

The Influencing Factors of Computer Network Security in Universities

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Abstract: The extensive application of network technology has had a great impact on the economy, and has prompted profound changes in the way of life and production of human society. In the field of education, it has also caused profound changes. College computer network security has become an important part of national network security construction around the world. The computer network in colleges and universities has become a powerful tool for the external publicity and communication of the school. The improvement of the student network in the campus network has gradually become the main improvement point of the campus network security. The purpose of this paper is to analyze the factors that affect the security of college computer networks. The experimental results show that the interviewed teenagers are more inclined to solve their difficulties in life and study through online search channels, although some search software may contain certain network risks.

1. Introduction

Since human contact and improvement of the network, natural society and human society are constantly changing. At present, the network plays a very important role in all aspects of human improvement [1]. Nowadays, people can even enjoy convenient food, clothing, housing and transportation services through the Internet by simply clicking on their mobile phones. The construction of campus informatization has brought many conveniences to the campus, causing great changes in teaching methods, security management and other aspects. Through the campus network, information resources are shared, teaching methods are more abundant, and education methods are more convenient and effective. However, with the improvement of campus education informatization, it also brings great challenges to the safety management of independent colleges. The accidents caused by the lack of information security management emerge in endlessly. Campus information security management has become an important part of the security work of independent colleges, and its role in the computer network security management system of colleges and universities is gradually improving.

The rapid improvement of Internet, the continuous improvement of network protocols, and the continuous innovation of network technology have greatly promoted the network construction in various countries. Neville U studied the access control based on network and host, such as firewall system, which is an important security dividing point and serves as the front line defense of network and networking systems. Firewall policies are usually defined as a series of rules that depend on order. A network packet is an exception policy if it conforms to two or more policy rules. Access control mechanism policies may consist of thousands of access control rules, and it is very complex and error-prone to manage them correctly. There should be no exceptions to the creation of firewall policies. Therefore, he proposes an algebra for constructing and reasoning about firewall policies without exceptions. Based on the refined concept of security substitution, this algebra provides operators for sequential combination, union and intersection of policies [2]. Pachgare VK studied that intrusion detection is an important part of security information system. The main purpose is to identify the important features of the intrusion detection system. Identifying important features and eliminating less important features simplifies the problem, and gives fast and more accurate results. After a variety of comparative experiments, it is concluded that the linear genetic program is superior to neural network and support vector machine in detection accuracy under appropriate population size, program size, crossover rate and mutation rate. The technology of deleting one feature at a time was applied to conduct experiments on all three methods of modeling intrusion detection systems to rank the importance of input features of intrusion data collected by the National Defense Advanced Research Projects Agency [3]. The security of computer network in colleges and universities has become the inevitable trend of the improvement of education informatization, and the construction of network has become an important task in the improvement of campus network.

According to the research background and significance, this paper analyzes the influencing factors of the university computer network security, and studies the key technologies of campus network security, including firewall technology and intrusion detection technology. In the experiment, using the questionnaire survey method, the questionnaire survey mainly selects 10 questions to carry on the questionnaire survey in the university student group. According to the influencing factors of computer network security in colleges, this paper investigates and analyzes the relationship between the network security awareness and network risk of the interviewed college students.

2. Research on Influencing Factors of Computer Network Security in Universities

2.1 Research Background and Significance

The problem of network security has affected China's construction of a powerful socialist country and a harmonious socialist society, and has reached the point where it needs to be solved urgently. In the network society, facing many network security problems, if we restrict people's behavior from the technical level alone, we can only solve some problems; If laws and regulations are adopted to regulate people's online behavior, the law will also show its limitations when protecting the legitimate rights and interests of Internet users [4]. Therefore, efforts should be made to improve the ideological level, guide college students to establish a correct concept of network security, and keep the network security issues "out of the door" at the level of consciousness, so as to truly reduce the hidden dangers of network security. The network is a "double-edged sword". How to make the network society improve healthily and well, how to carry forward the theme and spread positive energy are the problems we must think about and solve.

With the improvement of various network software, the increase of mobile phone functions, and the promotion of online payment methods, the network has become an important means of people's

survival and improvement, closely related to people's lives. The four-year college life of college students is a mature period of intellectual improvement and personality improvement. Especially after contacting college life, college students are full of curiosity about the outside world [5]. Therefore, the education of college students' network security concept can help students broaden their horizons and change their prejudice against the ideological and political course. In the same course, they can receive the "extra meal" of network security concept knowledge while carrying out ideological and political education. While the network is gradually deepening into the lives of netizens, it also makes netizens face a series of problems. How they view the use of the network, what attitude and way they use the network, will be dominated and affected by the concept of network security. College students are an important part of the network virtual society and the main body of the education of network security concept in colleges and universities. Through the study of scientific theories and the practice of social activities, college students will have a new interpretation of the definition of "life" and form a new plan, which will have a profound impact on the future work and life. Therefore, to carry out the education of network security concept and influence the network security concept of college students in a deeper way and method is not only in line with the growth requirements of college students in the network era, but also in line with the teaching concept. The education of network security concept for college students has provided new programs and examples for the cultivation of students in the new era while promoting the improvement of campus security work [6].

2.2 Influential Factors of College Computer Network Security

In the new era, as the main force of Internet use, young citizens will inevitably suffer from various network security risks and dangers. Referring to the classification of influencing factors of public security and risk perception, five variables other than demographic variables are divided into internal factors and external factors according to their subject characteristics. The internal factors focus on young citizens' own cognition and behavior, while the external factors focus on the representation of social environment and government intervention [7].

Rational use of the network means that users actively manage and control their own network use behavior to avoid the negative impact of excessive use of the network, and return to rational use from excessive use. The opposite of rational use of the network is irrational use of the network, also known as transitional use of the network. In early foreign studies, excessive use of the Internet was defined as Internet addiction, pathological Internet use, etc. Excessive use of the Internet will lead to physical and psychological anxiety, or damage to people's life and social functions. The network brings convenience, but also brings about adverse consequences such as Internet addiction and Internet fraud. Excessive use of the network will increase the probability of meeting network security risks. Inappropriate use of the Internet will lead to adverse reactions in the physical, psychological and social aspects of the corresponding actors [8].

2.3 Key Technologies of Campus Network Security

(1) Firewall technology

Firewall refers to the protection layer built inside and outside the computer network system. It can protect the information and data inside the computer system from being damaged or modified by external malicious software or programs. It is a technical protection measure [9]. The firewall can effectively resist the unsafe factors and attacks from outside the security rules, but it can not solve the unsafe problems and attacks from inside the system, nor can it eliminate the spread and attacks of viruses.

(2) Intrusion Detection Technology

Intrusion detection is the detection of network intrusion. It will detect all kinds of data entering and exiting the computer system [10]. At the same time, these two categories can also be further extended into anomaly detection and misuse detection, as shown in Figure 1.

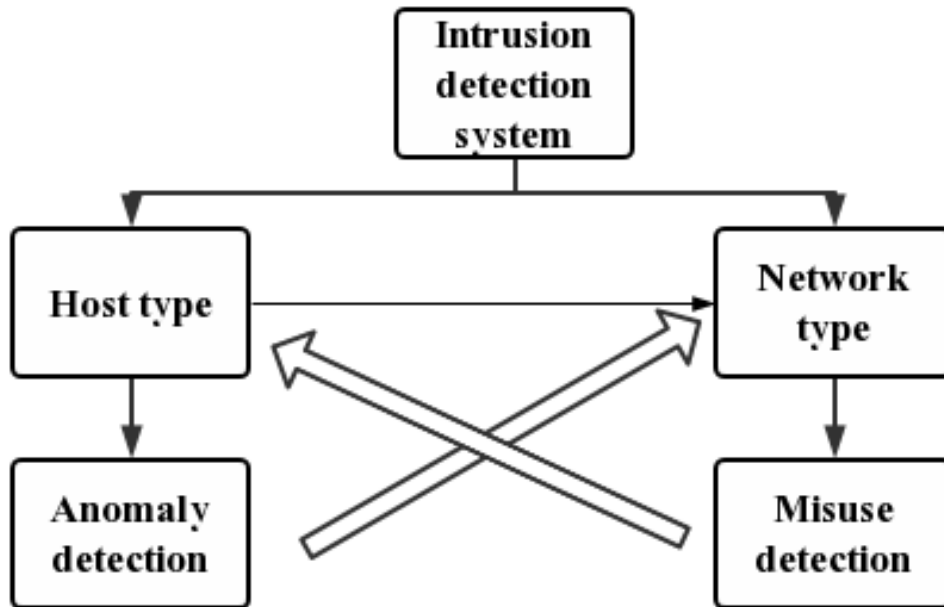


Figure 1: Classification architecture diagram of the intrusion detection system

3. Investigation and Research on the Influencing Factors of Computer Network Security in Universities

3.1 Research Content

This survey is mainly a questionnaire survey. In order to analyze the influencing factors of computer network security, this questionnaire survey mainly selects 10 questions to conduct a questionnaire survey among college students. This questionnaire survey adopts the method of sampling survey, with 1200 college students from five universities in Hunan as the survey objects, mainly undergraduates, and a small number of college students and postgraduates. The students in this survey come from different schools and basically cover students of different grades and majors, which is representative.

3.2 Research Methods

The survey is mainly based on online questionnaires, supplemented by randomly selected students in the library and study room. A total of 1200 questionnaires were distributed, and 978 valid questionnaires were recovered, with an effective recovery rate of 98.8%. The t-test formula used in this paper is as follows:

$$t = \frac{\bar{X} - \mu}{\frac{\sigma X}{\sqrt{n}}} \quad (1)$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad (2)$$

4. Analysis and Research on the Influencing Factors of Computer Network Security in Universities

Teenagers are the key subject in the network literacy education. Only when the youth subject constructs the real sense of network security autonomy, can the auxiliary role played by schools, governments and other relevant subject institutions be more smoothly organized, and the education effect achieved will also be optimized. Therefore, only when school education, family education and social education are truly integrated into or fit into the daily life experience of young people, can they help them dialectically view media content, objectively understand the network world, and complete the independent construction of network security. Table 1 and Figure 2 show the correlation between network security awareness and network risk issues of college students interviewed:

Table 1: The Relationship between the network security awareness and the network risk problems of the surveyed college students

Network risk situation	Correlation coefficient R	Significance level P
On the Internet has encountered netizens ridicule or threat abuse	-0.201	0.050
I have posted others' names, addresses and other personal information on the Internet	-0.344	0.004
Being harassed and lured online in vulgar language to expose large-scale private photos	-0.184	0.003
Will use the computer or mobile phone to enter the illegal website to download and install pirated software to use	-0.145	0.0045

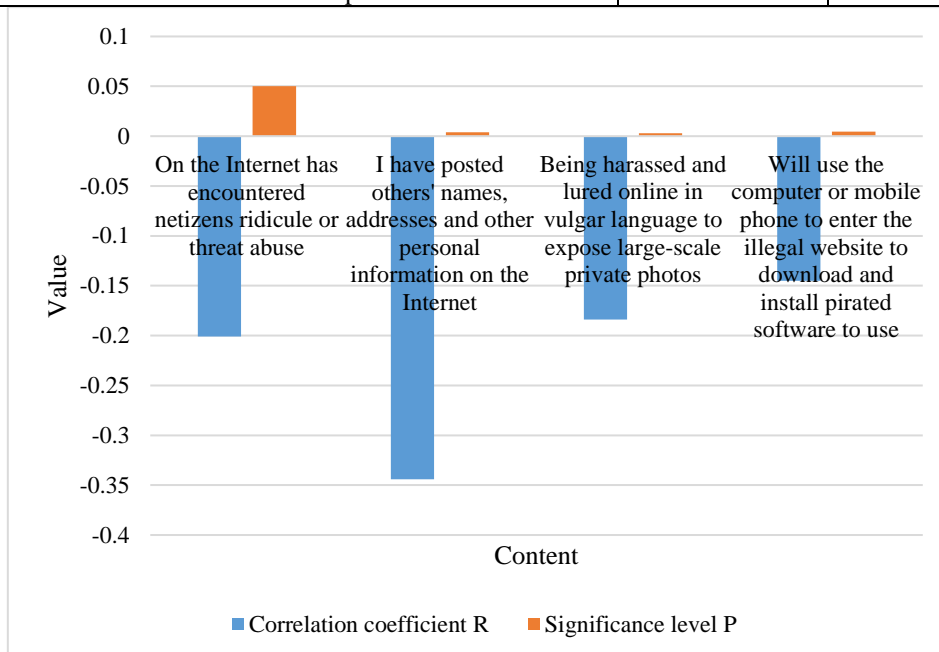


Figure 2: Analysis of the influencing factors of computer network security in colleges and universities

The study also conducted a multiple regression analysis on the network risk and network security awareness of the surveyed adolescents, and found that the significance of the model was $0.05 > 0.01$. Therefore, the impact of network risk factors on network security awareness is not significant as a whole. However, the study conducted correlation analysis on the relevant items of network risk and the factors of network security awareness respectively, and found that there was a significant negative correlation between network security awareness and the five items of network risk. These results showed that the stronger the network security awareness of young people, the less they would encounter the risks of network violence, network sexual harassment, network bullying and network piracy. In addition, teenagers' awareness of network security is positively related to their willingness to search for solutions online. It can be seen that the surveyed teenagers are more inclined to solve their difficulties in life and learning through online search channels, although some search software may contain certain network risks.

5. Conclusions

With the emergence and improvement of the network, changes are constantly taking place. Among these changes, part of our lives and work are becoming efficient and convenient because of the network. On the other hand, our world is becoming "dangerous" because of the network. The key is that these dangers may not be seen by us, but appear in front of us inadvertently. The education of college students' network security concept tries to improve college students' network security concept, and prevent college students from being troubled and injured by network security problems from the source. At present, college students are facing a severe network security situation. The improvement of the network challenges the security of ideology. College students' network misconduct and network crimes are gradually increasing. The normal order in real life will also be affected. Personal and property security cannot be guaranteed. College students' personal information is also leaked to criminals through various ways, providing opportunities for network violations. The cultivation of correct network security concept for college students requires the maintenance of network ideological security, the cultivation of network security ethics, the popularization of network security policies and regulations, and the study of network security prevention technology. The cultivation of a correct concept of network security for college students can not only provide conditions for China to become a network power from a network power, but also promote the cultivation of qualified talents in colleges and universities and make college campuses safer.

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