The reform and practice of information security teaching under the mode of "competition-oriented teaching"

Yuyan Dong[1,a,*], Yaoyu Ge[1,b]

[1]*Ulanqab Key Laboratory of Intelligent Information Processing and Security, Jining Normal University, Ulanqab, Inner Mongolia, China*
[a]*yuyandong88@gmail.com, [b]yaoyuge@163.com*
[*]Corresponding author

Abstract: This paper deeply studies the application of competition-oriented teaching mode in information security, aiming to solve the problem that traditional teaching methods lag behind the development of technology. The competition-oriented teaching model cultivates students' key skills such as real-world problem-solving, technical practice, and teamwork through practical safety competition projects. This paper analyzes the successful experience of this model in promoting the improvement of students' comprehensive literacy and evaluates its practical effect on student performance. The study found that the competition-oriented teaching model provides a richer and more practical learning experience for information security students so that they can better adapt to the challenges of the workplace.

1. Introduction

In today's information age, the importance of information security is becoming more and more prominent, and the demand for highly qualified professionals is also growing dramatically. To meet this urgent need, the education system for the information security profession is facing new challenges and opportunities. Traditional teaching methods are inadequate in cultivating students' practical application skills, so innovative teaching models have become an urgent need to adapt to the requirements of the evolving field of information security. Competition-oriented teaching has emerged as a proven way to address this challenge due to its practice-oriented, competitive, and problem-solving nature [1][2].

The rapid development of the information security profession and the urgent demand for professionals with practical skills have made the traditional theoretical teaching mode gradually lag, and a more feasible teaching mode that can cultivate students' practical skills is urgently needed. The competition-oriented teaching model has attracted much attention because of its emphasis on practicality, competitiveness and problem-solving ability. In this context, this paper aims to study the application of competition-oriented teaching mode in information security, to explore its value and potential effect in teaching reform.

This paper comprehensively analyzes the practical application of the competition-oriented teaching model in the information security major, and finds out the advantages and disadvantages of

the model by comparing the traditional teaching methods, to provide useful suggestions for the teaching reform of the information security major. The research questions mainly focus on how the competition-oriented teaching model can better adapt to the teaching needs of information security majors, and how it can significantly promote the cultivation of students' practical skills. The in-depth answers to these questions will help to understand the actual effect of the competition-oriented teaching model in the information security profession more comprehensively and provide a clearer guidance direction for future teaching practice.

2. Competition-oriented teaching model

In the ever-evolving landscape of information security, traditional teaching methods often struggle to keep pace with rapid technological advancements. This paper explores the practical and competitive approach of the competition-oriented teaching model in the context of information security education. This teaching method not only prioritizes knowledge transfer but also places a strong emphasis on enhancing students' practical abilities and fostering innovative thinking.

2.1. Overview of Competition-Oriented Teaching

The competition-oriented teaching model is a teaching method that focuses on practical and competitive learning. In this mode, students improve their professional skills and ability to solve practical problems by participating in various competitions, such as problem-solving competitions, practical project competitions, etc. This teaching mode not only emphasizes the transfer of knowledge but also pays more attention to the cultivation of students' practical ability and innovative thinking[3][4].

2.2. Examples of successful application of the pattern

The competition-oriented teaching model has been successful in many areas. For example, in the field of computer science, programming competitions have long been an effective way to train excellent programmers. In the field of engineering, various innovation competitions encourage students to be exposed to real-world engineering problems and find innovative solutions in advance. This model has also led to positive results in a variety of fields such as business and medicine, providing students with a learning experience that is closer to the needs of the real job.

2.3. Teaching advantages of information security major

In the information security major, the competition-oriented teaching mode has unique advantages. First, the field of information security is evolving rapidly, and traditional teaching methods often fail to keep up with the rapid changes in technology. The competition-oriented teaching model enables students to adapt and master the latest information security technologies more quickly through the simulation of real-world challenges and application scenarios. Second, the nature of information security requires practitioners to have practical offensive and defensive skills, which is what the competition-oriented teaching model focuses on. By participating in safety competitions, students are able to face real safety problems in a simulated environment and practice their technical skills [5]. Finally, information security often requires innovative thinking and teamwork, and the competition-oriented teaching model cultivates students' sense of innovation and teamwork spirit by forming teams to participate in competitions and solve complex problems.

Therefore, the competition-oriented teaching model is considered to be a practical teaching method in the information security major, which can better meet the requirements of professional development and cultivate more practical information security professionals.

3. The current situation of information security professional teaching

At present, the teaching of information security is facing a series of challenges and problems [6]. Although the importance of the field of information security is gradually recognized, the teaching and learning systems of many schools and institutions have not fully adapted to the rapid development of this field. The curriculum and content may be relatively lagging behind, and it may not keep up with the latest evolution of information security technology [7]. Students may face difficulties in gaining sufficient practical experience, which is particularly important in the field of information security.

On the one hand, the development of information security technology is far faster than the updating of teaching materials and the training of teachers. This has caused many educational institutions' information security courses to struggle to keep up with the latest threats and defence techniques. On the other hand, traditional classroom teaching often focuses too much on the transfer of theoretical knowledge and neglects the cultivation of practical application skills. The knowledge students gain in the classroom is difficult to translate directly into the actual ability to solve real security problems. In addition, the interdisciplinary nature of the field of information security poses challenges for teaching. Students need to understand multiple fields such as cybersecurity, cryptography, and risk management, and traditional discipline systems may not be able to effectively integrate these contents, resulting in isolation between disciplines.

Traditional teaching methods for information security majors are often limited to classroom explanations and theoretical assessments, ignoring the need for students to apply skills in real-world scenarios. Practical work in the field of information security requires practitioners to be able to respond quickly and solve problems, which requires students to have more practical operation and application skills. Traditional methods of curriculum design and teaching methods do not effectively provide sufficient practical opportunities, so there may be a gap in the application level of graduates when they enter the workplace.

Therefore, more flexible and innovative teaching methods are needed to meet the needs of students and cultivate more comprehensive and practical information security professionals.

4. The application of competition-oriented teaching in information security

This paper deeply studies the application of competition-oriented teaching mode in information security major, integrates the actual security competition project into the curriculum through comprehensive curriculum design and teaching reform, provides students with participation opportunities through the internal information security competition platform of the school, and encourages students to share knowledge and experience in collaborative learning and jointly solve security problems through the establishment of communities and teams. So as to better train students to adapt to the practical skills of vocational needs. (Figure 1)

4.1. Introduce a competition-oriented teaching model

In order to introduce a competition-oriented teaching model in the information security profession, a comprehensive curriculum design and teaching reform are needed [8]. One possible approach is to incorporate a real-world security competition into the curriculum or to create an information security competition platform within the school. By providing students with the opportunity to participate in competitions, they develop real-world skills by tackling a variety of security challenges in an environment that simulates real-world scenarios. In addition, building communities and teams related to safety competitions is also an effective tool. Students can work together in small groups to share knowledge, and experiences, and work together to solve safety problems. This collaborative approach to learning helps develop teamwork and communication skills and is a key component of competition-

oriented teaching [5]. Through this teaching method, students will better understand and respond to information security challenges and improve their practical skills and teamwork spirit.
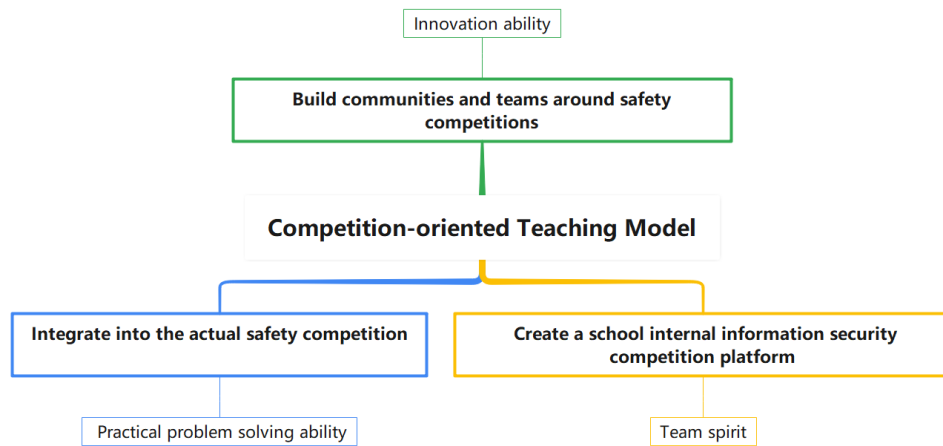

Figure 1: Competition-oriented teaching model framework.

4.2. Analyse how the model can effectively promote students' practical skills development in the field of information security

Practical Problem-Solving Skills: By participating in safety competitions, students will be directly confronted with simulated real-world safety problems, thus developing problem-solving skills. This hands-on training enables them to better cope with the challenges of real-life work scenarios.

Practical technical ability: Security competitions usually simulate real attack and defence scenarios and require students to conduct actual operations such as vulnerability analysis and penetration testing. Through such practical training, students will be able to understand and master information security technology more deeply.

Teamwork: Most safety competitions are teamwork, where students work together and coordinate resources to solve complex security problems. This helps to develop students' teamwork spirit and improve their communication and coordination skills in a collaborative environment.

Innovation: The problems in safety competitions are often complex and require students to constantly innovate and find new solutions. This fosters students' sense of innovation and independent thinking skills in solving problems.

Through the introduction of competition-oriented teaching, information security students will develop practical skills more holistically and be fully prepared for future careers. This practical application-oriented approach to learning helps to compensate for the shortcomings of traditional teaching methods in terms of skill development.

5. Practical experience sharing and effect analysis

5.1. Successful practice of competition-oriented teaching in information security

In schools, the practical application of the competition-oriented teaching model has achieved remarkable results in the field of information security. First of all, the school has actively introduced a variety of security competitions, including well-known cyber defence competitions and penetration testing challenges at home and abroad. Through cooperation with the industry, a safety laboratory has been established that is similar to the actual working environment, providing students with sufficient resources and platforms for practical operation.

At the same time, students are encouraged to participate in various safety communities and teams,

and professional mentors are provided to enable students to better apply what they have learned in actual competitions. It also stimulates students' interest in learning and increases their practical experience by organizing regular internal competitions.

5.2. The practical effect of the competition-oriented teaching model in terms of student performance

Improvement of technical practical ability: Students have significantly improved their technical practical ability by participating in safety competitions. Many students are able to flexibly apply the techniques they have learned in practical practice to quickly solve various security problems.

Teamwork and Communication Skills: Students develop good teamwork and communication skills during the competition. They learn to work together, work together, and solve complex problems effectively.

Innovative Thinking and Problem Solving: Through competition-oriented teaching, students develop innovative thinking, the ability to respond flexibly to new problems, and to come up with unique solutions.

Actual employability: Students excel in competitions, and their real-world experience becomes an important asset to attract employers. It is easier for graduates to find quality job opportunities in related industries.

The competition-oriented teaching mode has achieved good results in the cultivation of students' practical abilities. Case studies and actual data support show that this model not only improves students' technical level, but also comprehensively improves their comprehensive literacy in teamwork, innovative thinking, etc., and lays a solid foundation for their career development.

6. Conclusion

Through an in-depth study of the application of competition-oriented teaching mode in information security, this paper obtains a series of important findings and views, which provide a useful reference for the teaching reform of information security.

6.1. Key findings

Firstly, it is found that the competition-oriented teaching mode has significant advantages in the information security major. Through real-world safety competitions, students are able to tackle a variety of security challenges in an environment that simulates real-world scenarios, thus developing key skills in real-world problem-solving, technical practice, and teamwork. Compared with traditional theoretical teaching, this model is closer to the actual needs of information security work and provides students with a richer and more practical learning experience.

Secondly, the competition-oriented teaching model has performed well in promoting the improvement of students' comprehensive literacy. By participating in competitions, students not only improve their technical skills, but also develop soft skills such as innovative thinking, teamwork, and communication skills, making them more competitive and adaptable.

The application of competition-oriented teaching mode in information security is of great value. It not only enriches the learning experience of students, but also improves their practical skills, and enables them to better meet the challenges in the field of information security. This model provides students with a deeper learning path that gives them an edge in the competitive workplace.

6.2. Future research

Although the competition-oriented teaching model has been successful in the information security profession, there are still some directions that deserve future research and practical attention. First of all, we can further explore how to more effectively combine the competition elements with the traditional curriculum to achieve the organic integration of the course content. Secondly, the impact of different types of competitions on students' different skills and literacy can be deeply studied to adjust teaching strategies more precisely. In addition, it is possible to focus on the application of competition-oriented teaching in different schools and cultural settings for a more comprehensive understanding.

The application of the competition-oriented teaching model in the information security major not only provides students with a better learning experience but also lays a solid foundation for their future career development. Future research and practice should continue to pay attention to the optimization and development of this teaching mode to better meet the teaching needs of information security.

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