

The Current Situation and Improvement of Informatization Construction in Universities in the Era of Digital Education

—Taking the Nanchong Campus of Southwest Petroleum University as an Example

Yuli Zhang, Peng Jin, Yun Lin, Jing Tang

Modern Educational Technology Center, Southwest Petroleum University, Nanchong, China

Email: 2549043813@qq.com

How to cite this paper: Zhang, Y.L., Jin, P., Lin, Y. and Tang, J. (2024) The Current Situation and Improvement of Informatization Construction in Universities in the Era of Digital Education. *Open Journal of Applied Sciences*, 14, 2768-2776.

<https://doi.org/10.4236/ojapps.2024.149180>

Received: September 10, 2024

Accepted: September 24, 2024

Published: September 27, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution-NonCommercial International License (CC BY-NC 4.0).

<http://creativecommons.org/licenses/by-nc/4.0/>



Open Access

Abstract

Digitization of education is an important component of Digital China Strategy. China is deeply implementing the digitalization of education strategy, promoting educational reform and innovation, and accelerating the construction of a learning society and a learning country where everyone can learn, learn everywhere, and learn at all times [1]. As the cradle and gathering place of talent cultivation, universities should be at the forefront of educational informatization construction. As a comprehensive energy university in the northeastern region of Sichuan, the Nanchong Campus of Southwest Petroleum University plays an irreplaceable role in the local economic development. This article summarizes the current situation of educational informatization construction on this campus and proposes suggestions for its improvement path, providing constructive reference opinions for the development of similar universities.

Keywords

Digitalization of Education, Universities, Improvement Measures, Educational Information

1. Introduction

Educational informatization requires the comprehensive use of modern information technology based on computers, multimedia, big data, artificial intelligence, and network communication in the educational process, promoting educational reform and adapting to the new requirements of the upcoming information

society. It is of great significance for deepening educational reform and implementing quality education.

In recent years, major universities have continuously strengthened their own education informatization construction, and the reasons can be traced back to the following aspects

1.1. National Attention, Government Promotion

The country is paying more and more attention to information technology construction [2]. The “Outline of the National Medium, and Long Term Education Reform and Development Plan” has become an independent chapter on promoting the process of educational informatization. The preparation of the “14th Five Year Plan” for educational informatization has been launched, continuously promoting the rapid development of information technology construction in various universities. In the report of the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping, standing at the height of the overall development of the Party and the country, made important arrangements for providing satisfactory education to the people, emphasizing the need to “promote the digitization of education, build a learning society and a learning country with lifelong learning for all”. This has pointed out the direction and provided fundamental guidance for us to promote educational reform and innovation, and accelerate the construction of an educational powerhouse.

1.2. Leveraging Technology to Innovate and Transform

Information technology is becoming increasingly mature. Currently, information technology is developing rapidly, with technologies such as big data, the Internet of Things, virtualization, cloud computing, mobile connectivity, the Internet of Things, and ubiquitous access constantly innovating and maturing, effectively promoting the development of informatization and providing technical feasibility for universities to achieve high-level informatization construction.

1.3. Teacher and Student Needs Being Balanced and Evenly Distributed

In the report of the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping pointed out that “we must adhere to the people-centered development of education, accelerate the construction of a high-quality education system, develop quality education, and promote educational equity”. Promoting educational equity is not about cutting peaks and filling valleys, but about filling gaps and improving quality. Education digitization can utilize new technological means to quickly and efficiently aggregate dispersed high-quality educational resources, achieving cross college, cross regional, and cross national dissemination and sharing on the basis of breaking through time and space limitations, thereby continuously expanding the coverage of high-quality educational resources and eliminating the digital divide of unbalanced and insufficient

education development. The transformation of new technologies has spurred changes in education. Since the first industrial revolution, the development of each industrial revolution has led to new changes in the field of education, as shown in **Figure 1** below.

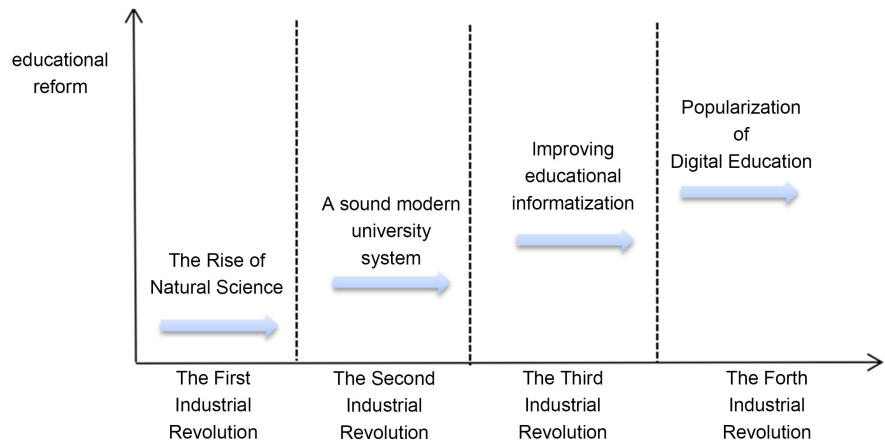


Figure 1. Technology driven educational transformation.

For example, digital online education can serve as a supplement and extension to college education and classroom teaching, allowing urban and rural students in China to share resources from renowned teachers, experts, colleges, and courses across the country. We need to gradually narrow the regional and urban-rural digital gap through education digitization, vigorously promote educational equity, and enable billions of children to share high-quality education under the blue sky. Colleges and teachers have a strong demand for digitalization. Most of the national “Double First Class” universities have established the grand goal of becoming world-class universities by the middle of this century. A world-class university is inevitably a digital first-class university, which puts forward higher requirements for digital support and guarantee capabilities; the various units of the college have put forward clear demands for the service capabilities of the college’s digital infrastructure platform; teachers and students have a high level of information literacy and hope that the college can provide better digital services. There is a strong demand for high-level digital applications.

1.4. The Epidemic Is Forcing, and the Form Is Giving Birth

The epidemic has forced the development of informatization in universities. The Ministry of Education has issued the “Guiding Opinions on Organizing and Managing Online Teaching in Ordinary Higher Education Institutions during the Epidemic Prevention and Control Period”.

The unprecedented opportunity urges the information technology departments of universities to think about it. With the support of previous leaders, the Nanchong campus. We have made significant progress in the informatization construction of the campus, but there are also some problems that need to be

addressed. Based on a comprehensive investigation and understanding of campus education informatization construction, this report will deeply analyze the difficulties and pain points in the construction and use process, and propose certain improvement measures to provide strong theoretical and decision-making support for better achieving campus informatization construction.

2. Research Area

Southwest Petroleum University was founded in Nanchong in 1958 and is the second undergraduate petroleum institution established in New China. The Nanchong campus is an important part of Southwest Petroleum University's "one campus, two districts" initiative, and has achieved comprehensive sharing with the Chengdu campus in terms of faculty and educational resources. Since the comprehensive deepening of reform in 2008, under the strong advocacy of the country, colleges have invested a large amount of funds, manpower, and material resources in the construction of educational informatization, striving to create an intelligent, convenient, efficient, distinctive, and warm "student-centered" educational environment [3].

3. Current Status of Campus Digital Construction

This report will conduct research on campus information construction from two aspects: hard power construction and soft power construction. "Hard power" construction mainly includes the hardware configuration of campus information construction, while "soft power" construction mainly refers to the rules and regulations, application promotion, and management and allocation of maintenance personnel during the use process. The report mainly uses field research, horizontal comparison, vertical comparison, interviews and other research methods to comprehensively and deeply understand the informatization construction of the campus. The following is a specific explanation of the construction of "soft and hard power".

3.1. Hardware Support

1) Network

The Nanchong campus and China Telecom Company have established a large-scale, high-speed computer network covering teaching, management, office areas, and student dormitory areas through college enterprise cooperation. The network is built using a dual machine, dual link networking method to ensure high-speed and stable operation. The wireless network covers the office and teaching areas of the campus, achieving functions such as gigabit access and seamless roaming, supporting multiple intelligent terminals to freely access, and providing support for ubiquitous learning and modern management on campus. The college has established information platform resources such as digital libraries, high-quality course networks, teaching resource networks, and online course centers. The campus has

achieved interconnection and intercommunication of teaching resources between the two campuses through cross regional dedicated lines, providing students with rich learning channels and resources.

2) Multimedia Classroom

The multimedia classrooms in Nanchong campus are mainly distributed in the second teaching building, the third teaching building, and the fourth teaching building. Among them, there are 13 multimedia classrooms in the second teaching building, of which 8 have recording function classrooms; 18 multimedia classrooms and three tiered classrooms in the third teaching building;

The fourth teaching building has 46 multimedia classrooms and ten smart classrooms have been built.

3) Computer laboratory

The Public Computer Room of the Modern Education Technology Center of the Academic Affairs Department currently has 630 teaching computers, mainly distributed in the Second Experimental Building, to meet the needs of all public and professional basic course experimental computer teaching tasks in the entire campus.

4) Current Status of One Card Platform Construction

The Modern Education Technology Center of the Academic Affairs Department has been using the new one card platform since June 2017. On July 15, 2020, the one card equipment in the Xindu campus was upgraded, and the software upgrade in the Nanchong campus was able to match the upgraded platform with the old equipment technology.

Using the One Card as a medium, we have successively connected the access control of the library and student dormitories, the library's gold plate borrowing system, and the physical examination system, providing a more convenient way for student management and services.

5) Other

The Nanchong campus has a graduate exam command center, which provides technical support for graduate exams, CET-4 and CET-6 exams, as well as regular final exams. The core data center of the campus hosts 23 servers from various colleges and departments, providing a suitable environment and technical support for the management and storage of servers.

3.2. Regulations, Application Promotion, and Personnel Allocation

Educational informatization has two meanings: one is to effectively apply information technology means to teaching management and scientific research, focusing on the development and utilization of educational information resources; The second is to incorporate the improvement of information literacy into educational goals and cultivate talents who can adapt to the information society.

1) The existing regulations and procedures are relatively outdated and difficult to reflect the informatization of education. For example, in recent years, the campus has built new smart classrooms, but the regulations for the use of smart

classrooms still need to be further improved; In addition, our department has both formal and temporary employees. How to develop relevant reward and punishment measures to ensure everyone's enthusiasm for work is an urgent issue that needs to be addressed.

2) The campus lacks promotional tools for application, for example, the current teaching center does not have an independent webpage.

3) Lack of professional technical personnel and inadequate allocation of existing staff.

4. Existing Problems and Challenges

Although the informatization development of Nanchong campus has achieved certain results in recent years, there are still many problems and challenges:

4.1. The Funding for Information Technology Construction in the Campus Needs to Be Further Strengthened

Compared to universities at the same level as Southwest Petroleum University, the Nanchong campus is significantly inferior in terms of basic facilities, hardware equipment, and teaching conditions. For example, the version of the campus card system is still at the lowest level. Due to the use of relatively primitive connection for interface concatenation, it is difficult to quickly locate a specific location when the system fails, resulting in a lot of time wasted on troubleshooting. In addition, the number of smart classrooms in the campus is limited, and the diverse teaching methods of teachers and the diverse activities of students require the support of more new style classrooms.

4.2. Shortage of Professional and Technical Personnel

The informatization development of colleges and universities needs professionals with certain computer knowledge. By analyzing the employment market data, we can find that general computer graduates are more inclined to be employed by the Internet factories, and secondly, they are more inclined to enter the first and second tier cities in China. Based on this, the Nanchong campus has only introduced one computer related staff member in the past decade, and there will be 2 - 3 personnel on the verge of retirement or replacement in the department. Therefore, the Nanchong campus urgently needs to introduce technical personnel related to information technology construction.

4.3. The Situation of Network and Information Security Being Severe

The college's important information system stores important colleges information and a large amount of sensitive personal information of faculty and staff. Ensuring the security of college network information is the primary task of information construction. Network attacks, website tampering, information theft, and other threats continue to threaten college networks and information security. There is a

shortage of information security professionals and the situation is severe.

4.4. The Rapid Development of Information Technology and Frequent Product Updates and Replacements

The rapid development of information technology not only provides new technologies for information construction, but also results in rapid updates and high development costs for information products, making sustainability difficult to guarantee.

5. Construction Principles and Measures

5.1. Unified Planning, Step-By-Step Promotion

Universities should make good plans and top-level designs for information technology development, decompose tasks by department and year, focus on the central work of the college, highlight key areas, strive for practical results, and comprehensively and orderly promote information technology [4].

5.2. Coordinated Construction, Collaborative Integration

Strengthen the overall informatization work, and implement unified and centralized construction of informatization infrastructure such as information networks and data centers in the two campuses. Stimulate the enthusiasm of leading departments for information construction, create an information construction community with the participation of information management departments, technical support departments, functional departments, and departments, and form a good situation of mutual support, unity and cooperation, and integration and innovation. We must avoid the formation of information islands and the phenomenon of building without using them.

5.3. Business Led, Open Sharing

Adhere to the guidance of meeting the needs of campus informatization and teachers and students, the construction of important business application systems and their databases is mainly based on departmental requirements, and is led by business departments under the unified planning and standards of the college, promoting “informatization of all processes and dataization of all businesses”. Build a brand new information ecosystem, with important business information systems following the principle of open sharing, deeply integrated with the college’s comprehensive information system, and fully connected with other business information systems to complete cross departmental and cross system business process restructuring and optimization [5].

5.4. Technological Leadership, Green and Reliable

In the construction process, highlight the technological advantages of the college, encourage innovation, and dare to try and adopt promising new technologies, methods, platforms, and green information technology equipment as much as

possible on the premise of strengthening expert argumentation. Adhering to information security is the top priority of information construction, strengthening the construction of information security system and quality management of information projects, and improving the reliability, stability, and security of systems and software.

5.5. User First, Focusing on Experience

In the construction and service of various informatization projects, the concept of “user centered” is highlighted, the needs of different categories of people are fully considered, the trend of mobile Internet development is met, the user experience is strengthened, and the availability and ease of use of systems and software are improved. Widely solicit opinions from teachers and students, stimulate their enthusiasm for participation, and consolidate the consensus that “information technology construction is for teachers and students, relies on teachers and students, and the construction results are shared by teachers and students”.

6. Conclusion and Expected Effect

The rapid development of high-tech such as big data, artificial intelligence, and cloud computing has brought unprecedented attention to the digitization of education. As a university that nurtures national talents, universities should be at the forefront of information technology construction. However, in the analysis of the actual situation, we found that there are still many problems in the Nanchong campus of Southwest Petroleum University. In response to these problems, we propose the causes and countermeasures, hoping to provide reference for universities facing similar problems. In addition, the Nanchong campus will also follow the following principles in the later construction process:

1) Further improvement of educational informatization environment

Build data centers and network centers with relatively complete functions to serve various applications of educational informatization; a diversified teaching environment that meets the needs of information technology teaching has been initially established, providing environmental protection for the application of new teaching methods and the learning and living of teachers and students.

2) Optimized allocation of educational information resources

Improve hardware construction level and optimize campus education and teaching environment space. On the existing basis, carefully plan to improve hardware utilization and integrity, and maximize efficiency. By updating and improving the basic hardware facilities of the college, such as network equipment, servers, and storage devices, a strong and stable environmental guarantee is provided for the digital applications of the campus.

3) The construction of the education informatization team is fully underway

Utilize various forms of training, lectures, seminars, etc., to enhance the information literacy of all teachers in the college. On the one hand, building a specialized team to support educational informatization; on the other hand, improving

teachers' ability in educational informatization and integrating the ideas and methods of educational informatization into their daily teaching can enhance the quality of teaching.

4) Preliminary demonstration effect of educational informatization radiation

Through hardware construction, software construction, and team building, the level of educational information on the campus has been improved. In practice, the demonstration effect of educational informatization on the campus has been preliminarily demonstrated by summarizing, improving, and enhancing at the same time.

Funding

2023 Sichuan Province Education Information Technology Research Project (DSJZXKT201); 2024 Ministry of Education Industry-University Cooperation Collaborative Education Project 2024 (231004117055707).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] (2013) Open up a New Track for Educational Development with Digitalization. http://www.moe.gov.cn/jyb_xwfb/s5148/202310/t20231013_1085364.html
- [2] (2024) Digital Transformation Helps Boost Education Upgrade: Observations from Parallel Meetings on Digital Governance and Digital Education Governance in the Field of "Numeracy". http://www.moe.gov.cn/jyb_xwfb/xw_zt/moe_357/2024/2024_zt02/pxhy/pxhy_szzl/pxhy_szzl_mtbd/202402/t20240201_1113754.html
- [3] Introduction to Southwest Petroleum University. <https://www.swpu.edu.cn/nc/xqgk/xqjj.htm>
- [4] Cai, M.J. and Zhang, S.Q. (2024) Research on Policy Guarantees for Promoting the Digital Transformation of Education. *E-Education Research*, **45**, 37-44+60. <https://doi.org/10.13811/j.cnki.eer.2024.09.005>
- [5] Bao, J.W., Wang, S.T. and Xing, H. (2024) Digital Transformation in Education Promotes Common Prosperity: Logic, Challenges, and Pathways. *Modern Distance Education Research*, **36**, 49-57+66.