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Improvisation Strategies for Student Affairs Informatization Management in China

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Abstract
The construction of student affairs management informatization is an important part of the management and development of colleges and universities. This paper serves as a proposal and conceptual paper, by analyzing the current influencing factors in the construction of student affairs management informatization in Chinese colleges and universities, it adopts the method of combining system analysis and system design, aiming at putting forward a preliminary improvement strategy for management and administrators, application platform, and data processing. Based on the literature and research, it proves that the improvisation strategy has a positive impact on the construction of student affairs management informatization.

Keywords: information management system, student affairs management, informatization, Chinese universities

1.0 Introduction

The historical process of cultivating and developing new productive forces represented by intelligent tools and making them benefit society is informatization. Under the background of Big Data, as well as in the globalization and informatization environment, the informatization management of student affairs in colleges and universities can play an important role in guaranteeing and supporting the construction of the talent training system. Therefore, the higher education industry has embarked on a new wave of innovation and transformation and has gradually applied management informatization, education informatization, and Smart Campus construction to the construction of students' educational management informatization in colleges and universities. The current higher education is changing from elite education to mass education. The number of colleges and students continues to increase, and the amount of information data on students is also increasing, which makes student management more difficult. At present, colleges and universities can realize some information processing and business management. However, most colleges and universities cannot deeply explore the characteristic and abnormal information in the process of student affairs management and student education, and still cannot provide corresponding guidance and early warning through the analysis and utilization of massive student information data. Therefore, the management mode of student affairs in Chinese colleges and universities urgently needs to change from the traditional management relying on information technology staff to the informatization and intelligent management of the new generation of information technology deep integration.

This paper takes the student affairs management activities of colleges and universities as the research object and takes management informatization as the background. It makes full use of Internet technology and big data technology and analyses the current situation of the construction of student affairs management informatization in Chinese colleges and universities. It introduces the concept of Informatization and discusses the promotion strategy of student affairs management information in Chinese colleges and universities based on improving the quality of management and administrators, application platform construction, and data processing capabilities.

The informatization management of student affairs in colleges and universities is a systematic work that includes the implementation of education for students, the management of students, and the provision of services for students. Therefore, it is very important to understand the factors that affect the informatization management of student affairs in colleges and universities.

2.0 Literature Review

Informatization is a technology based on modern communication, network, and database technology that aggregates data and applies it in numerous ways, which greatly improves efficiency and reduces costs (Wang, 2006). Information technology has brought great advantages to the management of student affairs in colleges and universities and has played an active role in standardizing management, sharing information resources, ensuring scientific analysis, and the accuracy of decision-making. The powerhouse of higher education represented by the United States (US) has already increased its investment in the construction of informatization and has introduced the Chief Information Officer (CIO) to colleges and universities to be responsible for college informatization work. Most US colleges and universities have formed relatively complete management systems norms, involving many stages such as the students' registration, study period, and graduation (Yang et al., 2020). The level of its management informatization has approached perfection. In April 2017, NASPA, a comprehensive association for student affairs management in the US, released the research report "Predictive Analysis of Student Data-Focusing on Input and Behavior", pointing out that in the field of higher education, colleges and universities are very concerned about enrollment, student retention rates, and completion rates, and consider using data to intervene students at risk of poor academic performance and students with low institutional engagement, aiming to use information technology to achieve effective processing and application of student data.

Chinese scholars mostly use the US as an example to explore the development path of student affairs management informatization in Chinese colleges and universities. Smart Campus is a combination of advanced technologies to realize efficient, versatile, and user-centered information technology services (Samancioglu & Nuere, 2023), which has become increasingly popular in the academic community (Joshy et al., 2023), although the research level is still conceptual (Polin et al., 2023). Among the hotspots of Chinese universities' construction of informatization in 2021, "Smart Campus" occupies the first place in most of the rankings (Zhong et al., 2022), and Chinese universities have already focused the direction of informatization on the construction of smart campus and data management and governance, to provide intelligent services for students and staffs. Zhang (2014) took the University of California, San Diego as an example for reference, she found that the school-level management organization directly completes routine affairs, student services, activities, etc, on the campus network platform, which fully reflects that the application platform presents the characteristics of fewer layers and higher efficiency in the management of student affairs. Li (2013) conducted a systematic study on the career development process of student affairs administrators in US universities, he sorted out the training, management, and development process of American student affairs administrators, highlighting the importance and the need to pay attention to the professionalization of it, which includes talents training, continuing education, career development management. These issues indirectly promote the improvement of the level of student affairs management in colleges and universities.

In the process of comparative analysis with the case of American colleges and universities, it is found that the formulation of management mechanisms, the effective processing of data, the construction of application platforms, and the training of administrators are inevitable problems encountered in the current process of informatization of student affairs management in colleges and universities.

2.1 Management and Administrators

Zhang (2022), from a macro perspective, pointed out the existing problems at the level of the informatization system of student affairs management in former colleges and universities. Although the information technology in colleges and universities is constantly improving and innovating, the matching system has not been reformed and updated at the same time, and the old management system is blindly used, it will not only lead to the inability to guarantee the investment of personnel and funds in information management but also cause resistance to the promotion of subsequent student affairs management. Wang (2021) analyzed the deficiencies of the informatization system of student affairs management in colleges and universities from the perspective of student data security. In the process of collecting, keeping, and using student affairs management data, universities do not have effective supervision and management systems to control them, which is prone to the risk of student personal data leakage, which threatens the personal safety of students and the safety management of colleges and universities. Wang (2021), Liu and Ma (2021), analyzed the current situation of student affairs administrators in colleges and universities. College student affairs administrators are relatively lacking in media literacy and big data thinking and receive less subject knowledge learning and professional training; there are even many colleges and universities that lack talents related to big data, and the existing student affairs administrators are not proficient in big data and college student affairs management, which directly affects the level of refined management of college student affairs. Lin and Lin (2022) believe that the data collection, analysis, and application abilities of most college student administrators are not strong, which restricts the improvement of student management work efficiency. The information literacy ability of administrators in colleges and universities is closely related to

the development of student management work. However, there are few professional talents in colleges and universities, and colleges and universities have insufficient effort and funds to introduce and cultivate relevant talents.

Chinese colleges and universities have completed the task of building campus informatization, but the construction of the Smart Campus is still a little behind due to the constraints of talent and system compatibility (Hu, 2020). At present, many colleges and universities have built Smart Campus that mainly use the Internet as the core management and service for teachers, students, and employees, but the main purpose is to facilitate the daily study, work, and life affairs of teachers and students, but they cannot effectively apply information such as individualized management and training of students, helping administrators to master students' situations, obtaining early warning of abnormality, and assisting students' growth.

2.2 Application platform
At present, the degree of integration of big data technology into the student management informatization system in Chinese universities is still at a low level, which restricts the overall construction of university management informatization (Lin & Lin, 2022). Lin (2021) believes that the current construction of the college education management network platform lags. Colleges and universities ignore the effective connection with the external environment and the fact that student management also requires the synergy of family, society, and the Internet. Zhang (2022) took the Central University of Finance and Economics as an example to analyze the problems existing in the current application platform of student affairs management in colleges and universities. The self-built systems of various departments in colleges and universities are dispersed and the data is fragmented, data services cannot fully meet cross-sectoral needs, and the use efficiency is low; there are few information supply and collection channels, and the cost of data maintenance is high; the integration of information services is not enough, and the coverage of service processes provided is limited; a large number of informatization services are still dependent on isolated business systems, resulting in the dilemma of conflicting service lines and suboptimal service effects. Xu (2021) believes that the current construction of student affairs management platforms in colleges and universities is not fully functional. With the expansion of colleges and universities and the further refinement of management services, the performance of traditional management is limited by the rapid growth in the amount of student information data, and it is not possible to effectively analyze the behavior of students to guide the education and management of students and to meet the requirements of comprehensive management of students.

2.3 Data processing
Qin and Liao (2020) pointed out the current bottleneck in the current construction of data governance in smart campuses. Currently, the business systems of various departments in colleges and universities are dispersed, and there are often problems of inconsistent data standards, data redundancy, and low data quality; some colleges and universities' student affairs information management systems need to rely on vendors who develop the business system for data processing and exchange, which is a big limitation. Wang (2021) further analyses the effective application of data on this basis. In addition to the phenomenon of Data Barriers and Information Islands caused by the lack of data sharing among various departments, most colleges and universities cannot analyze in depth and effectively use the collected data to assist the decision-making of student affairs management.

3.0 Methodology
This research combines the methods of system analysis and system design and consists of four stages: defining the problem, determining the goal, investigating and collecting data, and proposing the most feasible plan.

Stage 1: Qualifying questions
According to the current situation of student affairs management informatization in Chinese colleges and universities, by reading the relevant literature, to find out the specific symptoms and causes of the problems related to the formulation of management mechanisms, effective data processing, application platform construction, and management personnel training. The scope of the problem is to be determined after investigation and research.

Stage 2: Determining goals
Concerning the current level of management informatization work in American colleges and universities that have become nearly perfect, as well as some Chinese colleges and universities with a high degree of informatization, further, identify the problems that need to be solved and try to explain the student affairs management informatization in colleges and universities through indicators and texts, to allow for subsequent qualitative analysis and evaluation the effectiveness of the systematic analysis.

Stage 3: Survey research and data analysis
The research was carried out through a questionnaire survey and a literature review. Focusing on the informatization of student affairs management in Chinese colleges and universities, from the use of the Internet, the application of Big Data technology in the student affairs management of colleges and universities, the existing problems in the student affairs management informatization in colleges and universities, prospect prediction and expectation of Big Data in the development of student affairs management informatization in colleges and universities, to collect information including facts, opinions, and attitudes, verify the problems and goals raised in Stage 1 and Stage 2, and prepare for the next step to propose the most feasible solution to the problem.

Stage 4: The most feasible solution
Through in-depth research and data collection, starting from the universal rules and principles of student affairs management informatization in colleges and universities, combined the knowledge and experience accumulated by the author over the past seven (7) years of working in the student affairs management in colleges and universities, fully considers the functions, environment, media, users, and other factors of colleges and universities in actual work, to find the factors that can improve the current level of informatization management and put forward the most feasible solution for the student affairs management informatization in Chinese colleges and universities.

4.0 Findings from Previous Research
From the results of the previous literature analysis, it can be found that the imperfect management mechanism, the ineffective processing and application of data, the imperfect construction of the application platform, and the insufficient professional management and training of administrators have a more important impact on the student affairs management informatization in colleges and universities. So with the help of the experience of developed countries and the colleges and universities that have better developed in China, this section proposes the following hypotheses for these four influencing factors to construct an effective strategy for improving the student affairs management informatization in colleges and universities.

4.1 Improve management and administrators' quality
According to the statistics by the Ministry of Education of China, during the nine years from 2012 to 2020, the scale of Chinese universities has been greatly improved, the number of teachers and students in universities has continued to grow, and the student-teacher ratio has increased from 17.5 to 18.4. Through analysis and calculation, Wang, Lv, and Yan (2016) pointed out that the reasonable range of the student-teacher ratio in Chinese universities is 16 to 18. The current student-teacher ratio in Chinese universities has exceeded this reference value, and as of 2020, the growth rate of students in universities is 13.9%, which is much higher than the growth rate of teachers, which is 5.3%. The continuous expansion of the student-teacher ratio will affect the efficiency of student affairs management and the quality of student training in Chinese universities to a certain extent. Chinese colleges and universities urgently need to find a more efficient student affairs informatization management platform and administrator team to assist colleges and universities in completing a large number of data processing and student management problems brought about by the proliferation of students.

Relying on Internet technology, colleges and universities can innovate management methods and improve management quality (Liu & Zhang, 2021). Zhang (2022) proposes to establish a scientific and effective governance system for informatization and focus on cracking the key problems affecting and restricting the construction of smart campuses from the aspect of system and guarantee system. Starting from the top-level design, ensure the sustainable development of student affairs management informatization in colleges and universities, strengthen the construction of the system, improve the employment mechanism, and attach importance to the development of informatization: (a) To formulate standards for the construction of informatization, standardize management departments, department functions, and staff settings, clarify the functional positioning of staff, and promote the smooth implementation of informatization. (b) To standardize the assessment and supervision rules of student affairs management informatization, strengthen the process management of informatization, and ensure it is carried out in an orderly manner. (c) To strengthen the internal management of relevant data files, standardize the acquisition process and scope of student data, and strictly implement data supervision and protection. (d) To improve the introduction, training, and assessment process of student affairs administrators in colleges and universities, enhance media literacy, and strengthen the professionalization of management teams.

4.2 Improve application platform construction
The "Big Data Student Affair Platform" could improve the sharing and utilization of data, and further enhances student management in colleges and universities (Xu, 2016). According to the literature research and analysis, this paper proposes a system based on information sharing, it could realize the analysis of student behavioral characteristics and the early warning of special situations and builds a platform system that effectively uses student information to assist colleges and universities in student management and decision-making, as shown in Figure 1. The system of information application platforms for student affairs management in colleges and universities consists of three parts.

The bottom layer is the basic data sharing center, which is used for collecting, organizing, and storing student registration information (source information and background information), school data (academic, life, health, and personal development data), and graduation information (admission or employment data), sorting out student information and establishing reasonable data standards.

The middle layer is the data processing and analysis center. Through the analysis of the shared data, it obtains the characteristic portraits of students, and the characteristic portrait samples of the students are obtained through their commonality with the previous students and current students.

The third layer is the information visualization service. By comparing the students' characteristic portrait and the student's characteristic portrait sample, it could analyze the students' features and warn about abnormal behavior, which will provide to the universities and students. It will send growth and management guidance services and the analysis of students' characteristics to parents and society at the same time so that they can assist in the development of students.
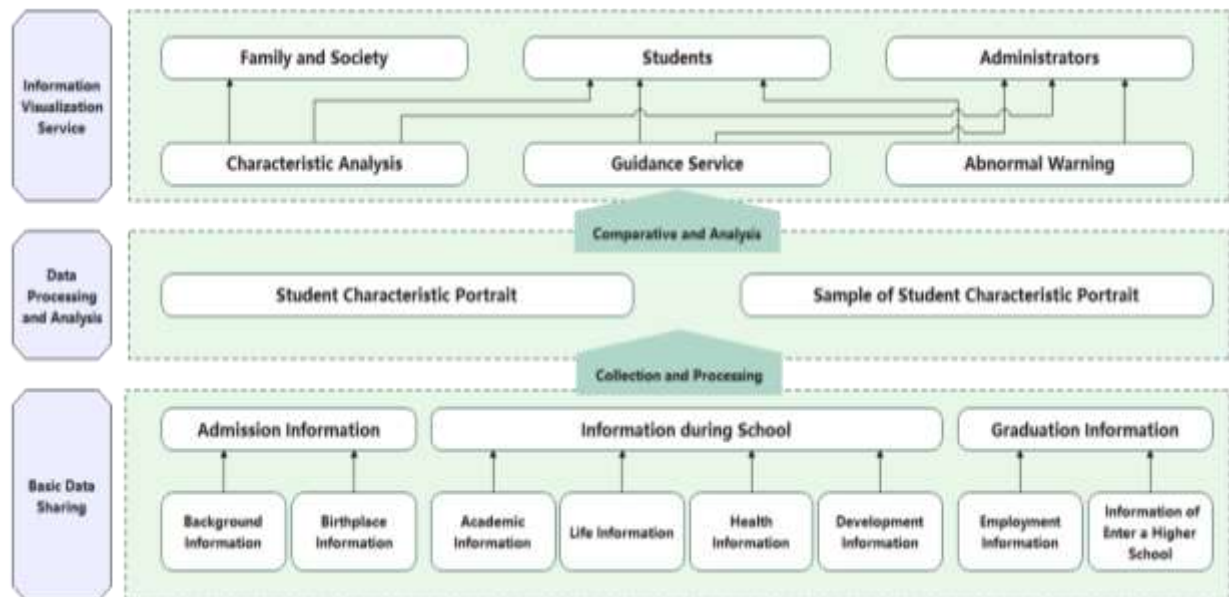
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Fig. 1: System model of information application platform for student affairs management in colleges and universities

4.3 Improve data processing capability

Data processing through certain standards can more effectively exert the advantages of smart campuses (Chen, 2020) and improve the effectiveness of student affairs management informatization: (a) To create a basic data sharing center, focusing on the needs of students, use big data technology to achieve precise management services, build a management aggregation service platform to realize the mutual circulation of data between various departments, eliminate redundant information, and promote the synergistic development of management informationization. (b) To build student portraits, using big data analysis, through quantifying student characteristic indicators, assisting students in self-analysis to find development directions, and assisting administrators in understanding the situation of students. (c) To improve student management information service, based on big data analysis technology, extract and analyze the characteristics different of student portraits, and provide a timely reference for discovering and early warning of students' mental health, academics, and behavioral abnormalities. (d) To realize information visualization services, build a new platform for "one-stop" student management, expand the time and space for education, and make full use of the network to facilitate cooperation among families, universities, and society, to enhance the informatization capacity of student affairs management in colleges and universities.

5.0 Conclusion & Recommendations

The student affairs management information application platform system with efficient data processing ability and its' supporting mechanisms system and professional administrator team can cooperate to collect, organize, and manage all student data, and provide important references for daily student affairs management and cultivation in colleges and universities. The relevant student data analysis results can also support universities and administrators in making student management decisions so that both students and administrators can benefit from the information management process.

Admittedly, the main limitations that should be noted are: (a) The scope of the study is limited to China, and the applicability of the promotion strategy to universities in other countries remains to be explored. (b) The systematic analysis of this study is insufficient, and there is no further improvement of the student information management system, such as quality standard requirements, supervision and evaluation mechanism, and security protection system.

This study contributes to further empirical research for student affairs management informatization in higher education. With the development of technology, more services can be incorporated into the student affairs management informatization system, and an in-depth understanding of its infrastructure and characteristics provides a direction for future research and development.

In conclusion, improving the informatization of student affairs management in colleges and universities through management and administrators' quality, application platform construction, and data processing capabilities are the objective demand for the development of Chinese colleges and universities.

Acknowledgments

Paper Contribution to Related Field of Study

1. Improve Student Information Management Systems (SIMS) in colleges and universities.
2. Improvise the role of the Chief Information Officer (CIO), management, and administrators.
3. Improve information quality and service to secure the trust of parents and students.

References

Chen X. Y.. (2020). Research and Application of Intelligent Campus Data Sharing and Exchange [Master, Zhejiang A&F University].

Hu T. L.. (2020). "Informatization and Smart Campus" Construction Ideas - Taking Guangxi Vocational College of Safety Engineering as an example. *The modern occupation education*, (07), 222-223.

Joshy, K. X., Thakurta, R., & Sekh, A. A. (2023). Future educational environment – Identification of smart campus topic trends using text mining. International Journal of Educational Management, 37(4), 884–906. https://doi.org/10.1108/IJEM-01-2023-0005

Li Y. S.. (2013). *Research on the Process of College Student Affairs Administrator's Career Development in America and its Enlightenment,* [Ph.D., Hefei University of Technology (Hefei)].

Lin J. W., & Lin L. Y.. (2022). Research on the Dilemma and Countermeasures of the Informatization Reform of College Student Management. *Journal of Shaoguan University*, 43(05), 54-58.

Lin Y.. (2021). *A new mode of education management for local universities under Internet plus background*, [Master, Hunan University of Technology (Hunan)].

Liu G. X., & Zhang L. W.. (2021). Research on Informatization Construction of College Student Management under the Internet Background - Comment on "Research on the Innovation of College Student Management Model under the Internet Background". *Science and Technology Management Research*, 41(17), 234.

Liu Y., & Ma X. Y.. (2021). Experience and Enlightenment of Student Affairs Management in Top Universities in America. *Journal of World Education*, 34(08), 49-54.

Polin, K., Yigitcanlar, T., Limb, M., & Washington, T. (2023). The Making of Smart Campus: A Review and Conceptual Framework. Buildings, 13(4), Article 4. https://doi.org/10.3390/buildings13040891

Qin Y. Y., & Liao H. J.. (2020). Bottleneck and Countermeasure Analysis of Data Governance Construction of Smart Campus in Colleges and Universities. *Education Modernization*, 7(07), 96-97. https://doi.org/10.16541/j.cnki.2095-8420.2020.07.039

Samancioglu, N., & Nuere, S. (2023). A determination of the smartness level of university campuses: The Smart Availability Scale (SAS). Journal of Engineering and Applied Science, 70(1), 10. https://doi.org/10.1186/s44147-023-00179-8

Wang B.. (2021). Research on the Elaboration of College Student Affairs Management in the Big Data Age. *Journal of Qiqihar Junior Teachers' College*, 1, 83-85. https://doi.org/10.16322/j.cnki.23-1534/z.2021.01.029

Wang C. Y., Lv X. H., & Yan H. F.. (2016). What should Be the Rational Structure of the Student Scale of Research Oriented Universities——Based on a Comparative Analysis of Transnational Universities. *Education Research Monthly*, (06), 8-15. https://doi.org/10.16477/j.cnki.issn1674-2311.2016.06.002

Wang J. C.. (2006). Selected terms of modern science and technology. Henan Science and Technology Press.

Xu L. W.. (2021). *Design and Research of Student Information Management Platform Based on Campus Big Data* [Master, North China Electric Power University (Beijing)].

Xu W. X.. (2016). Present Situation and Countermeasures to Informationization of Student Management in the Era of Big Data. Mianyang Teachers' College, 35(01), 53-56. https://doi.org/10.16276/j.cnki.cn51- 1670/g.2016.01.011

Yang X. M., Guo L. M., & Xing B. B.. (2020). Research on Analysis Architecture and Presentation Design of Regional Education Big Data: Taking City A in Jiangsu Province as An Example. *E-education Research*, 41(05), 66-72. https://doi.org/10.13811/j.cnki.eer.2020.05.010

Zhang F.. (2022). Construction Practice and Innovative Application of Smart Campus in Colleges and Universities ——Taking the Central University of Finance and Economics as an Example, *Modern Educational Technology*, 32(04), 113-125. https://doi.org/10.3969/j.issn.1009-8097.2022.04.013

Zhang Y. Y.. (2014). Features of Student Affairs Work in American Universities and the Revelation. *Journal of College Advisor*, 6(05), 76-79. https://doi.org/10.13585/j.cnki.gxfdyxk.2014.05.045

Zhong W. F., Chen H. C., Zou X. R., Xie S. P., & Liu C.. (2022). Survey Analysis of Hot Spots of the Informatization Construction in Chinese Colleges and Universities in 2021. Modern Educational Technology, 32(07), 109-117.