.

Fig. 6. Two university students design the "made in Vietnam" VR glasses

3.5 Vietnam – Ava Promising Game Market

Vietnam is one of the largest online game markets of value in Southeast Asia with sales of approximately \$200 million in 2012 [19]. Particularly popular in Vietnam are virtual online games, which allow computer users to solve challenges in a virtual reality. With the recent increase in broadband adoption across Vietnam with 412% increase, Vietnam is clearly a fit for online knowledge dissemination [1].

Gaming also belongs to the top 3 interests among online activities according to Appota report 2015 and 2016. Casual games dominate gamers’ taste, while various game types occupy their market share too (Fig. 7).

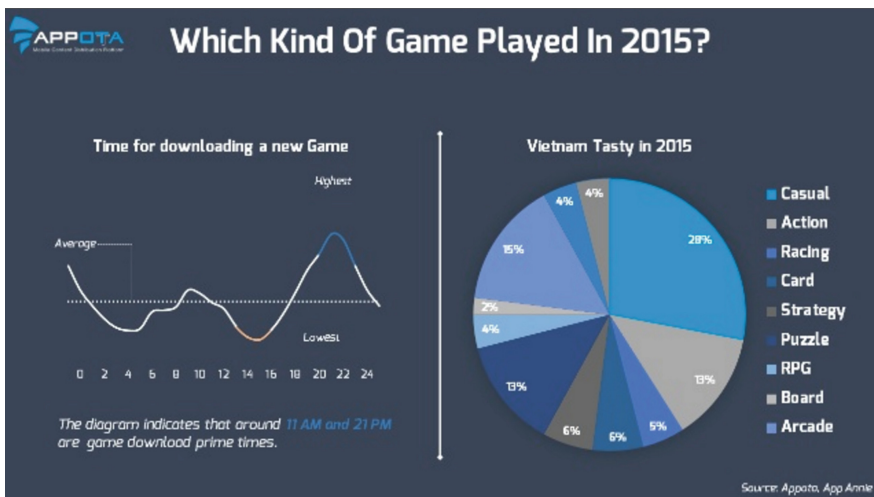


Fig. 7. APPOTA report: games market share in Vietnam

Vietnamese youth are willing to experience new technology and gaming experience. Several types of services are available as special equipment in shopping malls and even a “hybrid” VR game which has a staff stand behind and help the consumer “experience” movement and effects while wearing the VR headset. This funny approach attracts many customers to their stores [15] (Figs. 8 and 9).

VR games do not always need to provide dramatic effects to be popular. The “Summer Lesson”, one of the best-selling VR games in Japan is a typical example. The gamer will play the role of a tutor for a high school student during her summer break for one week. Yet this simple design effectively increases the immersive and memorable experience of the users. Bandai Namco, the game developer has initiated penetration of this game to Southeast Asia by providing English subtitles [22] (Fig. 10).

Bandai Namco’s target in Southeast Asia indicates the importance of this region in the games industry. SEA is forecasted to lead the global industry growth by 13.1%. The Big6, which includes Vietnam accounts for 99% of the region’s revenue. Vietnam, in



Fig. 8. A VR game area in a shopping mall

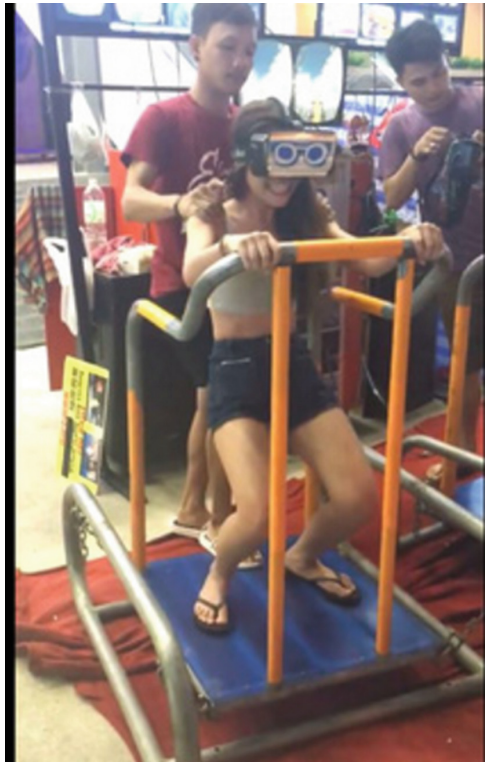


Fig. 9. The “hybrid” model which a person will create “physical effects” while the user experience VR headset.



Fig. 10. A scene from “The Summer Lesson” game

particular, is expected to witness the highest growth for smartphone games (Casual Games Association, 2017). It is indicative that any future activity will need to either compete or cooperate with the time customers spend on game activities.

4 Can Gaming Logic Be Integrated to SBT to Make It More Interesting

Extempore Emergency Response Technique (EERT) advocates the use of the resources in the immediate environment and improvising accordingly for protection and safer outcome, much as the girl in the fire incident in Hanoi who used her bra against the fume of the fire.

Combining current technology infrastructure and the potential growth of Vietnam market, Virtual Reality can utilize virtual gaming for Extempore Emergency Response Technique (EERT) training. Such training could easily be duplicated implemented across internet cafes in Vietnam (Fig. 11).

The popularity and increasing awareness of The Summer Lesson VR game provides different ideas regarding a gaming approach to enhance people’s awareness of EERT, either by immersing the user into a virtual disaster or simply coaching and saving a virtual character out of emergency. Although the lack of physical practice, frequent exposure to a situation will enhance outcome like the research on firefighters (Fig. 12).



Fig. 11. Tsunami response training with virtual reality



Fig. 12. Be a friend with the high-school girl and save her in dangerous situations?

5 Conclusion

As a developing country with low awareness of safety standard and emergency response technique, Vietnam suffers thousands of deaths and injuries caused by fire, work accidents, and other types of disaster every year. Limited solutions are available, including instructing radio and TV program, news and articles on the internet. However, these media contain several shortcomings, being uninteresting, theoretical, and lack of experience and practice just to name a few.

Given the development and penetration of the internet, smartphones, and other technology, the use of virtual reality gaming for Extempore Emergency Response Technique training presents an opportunity for training across various sectors of the economy. It would lead to the reduction of dependency and resource stretching at regular educational training institutions in the country. Implementing entertaining training solution would not only provide users with entertainment moments, but also uphold society's awareness of self-protection skills.

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