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# A Study on the Utilization of Virtual Educational Training Contents

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### Abstract

*Virtual world technology is driving major advances in education, entertainment, and professional training. Metaverse and extended reality (XR) technologies maximize immersion to enhance learning, provide global learning environments, and expose students to situations that are difficult to experience in real life. Career exploration is an important developmental task in adolescence, and virtual training maximizes learning by providing life-like experiences with imagery training. Virtual training overcomes spatial, financial, performance, and situational constraints and is effective in a variety of fields, including military and disaster training. It provides customized learning for various users such as youth, job seekers, and people with disabilities, deepening their understanding of professional activities and improving their problem-solving skills. It also improves the quality of learning through repetitive learning and contributes to the improvement of teamwork and communication skills, and helps to solve financial problems by using unlimited internal resources and space in virtual space, and enables people with disabilities to perform in various professions. This paper investigated the value of virtual training as a comprehensive educational tool through an economical and efficient learning experience.*

## 1. Introduction

The digital revolution of the 21st century has marked a major turning point in the evolution of video content. In particular, content involving virtual worlds is at the forefront of technological advancement and driving innovation. These virtual worlds offer unprecedented experiences for users through image training, metaverses, and extended reality (XR) devices, opening up incredible possibilities in education, entertainment, and professional training. Interacting in virtual worlds maximizes immersion, which contributes to better learning. Metaverse and XR technologies also provide global learning environments that transcend geographical constraints and allow users to experience situations that would otherwise be difficult to experience in real life through a variety of simulations. These technologies are revolutionizing educational methodologies, enabling learner-customized content delivery and interactive learning experiences. This study analyzes how virtual

world technologies are contributing to the innovative development of educational content through various examples and suggests future directions.

## 2. Metaverse and XR

Metaverses and extended reality (XR) are key pillars of modern technological advancement, providing users with experiences that are indistinguishable from reality. Metaverses are digitally-based 3D virtual worlds that are used for everything from social interaction to education to entertainment. XR encompasses virtual reality (VR), augmented reality (AR), and mixed reality (MR), which have overcome initial technical and economic constraints and become increasingly popular with the advent of mobile-based AR applications. Pokémon Go, in particular, has been instrumental in bringing AR technology to the masses. Devices such as the Oculus Rift and HTC Vive are opening up new possibilities in education and entertainment, and the continued development of these technologies has the potential to transform many aspects of society. Metaverse and XR are pushing the boundaries between digital and real.

## 3. Exploring Careers in Adolescence

Career exploration is considered a crucial part of the developmental tasks of adolescence. According to career development theory, adolescents are establishing their sense of self during this time, and career exploration is an important steppingstone to self-actualization and leading a happy life. During this process, adolescents deeply consider and explore their interests, abilities, and values. Experiencing a variety of jobs is essential to this process. It helps them learn about careers and find the work that suits their aptitudes. In adulthood, these experiences become even more important, and a variety of work experiences can be an important reference for career choices. Therefore, career exploration is not just about finding a job, it is an important process for young people to decide how they want to design their lives and what their goals are. For this reason, career exploration is considered a key component of the developmental task of adolescence, through which young people establish their identity and prepare for life as an adult.

## 4. Virtual Training

Imagery training is a process in which learners practice a skill by mentally envisioning the action or information of the skill before actually practicing it. It is widely used in sports to help athletes analyze their performance and improve their game strategy, and it is also used to boost confidence before an important competition.

Virtual training utilizes computer technology to recreate real-world situations, allowing users to have a life-like experience within a virtual environment. It helps users gain a deeper understanding of a particular skill or procedure through a variety of scenarios and develop their ability to solve various problems they may encounter in the real world. It is especially suitable for simulating situations that are difficult to train in real life or that involve risk. Both image training and virtual training are effective ways to help learners improve skill acquisition and problem-solving by providing realistic experiences. Virtual training is particularly useful in situations where training in a real-world environment would be impossible or dangerous, such as operating expensive equipment or simulating extreme situations that are difficult to replicate in the real world. We have divided these factors into four categories: spatial constraints, financial constraints, performance constraints, and situational constraints.

### 4.1 Space Constraints

Real-world training has many spatial constraints depending on the field. Among them, military exercises can be set up in a small area if the space to be trained is small, or in a large area if it is set up in a country or globally. Disaster drills can also be expanded from a single building to an area depending on the type of disaster. This can be overcome by using the virtual reality environment. The open world system currently used in many games is not a limited space, but a system that automatically expands as the user moves around. These factors can be used to great advantage in virtual training. In military training, it is possible to combine land, sea, and air with the coastal or mountainous terrain of other countries that do not allow military training. For disaster drills, virtualizing the interior of a realistic building can create a more dramatic environment by recreating the conditions that can cause a building to collapse, such as fire drills, earthquakes, and tsunamis. In addition, in the case of large-scale disaster training such as mountain fires, it is impossible to reproduce in reality, but in virtual reality, it is possible to create a large space beyond spatial constraints and train. These points can be applied to training in each field to develop adaptability to new environments through realistic environments and to develop immediate response capabilities in real-life situations.



**Figure 1. Army Virtual Training Exercises**

### 4.2 Financial Constraints

Large-scale or expensive exercises can pose significant financial challenges. For example, the U.S. and South Korea's joint U.S. Freedom Guardian (UFG) drills require hundreds of billions of dollars in defense spending, and the U.S. Air Force's Red Flag exercises also require hundreds of billions of dollars in defense spending to provide a large number of troops, fighter jets, and fuel to operate them. In addition, disaster drills can cost as much as $1.8 billion for a single Rosenbauer Panther, which is said to be the most powerful fire truck in the world.
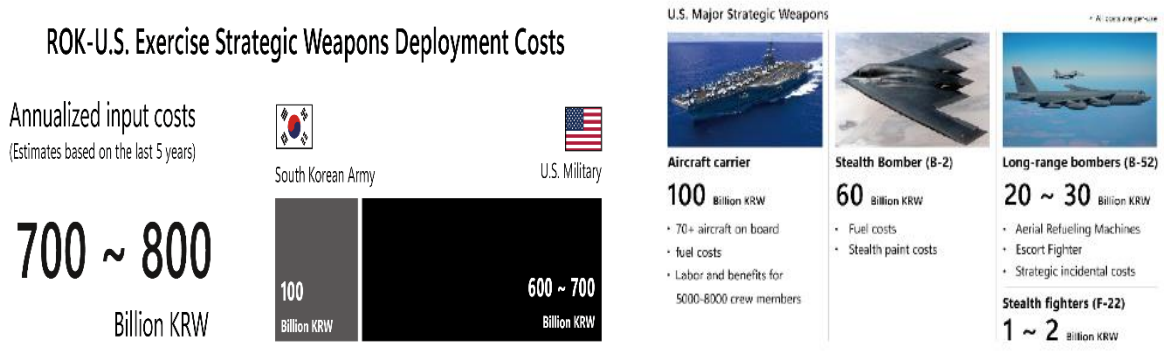


**Figure 2. ROK-U.S. Exercise Strategic Weapons Deployment Costs**

Due to the many restrictions on the cost of consumables and equipment purchases, these drills cannot be conducted freely, and there is a gap between the rich and poor, leaving only a few technicians to operate such equipment. However, the nature of virtual worlds can solve many of these problems. According to the GOA, the U.S. Army and Marines have found benefits in terms of training effectiveness and cost savings or cost avoidance by utilizing simulation-based training. These benefits include the ability to digitally create expensive equipment so that prospective users can learn how to use it and develop application skills so that when the equipment is delivered, it can be put into the field with a short acclimatization period, reducing the gap between training and deployment. In addition, consumables can be provided indefinitely in the virtual environment, so it is possible to identify the consumption patterns of real equipment and create a realistic use environment when applied systematically, eliminating the budget for consumables, making budgeting possible, and eliminating the problem of environmental destruction. This makes training more comfortable for organizations and businesses that have difficulty budgeting for expensive equipment in their training protocols and provides an opportunity to quickly experience and apply new equipment.

## 4.3 Performance Constraints

An important factor in workplace experiences is the degree to which they feel realistic. However, children, adolescents, and people with disabilities often struggle with realistic experiences due to physical requirements, which can be a major barrier to job experiences and lead to psychological rejection. Virtual training can overcome these limitations and provide customized content to enable realistic job experiences.

First, it provides customized learning based on performance. For example, according to The Japan Times, a special school in Osaka, Japan, utilizes VR technology to help students with disabilities experience a variety of jobs. Second, it allows students to quickly master skills before entering the workforce through iterative mastery learning. In an airplane maintenance training program conducted by the Federal Aviation Administration (FAA) in the United States, virtual training helps mechanics master their skills and perform quickly and accurately in real-life situations. Finally, quick feedback allows for quick correction of dangerous situations or task errors. Harvard Medical School's medical training program uses virtual surgical simulations to help interns practice surgical procedures and receive immediate feedback to reduce mistakes in real-life surgeries.

Virtual training is becoming an important tool for providing realistic educational content to children, adolescents, and people with disabilities to help them reach their full potential.
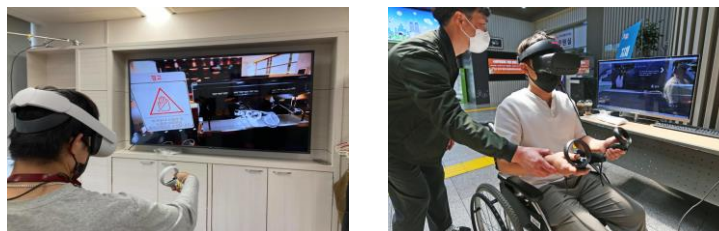


**Figure 3. Virtual job training for people with disabilities**

## 4.4 Contextual constraints

In 2020, the world was facing many difficulties due to the prohibition of gathering in each country due to

Covid-19. Among them, educational institutions were unable to conduct face-to-face training, so they used 'Zoom' to conduct non-face-to-face video lectures in Korea, and in the case of the national army reserve, it was inconvenient for each organization and institution to replace it with video training on the Internet because it was impossible to gather at the training site. As a result, the quality and acquisition of learning were very poor. This can be seen in research from the Korean Education Research and Information Service (KERIS).

Virtual training can solve the above problems very easily. In the event of a social disaster, such as an epidemic, it is possible to create an environment like gathering in the field through a virtual space to improve learning not only through video training but also through virtual practice. As a real-life example, Mayo Clinic continued to educate medical staff through virtual training programs during Covid-19. This includes surgical simulations using virtual reality, remote patient diagnosis and treatment training, and more. This training has been instrumental in maintaining the quality of patient care during Covid-19.

These elements not only transcend spatial boundaries in training protocols, but also national boundaries, creating a realistic environment to learn from the differences in professions between countries to those that can only be practiced in certain countries. As a result, the diversity of content can be categorized into various factors such as country, space, and time.



**Figure 4. COVID-19 remote learning experiences and perceptions**

## 5. Conclusion

Virtual training can help solve many of the constraints that can arise in real-world training. For example, factors such as training intensity, social environment, financial situation, etc. can be adjusted more flexibly in a virtual environment. This is one of the key reasons why virtual training content can serve as more than just a learning tool, but also as a work experience training protocol. By providing environmental elements that are difficult to perform in real life, especially in a virtual space, it can provide a more realistic experience for a wide range of users, from adolescents to those who have not found a job to those who want to try out a new career. This lowers the barriers to experience, making it easier for users to experience and understand different careers. Virtual training also allows people with physical disabilities to experience different careers without the need for large spaces or travel. This is possible through static exploratory activities rather than unconditional dynamic activities. In this way, it can provide opportunities for people with and without disabilities to broaden their spectrum of vocational activities.

Virtual training content is more than just a training tool. High-level training that is difficult to accomplish in real life due to financial and physical constraints can be done more economically and efficiently with virtual training. Virtual training also allows for iterative learning, allowing users to repeat drills until they've mastered

them. This contributes greatly to improving the quality of learning and can also play an important role in creating a social environment. By learning the differences between the performance capabilities of people with disabilities and people without disabilities through virtual training, and as a result, efficiently dividing the workload using the differences in real work, both people with disabilities and people without disabilities can create tangible data that can be used in the workplace. In conclusion, virtual training is valuable as an inclusive training tool that provides realistic job experience and learning opportunities for a wide range of users and gives equal opportunities to all, regardless of whether they are disabled or able-bodied. It enables users to deepen their understanding of professional activities, improve their problem-solving skills in the real world, and enjoy a safer and more efficient learning experience.

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