

# On the Application and Management of Electronic Signature in the Informatization Construction of Colleges and Universities

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**Abstract:** Owing to the progress of information technology, office work in colleges and universities has changed to the direction of automatic office work. More and more colleges begin to use electronic signatures for project management, data file approval, etc., and identity certification, which greatly improves the efficiency and quality of office work in colleges and universities. Due to the legal and authoritative nature of electronic signatures, they are very popular in colleges. Based on this, this paper makes a concrete analysis of the overview of university seals and electronic signatures, as well as the application and management of electronic signatures in the construction of university informatization.

## 1. Introduction

In order to better adapt to the progress of the digital era, all major enterprises and units have begun to transform and innovate their office models. At present, the office mode of enterprises and public institutions is mostly changed from offline office to online office, which improves work efficiency and quality on the basis of effectively solving office costs. However, this change has also brought about problems such as identity cost, data leakage and tampering. The electronic signature is formed and developed in this environment. It is of great significance for the construction and development of university informatization to apply it to the construction of university informatization, which can improve the standardization and security of information management by using information technology.

## 2. Overview of College Seals

### 2.1 Characteristic

The use of seals in the actual office work of colleges and universities will show the following three characteristics. First, it is legal. University seals can be broadly divided into official seals and school leaders' seals. Both seals play the role of audit, management and certification in the process of college office work<sup>[1]</sup>. From the perspective of application scope, university seals can also be divided into two types: internal use and external use. The internal use of seals is mainly applied to the approval of office affairs and campus construction activities within universities, which can effectively standardize the office work, and promote the preciseness and process of office work. The external use of seals are used for documents issued by universities and project contracts signed, which has clear legal benefits. Such seals require universities to strictly comply with relevant national laws and regulations. Secondly, it has authoritativeness. The seals of universities represent different departments and different posts, which is the legal proof of the recognition of written documents by universities. The name seal of school leaders represents the rights, obligations and responsibilities of individuals<sup>[2]</sup>. Finally, it is probative. It is not difficult to understand the probative nature of the university seal, which means that the document with the university seal is recognized by the university and the law, has a certain legal nature, and can carry out relevant activities for the legalization of the actor in combination with the document materials.

## 2.2 Requirement

With the rapid progress of information technology, universities also put forward higher requirements for seals. First, convenience requirements. As we all know, traditional seals of universities are managed by specially assigned personnel, and because of the particularity, they cannot be taken out at will, which greatly reduces the convenience of the seal<sup>[3]</sup>. Second, security requirements. As a proof tool and voucher, traditional seal are easy to be stolen and imitated in the actual application process, which greatly reduces the security of the seal. In serious cases, problems such as university information leakage will occur, which will bring huge economic losses to universities. Therefore, colleges and universities put forward higher requirements for the security of seals. Third, traceability. The so-called traceability mainly means that the traditional seals can only be applied to a specific department for sealing after being approved by the head of the school affairs office. Based on this, many universities record the use of seals through the seal rating table. This is not only inefficient, but also leads to problems such as information fraud and information recording errors, which makes it difficult to effectively trace the use of seals. The electronic signature can be completely preserved through information technology, which is convenient for universities to review and manage seals<sup>[4]</sup>. Fourth, certification requirements. Traditional seals can only solve the problems of document authentication and process approval. However, with the construction and development of information technology in universities, the number of electronic documents in universities is increasing. Colleges and universities need to seal and approve electronic documents, which puts forward higher requirements for traditional seals.

## 3. Overview of Electronic Signature

### 3.1 Principle Analysis

Electronic signature is mainly a kind of identity verification technology of electronic documents formed by information technology and Internet platform. It can be used as the core element of the authentication system through digital signature. Specifically, the electronic signature information management system will review and record the digital signatures, certificates, pictures, etc. with user identity information, and then organically combine them with the text file processing plug-ins and web page plug-ins, and then effectively verify the electronic documents. In this way, the verifiability and authenticity of electronic documents can be improved<sup>[5]</sup>.

### 3.2 Systems Analysis

The electronic visa system of universities can be divided into two parts. The first part is effective verification and processing of text files, such as DOC, XLS, DOCX, etc. Because the PDF reader does not have an open interface, the major enterprises use the software independently developed within the enterprise to sign the electronic signature. For example, there are two parts of the signature client of some enterprises. One is the word processor plug-in and the PDF signature tool. Among them, Power PDF Reader is the PDF signature software often used by enterprises<sup>[6]</sup>. Module 1 is mainly used for electronic signature of foreground users, mainly used for text signature and file verification. The second module is mainly used for background management, which is responsible for the background identification information verification on the basis of realizing the basic functions of seal printing and management. Specifically, the electronic signature management system can organically link the user's identity information with seals, pictures, etc., and then read the user's identity information through the background service system during the user's signature process. Only after the identity audit, can the electronic signature be stamped into the electronic document of the application. This greatly improves the security of office work in universities.

## 4. Application and Management of Electronic Signature in the Informatization Construction of Colleges and Universities

Since the official implementation of the *Electronic Signature Law* in 2005, electronic signatures

have the same legal benefits as traditional seals. In the same year, China's Technology Supervision Bureau also issued and implemented a digital signature scheme, which further standardized the scope of use of electronic seals. In this context, more and more enterprises began to use electronic signatures.

Generally speaking, electronic signatures are mainly used in two aspects. First, some units only use electronic signatures to sign in text files such as Word files and Excel tables<sup>[7]</sup>. Secondly, the electronic signature is signed with the website content of the office system, official website and information management system. In order to better promote electronic signatures in the office of universities and promote the informatization construction of universities, the internal management, teachers and students should deepen their understanding and attention to electronic signatures from a subjective perspective.

#### **4.1 Client Signature Based on Windows Certificate Service System**

The client electronic signature in the self-certification system is an important stage for college personnel at all levels to change from the traditional seal working mode to the electronic signature. In this stage, colleges and universities should strengthen the promotion and publicity work. First of all, universities should carry out research activities within the scope of the university to clarify the scope of application of electronic signatures. General school seals include the official seals of administrative units, school departments at all levels and the official seals of party affairs. At this stage, the official seal of personal name is mainly the official seal of the school leaders. Secondly, purchase for specific projects. In this process, universities should purchase assets in strict accordance with China's procurement law, and determine the number of clients to be purchased, project funds and budget management in combination with the first step of research data. Thirdly, in the project implementation stage, universities should take the actual development situation as the implementation standard to arrange the collection and training of electronic seals. Finally, universities should strictly implement the project acceptance, and conduct specific analysis and comprehensive consideration on the actual use of electronic seals.

#### **4.2 Web Page Signature Based on Windows Certificate Service System**

Web page signature is also one of the applications of electronic official seal. In the process of office work in universities, it is inevitable to confirm and manage the web pages. The web page signature system can use electronic signature technology to achieve the signature of web page content. In this way, the identity certificate and information exchange of the portal website and data information management platform can be effectively realized, so as to better realize paperless office, improve the efficiency and quality of college office, and promote the construction and development of college informatization.

#### **4.3 School-Level External Certification System Based on Ca Certification System**

CA is the certificate authority of the whole university authentication system, in which the trust of both sides of the information receiver can be obtained. Unlike the Windows certificate service system, the CA signature system is issued and recognized by a third party with the qualification to issue certificates, which is legal and authoritative. For universities, when some electronic cultures need to be used externally, such as project contracts and school official documents, they need to use CA certified electronic signature systems to better improve the security of system authentication.

#### **4.4 Build School-Wide Certification Systems**

In the process of popularizing electronic signature, universities should fully consider the actual needs of the school office, and apply the electronic signature system step by step from point to surface. After leaders at all levels and departments in the school began to use electronic signatures, electronic signatures can be promoted throughout the school, so that every teacher and student could have electronic signatures, thus laying a good foundation for the informatization construction of universities.

## 5. Conclusion

As an important product of the development of information technology and an identity authentication tool in the information age, electronic signature improves the authentication function of seals due to the shortcomings of traditional seals. At the same time, electronic signature also plays an irreplaceable role on the basis of the widespread popularity of online office. Therefore, colleges and universities should keep pace with the progress of the times, seize the development opportunities brought by information technology, integrate electronic signatures into college office, and promote mobile office development and college information construction.

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