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Analysis of Local Governance and Legal Protection of Students' Information Security in the Context of Sustainable Development of Digital Education

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Abstract Local governments are dealing with student information more and more frequently, resulting in the risk of student information being leaked, so it is necessary to introduce relevant policies, laws and regulations to standardize information collection activities and improve the level of social information governance. Therefore, this study proposes three hypotheses: on the one hand, whether the information policy issued by the local government can guide students' information collection activities, and on the other hand, whether the introduction of local laws and regulations can provide protection for students' information security; Finally, whether public participation can provide supervision for student information collection and governance, and create a good public management environment. The results show that local information laws and regulations can regulate the behavior of students' information collection and clarify the purpose and direction of students' information collection. At the same time, laws and regulations such as privacy protection and local codes of conduct can improve the security of student information and ensure the legal collection of information. The active participation of the public is conducive to the public information collection environment and ensures the overall security of student information. Therefore, local government policies, laws, and regulations can provide assurance and support for students' information security and promote the sustainable development of digital education.

Keywords: • digital education • student information • information security • school obligation system • data management • information literacy

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1   Introduction

Under the premise of the rapid development of digital education, local governments need to collect information about students in order to carry out administrative management. In the process of collecting students' information, due to improper personnel operation or poor coordination of departments, student information is leaked. In addition, after digital education is processed through information technology such as servers and networks, there will be the problem of student information theft, resulting in incomplete information (Xiao, Teng, Wang, & Tan, 2022). Digital education is information technology to realize a form of local education reform and development by Local educational institutions and government departments (B. Li, 2016). It is crucial for digital education to improve the level of local education governance and have a significant impact on the improvement of the local education environment. A comprehensive review of the existing literature shows that more and more scholars in the field of public administration are conducting research on government governance of education (W. Wei, Fang, & Wei, 2021). For example, through bibliometric mining, policies, laws, and regulations protect student information, and construct an interactive governance mechanism (X. Chen, Zou, Xie, Cheng, & Liu, 2022). In the process of local government governance of education, the issue of students' personal information has gradually become a key point of governance. Due to the lack of systems and laws, students' personal information is easily collected, sold and misused by different people and institutions. Due to the lack of supervision by laws and regulations, illegal institutions collect student information through electronic questionnaires, online learning platforms, school websites, etc., and the main person responsible for initiating the above acts is the government, which in turn affects the credibility of the government (Z. Wang, Yu, & Qi, 2021). Under this trend, the problem of local education governance by the government becomes dangerous and affects local education reform (Andrews, Walker, & Kees, 2020; J. Li, Xiao, & Zhang, 2023). The survey shows that the risk of student information leakage is very common at the provincial and municipal levels, and the number of student information leakage incidents is increasing year by year. It must be acknowledged that the innovation of educational technology can provide assistance to local governance, but it also brings information security problems for students (LaBarge et al., 2022). Information security is related to the security of students' personal information and property, and illegal access or improper operation will lead to infringement incidents. Faced with the urgent need for student information security, local governments need to find governance methods on "how to improve student information security" under the premise of giving full play to digital education technology (C. Sun, Liu, Razmerita, Xu, & Qi, 2022; Kalaf-Hughes, 2023), and combine external factors (such as systems, regulations, laws, etc.) to improve the level of student information security governance. Research confirms that local governments lack the necessary systems, laws, and

regulations to apply digital technology to educational activities, which puts students' information security at risk. Due to the lack of adequate protection measures, there are problems of improper operation and non-standard processes in the information security of students (Walker et al., 2023). The research on the structure and function of digital education (X. Chen, Ma, Qin, & Gu, 2020) found that the research focus of governments and educational institutions is still focused on the use of information technology norms, lacking the improvement of systems, laws and regulations, poor inter-departmental cohesion, and high possibility of private intervention. In the study of law, human information is taken as the research object (Williamson, 2022), and it is believed that the security of students' information should be targeted, and laws and norms that meet the actual requirements should be introduced. In the digital education environment, the privacy law and information security law have a good guarantee for students' information security and promote the sustainable development of digital education (Walker et al., 2023). Based on this, this paper takes local government students' information governance as the research object, uses questionnaire survey method and literature analysis method to standardize digital education behavior from the perspective of laws, regulations and public participation, and discusses the actual effect of social governance. Firstly, based on the Information Law and public service regulations, the governance of local policies and regulations on students' information security is analyzed. Secondly, through questionnaire survey and regression analysis, the assumptions of local governments, laws and regulations on the effect of students' information security governance were verified (H. Wang, 2023). Finally, according to the survey results, the student information security governance system is proposed. The main objectives of this study are: a) to understand the governance of student information security by local governments; b) Improve student information security systems and regulations, promote the sustainable development of digital education, and improve the level of local education governance.

2 Literature review

2.1 Governance needs of local governments for student information security

The literature from different research perspectives shows that there is a certain relationship between students' information security needs and local governance effects, but there is a lack of cases of whether there is a positive relationship between the two. The researchers found that increasing government governance of students' information security is a fundamental condition for the sustainable development of digital education (Sapanca & Kanbul, 2022). However, in the development of digital education, information security is often caused by improper departmental collaboration and unsatisfactory management, resulting in information leakage. Some scholars believe that sustainable development in any

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field is supported by digital technology, and personality information is the key point in digital technology. At present, local policies lack a safe educational environment in digital education, and the risk of digital information leakage increases (Saeed, 2023). In the protection of information security, there are certain deficiencies in the privacy law, and the information security law, need to be further improved to protect the information privacy of students. Some scholars believe that there is no coordination mechanism between departments, so the lack of information communication between departments leads to the intrusion of private accounts into the public network and affects the security of the entire information (Buzzetto-More, 2008). The risk of information security will affect the credibility of the government, cause difficulties in information collection, and affect the sustainable development of digital education and the effectiveness of local education governance.

2.2   Laws and regulations on student information security

After summarizing the existing research, there are two main models to realize the need for information security: one is the rights protection model (RPM), and the other is the behavior regulation model, in which the government is a subject that protects personal information and defines the interests related to personal information as legitimate rights, so the credibility of this model is relatively high (Zheng, 2021). Another view is that RPM is the information subject (Gao, 2018), which satisfies the information security needs of individuals by giving them the right to process the information of others. BRM sets obligations and protects personal information security through regulations and laws that regulate the behavior of information processors (Ye, 2017). It can be seen that BRM consists of two parts: empowering information subjects and imposing obligations on information processors, and the essence of BRM is to achieve a balance of interests between information subjects and information processors through "legal empowerment" (X. Huang, 2022). Through literature analysis, it is found that in the 18th century, the legislative protection of K-12 students' personal information in the United States was based on rights, and the law emphasized giving students and their guardians the right to information (Feng, 2021). The focus of legislative protection of K-12 students' personal information in the United States has gradually shifted to the obligations of educational institutions and other social organizations (J. Wang, 2019). The existing research on the governance of education by local governments mainly advocates improving the governance of student information by strengthening the rights of educational institutions, local governments and civil society organizations. Relatively speaking, China uses RPM to protect students' information security, and there are problems with privacy security and education security regulations. According to the ranking method of Policy goals and Applicable Objects (Walker et al., 2023), the legal

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content of personal information protection of Chinese students in 2022 is summarized, and the results are shown in Table 1.

Table 1: Laws on the protection of students' personal information in China

Legislation/Policy	Strategic objectives	Eligibility	Start time	Updated
Civil Code of the People's Republic of China	The government protects personal information in general	General Information Subject	2020	2020
People's Republic of China the Personal Information Protection Act	The government protects personal information in general	General Information Subject	2021	2021
People's Republic of China Cybersecurity Law	Laws and regulations ensure cybersecurity	Network Service Providers	2016	2016
People's Republic of China Compulsory Education Act	The Government guarantees the right of school-age children and adolescents to compulsory education	Child	1986	2018
Higher Education Law of the People's Republic of China	The government is leading the development of higher education	University student	1998	2018
Provisions for the protection of minors in school	The government safeguards the legitimate rights and interests of minors	Youth		
Provisions on the protection of children's personal information online	The government protects the security of children's personal information	Child	2019	2019
Decision of the Standing Committee of the National People's Congress on Strengthening the Protection of Online Information	Laws and regulations protect network information security	Network Service Providers	2012	2012
Basic information specifications for the management of primary and secondary school students' academic status information	The government and regulations regulate the identity of primary and secondary school students	Student identity management	2007	2007

Table 1 shows that the Civil Code of the People's Republic of China and the Personal Information Protection Law of the People's Republic of China clearly state that the government should protect general personal information and clarify the rights of individuals to their information, and make it an important part of local education governance. The Information Security Law of the People's

Republic of China and the Decision of the Standing Committee of the National People's Congress on Strengthening the Protection of Online Information also make it clear that local governments should improve and supplement personalized digital information security, and their provisions are mainly aimed at regulating the information collection behavior of government departments and non-governmental organizations (Deng, 2020). The People's Republic of China Compulsory Education Law and the People's Republic of China Higher Education Law aim to strengthen public supervision, comprehensively protect the legitimate rights and interests of students, regulate government and organizational behavior, and promote the development of education governance. However, there are no perfect regulations on the content of local government policies and regulations, so there are certain deficiencies in the teaching governance of local governments, and local governments need more targeted and practical measures.

2.3 Supervision of information security norms by the public

From the perspective of social governance, information security governance refers to the fact that local governments are responsible for information destruction (Bongiovanni, 2019), which means that policies need to assume more social responsibility when the confidentiality, integrity, and availability of information are violated (Osei Yeboah-Boateng, Osei-Owusu, & Henten, 2017). At present, the government's security management of student information is insufficient, and there is a lack of information guidance policies, laws and regulations, which cannot ensure the security of students' information. The lack of a regulatory mechanism for the collection and use of student information by non-governmental organizations in the name of education in the process of digital education has led to the management of students' information collection activities by law, and the government and educational institutions need to bear the main responsibility (L. Zhang, 2022). In addition, in the three stages of data collection, storage and use, whether government departments carry out standardized behaviors, whether they are implemented in accordance with the corresponding measures and systems, and the perfection of measures are all existing research contents. In the current digital education, the government and education departments lack the necessary support for students' information security risk management, and the performance is different at different stages, so it is necessary to standardize accordingly. There is a risk of over-collection at the collection stage, so the government needs to open up the data to improve the public's scrutiny. According to the laws of each country, the collection of personal information must follow the principle of appropriateness, i.e., personal information should be collected only for necessary purposes and subject to the supervision of local residents. Some studies have found that in digital education (Zuo & Hu, 2021), local government departments and organizational structures often ignore the principle of appropriateness, resulting in

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excessive collection of student information, affecting the credibility of the government and reducing the effectiveness of local governance.

Lack of credibility, and public concerns about the risk of information leakage during the storage phase, which in turn affects the implementation of governance policies (Yang & Qu, 2020). Digital education is database-based, which is a field of public administration, and the government must use a large number of student information data to collect student information in order to complete digital education management (Hui, 2022). Due to human management negligence, imperfect systems and laws, the student information in the database is easy to leak, which affects the results of local teaching governance. In 2020, Paper, a well-known Chinese media outlet, reported two serious student information leaks, mainly due to the failure of local governments to implement information security work, resulting in a lack of information security links (Z. Yu, Qin, & Luo, 2020; He, 2020). There is a risk of illegal use in the use stage, and more and more public management scholars have a strong need for information governance in digital education (M. Chen et al., 2021). During the period of education governance, students' information is widely collected, especially in online learning, and students' information is comprehensively mined and shared, which increases the risk of students' information (Walker et al., 2023).

3 Research framework and hypotheses

3.1 Enlightenment of public service theory to information security

3.1.1 Consistency between public service purposes and information security

The term "life cycle" comes from the field of biological sciences and refers to the entire life process of an organism from birth, growth, maturation, and aging to death (Du, Xiang, & Li, 2015). Scholars have different views on the specific division of the different phases of the information life cycle. According to Suo (2010), the life cycle of information is the entire process of information from generation to death, including different stages such as generation, disclosure, processing, utilization, and disposal. Strictly speaking, how to divide the phases of the information lifecycle is not the point. Rather, the theory emphasizes the need to focus on information security and privacy protection at every stage of the information lifecycle (Wing, 2019) and the information lifecycle theory aims to provide a structure for organizing activities related to information management (Pouchard, 2015).

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3.1.2   Consistency of social education governance with laws and regulations

In China, the theory of risk controller obligation is the main means of dealing with social risks, and (X. B. Zhang, 2021) interprets the theory of risk controller obligation to mean that those who can control risks should bear a certain degree of security guarantee obligation. This definition is consistent with the general understanding of the theoretical community. Recently, with the emergence of information security risks, the theory of risk controller obligation has been gradually applied to information security risk management. Wade (2014) states that technology users should assume greater social responsibility to ensure that their use of technology does not cause safety problems, and to add security protections in the process of technology application, rather than just profiting from the market. In information security risk management, the theory of risk controller obligation embodies the spirit of collaborative management. On the one hand, the theory of risk controller obligation requires personal information processors to assume more critical risk management obligations, rather than transferring risks to personal information subjects (T. Zhang, 2022a). On the other hand, the theory of risk controller obligation emphasizes the self-regulation of information processors, requiring them to take the initiative to take security protection measures that match the information security risks, and reduce the risk of adversely affecting the legitimate rights and interests of personal information subjects to an acceptable level (T. Zhang, 2022b).

3.1.3   The combination of public participation and information security

The previous analysis shows that the information security risks of students mainly exist in the stages of information collection, storage, and use. According to the information life cycle theory, it is necessary to fully protect students' information security in the three information life cycle stages of "collection-storage-use". In these three stages, the school's unreasonable handling of student information is the main cause of student information security risks. It can be seen that the right of students to control personal information security through the informed consent mechanism has not been implemented, and the dominant intervention of schools in the process of student information processing has weakened students' ability to control personal information security. In other words, in the development of digital education, the school is the actual risk controller of the student information security risk chain. Following the spirit of the theory of risk controller obligation, schools should strengthen the role of student information security risk management and assume important obligations to protect student information security. Based on the above analysis, the research on students' information security needs can be divided into two parts. The first part is based on the information life cycle theory, which investigates the actual information security needs of students, and the second part is to understand students' attitudes towards

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the school's information security protection obligations to meet their own information security needs.

3.2 Research hypotheses

3.2.1 Local policies are binding on information security

The need for information risk prevention and security in local policies is a set of corresponding concepts, all of which are to improve the effectiveness of public governance. The former is the reason for the latter, but the risk of excessive collection in the information collection stage is mainly a matter of governance process, governance content and means. Students have security requirements, that is, information is not over-collected, and the main body that meets this need is the government and legal institutions. In the face of the risk of leakage in the information storage stage, it is necessary for government departments to conduct comprehensive research, standardize corresponding measures, systems and methods, meet the requirements of maintaining strict security for information, and meet the needs of social governance. In the information use stage, it is necessary to standardize the content, process and means of information to reduce the risk of illegal use, so there is a need for security for information to be used for legitimate and reasonable purposes. In the digital education environment, whether the governance of government departments has information security requirements depends not only on their subjective views, but also on whether local policies, systems, and regulations are fully implemented. With the intervention of laws, regulations, and policies, the government can ensure information security through systems and laws, and improve the protection capabilities and information security protection results of information governance. If the government does not take sufficient measures to protect the information security of students, and the society does not conduct adequate supervision, it may not be able to meet the information security needs of school students and affect the governance environment. So put forward the hypothesis:

H1: Local policies play a role in promoting information security, social and public governance, and functional play.

3.2.2 The role of the Information Security Law and government actions in information governance

Research shows that imposing obligations on government actions, laws, and the public to control the risk of information infringement is essential to ensure that information is handled correctly (Kuner, Cate, Millard, Svantesson, & Lynskey, 2015). Through the investigation of government information platforms, it is found that in the process of government information governance, government departments take the initiative to fulfill their information protection obligations, and the perfection of laws is more effective in protecting information security (X.

B. Zhang, 2021). Students cannot refuse the school's request for information processing, but government departments should take the initiative to protect students' information security, optimize the information processing environment, and standardize information processing behavior. From the perspective of satisfying public services, it is necessary to adopt sound laws and regulations to protect students' information security. Therefore, this paper puts forward the following assumptions:

   H2: The government is the main person responsible for learning information protection, and it should fulfill its responsibilities and play a leading role in improving information laws and regulations.

   H2a: The government takes the initiative to protect students' information security through policies, restricts organizational departments from conducting information supervision, and guides the public to participate in information supervision needs to have a positive impact.

For local governments, protecting students' information security cannot rely on subjective will, but requires perfect supervision and systems, and government departments must also have certain information security protection capabilities. With the rapid transformation of digital teaching and learning, the collection of students' information is increasing, and local governments can no longer meet the needs of students' information security, mainly due to imperfect laws and regulations (Y. Sun, 2022). It is confirmed that information security awareness and information norms have been significantly improved under the constraints of local institutions, laws and regulations (Sapanca & Kanbul, 2022), and that perfect laws and regulations are crucial in the sustainable development of digital education and can promote the development of local education governance (Al-Janabi & Al-Shourbaji, 2016), so the hypothesis is proposed:

   H2b: Improve the level of student information governance, improve public management laws and regulations, and promote information security.

Local governments are required to bear the responsibility for protecting student information security, and the impact of laws, regulations, and the public on information security (Vijayalakshmi, Lin, & Laczniak, 2022). In the field of local government education governance, information security regulations give government departments the power to collect and manage information, such as student registration management, student disciplinary measures, and the awarding of degree certificates (Bo & Onwubuya, 2022), and whether the information is safe and leaked during the collection process needs to be guaranteed by perfect laws and regulations (P. Chen & Wang, 2021). Imperfect laws, regulations and systems not only affect students' sense of information security, but also reduce the credibility of the government, which is not conducive to local education governance (Felton & Stickley, 2004). Therefore, local governments and organizations should take the initiative to take responsibility for protecting student

information security and establish an education mechanism to ensure that the government fulfills its responsibility to protect student information security. Therefore, the hypothesis is proposed:

  H3: The public participates in the process of protecting student information security and fulfills its own right to supervision.

In accordance with the requirements of the local philosophy of governance, as well as the administrative authority of the government, social groups are actively guided to protect and supervise student information (Jin, 2021). The rights and responsibilities in the process of information management must be based on national legislation and local norms of conduct. Therefore, only by clarifying the government's responsibility to protect students' information security in policies, laws, and regulations can various policies be truly implemented and local needs for education governance can be guaranteed.

3.3   Local government governance framework for information security

Based on the above research framework and assumptions, Figure 1 shows the research model of this study.

Figure 1:   The process of information security governance by the local government
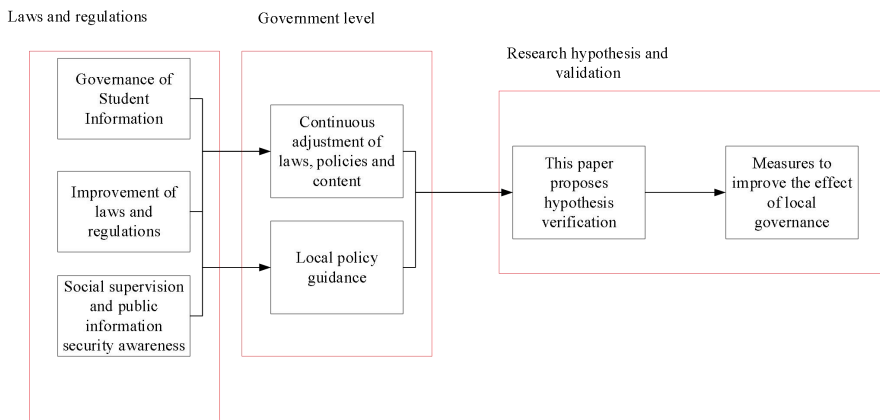
From the data analysis in Table 1, it can be seen that the local information security situation is first understood, and then the actual situation of the local information is verified, and the local information data is collected. Through the guidance of laws, regulations, and public information security awareness, the purpose of mentioning the level of local information governance is achieved. Regression analysis should be carried out through relevant hypotheses to verify whether the

relevant hypotheses are valid, the verification results should be discussed, and targeted solutions and strategies should be put forward to improve the government's governance environment for local information.

4   Method

Unlike the political tournament organised by local governments around economic indicators, the organizational logic informing commendation governance activities guides local governments to shape people-centred governance and improve the quality of social governance in their districts. "Commendation governance" activities require public engagement in their organization and rules selection.

4.1   Research subjects

In this paper, 300 respondents were local government staff, leaders of social organizations and supervisors of education departments, and 505 questionnaires were distributed, 504 were recovered, and 1 was missing. The higher the score, the higher the degree of consistency between the description and the question. After the questionnaire was revised, the validity was 0.783 and the reliability was 0.812, both of which were greater than 0.07, indicating that the target could be analyzed in the later stage.

4.2   Research methods

The "Information Security Governance Survey" conducts a questionnaire on qualified administrative personnel, which includes three main aspects, local student information governance, laws and regulations on student information case governance, and local public awareness of information security, so as to prove the degree of local government information governance of students, as shown in Table 2.

Table 2:   Government Governance Survey of Local Information Security

Target	Hypothesis	Content	Symbol
Governance of information security by local governments	Local policies play a role in promoting information security, social and public governance, and functional play	The role of policy in social information security	YES
		Public features of information security governance	SG
	The government is primarily responsible for	The role of government in information security governance	GZ

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Target	Hypothesis	Content	Symbol
	learning about information protection, and it should fulfill its responsibilities and play a leading role in improving information laws and regulations	Laws and regulations guarantee information security governance	GD
	The public participates in the process of protecting student information security and performs their own right to supervision	Supervision of the public's implementation of policies	SJ
		Information security laws and regulations reported by the public	SL
		The public's awareness of information security	SS
		Public feedback on the effectiveness of government policy implementation	SF

In view of the above problems, the survey of different indicators and contents was carried out, and the survey score was 1~5 points, and the relationship between different scores was judged to verify the rationality of the survey results.

4.3 Software analysis of data

Use the "Questionnaire Star" (www.wjx.cn) to distribute and collect questionnaires and check the completeness of the data survey. A total of 299 valid questionnaires were collected from government workers. The questionnaire was distributed and collected to meet the needs of the survey, and all data were analyzed using SPSS26.0 software. Descriptive statistics to investigate the on-premises information governance landscape, identify anomalies, and cull them. Variance column analysis was performed on the survey results to determine the reasonableness of different assumptions.

Table 3: Statistical analysis of survey data

Name	Sample size	Minimum	Maximum	Average value	Standard deviation	Median
YES	504	1.00	5.00	2.50	0.65	2.50
SG	504	1.00	3.00	2.64	0.76	3.00
GZ	504	0.12	4.01	0.46	0.18	2.44
GD	504	0.20	4.89	0.52	0.15	2.47
SJ	504	1.00	4.02	2.40	0.00	2.00
SL	504	1.00	4.10	2.37	0.33	2.00
SS	504	1.00	4.00	2.29	0.84	2.00

The statistical results of the survey data organized by the data analysis in Table 3 are relatively average, and the difference in the values is relatively small, which can be used for later statistical analysis, and there is no significant correlation between different hypothetical indicators.

5   Results

5.1   Questionnaire reliability and validity test

In this study, SPSS26.0 data analysis software was used to test the data reliability of the variables related to students' information security needs and whether the data were reliable. The academic reference indicators are as follows: (1) Cronbach's Alpha >0.6, (2) Adjusted Item-Total Correlation (CITC) >0.3, and (3) Removing the Effect of Each Item on the Overall Cronbach's Alpha of the Questionnaire. The results of this study showed that: (1) the Cronbach's alpha of the questionnaire was 0.896, which was greater than 0.6; (2) CITC values were distributed between 0.7 and 0.8, both greater than 0.3; (3) It can be seen that removing any variable results in a Cronbach's alpha coefficient of less than 0.896 for the questionnaire. According to the above three indicators, the questionnaire data proved to be reliable and passed the reliability test, as shown in Table 4.

Table 4:   Reliability of the survey results

Name	Total Correlation of Adjusted Terms (CITC)	The α factor for which the item has been removed	Cronbach α coefficients
YES	0.131	0.545	
SG	-0.237	0.558	
GZ	-0.142	0.567	
GD	0.887	-0.015	0.783
SJ	0.833	0.554	
SL	0.833	0.049	
SS	0.935	0.554	

As can be seen from Table 4, the reliability of the survey results is relatively good and meets the survey requirements. In this study, the validity of the questionnaire was tested by KMO and Bartlett test, and the KMO value was greater than 0.6, and the significance of Bartlett sphericity test was P<0.05, proving the validity of the questionnaire. The results of this study showed that the KMO value was 0.848, which was more significant than 0.6. The chi-square of the Bartlett sphericity test is 1168.706; The degree of freedom is 6 and the significance P is 0.0001, less than 0.05. The combination of the above two indicators and the evaluation showed that the questionnaire had validity.

5.2 The role of local policies in information security and social and public governance

In view of the analysis of local policies on information security and social public governance, the research function plays a promoting role in finding the responsibility of the government in local governance, and the specific results are shown in Table 5.

Table 5: The role of policy in information governance (N=504)

Characteristic		n (%)
YES	Significant effect	267 (53%)
	General role	237 (47%)
SG	Functional < 18%	31 (6.2%)
	18-22	182 (36.1%)
	22-25	142 (28.2%)
	>25	149 (29.6%)

As can be seen from Table 5, the role of the government in information security governance is relatively obvious. Fish play a role. There was no significant difference between significant and non-significant, and the degree of function was relatively large. However, the overall public function is in the intermediate stage, between 18%~22%. It can be seen that the analysis of the role of local policies on information security and social function governance is relatively good, and it shows certain potential, which is the main focus of the research.

5.3 Fulfillment of government responsibilities and public guidance

In the survey of student information governance, local governments have adopted clear information collection norms, completed information security systems, and strengthened the cultivation of information security laws, as shown in Table 6.

Table 6: The current situation of students' information security

Index	Content	
GZ	Information Governance Body	169 (33.5%)
	The primary responsible body for information governance	171 (33.9%)
	Divisional division of labor	98 (19.4%)
	Department-assisted processes	66 (13.1%)
GD	Raise public awareness	44 (8.7%)
	Create an atmosphere of governance	137 (27.2%)
	Enhance the role of public services	120 (23.8%)
	Encourage civil supervision	203 (40.3%)

The statistical results (Table 6) show that the government's situation in student information governance is not optimistic, with 33.5% of the respondents saying

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that local governments have not taken their own responsibilities, which affects the governance effect of student information security. 53.4% of government officials said that the local government has adopted policies, laws and regulations to protect students' information security, but the implementation process is not perfect and there is a lack of protective laws. However, only 19.4% believe that local government policies ensure the security of students' information and that relevant laws and regulations meet the requirements. 13% of government officials said that although the current laws and regulations have been implemented, they cannot fully guarantee information security, and further measures need to be further improved. 8.7% of government officials said they had not encountered an information security incident due to a lack of communication between departments. 91.3% of government officials said that existing systems, laws, and regulations could not reduce information leakage incidents, and more than 40% of government officials believed that their responsibilities were unclear, which affected the effectiveness of information security governance.

5.4   Public participation in the governance and supervision of information security

Public participation plays a significant role in the governance of information security, so it is necessary to conduct an in-depth analysis of the results and situation of information public participation, and the specific analysis results are shown in Table 7.

Table 7:   Results of public participation in information security governance

Index	Content	
SJ	Information Governance Body	169 (33.5%)
	The primary responsible body for information governance	171 (33.9%)
SL	Divisional division of labor	98 (19.4%)
	Department-assisted processes	66 (13.1%)
SS	Raise public awareness	44 (8.7%)
	Create an atmosphere of governance	137 (27.2%)
SF	Enhance the role of public services	120 (23.8%)
	Encourage civil supervision	203 (40.3%)

From the analysis results in Table 7, it can be seen that the public participates in information security, and the main body of social information governance is clarified, and the main responsible institutions are government departments. In terms of the division of labor and cooperation between departments, there are big problems, and the efficiency of cooperation between departments is relatively low. Among them, encouraging and guiding non-governmental supervision is an effective means to improve student information governance, and can play a promoting role in public service. This result can also show that during the

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information gathering phase, students have a need for safety and do not need to over-collect information. In the information storage stage, students have a security need for information to be stored tightly. During the information use phase, students have security needs for the information to be used for lawful and reasonable purposes.

5.5 Summary of results

In this study, the local government's information security governance mainly consists of four aspects, and government departments should clarify their responsibilities and take active measures to protect students' information security. Establish an information processing mechanism between different departments to improve the level of information security governance. At the same time, a disciplinary mechanism is adopted for government departments to deal with information problems, and the responsibilities of government departments and laws and regulations are defined in combination with the laws and regulations in the Education Law, and the final statistical results are shown in Table 8.

Table 8: Summary of the results of local government on student information security governance

	The role of the government and the legal department		The role of social supervision	*t*	*p*	95% degree of interpretation	The intersection of the government, the legal department, and the public
	B	Standard error	*Beta*				
constant	26.177	17.237	-	1.519	0.145	-7.607~59.961	-
SG	0.038	1.891	0.004	0.020	0.984	-3.669~3.744	1.120
GZ	-0.164	0.309	-0.109	-0.530	0.602	-0.770~0.442	1.056
GD	0.072	0.098	0.408	0.735	0.471	-0.121~0.265	7.629
SJ	9.077	35.527	0.160	0.255	0.801	-60.555~78.709	9.670
SL	-0.182	0.131	-1.207	-1.396	0.179	-0.438~0.074	18.565
SS	51.705	63.193	0.828	0.818	0.423	-72.151~175.560	25.424

Remarks：Dependent variable = SI; * $p<0.05$, ** $p<0.01$

As can be seen from Table 8, there are slight differences in the average scores of the government, legal institutions, and the public, but the degree of explanation is close to 4 points, indicating that the above indicators have a significant role in the security governance of student information systems. Among them, legal institutions, government departments and public guidance have the highest degree of influence, and the implementation of the above strategies should be strengthened. In order to further explore the overall results of government departments, institutions and the public on student information governance, the regression coefficient analysis can be carried out, and the specific results are shown in Figure 2.

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Figure 2: The results of the government, the law, and the public on student information security governance
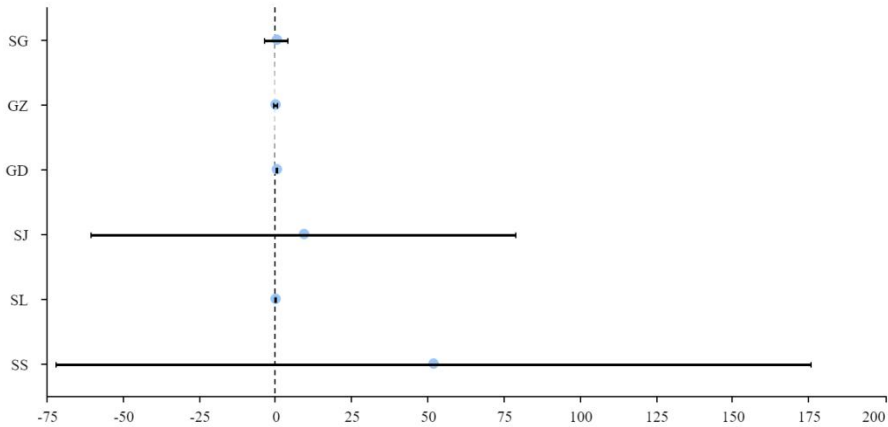
6 Discussion

The purpose of this study is to understand the improvement of the local government's governance level of students' information security needs in the process of sustainable development of digital education, and to construct a legal and regulatory system for student information governance. The results of this paper show that more than 90% of local government departments have dealt with information security incidents, but there is a lack of perfect legal measures to protect students' information security (Fung, 2017), which affects the effectiveness of information governance. The results of this paper also confirm that the government's previous governance measures on student information security are single, lack of a perfect governance system, poor degree of assistance between departments, and lack of information security awareness of the public, which cannot realize the necessary conditions for student information security governance (Hui, 2022).

6.1 Clarify the governance responsibilities of local governments and actively protect the security of student information

Local governments need to formulate sound policies, laws, and regulations to strengthen the governance of student information security. First of all, government departments should establish management methods for the collection process of students' personal information and formulate information governance policies (Shen & Zhao, 2022). At the same time, communities, counties, and cities should standardize procedures for handling student information to avoid human

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interference. At the beginning of information collection, a student privacy and security operation system is formulated and improved in conjunction with the Information Security Law. At the same time, government officials should be trained on privacy rights and information security laws, and the information processing process should be publicized (Jiang, Yang, & Dai, 2020).

1) In the information collection stage, improve the "notification and consent" system in terms of notification content and procedures, fulfill the notification obligation, and handle information in accordance with regulations (F. Huang & Sun, 2023).

2) In the information storage stage, student information must first be classified and operated by social supervision. Then, according to the specific purpose and scenario of information processing, the storage period is divided into long-term storage and short-term storage, and the personnel in the information processing process are recorded (X. Li, 2022). At the same time, measures such as encryption and de-identification should be taken to improve the process of information security (Tatiana, Kobicheva, Tokareva, & Mokhorov, 2022).

3) In the information use stage, government departments and education departments should classify student information, and content that must be used, allowed and prohibited in accordance with information processing regulations and laws. Establish a legal list of the processing of student information, and clarify the means and purposes of the processing of student information.

6.2 Introduce the role of public supervision to improve the awareness of social information security

Information security risks are not fixed, but with the continuous development of digital education, governments and legal institutions should increase the publicity of the governance of students' information security, protect students' information security, and improve the public's awareness of information security in public management (Ozor & Toner, 2022), and public information security awareness is a priority in social governance and plays a vital role in information security protection. After information security governance, the public should raise their awareness of information security governance and create a good information security governance environment (Nwagwu & Donkor, 2022). At the same time, in order to fulfill social responsibilities and protect students' information security, the public not only needs to bear relevant obligations, but also cooperate with the government to establish a disciplinary mechanism to provide support for information security governance, so as to meet the needs of social information security governance (Levitan, 2022). At the same time, the public helps governments and legal institutions to establish institutionalized governance mechanisms to effectively protect students' rights (S. Yu & Gao, 2018) In addition,

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if the government or legal institution violates the student information governance norms, it shall discipline the person in charge and department in accordance with the authority and procedures prescribed by law. When necessary, judicial proceedings may also be conducted in accordance with the Information Security Law, or administrative punishment measures may be used to correct information security governance behaviors.

6.3 Improve laws and regulations on information security governance, and standardize the process of student information governance

Student information security governance is not only a policy issue of a local government, but also an issue of improving the local legal mechanism. Although Chinese law stipulates that individuals who handle personal information by the government should have the obligation to protect the information and fulfill the corresponding responsibilities, the specific operation process in the process of processing student information is not clear, and there is a lack of systematic legal regulations, resulting in the government departments not being able to install and require the implementation of corresponding punitive measures. The findings of this study confirm that laws and regulations are the basis for promoting student information security governance, and the departments of student information governance should be clarified. In education laws and regulations, independent clauses stipulate that "government departments and educational institutions shall bear the obligation to protect the security of students' personal information, and divide the responsibilities between different departments", improve the content of information governance, assess the severity of the quality consequences of information security, and establish civil, administrative, and criminal liability. At the same time, it is necessary to stipulate the ways in which government departments and education departments should assume their responsibilities. The special "Local Government Regulations on the Protection of Students' Personal Information", provides a unified normative basis for the security governance of students' personal information.

7 Conclusion

In the context of comprehensively promoting digital education and emphasizing the protection of personal information, student information governance has become the main responsibility of local governments, which directly affects the effectiveness of local governance and the improvement of laws and regulations. Based on the conditions of local governance, this study deeply analyzes the system, influencing factors and governance subjects of student information governance. Among them, government departments, laws, regulations and the public are the main aspects of governance, and the adjustment of laws and regulations should clearly stipulate the role, process and norms of the government

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in the processing of student information. Local governments should establish policies and programs for information security governance, and actively guide the public to participate in social governance. Finally, it is necessary to strengthen the public's supervision of information governance, promote the implementation of the punishment mechanism, and effectively improve the effect of student information governance. The results show that government policies, laws, regulations and public awareness are the basis of information governance, the government is the main body of responsibility, laws and regulations are the guarantee, and the public is the condition for promoting information security governance. Perfect laws and regulations can improve the information governance system, eliminate the negative impact of education informatization, and promote the clarification of the responsibilities of local governments. There are also some shortcomings in my research, mainly because the development of digital education involves a wide range of areas, and the content of information law and education law is relatively professional, and I will analyze the above problems in depth in the future and propose more effective governance measures.

Conflicts of Interest:

The author declares no conflict of interest.

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