

Analysis of immersive teaching methods for the cultivation of higher vocational network security talents based on meta-universe

Hanbing Yu

Department of Electronic Information Engineering, Leshan Vocational and Technical College, Leshan, China

Abstract: *According to the characteristics of students' learning habits and foundation in higher vocational colleges, and integrating the practical experience of students participating in network security competitions in our school in recent years, this paper analyzes the new way of training network security talents in higher vocational colleges using the prevailing meta-cosmic environment combined with the current more interactive immersive teaching methods, stimulates students' interest in exploring learning and better integrating the knowledge they have learned into the application environment.*

Keywords: *higher vocational; meta-universe; network security; immersive teaching*

1. Foreword

Without network security, there will be no national security, there will be no stable operation of economy and society, and it is difficult to protect the interests of the people. With the continuous improvement of modern science and technology, network technology has gradually been integrated into people's work, study and daily life, and has become its leading force. Network security is an essential part of national security. It refers to putting the network in a stable and reliable operation by taking necessary measures to prevent attacks, intrusion, interference, breaching and illegal use of the network, as well as accidents, and to ensure the integrity, confidentiality and availability of network data. Network security has different types due to different environments and applications, mainly including the following: information system security, network security, information dissemination security, and information content security. In today's social environment, it has become an important task and task to cultivate high-quality talents in network security.

2. Analysis of network security talent training

With the rapid development of the times, Internet networks and information technology are also keeping pace with the times, and network security has also become an indispensable part of the learning and daily life of contemporary college students. According to statistics, as of June 2022, college students accounted for 25.1% of netizens.

With the rapid development of emerging technology industries in today's era, the supply of talents in the field of network security exceeds the demand. 《Research Report on the Market Situation of 2022 Network Security Talents》 released by Zhilian Recruitment It's pointed out that the demand for network security talents is gradually increasing, and the training of network security talents is imminent. In the current volatile society, what is lacking is high-quality skilled talents who combine theoretical knowledge and hands-on ability. However, even if China has drastically reformed education for decades, it still lacks some substantial breakthroughs and changes, which indirectly leads to the extreme shortage of such applied talents in all walks of life.

At present, colleges and universities still have significant shortcomings and shortcomings in the training of network security talents: in teaching practice, most schools generally attach more importance to the teaching of theoretical knowledge, ignoring or indirectly skipping the practical application of theoretical knowledge itself in real life. Among college students, there are some situations of "overambitiousness" and "low eyes and hands". I am only familiar with theoretical

knowledge, but I can't apply it in practice. There is no trend of "talking soldiers on paper". Similarly, it has been shown in the teaching feedback on the training of network security talents that some students feel that theoretical knowledge is boring and can't be interested in network security-related knowledge. This also reduces the flow of fresh blood in the field of cybersecurity. In the current fickle society, comprehensive and high-quality skilled talents combining theoretical knowledge and hands-on ability are more needed [1].

3. Immersive teaching based on meta-universe

3.1. The concept of meta-universe

The meta-universe adopts the technology paving network bridge model to connect the virtual world with the real social world, showing the integration of multiple technologies and a complete new social system. The meta-universe is also a definition of constant development and change. Different participants are changing and updating the inner meaning of the meta-universe in their own way. The new virtual visual scene it produces also makes users immersed in the virtual world. The term metacosm begins with the science fiction novel *Avalanche* written by writer Neil Stephenson in 1992, which embodies the infinite imagination of people of future science and technology at that time. Under the description of the novel, virtual 3D architecture is integrated with reality and inherent limitations are broken. Since then, the concept of meta-universe has gradually attracted widespread social attention, and reached a new height in 2021, as shown in Figure 1.

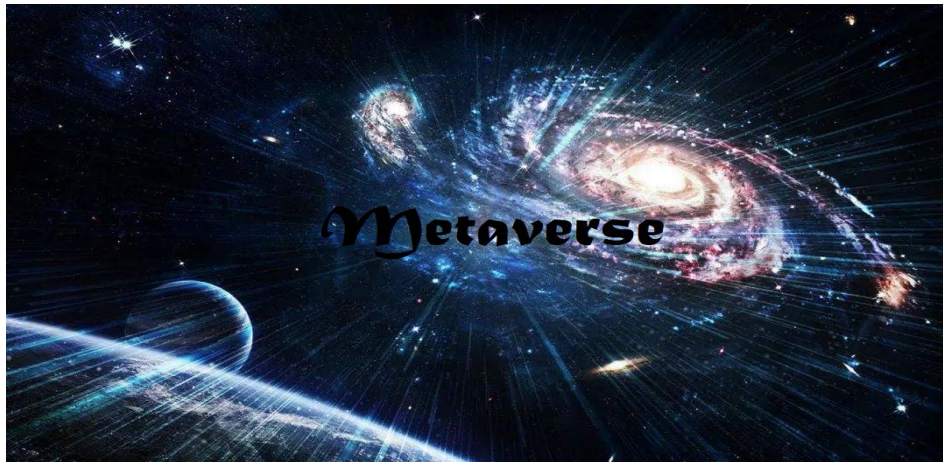


Figure 1: Metaverse

3.2. The essence of the meta-universe

The metacosm is essentially a process of virtualization and digitization of the real world, which requires a large number of transformations to the production of content, the economic system, the user experience, and the content of the real world. The development of the meta-universe is also gradual. It is supported by shared infrastructure, standards and protocols, and is formed by the continuous integration and evolution of a variety of tools and platforms. The immersive experience it provides is based on extended reality technology, also based on digital twin technology to generate real-world mirrors, or based on blockchain technology to build an economic system that closely integrates the virtual world with the whole real world in economic, social systems and identity systems, and allows each user to produce content and edit the world.

3.3 Analysis of immersive education

Immersive teaching can deepen our understanding of knowledge. When listening to lectures or reading books, everyone's efficiency and learning progress are different, just "remembering" a small part of what they have learned. Immersive learning can help us understand knowledge points faster and better, put forward our own opinions on the confused part, and discuss together. Until doubts are eliminated and the knowledge is fully understood, the knowledge can be better used [2]. We can promote the practical application of the knowledge learned and find like-minded partners by integrating

the knowledge learned into the scene for practical application, or discussing with others. We can find like-looking friends through many community punches, online discussions, meeting modes and other ways. The heart is a little smart. Even if we are actually far away, we still have a common interest in learning and learning goal.

3.4. Significance of immersive teaching

The most important feature of immersive teaching is its simulation, which can guide students to find key problems in the constructed situation, while using the knowledge learned and long experience to accumulate problems. And this inquiry process is the essence of learning, so that students can in exploration, gradually mobilize interest, activate your own cognition, develop good thinking habits, and feel the fun of solving practical problems with professional knowledge, and truly realize the significance of learning. In order to enable students to build an emotional understanding of what they have learned and enhance learning interest. Teachers can also use various teaching auxiliary materials to carry out the situation design of teaching, so that students can be in the situation, carry out reasonable imagination and association, and then produce empathy. Students' attention is more focused, stimulating students' desire to explore knowledge, so as to form a reasonable imagination and expand students' logical thinking. This learning process is to set up scenarios according to the content of the teaching, so that students can imagine and discover, explore and acquire new knowledge, so as to improve students' knowledge and application level.

3.5 Immersive teaching method based on meta-universe

3.5.1. Cases of virtual environment teaching in the meta-universe

With the development of the times, the ways and methods of training network security talents have also changed. Nowadays, network security students can not only learn through offline teaching, but also have more ways to learn under the meta-universe. For example, the more common web attack and defense game: "attack and defense world", "bugku" and so on. Through practical operation, network security students can be better improved, not just boring oral theoretical teaching, as shown in Figure 2.



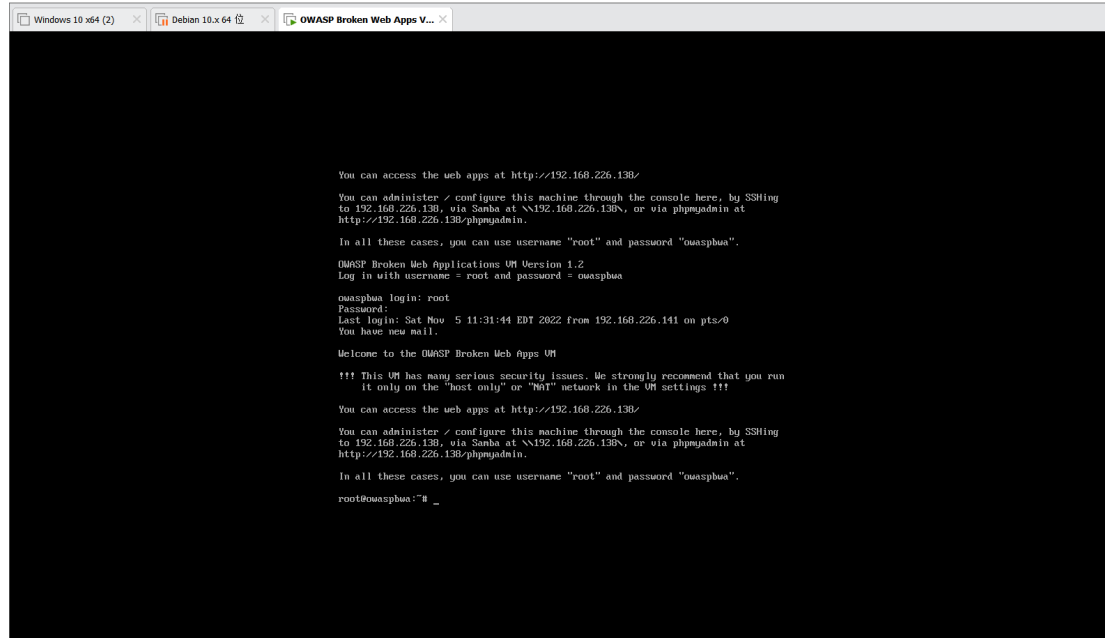
Figure 2: Hetian Network Range

3.5.2. How to use the meta-universe to achieve immersive teaching

Combined with the above cases of establishing web pages for offensive and defensive games and online competitions, although students can establish an emotional understanding of what they have learned and enhances interest, theoretical knowledge and practical operation knowledge are not comprehensive, and there are teaching loopholes. In order to achieve immersive network security teaching in the metacosm, we can build a fully developed web page. The web pages are diversified. In addition to the customs clearance games of "attack and defense world" and "bugku", there is a separate theoretical knowledge learning platform that can, like CSDN (Chinese Software Developer Network), specialize in technical exchanges for network security personnel, and can also realize resource sharing. You can play game confrontation, technical exchange and resource sharing on the platform, which can provide all aspects of improvement for students across the country.

3.5.3. The meta-universe achieves the focus of immersive teaching

The learning and practical operation of network security are the easiest way to raise students' interest in learning. They can build a variety of target machines and environments, so that students can better immerse themselves in learning in practice. It perfectly realizes the purpose that students can enter the meta-cosmic world at any time and anywhere, and can also view, use and experience a large amount of content in the meta-universe anytime and anywhere, as shown in Figure 3.



```
Windows 10 x64 (2) | Debian 10.x 64 | OWASP Broken Web Apps V... |
You can access the ueb apps at http://192.168.226.138/
You can administer / configure this machine through the console here, by SSHing
to 192.168.226.138, via Samba at \\192.168.226.138\, or via phpmyadmin at
http://192.168.226.138/phpmyadmin.
In all these cases, you can use username "root" and password "owaspbua".
OWASP Broken Web Applications VM Version 1.2
Log in with username = root and password = owaspbua
owaspbua login: root
Password:
Last login: Sat Nov  5 11:31:44 EDT 2022 from 192.168.226.141 on pts-0
You have new mail.
Welcome to the OWASP Broken Web Apps VM
!!! This VM has many serious security issues. We strongly recommend that you run
it only on the "host only" or "NAT" network in the VM settings !!!
You can access the ueb apps at http://192.168.226.138/
You can administer / configure this machine through the console here, by SSHing
to 192.168.226.138, via Samba at \\192.168.226.138\, or via phpmyadmin at
http://192.168.226.138/phpmyadmin.
In all these cases, you can use username "root" and password "owaspbua".
root@owaspbua:~# _
```

Figure 3: Open Web Application Security Project

4. Sum up

Through immersive teaching, we can tap the potential of students to ask questions, explore problems and solve problems, so that students can effectively integrate the knowledge they have learned. Learning is not only a process for teachers to unilaterally transfer knowledge to students, but also a process for students to build a knowledge network system through their own experience according to various material resources to promote the development of their own logical thinking. By creating different scenarios and integrating different dimensions of cognition to cultivate students to maintain calm thinking and rational judgment in extremely complex situations. At the same time, under the guidance of teachers, students can constantly reflect on and constantly improve their learning habits and methods to obtain a more scientific and comprehensive knowledge system.

Meta-cosmic immersive teaching pays attention to teachers who should change the teaching methods that inject knowledge in the past. Instead, they should follow the cognitive laws of students, fully mobilize teachers' own guidance ability to combine with students' own situation, guide students to imagine, make the whole teaching process into a relaxed and active atmosphere, enhance students' feelings and experiences, and fully mobilize students' enthusiasm for learning. In this way, in immersive teaching, students can be more willing to invest their own energy and time in researching and using the knowledge they have learned, cultivate a series of abilities such as observation, analysis, thinking and exploration, and stimulate students' emotional development.

References

- [1] Jiang A P. On the Tentative Reform of Higher Vocational English Project Teaching [J]. Journal of Huaihua University, 2012.
- [2] Jiang C, Jiang J. Construction and Management of Online 3D Training Studio[C]// 2018 China International Conference on Electricity Distribution (CICED). 2018.