

# Application of two-dimensional code technology in college students archives management

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## Abstract

Two-dimensional code technology can be applied to college students archives management by using its large-capacity information storage technology, which can greatly improve the efficiency of student file management. This paper first analyzes the feasibility of two-dimensional code technology for college student file management, and expounds the advantages of two-dimensional code technology applied to student file management, and finally explores the risks and challenges and solutions. This paper aims to promote the application of two-dimensional code technology in student file management in terms of safety, accuracy and efficiency.



Full Text Article



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**Keywords:** two-dimensional code; file management; student archives

## Introduction

College students' archives are highly sensitive archives materials, which are the basis of proving students' identity. College students' archives are of great significance to college construction and talent selection. At the same time, file information security is the key and difficult problem in the work of college students' file inquiry. At present, most of the college students' file inquiry work stays at the stage of manual inquiry. Although this way of archives inquiry and utilization has its important practical significance, it lags behind the development process of archives informatization, consumes labor and energy, and has low work efficiency, and cannot meet the needs of social development. At present, how to provide safe, accurate and efficient electronic inquiry service for college students' archives has become an important issue in the management service of student records.

## Application feasibility analysis

### ***2.1 Features of two-dimensional code technology***

Two-dimensional code is composed of a specific geometric pattern and distributed in the two-dimensional direction of the plane, the current widely used two-dimensional code for two-dimensional code, the most important advantage is that it contains a large amount of information, easy to be identified, and low cost, widely used by the current society. Two-dimensional code is based on the new photoelectric information technology, relying on the concept of bit stream, a variety of data character information, in two dimensions of the two-dimensional plane in the direction of black and white alternately arranged, "1" and "0" in the computer language respectively represent black and white, composed of graphics can be easily recognized by the user mobile device image recognition device, to achieve rapid sharing of information content<sup>[1]</sup>. Two-dimensional code adopted in the informatization construction of college students' archives is suitable for Chinese character coding, which can be directly recognized by smart phones. Two-dimensional code technology should be fully utilized to provide accurate, efficient and safe services in college student.

### ***2.2 Advantages of two-dimensional code technology***

First of all, the application of two-dimensional code technology in college student file management is not difficult, compared with magnetic cards, IC cards and other storage methods, the technical difficulty is low, and the advantage of low development difficulty makes two-dimensional code technology more dominant in college student file management. Secondly, the information content of two-dimensional code is huge, far exceeding the information content of one-dimensional code, and the two-dimensional code can easily store the text information in college student file materials, and the two-dimensional code can also put anti-counterfeiting information into the bar code, which is convenient for people to identify the true and false. Finally, the development cost of two-dimensional code technology is extremely low, and similar radio frequency identification systems mainly rely on reading equipment to read information, but because the chip cost used is too high, it cannot replace two-dimensional code technology as the mainstream; Two-dimensional code technology not only has the advantages of low development difficulty, large amount of information and low cost, but also has the advantages of not easy error and wide coding range<sup>[2]</sup>. The maturity and convenience of two-dimensional code technology greatly increase the feasibility of its application in the management of student records.

### ***2.3 A good network environment***

As of 2023, Chinese smartphone penetration rate exceeds 75%. With the rapid development of Internet technology, my country's smartphone penetration rate is growing rapidly. The public is no stranger to the use of Two-dimensional codes. Scan Two-dimensional codes for payment, scan Two-dimensional codes for information, etc. Two-dimensional code technology is now everywhere in society. Two-dimensional code technology has high requirements for the network. At present, 3G and 4G signals of smart phones in China have been fully popularized, and 5G technology tends to mature. Almost everyone in university campuses has mobile devices that can enjoy the network at high speed. Every university also basically achieves full network coverage, which provides good

conditions for the application of two-dimensional code in college student file management.

### ***2.4 Promoting the resource integration of student file information***

Two-dimensional code can integrate file information resources, its main job is to organize all the data in each college student file in an orderly manner, and integrate the disordered documents into an orderly digital college student file through two-dimensional code technology; on this basis, two-dimensional code technology can edit abstracts and catalogues of information in the files, and set up corresponding retrieval directories for easy access<sup>[3]</sup>. When the student file information changes, the staff can integrate the old and new information resources by updating the two-dimensional code, effectively avoiding the lack and distortion of information, and the application of two-dimensional code technology effectively promotes the integration and management of college student file information.

### ***2.5 Practical application of introducing two-dimensional code technology***

Specifically, the two-dimensional code can be placed in the upper right corner of the material cover, all college students' material information can be compiled into the two-dimensional code, and the corresponding entry directory can be set. To develop two-dimensional code information system for college students, firstly, input college students' archives into archives digital management platform and create a college students' information database, then develop two-dimensional code of information database. The university student information database shall contain the personal basic information of university students, admission time, graduation time, examination results, internship employment situation, rewards and punishments, etc. After creation, the information to be consulted can be retrieved according to the catalogue needs, and the corresponding two-dimensional code can also be generated for mobile equipment to scan the code to identify the content information. When grass-roots party organizations manage college students' files, they can scan the Two-dimensional code with smart phones to learn and consult the relevant information of college students' files. The application of two-dimensional code technology in the practice of college students' archives management can ensure the standardization of process dynamic management, promote the transformation and upgrading of paper archives management to electronic archives management, and further improve the informatization level of college students' archives management.

## **Advantages of two-dimensional code technology applied to student file management**

### ***3.1 Ensure the authenticity of the source of the material***

College students file formation time is long, after graduation will "file with people go", file transfer is a very normal thing, but some for employment, promotion, because of the qualification conditions restrictions, some people will take risks, through various improper ways to fake, think in the circulation process muddle through, fake, to the unit audit process brought certain difficulties<sup>[4]</sup>.

If two-dimensional code technology is actively introduced into college student file management, all information of all files in college student management system will be converted into two-dimensional code and placed in the upper right corner of relevant documents. With the help of two-dimensional code technology, each college student file has a unique two-dimensional code. In the later stage, if you need to call and retrieve a college student file, you can quickly query the target two-dimensional code through keywords, and you can obtain all the content information of the target file.

### ***3.2 Improve process management standardization***

Traditional college student files have complicated procedures to consult. In each college file bag there are various student documents, such as high school graduation registration forms, college transcripts, honor certificates, graduation certificates and other materials. In order to prevent file loss and damage, it is basically not allowed to view students' file materials without special circumstances when collecting college students' file materials in daily work. When graduate students enter the school, their student records and personnel files are transferred to the school where they study, but different schools, different student training processes and each time are different. After being transferred to the new training unit, it takes a lot of time for the grass-roots organizations to collect, manage and examine the file materials of college students. If the two-dimensional code technology is applied to the dynamic management of college students' files, the information of student status files can be scanned by mobile equipment, which will avoid repeated verification of the original carrier file materials and effectively improve the efficiency of dynamic management of student status files process. Standardized management makes the storage and use of college students' files orderly, which can greatly reduce the risk of damage and loss of original files. After embedding the Two-dimensional code on the cover of the material, each college student file is equivalent to having a unique "ID card". In the subsequent review of college student files, the reviewer can obtain information by scanning the Two-dimensional code, which can track and record the whole process of the formation and management of the college student file, thus ensuring the process standardization of college student file management.

### ***3.3 Ensuring the security of college students' archives management***

The application of two-dimensional code technology in the management of college students' archives can improve the safety of work. In the daily management of student registration files, the contents of student registration files are complicated and there are many styles, so there will be many difficulties in the process of collection and arrangement. The loss of original files often occurs, and it is difficult for the responsible personnel of grass-roots units to ensure that each student registration material is intact. The application of two-dimensional code in the management of college students' files can fundamentally solve the problem of repeated access and review of student records, so as to protect the safety of original files. In order to further ensure the security of student status file management, operation record function can be added to the student status file information management system to ensure that the borrowing and consulting work of student status files can be traced, the original file materials are not easy to lose, firewall is added for the dynamic

management of student status files, and the security of file work is guaranteed.

### ***3.4 Improving the convenience of using college students' archives***

Introducing two-dimensional code technology into the management of student status files, inputting the information content in a student status file into the two-dimensional code, scanning and identifying and reading the content through mobile equipment, can greatly reduce the time of browsing files, improve the file searching efficiency, accurately locate the content that needs to be consulted, and reduce the time cost. At present, in the management of student status files, coding and classification should be carried out for each student status file material. Each student status file contains various materials, such as volunteer book for joining the Party, thought report, personal honor certificate and personal information. Two-dimensional code technology will include different types of information in a student status file into two-dimensional code one by one, which is convenient for management and user inquiry and utilization<sup>[5]</sup>. Two-dimensional code technology can also identify the identity of the inquirer during file inquiry, and identify who has used this student status file by scanning the code, eliminating many work processes and facilitating the inquiry and utilization of student status files.

## **Challenges faced by two-dimensional code technology in college student file management**

### ***4.1 Risk of leakage***

Two-dimensional code technology itself has high security, and the information security problems of student files are mainly concentrated on the user side. Through the use of two-dimensional code in student files, the dissemination of student file information becomes very convenient, but users usually lack understanding of the hidden dangers of file information security student files, and are easily used by illegal student file elements, resulting in information theft, thus causing some adverse events or harm to student files. In addition, the level of equipment security student file integrity also affects the use of two-dimensional code security student file degree. At present, to apply the two-dimensional code technology to the electronic inquiry entity management of student files, it needs certain funds and professional talents for student files. How to effectively do a good job of student file electronic inquiry information system and two-dimensional code system student file docking, while reducing information security issues become the focus of student files.

The two-dimensional code is placed on the cover of each student file, and all information in the file is contained in the two-dimensional code. In the use of student status files, the two-dimensional code in each file is an ordinary pattern, and the identification degree is not high. Meanwhile, the workers and users of student status files usually do not know enough about the potential safety hazards existing in the two-dimensional code. While convenient management, there are also potential information security risks. If this small two-dimensional code is obtained by illegal means, all the information of this student status file will be leaked, causing a series of adverse events. Therefore, there are problems in the application of two-dimensional code technology in the management of student status files. It is necessary to find a balance point between efficient work

and safe work to ensure that student status information is prevented from being stolen on the basis of convenient work. It has become a big challenge to do a good job in the docking of student status file management system and two-dimensional code system to reduce information security risk.

#### **4.2 Lack of standards**

Due to the characteristics of student file work, the connection between electronic query management system and two-dimensional code technology is not simple. The mature two-dimensional coding technology has high requirements for image acquisition, processing speed and reliability. At present, there are application standards for two-dimensional code in China, and there are various coding methods, but there is no clear standard for two-dimensional code in student file management. In order to apply two-dimensional code reading technology to electronic in query of student files, it is extremely important to select two-dimensional code coding methods with high confidentiality and strong error correction ability.

#### **4.3 The technology itself is flawed**

At present, the defects of using two-dimensional code technology to store information are mainly reflected in the following two aspects: on the one hand, two-dimensional code can carry virus code, two-dimensional code carries a large amount of file information, and can also store virus, illegal link, etc., so it is difficult to identify illegal information from the surface in daily work; On the other hand, there is a risk in the process of one-way transmission of information between archives and users. The information transmission mode of two-dimensional code technology in college students' archives work is one-way transmission. In view of this characteristic, lawbreakers can obtain information through hijacking the one-way transmission process between scanning equipment and archives, archives and management system background. The information hijacking security problem generated in this process is also a big challenge.

### **Responses and measures**

#### **5.1 Set watermark function to prevent information leakage**

In order to further improve the security of student file management, watermark function can be added to two-dimensional code. Watermarking technology can effectively prevent information from being illegally copied and tampered with. By embedding specific watermark patterns or information in the two-dimensional code, the uniqueness and authenticity of the two-dimensional code can be ensured. When scanning the two-dimensional code, the system will automatically detect the watermark information. If the watermark information is found to be inconsistent with that stored in the database, the system will refuse access, thus effectively preventing information leakage and illegal copying. Adding two-dimensional code digital watermark function in the student status file management system, scanning two-dimensional code can display the basic information of file searcher and file manager, as well as the source of the student status file, monitor the user's operation record, access time and printing behavior in real time, add authority setting to the searcher and reference link, realize the record of the whole process of file borrowing and use, and add safety



defense line for the application of two-dimensional code technology to student status file, which can greatly improve the safety coefficient of college student file management.

### ***5.2 Strengthen the security of two-dimensional code technology***

First of all, when developing the two-dimensional code of student status files, we should strengthen the supervision on the production of two-dimensional code, establish a safety monitoring and evaluation mechanism for the development of two-dimensional code and the background of student status file management system, review in a strictly confidential way, and regularly entrust a third party to carry out two-dimensional code stability detection. The second is to strengthen the verification steps of the management platform of the student status file management system, ensure the security of information in the one-way transmission process, allow the Party branch branch committee personnel who can identify the Two-dimensional code equipment to use the student status file, and other personnel have no right to consult and access the relevant information of the student status file, so as to prevent the third party from accessing in time. The defects of two-dimensional code in practical application are dealt with in the above two ways, and the safety of two-dimensional code technology is improved. At the same time, in order to cope with technical defects and safety risks, the coding method of Two-dimensional code should be updated regularly. The security and anti-attack ability of two-dimensional code can be improved by updating the coding algorithm and error correction mechanism of two-dimensional code continuously. At the same time, regular updates can prevent criminals from using known vulnerabilities to attack and ensure the security of student records information.

User authentication mechanisms can also be strengthened. Before scanning the Two-dimensional code, the system can ask the user for identity verification, such as entering a password, using biometric technology (such as fingerprint or facial recognition), etc. Only authenticated users can access the information of student records, thus effectively preventing unauthorized access and information disclosure.

### ***5.3 Establish and improve the technical standard specification of two-dimensional code***

In order to ensure the effective application of two-dimensional code technology in the management of student records, it is very important to establish a set of perfect two-dimensional code technical standards. First of all, a unified two-dimensional code coding standard needs to be developed to ensure smooth docking and sharing of information between different departments and agencies. Secondly, the application scope and use specification of two-dimensional code technology in the management of student records should be clarified, including the generation, storage, transmission, identification and destruction of two-dimensional code, so as to ensure the security and integrity of information.

In addition, a review and supervision mechanism for Two-dimensional code technology should be established to regularly inspect and evaluate the generation and use of Two-dimensional codes to ensure that they meet safety standards. At the same time, corresponding emergency plans should be formulated. Once safety problems are found in the application of two-dimensional code technology, measures can be taken quickly to reduce losses.

At the technical level, relevant enterprises and research institutions should be encouraged and supported to carry out technical research and innovation, continuously optimize Two-dimensional code technology, and improve their anti-virus, anti-tampering and anti-interference capabilities<sup>[6]</sup>. At the same time, the docking with international standards should be strengthened to ensure the compatibility and security of Two-dimensional code technology in international exchanges and cooperation.

Through the establishment of sound two-dimensional code technical standards, it can provide safer and more efficient technical support for the management of student records, and provide more convenient and reliable services for students and educational institutions. This not only helps to improve the overall level of student record management, but also helps to protect students' personal privacy and information security, and provides a strong guarantee for the healthy development of education.

#### ***5.4 Establish and perfect archives management standard***

By formulating clear application standards and specifications of two-dimensional code, the correct application of two-dimensional code technology in student record management can be ensured. At the same time, the specification should cover the generation, storage, transmission and destruction of two-dimensional codes to ensure the safety and standardization of the whole management process. On the other hand, by regularly holding safety knowledge lectures and training courses, archivists and users can improve their understanding of the security risks of Two-dimensional codes and enhance their safety awareness, thus effectively preventing and reducing the occurrence of security incidents.

### **Conclusions**

To sum up, the application of two-dimensional code technology in college student file management can greatly improve work efficiency, improve the standardization of the management process, and ensure the authenticity, integrity and security of college student file management. In the future application practice, relying on digital network technology, we will strengthen efforts to solve the difficult problems in the application of two-dimensional code technology to college students' file management, comprehensively promote the transformation and upgrading of college students' file management, and provide efficient and convenient student file services for users. In the process of convenient and efficient transformation, we should take preventive measures to avoid technical loopholes, perfect corresponding work regulations, promote the handover and integration of new forms of archives work and traditional archives work methods, and innovate on this basis to ensure the common progress of archives work and digital era, and make steady progress in the course of social development, so as to obtain greater development space for archives cause.

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## **Conflict of Interest**

The authors declare no conflict of interest.

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