Strategies for Information Sharing Based on Intelligent Technologies: Innovations in the Public Service System of Universities with a Case Study of Sichuan University

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Abstract. Under the impetus of technological and institutional mandates, public services within Chinese university campuses are undergoing significant transformations. Within this context, our study critically examines the dynamics of public service systems in Chinese higher education, with a particular emphasis on the challenges posed by technological integration and institutional innovation. Drawing upon foundational theories by Wagner, Duguit, DeHart, and Chen Xiyin, as well as contemporary interdisciplinary academic achievements, our research evaluates the effectiveness and accessibility of campus services ranging from dining to transportation. A case study of Sichuan University reveals widespread issues in service delivery, reflecting broader systemic challenges. Our findings highlight the critical need for innovative solutions that utilize smart technologies and institutional reforms to enhance service integration, efficiency, and user experience. Proposed interventions, such as errand and car rental services powered by WeChat mini-programs, aim to bridge the gaps in service provision, offering a model for the sustainable development of campus public services and contributing to the discourse on nurturing a rich academic community.

Keywords: Public Service Management; Application of Intelligent Technologies; Resource Integration; Campus Service Innovation; Information Sharing

1 Introduction

This study embarks on an analytical journey to scrutinize the current state of campus public services in Chinese universities, pinpointing critical issues related to service quality, accessibility, and user satisfaction. Concurrently, it delves into the theoretical foundations underpinning public service provision within the higher education landscape, leveraging both historical insights and contemporary scholarly discourse. Addressing the identified challenges, it advocates for a comprehensive suite of innovative solutions, rooted in the synergy of intelligent technology and institutional innovation, aimed at resource integration, enhanced information sharing, and the overall augmentation of service efficiency and user experience on university campuses.

2 Theoretical Considerations

Clarifying the theoretical foundations and historical development of China's campus public service system is a prerequisite for identifying the key components and innovative goals of campus public service systems. This will help illuminate clearer pathways for technological enablement and institutional innovation.

Constructing public service systems on university campuses is vitally important for promoting the development of higher education institutions. It constitutes a major initiative for providing services for teaching, research, and students. Currently, from the perspective of research communities and disciplines, public services have become an interdisciplinary field of study, with campus public services emerging as a novel research domain. Public service theory originated from the preliminary explorations of Wagner, which were subsequently emphasized by the French scholar Léon Duguit in terms of government regulation and intervention. The "New Public Service Theory" proposed by the American scholar DeHart, along with the recognition of its potential application in university management by the Chinese scholar Chen Xiyin [1-3], marks the continuous development of theory and practice in this field. Recently, Zhao Yingmei and Zhou Huayu have identified the main challenges of campus public services from the perspectives of service quality improvement and service model renewal [4-5], while Zeng Haijun emphasized the role of online education innovation and standardization construction in promoting technological progress [6]. Scholars like Sun Yujin argue that building a comprehensive campus service system is an urgent task [7], further highlighting the pressing issue of the gap between theory and practice.

With the rapid advancement of technology, research on innovative campus public service models has been propelled. Ni Minjing pointed out that the transition towards high-quality development in education demands a synchronous upgrade of service models [8]. Fan Jingyi and others designed an integrated service platform to meet the diverse needs of college students [9], while Chaoman Xie emphasized the urgency of the intelligent transformation of cloud services in colleges and proposed a smart solution based on big data [10]. Dai Zhiling explored the possibility of creating service models with unique characteristics and ecological diversity [11], and Sheng Shilong and Zhang Qiaoling examined the current state of resource dispersal from a management perspective, proposing expansion strategies for segmented markets in the life service domain [12]. Peng Li highlighted the positive impact of an efficient booking system on improving resource allocation efficiency and optimizing user experience [13], and Fang Na and others used spatial syntax analysis to study the layout of facilities within

living circles, offering suggestions aimed at creating a more humanized and comfortable environment [14].

3 Current Situation

This paper investigates the practical implementation of campus public services at Chinese universities, with a focus on canteens, transportation, logistics, etc., culminating in a summary table of the current state of public services at Chinese institutions of higher education.

Table 1. Current situation of public services in some Chinese universities

University	Cafeteria ordering	Food delivery	Bike sharing	University shuttle bus
Peking University	Order in-person	Delivered to lockers outside campus gate, 5-min bike ride	√	
Tsinghua University	Order in-person	Delivered to lockers downstairs in dorm buildings	√	√
Fudan University	Order in-person	Delivered to outside university walls, no lockers	√	
Zhejiang University	Online pre-ordering available but limited menu, pick up at window	Delivered to lockers in dorm area, 5-min bike ride	√	√
Northwestern Polytechnical University	Online ordering available	Delivered to lockers outside campus gate, 5-min bike ride	√	
Dalian University of Technology	Order in-person	Delivered to lockers outside campus gate, 5-min bike ride	√	
Communication University of China	Online ordering available, delivery to dorms	Delivered to lockers	√	
Southwest University	Order in-person	Delivered to fixed pickup points in each campus area, inefficient		√
East China Jiaotong University	Online ordering available, delivery to dorms	Delivered to downstairs dorm buildings, no lockers	√	
Wenzhou Medical University	Online ordering available	Delivered to downstairs dorm buildings or lockers in dorm area (5-min bike ride)	√	

Table 1 reveal significant disparities in the quality of campus services across Chinese universities, pointing to challenges like information asymmetry and supply-demand mismatches. Despite advancements in digital technology, there's an imperative need for better integration of services into student life to improve access and convenience. Specifically, the misalignment of transportation and catering services with student needs calls for enhanced shared management approaches. This would address varying demands and peak usage effectively, ensuring equitable service provision. Adopting smarter technologies, improving information sharing, and prioritizing user-friendly digital interfaces are crucial steps toward optimizing campus services.

4 A Study on the Dilemmas of Public Services in Chinese University Campuses - A Case Study of Sichuan University

Sichuan University, with its rich history, multidisciplinary strengths, research prowess, diverse community, and strategic location, exemplifies the potential for public service innovation in China's higher education. Its commitment to reform makes it an ideal model for studying service system improvements. Our analysis, derived from a bespoke survey titled "Survey on the Life Service Needs of Personnel Within Sichuan University," provides actionable insights for enhancing public services sector-wide.

4.1 An Analysis of the Dilemmas in Public Catering Services for Students at Sichuan University

At Sichuan University's Jiang'an and Wangjiang campuses, the placement of food delivery lockers approximately one kilometer from student dormitories poses logistical challenges. Although direct dorm delivery exists, it offers a limited menu. Additionally, the scattered distribution of student cafeterias across various campus zones complicates accessibility for those residing in distant areas.

Peak dining times result in significant congestion at campus eateries, with students routinely experiencing 10-30 minute waits for meals, especially around traditional breakfast and post-class lunch/dinner periods. The tight scheduling between morning classes, which end by 11:55am, and afternoon sessions starting as early as 1:50pm, leaves a narrow window of approximately 2 hours for lunch and rest. Considering transit and dining durations, students are left with less than an hour for relaxation, often foregoing naps for early class arrivals or study, compromising their rest time.

4.2 An Analysis of the Public Service Dilemmas for Student Commuting on the Sichuan University Campuses

Campus transportation challenges are highlighted by the unpredictable availability of tricycles and the inefficiency of the shuttle bus booking system. The absence of an online reservation system for tricycles leads to prolonged waiting periods. While shuttle services offer real-time tracking and booking, the lack of confirmation, unclear shuttle routes, destinations, and seating availability result in extensive waits and full shuttles upon arrival.

5 Innovative Implementation Paths: Innovation of Mutual Aid System Supported by Intelligent Technology

Addressing the inefficiencies in basic campus services, our study highlights the crucial role of poor resource integration and information dissemination in creating daily inconveniences. We propose solutions focused on institutional reform and the adoption of advanced technologies to streamline resource coordination and enhance information flow, aiming to resolve these public service issues.

5.1 Institutional Innovation to Facilitate Resource Integration

At the university level, defining "resources" to include human capital, physical assets, and available time is essential. Addressing resource capability ambiguities, we advocate for integrating services through innovative solutions like establishing paid errand and car rental services on campus to optimize public service delivery.

Campus Paid Errand Services

To mitigate meal pickup delays, we suggest establishing a network of part-time student errand runners, enhancing access to campus dining by addressing resource shortages. Implementing a secure, real-name system ensures the service's reliability and efficiency, particularly during busy periods.

Campus Car Rental Services

Despite the prevalence of car rentals in wider society, their introduction on university campuses has been hindered by safety concerns. We recommend utilizing the private electric vehicles of students and residents to establish a campus-centric service, enhancing transportation efficiency while addressing safety.

5.2 Technological Empowerment for Information Sharing

WeChat mini-programs, requiring no download, facilitate our innovative campus services with their ease of access and efficiency. Their use in developing errand and car rental systems has notably advanced information sharing capabilities.

Errand Function Module

Incorporating an errand feature in the mini-program for food delivery, meal pickup, and courier tasks consolidates resources, enhancing service transparency and safety. It streamlines campus dining through online booking, saving time for the university community.

Campus Car Rental Function Module

Our module enhances campus transportation by leveraging the mini-program for real-time vehicle tracking and availability, addressing parking, and charging issues for bikes and electric bikes with online booking and payment. This approach forms part of our dual strategy to overcome campus service challenges through institutional and technological innovations, aiming to advance resource integration, information sharing, and the efficiency of campus life beyond conventional public service models.Figure 1 shows the functional modules of the mini program.
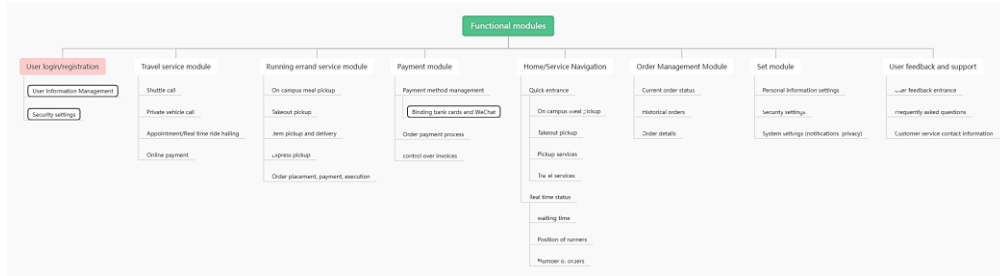
Fig.1. Schematic diagram of the technology development module.

5.3 Analysis of survey data on the willingness to accept technical services.

In the analysis of data regarding the willingness to accept technical services, we utilized the survey data on "Your longest waiting time during peak periods" and "Whether you have experienced picking up takeout from a locker" as independent variables. The dependent variable was "Do you think it is necessary to develop a group offering errand services within the campus?" A cross-analysis was conducted, and charts were drawn.
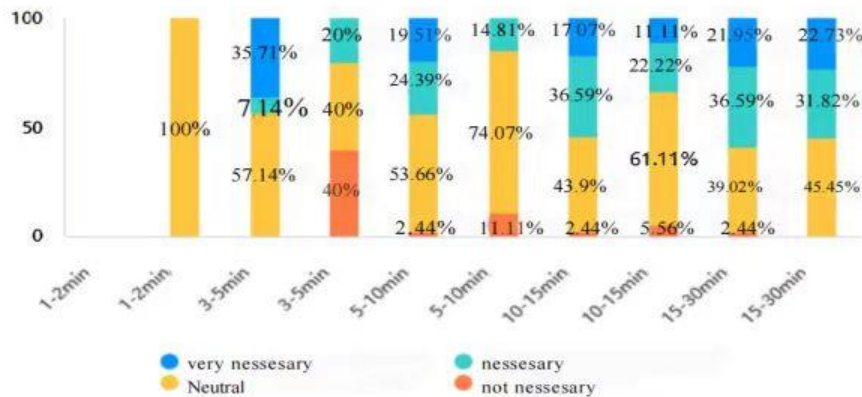

Fig.2. Cross-analysis of the willingness to accept errand services

Figure 2 reveals that students who experienced longer wait times during meal peak periods and those who had experience picking up meals from lockers showed a higher willingness towards the development of errand service groups.

Furthermore, we employed the survey data on "What mode of transportation do you generally prefer for on-campus travel (e.g., going to classes, engaging in sports, traveling from your residence to the campus gate)?" and "Have you ever been unable to find transportation in a timely manner for on-campus travel (e.g., from your residence to the campus gate)?" as independent variables. The dependent variable was "Do you wish to be able to promptly contact on-campus public transportation (e.g., campus shuttle bus, tricycles)?" Cross-analysis was performed, and charts were generated.
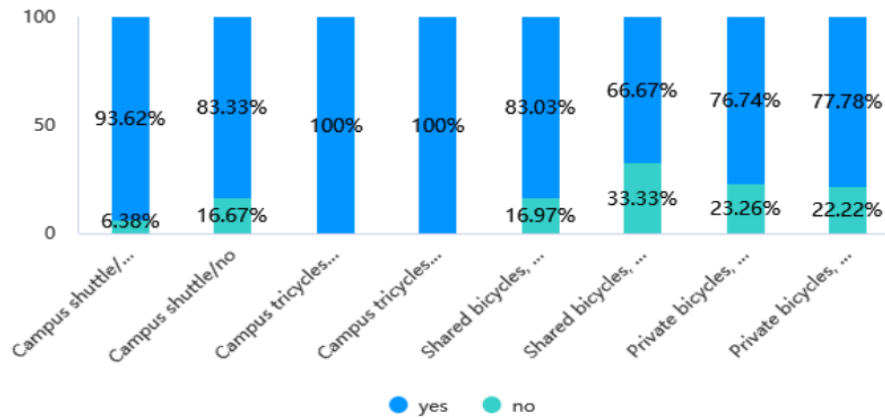
Fig.3. Cross-analysis of the demand for campus car rental services.

Figure 3 indicates that regardless of the preferred mode of transportation and whether there was an experience of not being able to find transportation in a timely manner, there exists a demand for being able to promptly contact on-campus public transportation. Moreover, nearly all respondents expressed a need to promptly reach out to private vehicles such as campus tricycles.

6 Conclusions

This study presents a comprehensive analysis of the challenges and opportunities within the campus public service systems at Chinese universities, with a focused case study on Sichuan University. By integrating a historical and theoretical perspective with empirical research, we have identified significant gaps in service quality, accessibility, and user satisfaction. The heart of our findings lies in the innovative solutions proposed, leveraging intelligent technologies and institutional innovation to bridge these gaps.

The implementation of WeChat mini-program-powered errand and car rental services stands as a testament to the potential of intelligent technologies in revolutionizing campus public services. These initiatives not only address the immediate inefficiencies and accessibility challenges but also set a precedent for the integration of digital solutions in the management and delivery of campus services. By fostering a more connected, efficient, and user-friendly campus environment, these innovations contribute towards enhancing the overall quality of campus life for students, faculty, and staff.

Looking ahead, the potential for further integration of cutting-edge technologies in campus public services is immense. Future advancements could see the application of artificial intelligence (AI) for predictive analytics in service demand, the Internet of Things (IoT) for enhanced resource management, and blockchain for secure and transparent information sharing. These technologies could drive further innovation in service delivery models, from personalized service delivery to automated resource allocation, thereby enriching the campus experience and operational efficiency.

In conclusion, this research highlights the transformative potential of intelligent technologies and institutional innovation in addressing the challenges of campus public services. By continuing to explore and implement these innovations, universities can enhance the efficiency, accessibility, and quality of their services, thereby supporting their academic communities more effectively. As we move forward, the ongoing evolution of technology offers exciting opportunities for further innovation in campus public services, promising a more integrated, efficient, and user-centric future for higher education institutions.

References

[1] Duguit, L. (1999). The evolution of public law. G. Zheng (Trans.), Shenyang: Liaohai Publishing House; Chunfeng Literature and Art Publishing House .

[2]Denhardt, J. V., & Denhardt, R. B. (2004). The new public service: Serving, not steering. X. Fang & H.Ding (Trans.).Beijing: China Renmin University Press.

[3]Chen, X. (2012). The impact of new public service theory on university administration. Journal of Liaoning Medical University (Social Science Edition),(1),1-4.

[4]Zhao, Y., Xiong, W., Zhang, Y., et al. (2012). Reflections and understandings on the design of campus public services .Popular Literature and Art ,(9),96.

[5]Zhou, Y. H. (2019). Research on campus public service platform based on "Internet+". Modern Vocational Education(01),176- 177.

[6]Zeng,H.J.,&Fan,X.M.(2007).On the public service model and architecture design of the supporting platform for online education. Chinese Electrified Education, (7),103- 108.

[7]Sun,Y. (2015).A review of research on public services in university campuses. Journal of Weinan Normal University, (08), 31-34.
https: //doi.org/10.15924/j.cnki.1009-5128.2015.08.005

[8]Minjing Ni. (2023). Quality and balanced development of the basic public education service system goes beyond campus. People's Education, Z2: 86-88.

[9]Fan, J., Fan, J., Cai, Y., et al. (2023). Design and implementation of a comprehensive campus service platform [J]. Modern Computer, 29(23), 101–105.

[10]Xie Chaoman.(2022).Construction of Smart Campus Cloud Service Platform Based on Big Data Computer System.Procedia Computer Science583-589.

[11]Dai, Z. (2021). Research on the design of a multi-ecological campus service platform. Modern Information Technology (in Chinese), 18, 9–12.

[12]Sheng, S. L., & Zhang, Q. L.. (2022). Design of campus service platform background management system. Modern Information Technology(07), 8-12.

[13]Peng, L.(2021). An integrated booking platform for public services in universities based on smart campus technology. Technology Wind(06), 102-103.

[14]Fang, N., Zou, W. Y., Huang, J. W., & Wang, P. M. (2021). Research on the layout of campus public service facilities based on the concept of life circle: Taking Yunnan University as an example. Urbanism and Architecture, (15), 112-116.