

# Analysis on the Management and Maintenance of Computer Labs in Higher Vocational Colleges

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**Abstract:** *With the continuous development of society, computers are playing an increasingly important role in people's lives, and the application of computer technology is becoming more and more widespread in various industries. The "Education Informatization 2.0 Action Plan" issued by the Ministry of Education points out that educational informatization is the basic connotation and significant feature of education modernization, and it is a key content and important sign of "Education Modernization 2035." During the "13th Five-Year Plan" period, schools, teachers, and students have built three major educational basic databases. The "14th Five-Year Plan" for National Informatization also explicitly proposes the requirements to improve the level of educational informatization infrastructure construction and build a high-quality educational support system. Therefore, the development of networks and computer technology has become the foundation for adhering to the strategy of building a strong country through science and technology and prioritizing educational development. In order to meet the needs of teaching and scientific researching, higher vocational colleges often establish computer labs to meet the demands of teaching and scientific researching when offering computer-related courses. As the number and scale of computer labs continue to increase, if the management and maintenance of computer labs are not strengthened, it will seriously affect the quality of teaching and scientific researching. Therefore, this paper starts with the current situation of the management and maintenance of computer labs in higher vocational colleges, analyzing the existing problems, and proposes solutions, in the hope of providing some reference for the management and maintenance of computer labs in higher vocational colleges.*

**Keywords:** *higher vocational colleges; Computer; Management and maintenance*

## 1. Introduction

The development of networks and computer technology is the foundation for building a strong country through science and technology and prioritizing educational development. In order to meet the needs of informative education, universities generally offer computer-related courses and basic courses. Therefore, the use and quantity of computer labs are gradually increasing, and the increase in the utilization of computer labs and their usage requires professional management personnel to ensure smooth educational and teaching activities. This article will mainly discuss the analysis of the management and maintenance of computer labs in higher vocational colleges.[1]

## 2. Current Situation and Analysis of the Management and Maintenance of Computer Labs in Higher Vocational Colleges

### 2.1. Setting of Computer Courses in Higher Vocational Colleges

In the 1980s, Deng Xiaoping proposed that "the popularization of computers should start from children." China's youth computer education industry started roughly at the same time of China's reform and opening-up. Over the years, computers have become essential equipment in people's daily work and study, serving as indispensable tools for work, study and life. Nowadays, China has become one of the most developed countries in terms of internet production and usage.

In the field of education, computers have become an essential course and a necessary skill for every student in their work, study, and life after entering the workforce. This course mainly improves students' abilities through training. Computer courses have been generally included as compulsory courses in domestic universities. In higher vocational colleges, computer courses usually fall into two categories:

theoretical courses and practical courses. The theoretical courses generally apply the knowledge learned in computer majors to real life. For example, when study computer network fundamentals, students should learn how to manage and maintain networks using computers; when study computer application basics, they should learn how to use computers for simple office automation. Practical courses require students to apply the knowledge they have learned to real-life situations.[2]

The computer courses in higher vocational colleges generally start in the first year, and each major has its own curriculum system, but the course settings are often similar. This often causes many students with a certain understanding of computer usage skills and the problems encountered in daily use after completing a semester of study feel confused about how to manage and maintain computer labs.

### ***2.2. Facilities, Equipment, and Environment of Computer Labs***

The main problem with computer equipment in higher vocational colleges lies in insufficient funding. It is usually difficult to timely upgrade and maintain computer equipment in higher vocational colleges, which leads to increasingly serious problems with the computer equipment itself.

Secondly, most computer equipment in higher vocational colleges is purchased in large quantities, and when updating or repurchasing computer equipment, it is easy to encounter inconsistencies in computer brands and systems. This means that during the maintenance of computer labs, the situation of the original computer equipment needs to be considered, as well as the actual situation of the new computer equipment, and whether the two can be integrated.

From an environmental perspective, computer labs are relatively sealed and enclosed spaces with poor air circulation. The continuous operation of dozens or even hundreds of machines generates a large amount of heat. Due to the enclosed nature of the labs and limited air circulation, especially in summer when students are present in large numbers and the climate is not well ventilated, combining with the heat dissipation of the computers themselves, the lifespan and speed of computers are seriously affected.

Computer labs with high crowd flow also have a negative impact on the facilities and equipment due to poor environmental hygiene. For example, if students do not wear shoe covers or litter during classes, it is easy to generate dust, damage internal components of machines, affect the normal operation of computer equipment, and even cause computer restarts and crashes.

### ***2.3. Maintenance of Hardware and Software in Computer Labs***

In general, the maintenance of hardware and software in computer labs is the responsibility of the lab administrators. However, in reality, due to insufficient emphasis from higher vocational colleges, many lab maintenance personnel lack professional skills and there is no established scientific and reasonable maintenance process. Hardware facilities in computer labs, such as keyboards, mice, and monitors, are prone to occur malfunctions during use. Teachers or students using infected USB drives can cause damage to computer hardware or decrease the computer's operating speed. Students using online games or installing unrelated systems or software, as well as uninstalling device systems or connecting various plugs arbitrarily, also pose challenges to the management of computer labs. Therefore, the maintenance of hardware and software in computer labs in higher vocational colleges has become more important.

Moreover, software maintenance is a very complex task that involves multiple aspects, including hardware, software and networks. Since everyone has their own unique work methods and habits, establishing a scientific and reasonable system and process is essential for effective software maintenance. However, in practice, the lack of unified software maintenance standards and specifications results in many lab administrators lacking scientific and reasonable guidance during software maintenance. Additionally, the lack of unified standards for hardware and software maintenance among different schools' lab administrators leads to significant differences in computer maintenance, which affects the quality of maintenance.

The rapid pace of technological advancements in computer and network technology also poses another challenge in terms of equipment updates and quantities. If hardware maintenance personnel fail to regularly maintain, upgrade, and replace hardware components, it will inevitably lead to an increase in hardware issues and software problems.

### ***2.4. Management Regulations of Computer Labs***

Most higher vocational colleges have established management regulations for computer labs, which

specifies that lab administrators are responsible for the maintenance of computer hardware equipment, guiding students in using computers, and managing the labs. However, due to insufficient funding and resources allocated to lab maintenance and lack of dedicated lab administrators, some schools have teachers who are also responsible for lab management while fulfilling their teaching duties. These teachers are often too busy to monitor students' computer usage in the labs. This results in students using the labs in a casual manner, causing more problems and making management more challenging. As a result, these management regulations are often difficult to fully implement and end up being superficial.

Students also often fail to comply with the regulations during computer usage, such as playing games, chatting online, watching videos, or bringing snacks into the labs, which poses serious security risks to the computers in the labs.[3] Some students, without understanding the regulations, may install unauthorized programs or software on the computers, posing risks of hacking attacks on the lab's computer network. These issues add to the difficulty of lab management.

Additionally, as computer and network technology continues to advance, new problems arise in lab management. The management regulations gradually become less comprehensive, and lab staff no longer have clear responsibilities and tasks, leading to a lack of communication and interaction between management personnel and students, which affects the effectiveness of management.

### **3. Basic Principles of Management and Maintenance in Higher Vocational College Computer Labs**

In order to ensure the normal operation of computer labs, there must be basic principles in place for lab management. These principles should be followed in daily management and maintenance and can be summarized as "prevention first, protection as a supplement."

"Prevention first" means strengthening the maintenance and management of computer hardware systems. Regular inspections and maintenance should be conducted on computer hardware systems. "Protection as a supplement" means timely identification and handling of faults when they occur. For example, using software or hardware backups to improve the success rate of system recovery. The principle of "prevention first, protection as a supplement" ensures the normal operation of the lab while minimizing damage to lab equipment.

This principle requires the use of management methods and technical means, protecting computer hardware systems from damage and ensuring that students can use computers in the labs without being affected by software issues.

Technical includes physical protection of devices and software protection. Physical protection can take various forms, including: setting data protection cards on the hard drives of the host computer, partitioning and formatting hard drives, physically shielding the computer system, physically deleting running software, and more. Software protection includes protecting the operating system itself and managing the installation and uninstallation of application software. The protection of the operating system itself can be achieved through various software settings, while the installation and uninstallation of application software can also be controlled through various software tools.[4]

### **4. Management and Maintenance Strategies for Computer Labs in Higher Vocational Colleges**

#### ***4.1. Establish Institutional Regulations for Computer Lab Equipment Management***

Scientific and effective management regulations for computer labs are essential to ensure the safe use and effective teaching outcomes of the labs. Computer lab management should have strict institutional regulations, which should be tailored to the specific circumstances of each school.

Firstly, the development of computer lab regulations should be implementable and standardized. Students, as the main learners and users of the labs, should have their behavior regulated to minimize the occurrence of computer equipment issues. Lab administrators and teachers should adopt a collaborative educational approach to supervise and guide students in complying with the lab's rules and regulations, fostering a sense of self-discipline.

Secondly, as lab administrators, it is important to establish a comprehensive system of rules and regulations. Having a well-defined system of rules and regulations serves as a guide for higher vocational colleges in managing computer labs. Everyone involved with the computer labs should use the computers according to the content specified in the system of rules and regulations.

Furthermore, a robust system of rules and regulations is crucial for the management and maintenance of computer labs in higher vocational colleges. Only with relevant regulations in place can higher vocational colleges quickly identify and address problems when conducting maintenance and repairs in the labs.

When establishing a comprehensive system of rules and regulations, higher vocational colleges should adhere to the principle of analyzing specific problems individually. The number of students, the number of students choosing computer courses and majors, and other factors vary among higher vocational colleges. Therefore, the development of management regulations cannot be generalized. It is necessary to consider the specific circumstances of each higher vocational college and develop a set of rules and regulations that are suitable for the management and maintenance of their own computer labs. Additionally, establishing a department responsible for the management support of the labs can ensure effective supervision and management.

#### ***4.2. Establish Comprehensive Documentation for Computer Lab Management***

Proper management of relevant documentation for computer lab equipment is an essential aspect of the scientific operation and maintenance of computer labs in higher vocational colleges. It holds significant importance for various aspects of lab management and maintenance.

Establishing a comprehensive documentation database enables easy access and retrieval of technical information. When creating the relevant documentation, all kinds of data and information related to the lab should be recorded accurately and completely. Additionally, important information should be recorded in the lab's logbook to facilitate searching and referencing of technical information.

Creating a complete documentation archive has become more convenient in today's society with the rapid development of network technology. The establishment of a database for computer lab equipment documentation in higher vocational colleges not only provides important references and support for lab management and maintenance but also presents data in a more intuitive and visual manner for administrators, thus improving work efficiency.

#### ***4.3. Strengthen the Maintenance of Computer Lab Hardware and Software***

Software management is a fundamental maintenance project for computer labs and can be achieved through the installation of computer lab software protection cards.

Software protection cards not only enable the intelligent and rapid deployment of software and systems in computer labs but also improve the efficiency of lab administrators, protect computer systems from viruses and hacker attacks, and reduce the difficulty of lab management. Lab administrators can use intelligent simultaneous interpretation to add and delete data on computers, quickly restoring them to normal working conditions. The software protection card's hard disk protection feature also allows for different backup and restoration modes, such as lab mode, personal mode, and open mode, depending on specific needs.

In addition to maintaining the external conditions of the lab itself, maintaining computer equipment is also crucial. The hardware and software equipment in computer labs ensures the normal use and operation of computers, guaranteeing the good condition of the power supply facilities and circuits in the lab, ensuring the orderly arrangement of circuits, and preventing safety hazards caused by circuit aging. Both hardware and software devices in the lab are essential for the normal use and operation of computers.

During the use and internet access process, certain websites' viruses can create vulnerabilities in computer systems, affecting their performance and speed. In addition to installing regular antivirus software, lab administrators need to strengthen the maintenance of hardware facilities. The computer's host should be placed in a cabinet under the desk, and the environment surrounding the host should be sealed to prevent damage caused by students.[5]

To maintain the normal operation of the computer operating system, the quality of internal software should be improved. Installing antivirus software and regularly clearing viruses by computer administrators can reduce the probability of virus intrusion, preventing virus harm and spread. Furthermore, installing an automatic restoration system within the computer allows for orderly restoration of files and software within the computer after students use the public computer lab, ensuring the efficiency of the original system.

#### 4.4. Introduce and Cultivate High-Quality Lab Administrators

Due to the fast pace of computer equipment updates, lab administrators need to constantly update and master their knowledge. In addition to recruiting professionals with computer management experience and technical expertise, higher vocational colleges should provide training and learning opportunities for lab administrators.

On one hand, higher vocational colleges can recruit professionals with computer management experience and technical expertise from society to improve the overall level of lab management. On the other hand, colleges can develop teachers' and lab administrators' training plans, providing various online and offline training methods to enhance their skills. Teachers' involving in the lab management process during teaching allows for effective communication and cooperation between teachers and lab administrators, improving the quality and efficiency of computer lab management. Selecting teachers to join the lab management team increases efficiency as they already have a clear understanding of computer equipment and frequently use the school's computers.

Enhancing fire safety awareness is also crucial for improving lab management. Lab administrators should be familiar with internal fire safety operations and rules, understand the operating principles of fire-fighting equipment, and master emergency response procedures, measures, and essentials. If any fire safety hazards are identified, lab administrators should take immediate measures to address them and report unresolved issues to relevant departments.

Regarding the training of lab administrators, the following approaches can be considered: first, hiring professors from relevant fields to explain the composition and operational status of computer equipment, as well as common problems, and to help lab administrators improve their professional abilities. Second, practical training should be provided to enhance practical skills, addressing the issue of high theoretical knowledge but lack of practical experience among computer teachers. Third, regular exchange meetings should be held to discuss and resolve lab management issues.

#### 5. Conclusion

China has entered the information age, and the establishment and popularization of computer courses are the inevitable trend in today's society. However, the management of computer labs in higher vocational colleges has not received sufficient attention. Therefore, higher vocational colleges need to take measures promptly to improve the management and maintenance of computer labs.

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