

# Research on the Status Quo and Dilemma of Minors' Personal Information Protection

-- From the Perspective of Guardian Consent System

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**Abstract.** With the rapid development of mobile Internet, minors' personal information is inevitably collected and processed by various information processors. Due to the characteristics of immature mental development and weak risk prediction ability of minors, it is difficult to effectively protect their personal information security. Although China's "Personal Information Protection Law" makes provisions on the protection of minors' personal information, there are still some problems such as "one-size-fits-all" age limit and imperfect guardian consent system. This paper will test the current hundreds of various types of apps, conduct a questionnaire survey on the protection of personal information of minors and their guardians, analyze the current dilemma of the protection of personal information of minors at the social level, propose countermeasures according to the symptoms, and explore more targeted ways to protect the rights and interests of minors' personal information. Escort the physical and mental healthy development of minors under the background of the information age.

**Keywords:** Personal Information of Minors; The Guardian Agrees; Information Collection; Information Protection.

## 1. Research Background

The vigorous development of mobile Internet makes more and more minors gradually participate in the network life. On November 1, 2021, China's Personal Information Protection Law came into effect, becoming the country's first special law that stipulates rules for the processing of personal information [1]. Although it puts forward higher requirements for the protection of minors' personal information, stipulating that "personal information processors who process the personal information of minors under the age of 14 shall obtain the consent of the minors' parents or other guardians" [2], cases of illegal processing of minors' personal information are still common. Minors' personal information rights and interests have been violated by illegal leakage, harassment, etc. It can be seen that the practical effect of the Personal Information Protection Law in the field of mobile Internet is not satisfactory.

The main reason for the above problems is that although the Personal Information Protection Act has made provisions on the protection of minors' personal information, it has not been further stipulated in lower laws or standard documents. At present, the main problems exposed are as follows: 1. The age division of minors as the subject of information is too simple, and other conditions of minors are not fully taken into account and adaptive provisions are made; 2. The guardian's "notify-consent" rule has not been effectively implemented, and the consent method and verification method have not been clearly defined; 3. The lack of supporting procedural law protection makes it impossible for minors to safeguard their rights and interests through public relief in a timely and effective manner after their information rights and interests are infringed.

Therefore, under the background of the current information age, it is necessary to conduct targeted research on the protection of minors' personal information. In the face of the current relevant laws and regulations in China have not made substantive requirements for the protection of minors' personal information protection, and the "one-size-fits-all" division of minors' protection age and other problems, how should we safeguard minors' information rights and interests in the minors'

information collection process? The author will conduct empirical research and qualitative analysis of the obtained data through actual observation and questionnaire survey, draw conclusions and put forward effective countermeasures, and strive to explore a powerful path to protect the rights and interests of minors' personal information, and help the healthy growth of minors.

## **2. Research Design**

### **2.1. Actual Observation**

1. Sample source: With the rapid development of mobile Internet in China, smart terminal devices are becoming more and more popular in People's Daily life, and APP applications mounted on mobile phones and tablet computers have been vigorously developed, with various apps emerging endlessly. The author selected ten categories of apps for observation according to their functions and the use of contemporary minors. They are social, life, food and beverage, reading, travel, health and fitness, shopping, photography and video, entertainment and education. According to the comprehensive ranking of IOS App Store and Android APP Store, the author selected 100 apps in ten categories. After selecting the APP, download it separately, and find the minor personal information protection agreement provided by each app and its independence. The APP will be downloaded between October 1 and October 10, 2022.

2. Data representation: Due to the expansion of the current Internet system, the fields involved in applications have also expanded. However, once an industry in the Internet industry has a dominant position, the industry will continue to self-strengthen, resulting in a higher degree of concentration of consumer choice, so that the lack of competitive advantages of the industry gradually no one interested, slowly eliminated. At the same time, from the perspective of APP significance, the APP of each application is to provide people with needs and more convenient digital services in all aspects, and the choice of APP should refer to the user, especially the degree of love of minors. Based on the above points, when studying the compliance of minors' personal information protection agreement, the author mostly chooses apps that are inseparable from life, widely downloaded and have prominent representative significance in each category to conduct actual research.

3. Reference basis: According to Article 31 of the Personal Information Protection Law of the People's Republic of China, the processing of personal information of minors under the age of 14 shall obtain the consent of the minors' parents or other guardians. Where a personal information processor processes the personal information of minors under 14 years of age, it shall formulate special rules for the processing of personal information [3]. Therefore, we investigated 100 kinds of apps by empirical research method, analyzed the practical effects of the provisions on the protection of minors' information in the Personal Information protection Law, and put forward reasonable suggestions to find effective regulatory paths.

### **2.2. Questionnaire Survey**

In order to more comprehensively study the practical effect of the provisions on the protection of minors' information in the Personal Information Protection Law, the author designed the Questionnaire Survey on Minors' attention to the protection of personal Information when using Apps and the Questionnaire Survey on Guardians' Attention to the implementation of the protection agreement for Minors' Personal information [4]. Through a comparative analysis of the results of the importance of minors themselves and their guardians to the protection of minors' personal information, this paper studies the practical effects and weaknesses of the provisions on the protection of minors' information in the personal information protection Law, and puts forward reasonable suggestions.

### **3. Research Result**

#### **3.1. Commonly Used Apps Independently Set up Minors Personal Information Protection Agreement Compliance Status**

In order to study the compliance status of the personal information protection protocol for minors independently set up by commonly used apps at this stage, the author randomly selected 100 commonly used apps in 10 categories for testing in early October 2022. Commonly used APP types include reading, education, social networking, health and fitness, shopping, entertainment, photography and video, life, travel and food and drink. According to the requirements of relevant laws, departmental regulations and national standards at this stage, minors' personal information is sensitive personal information, and information processors shall obtain the consent of their parents or other guardians when collecting and processing the personal information of minors under the age of 14, and shall formulate special personal information processing rules. That is, the APP is required not only to "set up a separate compliance agreement" in terms of personal information protection agreements, but also to achieve "informed consent of the guardian" on this basis.

After further classifying the tested commonly used apps by type, the author calculates the number and proportion of the tested commonly used apps that comply with the independent setting of minors' personal information protection agreements, as well as whether the apps have obtained the consent of their guardians before collecting minors' personal information.

Statistics show that the number of apps that meet the legal requirements to independently set up minors' personal information protection agreements is 61, accounting for more than half of the total number of apps commonly tested, but the number of apps that meet the requirement to obtain the consent of minors' guardians before collecting their personal information is only 5. Among them, health and fitness apps have the highest compliance ratio of 90% in the independent setting of minors' personal information protection agreements; Food and beverage apps had the lowest compliance rate in this regard, only 30%; 4 Apps that obtain the consent of minors' guardians before collecting their personal information fall into the categories of health and fitness, education, photography and video, and entertainment.

It can be seen that at this stage, the compliance of commonly used apps in the independent setting of minors' personal information protection agreements is in a good state, while the compliance of various industries in this respect is still different. In addition, only a few apps seek the consent of minors' guardians before collecting their personal information.

For general minors' personal information, the APP verifies whether it is consent by the guardian by means of "verification password" and "complex math problems"; For sensitive information of minors, strict guardian consent can be achieved through "verifying guardian identity information" and "biometric information" as appropriate. For example, in the Bilibili APP, there is a youth guard-youth mode and a parent-child platform. In the parent-child platform, the guardian binds the minor's account through identity verification and face recognition, and needs to negotiate and communicate with the minor, scan the code on the Bilibili platform to complete the parent-child relationship binding.

#### **3.2. Examination and Revision of Questionnaire Items**

Objective: To compile a questionnaire survey on guardians' concern about the implementation of minors' personal information protection protocol by APP and minors' concern about personal information protection when using APP, and to conduct exploratory factor analysis. Methods: Questions were compiled and questionnaires were determined by consulting literature and the relevant provisions on the protection of minors' personal information in the Personal Information Protection Law. 275 guardians and 219 minors filled out the questionnaires, and the valid questionnaires were collected within 5 days to obtain data. Questions were screened through item analysis, and exploratory factor analysis was performed on the data ( $n_1=275$ ,  $n_2=219$ ). Results: In the survey of guardians, 9 items and 4 factors were obtained by exploratory factor analysis, namely,

reading situation, protection consciousness, concern degree and boundary condition. The load of each factor was between 0.52 and 0.80, and the cumulative variance contribution rate was 58.323%. In the questionnaire of the minors, the exploratory factor analysis obtained 7 items and 4 factors, respectively: reading situation, attention degree, protection consciousness and boundary conditions. Conclusion: Through the exploratory factor analysis of the two questionnaire items, we know that the questionnaire of this study needs to be improved.

### 1. Research and analysis methods

Statistical methods SPSS Statistics was used for descriptive statistics, correlation analysis and exploratory factor analysis.

#### 2. Validity test: exploratory factor analysis

1) Questionnaire survey on guardians' concern about APP implementation of minors' personal information protection protocol (n=275)

The KMO value was  $0.572 > 0.5$ , and the Bartlett sphericity test was significant ( $\chi^2=156.269$ ,  $df=36$ ,  $P=0.000 < 0.05$ ). Therefore, the data meet the conditions for exploratory factor analysis.

As it is believed that there is a correlation between items, the exploratory factor analysis adopts principal component analysis and direct oblique Angle method ( $\delta=0$ ), and refers to the sequential way of deleting bad items in the literature (Wei Jin & Zuo Bin, 2016[5]), (i.e. 1, the maximum load of a single item  $< 0.4$ ; 2. The cross-load of the two largest projects is  $> 0.4$ ; 3, the difference between the absolute value of the two largest items of load  $< 0.1$ ; 4. If there are less than 3 items under the factors, exploratory factor analysis will be conducted again after each item is deleted.) Finally, 9 items are retained, and the cumulative variance explanation rate of 4 factors is 58.323% according to the method whose eigenvalue is greater than 1. Depending on the meaning of the item contained in the factor, The four factors are named as reading status (guardian's reading status of relevant provisions in the APP), protection awareness (guardian's protection awareness of personal information of minors in the APP), concern level (guardian's concern about personal information of minors) and boundary conditions (guardian's treatment of personal information of minors in the APP). Attitude and other defining conditions).

2) Questionnaire survey on minors' emphasis on personal information protection when using apps (n=219)

The KMO value was  $0.503 > 0.5$  and the Bartlett sphericity test was significant ( $\chi^2=42.544$ ,  $df=21$ ,  $P=0.004 < 0.05$ ). Therefore, the data meet the conditions for exploratory factor analysis.

The questionnaire retained 7 items in the end, and the cumulative variance explanation rate of 4 factors was 66.331% according to the method of eigenvalue greater than 1. Depending on the meaning of the item contained in the factor, The four factors are named as reading situation (minors' reading status of relevant clauses in the APP), attention degree (minors' attention to their personal information), protection awareness (minors' awareness of the protection of their personal information in the APP) and boundary conditions (minors' attitude toward the processing of their personal information in the APP) Conditions).

### 3. Conclusion

Under the conditions of this study, the following conclusions can be drawn: the questionnaire survey on guardians' concern about the implementation of minors' personal information protection agreement by APP and the questionnaire survey on minors' attention to personal information protection when using APP are composed of four parts: reading situation, protection awareness, concern level and boundary conditions. The guardian's concern about the implementation of the agreement on the protection of minors' personal information in the APP is influenced by the guardian's reading of the provisions related to minors' personal information in the APP, his awareness and concern about the protection of minors' personal information, and his own attitude towards the definition of age; The degree of attention minors attach to the protection of personal information when using the APP is

affected by their own reading of the provisions related to their personal information in the APP, their awareness of and attention to the protection of personal information, and their awareness of the security of personal information protection.

### **3.3. The Guardian's Attention to the Protection of Minors' Personal Information**

In order to study the importance of guardians to the protection of minors' personal information when using Apps, the author designed a questionnaire survey on Guardians' concern about the implementation of Minors' Personal information protection protocols by Apps in mid-October 2022, and collected 275 valid questionnaires within 5 days after the online release of the questionnaire.

#### **1. Statistical analysis of data sample description**

Descriptive statistical analysis was carried out on the results of 275 valid questionnaires, including the respondents' family identity, education background, awareness of the protection of minors' personal information, and the dimensions of the personal information protection law.

According to the results of the questionnaire data, the proportion of family identity in the data sample is 24.36% of the father, 36% of the mother, 27.27% of the elder brother/sister, 6.91% of the grandmother and 5.45% of the grandfather/grandfather. The distribution of respondents under the age of 40 was more balanced, while those aged 40 and above were more, accounting for 30.91%. The highest degree of the respondents is mainly bachelor's degree, indicating that the majority of the participants in this survey have a high level of cultural knowledge.

#### **2. Analysis of guardians' awareness of protecting minors' personal information**

After the analysis of the collected and valid questionnaire data, the vast majority of guardians will pay attention to the information protection of minors in their families, but they have a weak understanding of the specific protection methods and measures for the protection of minors' personal information. Guardians have a high degree of trust in APP processing of minors' personal information, with nearly 80% of respondents (guardians) allowing APP to process minors' personal information to varying degrees.

In the definition of the age of minors whose personal information should be collected with the consent of the guardian, 31.27% of the respondents chose the guardian under the age of 14, 33.45% chose the guardian under the age of 16, and 35.27% chose the guardian under the age of 18. Stating that the guardian does not have a clear understanding of the age range for the processing of minors' personal information as prescribed by law (that is, the processing of personal information of minors under the age of 14 shall obtain the consent of the minors' parents or other guardians);

If the APP shares, transfers, and makes public the collected personal information of minors with other platforms, 74.55% of guardian respondents think it is necessary to get their consent again, while only 8.36% of respondents think it is unnecessary and do not accept, and 6.91% of respondents say they have no feelings. When the commonly used APP shares, transfers, and discloses the collected personal information of minors with other platforms, more than 70% of the guardians believe that it is necessary to obtain consent again. It can be seen that the vast majority of guardians attach high importance to the APP processing of minors' personal information.

#### **3. Dimensional analysis of personal information protection law**

After the analysis of the recovered valid questionnaire data, the guardian respondents' reading of the relevant provisions of the agreement on personal information protection and minors' personal information processing in the commonly used apps is basically balanced, nearly 20% of the respondents will carefully read and roughly browse, while nearly 60% of the respondents will not read, and directly check the "consent" to enter the APP, indicating that in daily life, When using the APP, most guardians pay little attention to the contents of the terms. To some extent, guardians have a high degree of trust in the ability of the commonly used APP to process and protect the personal information of minors, and believe that their information will not be leaked or used.

According to the results of the questionnaire data feedback, more than 60% of the respondents (guardians) noticed that a separate agreement was set up in the APP for the processing of minors' personal information, and more than 60% of the respondents recognized the importance of setting an independent agreement for the protection of minors' information. It shows that guardians have a strong sense of protection of minors' personal information.

According to the questionnaire data, if the personal information of minors is leaked, the vast majority of guardians will take measures, among which 72.73% of guardians will ask whether the child has registered personal information in the commonly used APP and seek remedial measures, 53.45% of guardians will complain to relevant organizations or management units. Only 43.27% of the guardians realized that they should file a lawsuit to the court to protect the rights and interests of minors, while 24% of the guardians still felt indifferent. This data shows that most guardians are not aware of the importance of the law and the seriousness of the leakage of minors' personal information, and it is not the first choice of most guardians to protect the rights and interests of minors through legal means.

### **3.4. The Protection of Personal Information of Minor Users of Commonly Used Apps**

In order to study the protection of personal information by underage users of commonly used apps at the present stage, the author designed a questionnaire survey on underage Users' Emphasis on personal information Protection when using Apps in mid-October 2022, and recovered 219 valid questionnaires within 5 days after the online release of the questionnaire.

#### **1. Statistical analysis of data sample description**

After analyzing the 219 valid questionnaires collected, it was found that among the data samples, 31.05% were underage respondents aged 14 or below, 23.74% were aged 14-16 (including 16 years old), and 45.21% were aged 16-18. In other words, the data source of the questionnaire was mainly high school students.

In the evaluation of minors' understanding of their own personal information, 82.65% of minors think that they understand personal information very well, and only 5.94% of respondents think that they do not understand personal information.

However, when judging the classification of personal information, 70% to 80% of the underage respondents chose the correct answer, that is, the ID card number, mobile phone number and health status (the above three are personal information, which belongs to the correct answer, while the whereabouts track and personal diary are personal privacy), but 75.34% of the underage respondents still chose the whereabouts track. 73.97% of respondents chose personal diary. It shows that most of the underage respondents are not clear about the concept of personal information and personal privacy. To sum up, most minors think that they have a good understanding of personal information in their self-cognition, but in fact there are loopholes in the degree of understanding.

#### **2. Analysis of personal information protection awareness**

The analysis of the recovered and valid questionnaire data shows that the vast majority of underage respondents are concerned about and understand the protection of their personal information, accounting for 62.15% of the total number, and nearly 20% of the respondents are not concerned about their information protection.

Nearly 80% of the underage respondents allow the APP to process their personal information to varying degrees, and more than 70% of the underage respondents believe that it is not necessary to obtain the consent of their guardians before the APP collects personal information, which shows that minors have weak legal awareness of personal information protection, and most of the minors' awareness of personal information protection is passively instilled by the outside world. Their active attention is not high.

When minors use the APP, more than 30% of the respondents will enter their real personal information correctly, more than half of the respondents choose to fill in their real personal

information depending on the situation, and only one-tenth of the respondents never fill in their real personal information. It indicates that most minors are more cautious when filling in personal information, but there are still some minors who will enter their real personal information correctly, have a weak awareness of personal information protection, and do not realize the seriousness of information leakage.

When minors handle personal information released when they are mentally immature, more than 70% of them want to delete all of it, indicating that deleting personal information released when they are mentally immature is also an important privacy for minors, and it is necessary to improve the right of information to be forgotten and comprehensively protect minors' personal information.

### 3. Dimensional analysis of personal information protection law

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## 4. Conclusion and Countermeasure

### 4.1. Conclusion

This study uses different methods to quantitatively analyze the issues related to the protection of minors' information by guardians and the setting up of independent personal information protection protocols in apps.

First, the data show that the introduction of the Personal Information Protection Law has made guardians have the awareness of protecting minors' information, but there are still problems that cannot be ignored. 1. The Personal Information Protection Act does not provide comprehensive coverage. The popularity rate of the Personal Information Protection Law is not high, there are still some groups do not know the introduction of the Personal Information Protection Law, and have not really entered the public; 2. Guardians' awareness of prevention and protection is weak. Although the vast majority of guardians are aware of the importance of information protection for minors, only a very small number of guardians will use legal weapons to defend their rights when they are violated by illegal information leakage, and only a small number of guardians will carefully read the personal protection clauses set by apps when using various apps.

Second, according to the survey report and empirical research analysis, it can be seen that different types of apps are generally able to independently set up minors' personal information protection agreements in accordance with the provisions of Article 31, paragraph 2, of the Personal Information Protection Law, but for article 31, paragraph 1, only a few apps will obtain the consent of their guardians before collecting minors' personal information. It can be seen that the provision of "setting up a minor personal information protection agreement" is only a formality and cannot achieve the legislative purpose substantively. Moreover, in practice, we cannot perceive the authenticity of the guardian's "consent" in appearance, and there is no corresponding way to verify it.

To sum up, the low penetration rate of the Personal Information Protection Law and the defects of the legislation itself have not made clear explanations for the protection objects and how to protect the security of minors' personal information. Therefore, how to improve the protection mechanism of minors' personal information has become an urgent problem to be solved.

## 4.2. Countermeasures

### 1. Flexibly adjust the age limit for the protection of minors' personal information

Since the information age relies on information to operate, minors' personal information is naturally incorporated into the Internet big data. However, due to the immature mental development of minors, they do not have the cognitive ability to protect their own information security, so illegal violations such as information leakage of minors occur from time to time, and the protection of minors' personal information needs to be solved urgently [6]. At present, China has also issued relevant regulations, Article 31 of the Personal Information Protection Law, Article 72 of the Minor Protection Law, and Articles 2 and 14 of the Provisions on the Online Protection of Children's Personal Information. The Information Security Technology Personal Information Security Code clearly stipulates that information processors should obtain the consent of parents or other guardians when collecting the personal information of minors under the age of 14. However, it can be seen that the age limit of minors' personal information protection in China has formed a single situation of "one-size-fits-all" [7], and there is no regulation on how information processors should collect minors' personal information between 14 and 18 years old and how to protect their rights and interests [8]. However, with the rapid development of the Internet and the continuous innovation of information technology, minors in the new era have obtained more adequate knowledge nutrients than before.

The continuous influence and catalysis of emerging things, coupled with the influence of different economic levels, educational levels, traditional customs and other factors in different regions, minors' mental maturity, risk assessment ability and risk processing ability are very different. Therefore, a single age limit cannot effectively protect the information rights and interests of all minors, and a more detailed division should be made. Make flexible adjustments. As long as minors have sufficient awareness of information protection and risk assessment ability, and assist the rule of law protection, to a certain extent, information leakage and other adverse consequences can be avoided. On the one hand, with reference to the provisions of relevant laws and regulations, if the minor can meet one of the following conditions, it can be regarded as having the equivalent of full civil capacity to protect personal information: (1) The minor has reached the age of 16 and can rely on his own labor income as the main source of living. According to the provisions of Article 18 of the Civil Code, those who meet this condition can be regarded as persons with full capacity for civil conduct, which also means that they have the same risk assessment ability and risk bearing capacity as persons with full capacity for civil conduct [9]. (2) The guardian does not have the conditions or ability to protect minors, and the minors themselves have certain cognitive ability. For example, in real life, both parents have died and the guardian is an elderly person. The elderly in the family cannot keep up with the trend of The Times, do not understand the network technology, cannot control minors and cannot effectively protect their personal information. Often, the minds of such minors are more mature than their peers. On the other hand, minors with certain cognitive ability can be regulated according to the sensitivity of personal information: for general information, minors can freely exercise their rights, but for

sensitive personal information, such as name, ID number, home address, contact information, etc., further consent of the guardian is required [10].

## 2. Improve the guardian informed consent system

In order to protect the personal information of minors, the Personal Information Protection Law stipulates that the processing of personal information of minors under the age of 14 shall obtain the consent of the minors' parents or other guardians. Article 72 of the "Protection of Minors", Article 19 of the "Civil Code", and the "Code for Information Security Technology Personal Information Security" have also made corresponding provisions. However, from the analysis of questionnaire survey data and empirical research, the guardian informed consent system has not been fully implemented. There are no specific provisions in the legislation, and in practice, the information processor makes it mere formality for various reasons, resulting in the inability to know whether the "consent" behavior of the guardian is real or not, and it cannot be verified in some way. Improving the guardian informed consent system can effectively protect the security of minors' personal information and avoid illegal infringement from the source to a certain extent.

Two elements are essential, first, to ensure that the guardian is truly informed [11]. For example, at present, many Internet companies have set up face recognition, real-name registration and other ways to prevent minors from indulging in games, but many guardians help minors complete face recognition verification without knowing it, which can not necessarily reflect the true meaning of the guardians [12]. The guardian can send an email directly to the guardian, or inform the guardian by phone [13]. At the same time, the information processor is required to abide by the facts, truthfully inform the guardian of the detailed regulations on information collection and matters needing attention, and fulfill the obligation of good faith notification. The guardian should also read carefully and be responsible for his own behavior. Secondly, in terms of "consent" verification, the information processor can send the consent application to the guardian, which is signed by the guardian himself and then transmitted to the information processor, and the technology such as face recognition and other personal identity certificate verification is used to prove that the "consent" behavior is indeed made by the guardian. For different minor information situations, verification methods should also be different: 1. For general minor information, simple ways such as "verification password" and "complex math problems" can be used to verify whether it is consent by the guardian; 2. For sensitive information of minors, strict guardian consent can be achieved by "verifying guardian identity information and biometric information" as appropriate [14].

## 3. Give minors the right to be forgotten

With the increase of Internet penetration, the age of minors accessing the Internet is getting lower and lower. At the same time, because of the convenience of Internet information release and the inability of guardians to observe the surfing situation of minors in real time, minors often publish some information on the Internet. All this information will be permanently included in the database without any screening, and when the minors become mature, they will realize that some information is inappropriate and inappropriate [15]. And this information is extremely easy to be used by ulterior motives, so as to damage the interests of the publisher, causing illegal infringement. In view of this situation, the author believes that the right of information to be forgotten can be introduced to regulate. The right to be forgotten was first proposed in China in the "Ren Jiayu v. Baidu" case in 2015 [16]. When Ren Jiayu searched his name on Baidu, he found that his personal information in the Baidu results was linked to his former company, and because the former company's reputation was not good, Ren Jiayu's employment was affected. Therefore, Ren Jiayu sued the court to ask Baidu to delete all content about her personal information. Although this request was not supported at the time, it could reflect the subject's distress at receiving bad information and the need for this right.

The setting of the right of minors' personal information to be forgotten can be carried out in the following aspects:

(1) Establish a minor personal information data management agency [17]. The author thinks that our country should establish a minor personal information data management organization. The staff of the minor personal information data management agency shall establish a personal database for each minor who publishes information on the network, classify the personal information released by minors when it is collected, and place it in the minor user database according to categories, and then unify the information databases of different minor users into a big data system. It is an information database specially set up for minors. For example, when other users attempt to use the minor's information, they need to obtain the double consent of the staff of the information management agency and the minor or his guardian to use the minor's personal information according to law or in accordance with the contract. More importantly, minors can fully retrieve personal information in the database, and request to exercise the right to correct and delete information; Managers need to be audited to allow the removal of inaccurate information, etc.

(2) Determine the content of the rights and obligations of the right to be forgotten. The author believes that China's introduction of the right to be forgotten can learn from the provisions of the European Union. Article 17 of the General Data Protection Regulation of the European Union puts forward the concept of the right to be forgotten [18], which clearly stipulates that the data subject has the right to request the data controller to delete his data without unreasonable delay [19] in any of the following circumstances, and the data controller is obliged to immediately erase personal data. It mainly includes two aspects: First, the data should be deleted in time when certain conditions are met or there is no need to leave the data; Second, the outdated and worthless bad information should be removed in time. Of course, the "right to be forgotten" does not mean that any information can be eliminated, and it is also limited, and inaccurate information can be deleted or corrected [20].

#### 4. Establish a tripartite protection mechanism for guardians, information processors and the state

Information processors: The protection of minors' personal information is definitely not the responsibility of one party, but should build a tripartite protection mechanism between guardians, information processors and the state. Article 31 of the Personal Information Protection Act stipulates that "Where a personal information processor processes the personal information of a minor under the age of 14, special rules shall be formulated for the processing of personal information." However, in fact, even though most of the information processors abide by the legislative rules and formulate independent personal information processing agreements, the provisions are virtually null because of the general legislation, the unclear setting of personal information processing agreements, and the lack of attention from guardians. In order to improve the protection mechanism in all aspects, the information processor shall reasonably prepare the personal information processing agreement, and the agreement shall be independently listed in a prominent place for the guardian to read;

As for the state, there is currently no perfect procedural law on the protection of personal information, so when minors' information rights and interests are infringed, guardians are often unable to effectively protect their rights. Private relief is more flexible than public relief [21], but it is difficult to implement private relief, and the effectiveness of rights protection is not high, which is not conducive to the long-term development of minors' personal information protection. Therefore, the legislature should draft a procedural law for the protection of minors' personal information in a timely manner. Procuratorial organs should assume the major political and legal responsibility of strengthening the legal education of minors; The network supervision department should strengthen the supervision of information processors, conduct tango examination of information, and severely crack down on illegal acts that infringe upon minors' information rights and interests; Government departments may regularly carry out seminars and analysis meetings open to the public on the protection of minors' personal information, listen to the opinions of the masses, combine new problems, give timely feedback and take corresponding measures.

## 5. Conclusion

With the vigorous development of mobile Internet, it has penetrated into all aspects of social life, and the number of underage users is also increasing. In the Internet era, the collection and circulation of information maintain the operation of society. However, when collecting personal information of minors, due to their immature mental characteristics as a special group, they often have weak awareness of self-information protection and weak risk assessment ability, so it is difficult to protect their personal information. It is easy to cause harmful consequences such as information disclosure and even illegal use of personal information. At the same time, minors do not have the ability to bear risks, and it is difficult to properly deal with and respond to the adverse consequences of information leakage.

The promulgation of the Personal Information Protection Law has already made preliminary regulations on the protection of minors' personal information at the legal level. However, the inflexible age limit defined by the regulations for minors, the imperfect informed consent system of guardians, and the non-standard personal information protection agreements set up by information processors are still obstacles on the road to the protection of minors' personal information rights and interests at this stage.

Improving the personal information protection system of minors is the joint responsibility of many social subjects. The strength of minors and their guardians is weak, which puts forward higher requirements for information processors, administrative supervision organs and legislative organs. How to promote the compliance of information processors to the system, the effective regulation of administrative regulatory bodies and the further improvement of existing norms by legislative bodies have become one of the topics worth studying at present. Constructing a collaborative protection mechanism composed of guardians, information processors and the state is obviously the only way to realize the protection of minors' personal information at present.

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