





Assessment of the Cultivation and Protection of College Students' Information Security Consciousness in the Era of Big Data

Rui Su^{1,2}^a, Qianqian Wang¹^b, Lixian Xu^{3,*}^c and Caixia He¹^d

¹Shandong Institute of Commerce and Technology, Tourist road, Jinan City, China

²Angeles University Foundation, Metro Manila, Angeles City, Philippines

³Department of Computing, Shandong Jianzhu University, Fengming Road, Jinan City, China

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Abstract: The development of information technology brings great convenience to our living environment, but also brings the problem of information leakage, which has the same impact on the campus environment. The development of network technology brings a lot of convenience to the campus life of contemporary college students, but also brings a lot of hidden dangers of information security. Every year, many cases of information leakage cause losses to college students. Therefore, it is very important to enhance the awareness of information security of college students. This paper first introduces the importance of carrying out research on the cultivation and protection evaluation of college students' information security awareness, and sorts out the relevant research status. This study in order to more than 500 students with different levels of education as the research object, and using the likert scale method to design the questionnaire, we understand the student evaluation in self safety awareness, in the face of emergency handling capacity and existing security awareness training for schools and the relevant work satisfaction and Suggestions to protect the situation, and the research results on the reliability analysis, The experimental results are good. Finally, according to the analysis results of the questionnaire, this paper puts forward four suggestions on the cultivation and protection of college students' information security consciousness, which can provide reference for the relevant work of colleges and universities.


1 INTRODUCTION


The information technology in the era of big data has stronger interaction, which brings us a lot of convenience in daily life and work, but also brings the problem of information security leakage. With the development of information technology, the Internet will produce a lot of data every day, the traditional information security processing technology has been unable to meet the information age people's demand for efficient data information processing, in order to improve the quality and efficiency of information security processing, information security processing technology based on big data emerged at the historic moment. Of course, the application of these technologies is based on data. This paper will start


with the investigation of the research object and the acquisition of basic data, analyze the current situation of information security research of college students, and lay a foundation for the subsequent research on computer big data information security processing technology.

College students are a relatively special group in China. Most of them are adults with independent thinking and strong sense of individuality. Although many college students still need to get living expenses from their parents, quite a large number of students can get living subsidies through part-time jobs. In short, they have a greater degree of control over their money. However, most college students have not had in-depth contact with the society, so their thoughts are relatively simple. They are more used to making

^a <https://orcid.org/0000-0001-8562-0134>

^b <https://orcid.org/0000-0001-8562-0134>

^c <https://orcid.org/0000-0002-1633-1766>

^d <https://orcid.org/0000-0001-8585-4352>

judgments on things with emotional thinking rather than rational thinking. In their view, the social level is more tolerant and righteous, and some negative information, such as fraud and theft, is often ignored. As a result, many criminals treat college students as targets for their fraud.

In fact, it is a very important duty of colleges and universities to help college students establish information security protection awareness. However, surprisingly, even the teachers often take classes or class meeting to pass on his knowledge to protect the safety of personal information, still can't completely make sure that all the students away from danger, almost a week at least one will still occur due to personal information disclosure by fraud case, even, almost all the universities are facing this problem. For students to encounter fraud in this matter, in addition to bring pecuniary loss, more dangerous is likely lead to distrust and dislike of society, which for the personality cultivation of college students in the key period is a bad thing, it can also bring negative factors to the society as a whole, it is against the direction of the university for the cultivation of college students. These facts make me seriously reflect: why college students' awareness of personal information security is relatively weak? How should teachers guide students to establish information security consciousness more effectively? How do students need help from schools and teachers?

The answers to these questions need to be based on in-depth study and analysis of objective data. In order to further explore the cultivation and protection of college students' information security awareness and other related issues, and give teachers better work suggestions, better help students establish information security awareness, to ensure that they stay away from harm, I think it is of very important practical significance to carry out relevant research.

2 RELATED STUDIES

2.1 Research Status of Information Security

The concept of "information security" is often equated with "network security" in some studies. Although we cannot live without the network now, and many information security risks are indeed related to the network, it is not rigorous to directly regard these two concepts as the same. Some scholars believe that information security should meet the requirements of five aspects, specifically, the information is confidential, the information is real,

the information is complete, the information cannot be copied illegally, and the information storage environment is safe. Some scholars believe that information security refers to the protection of data storage system and data processing system through technical means or management means to prevent them from being infringed.

It can be seen that most definitions of information security are based on technology and science (Da Veiga 2015), and the author believes that "information security" is not just a technical concept, but should be defined from a wider range, including ethical and legal levels. Especially for college students, the establishment and protection of personal information security consciousness should be paid more attention to.

2.2 Research Status of Information Security of College Students in China

Since 2010, with the increasing popularity of the use of the Internet in China, the status quo of college students' information security has gradually received more and more attention, and many investigations and papers are based on this (Feng 2020).

Liu Xinyi, a scholar, believes that most of the domestic research is conducted through the information security awareness and behavior of college students. Although there are many research results, they lack pertinency of problems, so the application of research results is not good (Liu 2020). Li Zhiping, a scholar, has analyzed and evaluated the formulation and implementation effect of relevant laws and regulations based on the current situation of network security of College students in China. He believes that the legal system of information security in China is not perfect enough, which will have a negative impact on the information security protection of college students (Li 2021).

2.3 Foreign Research Status

Abroad for information security research carried out earlier, the use of the results is better, for example, the countries of the European Union by information security related courses, help students to establish information security protection consciousness, and the teaching content and social practice, and mental health, combining the help of information security related courses has become a comprehensive discipline, It can get better teaching effect and better practical application effect (Menard 2017).

However, most foreign studies on the cultivation and evaluation of information security awareness take primary and middle school students as the research object, and the cultivation and evaluation of information security awareness of college students are relatively few.

3 METHODOLOGY

3.1 The Design of Research Process

This paper will combine the current situation of college students' information security, and on the basis of detailed analysis of factors affecting college students' information security consciousness, put forward the research ideas: determine the survey object → design the questionnaire → analysis of the survey results → put forward targeted suggestions.

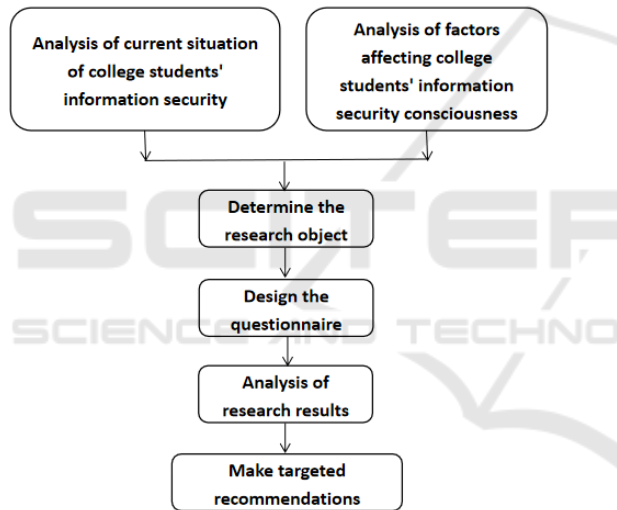


Figure 1: This caption has one line so it is centered.

3.2 Sample Selection and Sample Size Design

This research will be carried out from different dimensions and levels.

First, in order to better to analyze and compare the education environment of universities on the student information security awareness training, the author will be carried out in two different education levels school related research, finally selected the Shandong Jianzhu university undergraduates and Shandong institute of Commerce and Technology students as the research sample. Second, in order to analyze and compare the possible differences of information security awareness among students of different

grades, the author sets questions about the grades in the questionnaire, which is helpful for the analysis and comparison of the research results in the later stage. Thirdly, in order to compare and analyze the possible differences between male and female college students in their sensitivity to information security, the author sets questions in the questionnaire that can distinguish the gender of the survey samples.

3.3 Questionnaire Design

The survey questionnaire can help us understand the most real information security status of college students. For the relevant research work, the survey questionnaire is a reliable and convenient tool. Therefore, the reasonable design of the survey questionnaire is a very key link in the relevant research.

In this study, likert scale was used to design the questionnaire. The questionnaire includes 38 questions, which cover four dimensions of the research content: 1. College students' self-information security awareness evaluation (including 10 questions); 2. College students' ability to deal with problems related to information security (including 16 questions); 3. College students on the effectiveness of information security awareness training work evaluation (including 7 questions); 4. College students' evaluation and suggestions for strengthening information security awareness channels (including 5 questions). Five options are set for each question. The questionnaire will be released to the respondents through the online research platform, and the surveyed college students can answer the questionnaire through mobile phone or computer. This very convenient way of participation can ensure that we can collect more effective questionnaires.

3.4 Research and Analysis Methods

Although the author roughly determined the sample size at the initial stage of the survey, in order to obtain enough effective questionnaires, the survey scope was expanded during the actual distribution of questionnaires. This time, the author sent a total of 540 questionnaires to the two universities and collected 522 valid questionnaires, with an effective rate of 96.7%.

Next, the author will analyse the results of the survey questionnaire from different dimensions, mainly using quantitative analysis method.

Table 1: The Design of the Assessment of the cultivation and protection of college students' information security consciousness.

Dimensional variables	Number of questions	Percentage
College students' self-information security awareness evaluation	10	26.3%
College students' ability to deal with problems related to information security	16	42.1%
College students on the effectiveness of information security awareness training work evaluation	7	18.4%
College students' evaluation and suggestions for strengthening information security awareness channels	5	13.2%

4 RESULTS AND ANALYSIS

4.1 Survey Object Composition and Questionnaire Validity Analysis

A total of 540 online questionnaires were distributed to two different universities, including 330 for undergraduates and 210 for junior college students. From the perspective of the effectiveness of the questionnaires, the total number of valid

questionnaires collected was 522, with a total effective rate of 96.7%. Among them, 325 valid questionnaires were collected for undergraduates, with an effective rate of 98.5%. There were 197 valid questionnaires for junior college students, and the effective rate was 93.8%. In this survey, a total of 18 questionnaires were judged to be invalid, mainly due to short answer time and the same answers. The remaining 522 questionnaires were of high quality and could be used as the original data for this survey.

Table 2: Statistical table of education level composition and validity of questionnaire.

Investigated object	Number of questionnaires issued	Number of valid questionnaires	Percentage
Undergraduates	330	325	98.5%
Junior college student	210	197	93.8%
In total	540	522	96.7%

4.2 Reliability Analysis of Survey Questionnaire Results

Reliability analysis is generally used to measure the reliability of survey questionnaire results and is also an important basis for evaluating the design quality of survey questionnaire. We usually require the Cronbach reliability coefficient to be above 0.8.

In this study, we use online SPSS analysis tool to analyze the reliability of the questionnaire from the whole and different dimensions. The analysis results show that the reliability coefficient of Cronbach is 0.93 for the questions related to the "self-information security awareness evaluation of college students". In dimension 2, the related questions of "college students' processing ability assessment in the face of

information security-related problems", Cronbach reliability coefficient is 0.916; In dimension 3, the Cronbach reliability coefficient is 0.935. For the questions related to dimension 4, "Evaluation and suggestions of College students on strengthening information security awareness channels", the Cronbach reliability coefficient is 0.856.

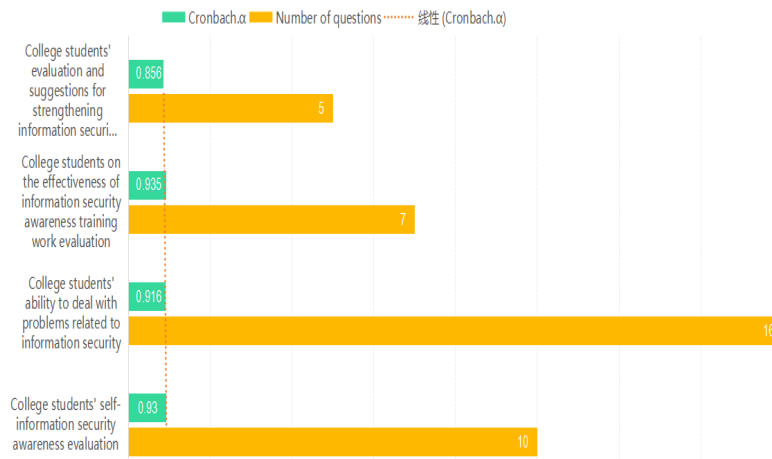


Figure 2: Reliability analysis of survey results.

4.3 Statistics of Frequency Analysis Results

Frequency analysis can usually objectively and directly reflect the real opinions of the respondents.

In this survey, frequency analysis method was used to conduct classified statistics on the answers to questions of different dimensions, as shown in Figure 3.

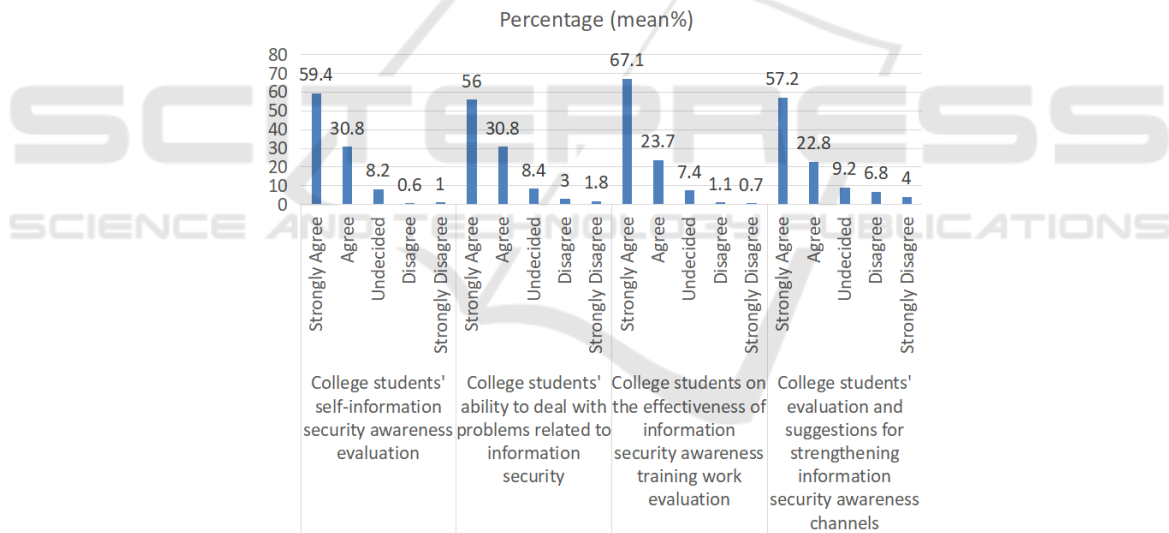


Figure 3: Statistical table of frequency analysis results.

The data in Table 4 make statistics on the investigation of questions from four dimensions.

Taking the analysis of questions related to dimension 1 in the table "Evaluation of self-information security consciousness of college students" as an example, the data means that the average proportion of "Strongly Agree" is 59.4%, the average proportion of "Agree" is 30.8%, and the average proportion of "Neutral" is 8.2%. The average number of respondents who answered "Disagree" was

0.6 percent, while the average number who answered "Strongly Dissagree" was 1 percent.

5 DISSCUSSION

Through cross-analysis of the research results of "information security awareness" and "normative behavior", it is found that "personal information security awareness" is closely related to information protection behavior, as shown in Figure 4.

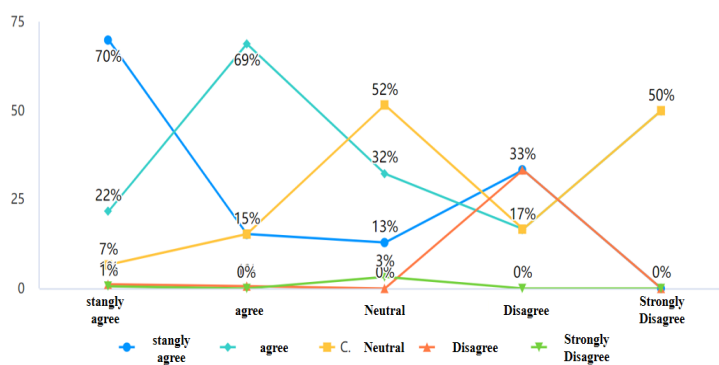


Figure 4: Cross analysis results.

And it can be found that in the survey questions of dimension 1, the proportion of "Strongly Agree" and "Agree" is as high as 90.2%, which indicates that college students are very concerned about "self-information security", and most of them think they have a good sense of self-information security protection.

In the survey questions of dimension 2, the proportion of "Strongly Agree" and "Agree" is as high as 86.8%. These data show that college students can make correct decisions in most cases when facing questions related to information security. Of course, these answers are obtained when they remain calm. In many cases, people's minds will be tense and confused when facing unexpected situations. That is to say, college students may not perform so well in dealing with practical problems as they do in answering questionnaires.

In the survey question of dimension 3, the proportion of "Strongly Agree" and "Agree" is as high as 90.8%, indicating that they highly Agree with the current work carried out by schools to protect and cultivate students' awareness of information security, which also provides reference suggestions for the future efforts of colleges and universities.

In the survey question of dimension 4, the proportion of "Strongly Agree" and "Agree" is 80%, which indicates that most students are still psychologically dependent on the relevant measures of the school for their personal information security protection, and they have more expectations for the work of the school to help them stay away from the hidden dangers of information security.

From the survey also found that the overall level of analysis, academic level and the reading grade for the understanding of the information security problem almost no difference, but the boys and girls has significant differences on some issues of understanding, such as "what do you think of personal information protection is entirely your own thing and

has nothing to do with school" problem of answer, The proportion of male students who answered "Strongly Agree" and "Agree" was 71.12%, while female students only answered 54.22%. In the answer to the question "Do you think the security of students' information should be protected by the school and there is no need for individuals to do anything", 47.59% of male students answered "Strongly" and "Agree", while only 68.98% of female students. This shows that girls have higher requirements for self-information security awareness, while boys are worse.

Based on the above analysis, I think it is very important for universities to find a good way to cultivate students' personal information security awareness and protection education. Based on my own work experience, specific suggestions are as follows:

(1) Strengthen top-level coordination mechanism and design clear and complete educational content.

Undertake to the student information security education is in fact a systems engineering, and if you want to do it well, the university's management should stand at a higher level thinking some problems, for example, combined with the actual situation of school teachers and students, to design a personalized, concrete, feasible about "information security awareness cultivation and protection of" education content, These should ensure the right environment for the university and its students.

(2) Formulate supervision and management rules and master the effects obtained in the education process.

In order to ensure that the educational links we design can be well implemented and achieve good results, there must be a corresponding supervision mechanism, which can help us quickly find some good educational methods and experience, and promote them to more people and schools. In the same way, we can also quickly discover some bad

aspects in the education process through the supervision mechanism, which can help us adjust the direction and focus of work in time.

(3) strengthen teachers' awareness of information security, and guide teachers to do a good job in cultivating students' awareness of information security.

In the education process for students, teachers are very important participants, because teachers are the people closest to students. For students, teachers are the transmitters of school education concepts and can represent the school. In fact, teachers pass some information to students through the teaching process is very direct, and the effect is very good. Therefore, it is very important to strengthen teachers' awareness of information security.

(4) Improve and enrich the campus culture to achieve a good effect of "using environment to educate students".

In China, there is a very famous word, called "moistens everything silently", it mean good environment can bring people a lot of good changes, these changes happened secretly, no one can be found, but in the long run, a good change of this man will be more and more obvious, like spring rain will bring many plants moist, no one can find to begin with, But the plants will gradually become very vigorous, the flowers will become very beautiful, let people feel surprised. Just like people, they are more likely to become a kind and gentle person in a nice environment.

So, we should pay attention to shaping a good campus environment, such as through "information security related events, let more students know the knowledge of the information security, and by his own strength to knowledge of the students passed around, if everyone can turn into" information security "the spread of the messenger, I think it must be a very good thing.

6 CONCLUSION

The cultivation and protection of college students' information security consciousness is a systematic project. As the main body of this task, college students' sensitivity to information security is very important. In addition, because they are still living on campus, the school and teachers for their influence is very big, schools and teachers to their influence is very big, as the main management and training of the students, the college managers should strengthen the mechanism of the top design, we hope to find a good method to guide students to strengthen their

information security awareness at the same time, Also create a better information security campus environment. In addition, there is a very important aspect, that is to improve the teacher information security education ability, inside and outside the classroom for students to carry out information security education, and strive to ensure that all students away from information security risks.

REFERENCES

- Da Veiga A, Martins N. Information security culture and information protection culture: A validated assessment instrument[J]. *Computer Law & Security Review*, 2015, 31(2): 243-256.
- Feng HOU. Research on Information Security and Protection Strategy of Computer Network[J]. *International Journal of Computational and Engineering*, 2020, 5(1).
- Li Zhiping, Xie Jiagui, Gao Likun, Nie Fanjie. Data Privacy Protection in Data Fusion[J]. *Journal of Physics: Conference Series*, 2021, 2033(1). Zhang Yue, Sun Qian. Information Security Protection Strategy Based on Computer Big Data Technology[J]. *Journal of Physics: Conference Series*, 2021, 1744(4).
- Liu Xinyi. Research on Information Security Awareness Education of College Students in the Micro Era [D]. Tianjin Polytechnic University, 2020. DOI: 10.27357/d. CN ki. Gtgyu. 2020. 000907.
- Menard P, Bott G J, Crossler R E. User motivations in protecting information security: Protection motivation theory versus self-determination theory[J]. *Journal of Management Information Systems*, 2017, 34(4): 1203-1230.