ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

Digital Transformation of Academic Affairs Administration under the Credit System in Local Universities

Wenhao Gong[1,a], Xijian Chen[2,b], Jing Zheng[3,c,*]

[1]*Academic Affairs Department, Zhaoqing University, Zhaoqing, Guangdong, 526061, China*
[2]*Institute of Education Development, Zhaoqing University, Zhaoqing, Guangdong, 526061, China*
[3]*School of Food and Pharmaceutical Engineering, Zhaoqing University, Zhaoqing, Guangdong, 526061, China*
[a]*gongwenhao@zqu.edu.cn,* [b]*861898714@qq.com,* [c]*zhengjing@zqu.edu.cn*
**Corresponding Author*

Abstract: *The implementation of the credit system in local universities in China is constrained by a contradiction: institutional reform has outpaced existing management practices, constraining both the quality of talent development and the efficiency of academic administration. Through fieldwork and semi-structured interviews, this study examines the credit system reform of a local university (hereafter University S) and identifies the tension between supportive institutional arrangements and the daily practice of academic administration. The results show that although the university has introduced credit-based course selection, academic early warning, and credit-based tuition, its academic administration still relies on scattered data, paper-based approval, and manual checking, , which makes administration slow and error-prone. In response, the university restructured its data system and collaborative processes and built a digital academic affairs system organized around data-driven operation, process-based modules, and service-oriented functions. The system integrates data across multiple departments, moves routine services online, and transforms academic early warning from periodic manual checks into real-time prompts with follow-up support. Its design concept and technical approach provide a useful reference for similar universities that remain in the exploratory stage of digital transformation.*

Keywords: *digital academic affairs, data-driven management, online workflow, early warning and assistance*

1. Introduction

The Ministry of Education has issued a series of national policy documents promoting credit-system reform in Chinese universities. The academic year system and the credit system are two models of higher education management, each reflecting the demand for talent in its respective period. The transition to the credit system is not a simple replacement of the academic year system; it requires a systematic reconstruction of the entire education and teaching system[1].

Under the credit system, students plan their studies across majors and programs[2]. Academic data therefore cover the whole process from enrollment to graduation along five dimensions, namely moral, intellectual, physical, aesthetic, and labor education, together with operational data on staff, space, courses, and funding. Consider the case examined in this study: a local university in Guangdong that has implemented credit-system reform for six years. Its data now involve 24 administrative units and about 27,000 teachers and students. Each course selection round serves about 21,000 students, and the university has handled more than 3,200 requests for course adjustment or suspension, 3,200 transfers between majors, and 4,500 classroom bookings. The resulting volume of academic records and paper forms has strained traditional academic administration.

Academic affairs systems have developed for decades and have moved from paper files to digital records[3]. The underlying philosophy, however, remains a uniform training model, which expects every student to follow a fixed curriculum within four years. That arrangement served the transition from elite to mass higher education and made large-scale education possible. At the stage of universal higher education, differences among students have become more visible, and personalized learning

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

under the credit system is needed. Traditional academic administration provides few functions for data integration, reminders, or early warning, so institutional design and daily operation diverge.

To close this gap, University S built a digital credit-based academic administration model organized around data-driven operation, process-based modules, and service-oriented functions. Student records form a closed loop from enrollment to graduation; each teacher's professional development is fully recorded; and the state of academic administration is presented in real time. Specifically, the model integrates data from campus departments so that all records can be queried and analyzed in one place [4]; moves routine services from paper filing to online data flows with visible progress; and establishes a monitoring mechanism that oversees all types of administrative processes and addresses anomalies.

2. Research design

2.1 Research object

This study adopts a single-case design and takes a local undergraduate university in Guangdong (hereafter University S) as its case. University S has implemented the credit system for six years, but the results have fallen short of the intended goals. Its difficulties in institutional design, resource allocation, and teaching management are common among local undergraduate universities, a situation that makes the case typical and representative. The study aims to identify why the credit system at University S has underperformed and to propose targeted improvements based on this diagnosis.

2.2 Data sources

The data were collected from three sources. First, fieldwork and interviews: semi-structured interviews were conducted with 25 academic administrators, 17 teaching management staff in schools and colleges, 170 full-time teachers, and 800 students, covering management difficulties, user experience with the system, and requests for improvement. Second, system operation data: process data on course selection, approval, and early warning were exported from the platform back end to verify improvements in management efficiency. Third, policy texts and institutional documents: reform documents, training programs, and meeting minutes were collected to compare institutional design with implementation.

2.3 Analytical approach

The study follows a sequence of problem identification, system construction, practice verification, and reflection. Based on the gap between institutional requirements and actual operation, it first identifies the structural deficiencies of traditional academic administration in data integration, process approval, and warning assistance. It then describes the design of the smart academic administration system, focusing on data restructuring and process reengineering. Next, it presents the effects of the system on efficiency, accuracy, and educational services through operation data and interview data. Finally, it proposes directions for improvement based on problems observed during operation.

3. Significance of the digital transformation

Digital transformation here refers to a systematic change in the mindset, processes, and organization of academic administration rather than a simple technical upgrade. It focuses on data connectivity and governance: unifying data standards, connecting administrative systems, and redesigning service processes, so that management shifts from experience-driven to data-driven, making later stages of intelligent application possible. For local undergraduate universities, this transformation matters in three respects.

3.1 Responding to the institutional requirements of the credit system

Policy documents on undergraduate education reform require universities to improve the credit system and expand students' autonomy and choice. Under the credit system, the focus of management changes from the administrative class to the individual student, and academic data expand from a single dimension of grades to data covering the whole process along five dimensions. Finer granularity and a larger data scale set higher requirements: management must keep institutional execution standardized

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

while responding to diverse student needs, which manual methods can hardly support[5]. Building a digital management platform that matches the credit system is therefore a precondition for implementing the reform.

3.2 Resolving the mismatch between institution and management

In practice, credit system reform in local universities shows a common pattern: institutional design comes first while management lags behind. Supporting mechanisms such as free course selection, academic early warning, and credit-based tuition charging have been established, but daily operations still depend on offline paperwork and manual checking. At University S, each semester involves about 21,000 course selections on average, and the university has cumulatively handled more than 3,200 course adjustment requests, 3,200 transfer applications, and 4,500 classroom booking requests. Rapid growth in administrative workload combined with outdated methods has led to scattered data, long approval cycles, and delayed detection of anomalies. Digital transformation is the key path to resolving this contradiction and ensuring that institutional arrangements function as intended.

3.3 Supporting talent cultivation and governance efficiency

Enhancing talent cultivation through digitalization has become a common trend in the high-quality development of universities[6]. For academic administration, the value of this transformation can be seen at three levels. At the management level, unified data collection and real-time presentation enable decisions to be based on data rather than personal experience, which improves resource allocation. At the service level, online and transparent processes shorten handling time, reduce error rates, and improve the experience of teachers and students. At the education level, whole-process tracking of academic data extends management to key points of student growth and transforms routine transactions into educational services. All three levels contribute to the quality of talent cultivation, which is a practical need for local universities at the stage of universal higher education.

4. Practical challenges

Viewed from the reform practice of local universities, the limitations of traditional academic administration are concentrated in three areas: data, process, and service. These difficulties form the starting point of digital transformation.

4.1 Scattered data with inconsistent standards

Credit system management involves data from academic affairs, student affairs, finance, the library, and logistics, covering course selection, grades, tuition, physical tests, disciplinary records, and awards. Under the traditional model, each department builds its own system with its own standards, so cross-departmental data can hardly be connected. Academic affairs staff have to coordinate repeatedly, clean data manually, and import records by hand, which increases workload and produces duplication, missing values, and misalignment. Scattered data also mean that managers cannot obtain a complete and real-time profile of student learning, so academic analysis, resource allocation, and decision-making depend on personal experience, and management loses precision.

4.2 Offline processes with long approval chains

The core of the credit system is free course selection, which generates a large volume of administrative processes such as deferred examinations, course exemption, course retaking, major transfer, course adjustment, and classroom booking. Under the traditional model, these processes rely on paper applications and step-by-step signatures. Applicants cannot see the progress of their requests, and there is no conflict detection or information check between approval steps, so repeated applications, incomplete materials, and inconsistent criteria occur frequently. At the same time, academic affairs staff spend much time checking data and filing paper documents, which are hard to retrieve, review, and preserve. Offline and fragmented processes keep academic administration in a state of high workload and low efficiency.

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

4.3 Delayed warning and disconnected assistance

Academic early warning is an important supporting mechanism of the credit system. Under the traditional model, however, academic data are scattered across administrative stages, and warning relies on manual calculation at fixed time points, which discovers problems only retrospectively [7]. Some students only reveal credit shortages, failed physical tests, or unresolved disciplinary records at the graduation audit, which affects their degree applications. After a warning is issued, there is generally no supporting assistance or access to support resources, so the warning remains merely a notification. Course selection guidance is also concentrated in the enrollment period and lacks tracking and adjustment during the semester. With such limited functions, academic administration can hardly fulfill its responsibility for whole-process education.

5. Construction of the digital credit-based academic affairs system

5.1 What smart digital academic affairs means

In 2009, IBM proposed the 3I framework (instrumented, interconnected, and intelligent) in its Smarter Planet strategy, which advanced information systems from digital to intelligent and provided a theoretical foundation for smart education. In 2012, the Ten-Year Development Plan for Educational Informatization (2011–2020) required deeper integration of information technology with education, and in 2025 the World Digital Education Conference released the China Smart Education White Paper, which called for closer integration of artificial intelligence with education. Research on digital campuses regards the smart campus as an emerging concept driven by artificial intelligence, the Internet of Things, and the digital transformation of higher education, and has developed validated frameworks for assessing campus intelligence. Reviews of institutional digital transformation emphasize that success depends less on the technology itself than on leadership, strategy, and consistent implementation across the organization. Studies of data-driven leadership further suggest that decisions become more reliable when institutional data are integrated and analyzed as a whole rather than kept in separate departmental silos.

Accordingly, in this study, smart digital academic administration refers to a digital management platform built on the teaching management system. It standardizes, transmits, and shares academic administration data; establishes a management model based on data-driven operation, process modules, and service functions; and provides preliminary intelligent functions for judgment and decision support.

5.2 The digital credit-based academic affairs system

Based on the needs of credit-based management, University S developed a digital management model based on data-driven operation, process modules, and service functions, comprising three core modules: a data center, online services, and warning and assistance. The data center contains seven databases covering basic data on all campus units, course selection, tuition, grades, physical tests, disciplinary records, and awards, so that each student's five-dimensional data are integrated and presented as a whole. Online services support various processes on mobile and web platforms, covering free course selection, resource optimization, academic tracking, and intelligent early warning. They connect the workflows among the university, colleges, teachers, and students, with every step transparent and traceable. The warning and assistance module analyzes the data reported by teachers and students, sends online reminders when indicators deviate from normal ranges, and provides targeted assistance. Data keep operations standardized, processes make administrative workflows transparent, and warning and assistance make services more accessible. The system thereby replaces paper-based manual checking with online, data-based verification. Its overall architecture is shown in Figure 1.

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

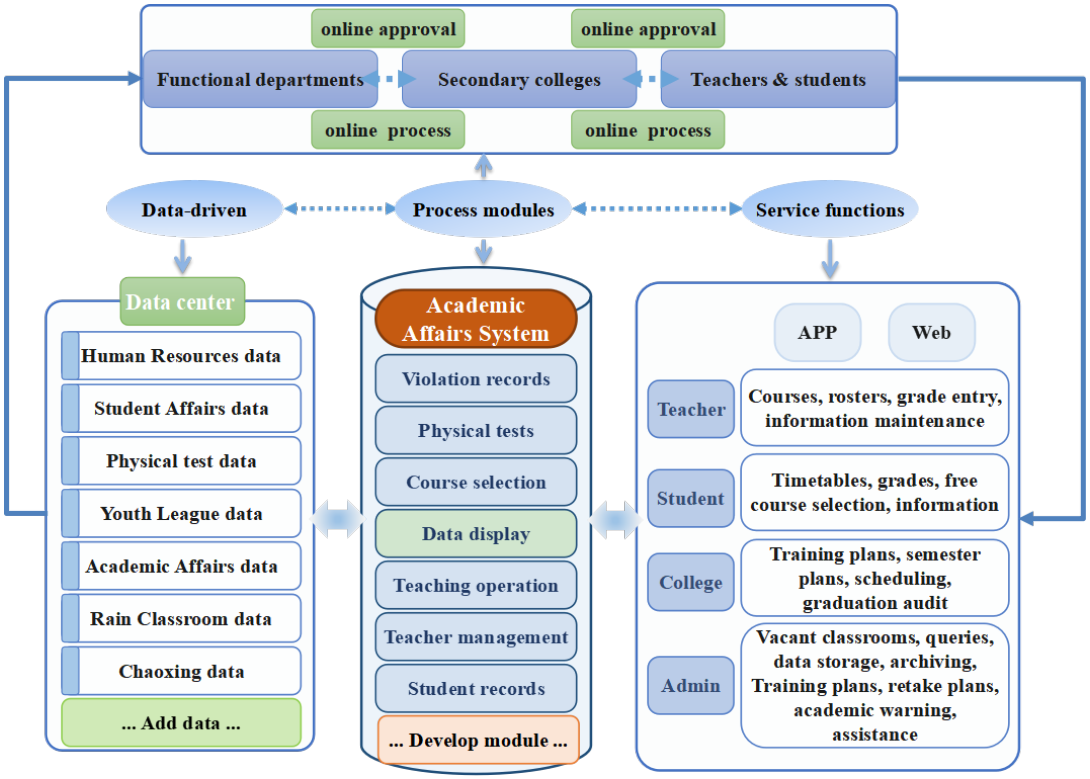


Figure 1. Overall architecture of the smart digital credit-based academic affairs management system

6. Operation results

6.1 Data-driven operation as the core

Data-driven operation is the core of the system. With all data running online, the system reduces data errors and supports visual analysis. As shown in Table 1, data-driven operation reduces labor costs, and management operates on preset parameters. The data hub enables interconnection and matching when data from other departments are integrated. The system determines the enrollment scale of each college, automatically assigns administrative classes, assigns class and student numbers, and synchronizes the results with the library, the finance office, student affairs, and logistics, so that data are seamlessly shared across departments. Process data related to the training program are analyzed along the five dimensions and presented as competence charts. In the course selection stage, the system analyzes selection data and reminds students of missing courses, exemption conditions, and retakes. In the assessment stage, it provides feedback on deferred, supplementary, and absent examinations and generates a quality evaluation report for each teaching class. All data are integrated into the warning module, which generates a warning and assistance report. At the end of each semester, the system compares records with the training program, generates a stage audit report, and provides suggestions for academic support. Reports on teachers' teaching, classroom utilization, and academic early warning are compiled every semester and shared with other administrative departments.

Table 1. Data-driven operation

No.	Business	Traditional mode	Smart mode
1	Data hub and flow mechanism	Data cleaning and manual importing	Self-service matching and automatic scale calculation
2	Study process and dynamic monitoring	Manual coordination with fixed resources	Automatic detection and intelligent scheduling

6.2 Process modules as the convenient channel

Traditional academic administration organizes teaching around administrative classes, cannot provide differentiated instruction, and can hardly meet the demand for free course selection. Free course selection is the core of the credit system: students make their own study plans, which reflects

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

self-management, self-service, and self-learning abilities. As shown in Table 2, the online process module has clear advantages over the traditional approval method: online processing replaces in-person errands, and electronic archiving replaces paper-based filing. The system builds a three-level online bridge among teachers and students, colleges, and the university; shifts academic administration from offline to online; and makes the approval process visible and traceable. For example, for course scheduling under free selection, the system calculates the courses, teaching classes, and numbers of retakes needed for the semester based on student data and program requirements, and sends the results to administrators at all levels, so that the workflow remains seamless. Students can check course selection, timetables, grades, academic warnings, deferred examinations, exemptions, and other academic information. Administrative departments can monitor teaching operations and resource utilization online, which closes the loop of query, verification, and feedback.

Table 2. Full-chain, highly collaborative process path

Business	Traditional mode	Online mode
Approval steps	Paper application, one-by-one signatures, no cross-checking	Online application, traceable progress, conflict detection
Document archiving	Manual organization, paper storage, difficult verification	One-click retrieval, electronic archiving, permanent storage

6.3 Service functions as the education safety net

The core of the service function is academic early warning, a supporting mechanism of the credit system that supports free course selection, provides early warnings about poor academic performance, and offers timely assistance. As shown in Table 3, the smart model combines human and automated responses and moves beyond purely manual handling. Traditional early warning is constrained by scattered data and periodic triggers, so the process is passive, and some problems only emerge at the graduation audit, affecting degree applications[8]. Warning and assistance in the system feature "whole-process" and "all-staff" education: they move from periodic to real-time and cover course selection at the start of the semester, continuous assessment, final grades, and make-up examinations. When teachers and students submit a request online, service options and step-by-step instructions are embedded in the interface, so that inquiries and processing connect seamlessly and responses are generated within seconds. Warning information at each stage is fed back to the data hub and then forwarded to the academic administration department, schools and colleges, course instructors, student counselors, and academic advisors, who provide targeted assistance.

Table 3. Assistance methods

Business	Traditional mode	Smart mode
Service carrier	Manual handling	Human-machine combination with data push
Consultation	Manual replies	Human-machine combination with automatic response

7. Reflection and improvement

7.1 Data integration

Although the system integrates data from multiple departments, data standards are not unified across departments and system interfaces are not sufficiently stable. As a result, cross-departmental synchronization is sometimes delayed or inconsistent, and some source data are missing or duplicated, which affects the accuracy of visualization and real-time traceability. The system is still at the stage of data presentation and lacks automatic cause analysis and predictive alerts for abnormal indicators, so managers still identify problems based on experience. The next step is to enhance data interconnection, establish unified standards and quality monitoring, and introduce intelligent analysis algorithms[9].

7.2 Approval efficiency

Online services currently cover routine transactions. For special cases and exception handling, however, the system lacks flexible channels and offline coordination is still required, so a dual-track pattern combining online processes and offline signatures remains in place. The system can track approval nodes but cannot automatically identify abnormal approval behavior, such as unusually long approval times or irregular approval paths, and supervision still relies on retrospective sampling. The

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

next step is to expand online coverage and introduce an intelligent monitoring module for approval behavior.

7.3 Warning and assistance

The system can issue academic warnings, but supporting interventions and resource linkage are insufficient, and warnings remain at the level of notification only[10]. Course selection guidance is concentrated in the course selection window and lacks continuous tracking and dynamic adjustment after the selection period, so intervention opportunities are missed. The system relies only on academic data, that is, whether the courses in the training program have been completed, and cannot identify the real reasons behind a student's withdrawal, such as course difficulty, schedule conflicts, or psychological state. The next step is to develop personalized guidance strategies and explore the integration of physical fitness, psychological, and disciplinary data.

8. Conclusion

Academic administration is the vehicle through which teaching institutions are implemented, and its digital transformation is a key instrument for implementing the national strategy and deepening credit-system reform. Most traditional academic administration systems were built on the academic year system. They met the needs of that system but are constrained by the management philosophy and the legacy system itself. Applying an academic-year architecture to credit-based management increases labor costs and reduces efficiency. Compared with the smart management systems reported in previous studies[1,4,10], the system at University S does not rely on new hardware investment; it reorganizes existing data and processes into a closed loop of data-driven operation, process modules, and service functions, and extends management from transaction processing to educational service. The platform has gone beyond basic transaction processing and evolved into a collaborative, efficient, and convenient digital platform that serves teachers and students and enriches the theoretical understanding of digital education in academic administration practice. The model is still at an exploratory stage. Data integration, approval coverage, and the depth of early warning and assistance need further improvement, and the model's long-term effects on the quality of talent cultivation need to be verified through continued practice.

Acknowledgments

This work was supported by the 2022 Quality Engineering and Teaching Reform Project of Zhaoqing University, "Exploration and Practice of Smart Academic Affairs Management in Local Universities" (Grant No. zlgc202237), and the 2025 Guangdong Provincial Undergraduate Teaching Quality and Teaching Reform Project, "AI-Empowered Yanyuan Lecture Hall: Building a New Model of Smart General Education Teaching Management" (Grant No. 1088).

References

[1] Nieto-Taborda, M.L., Luppicini, R. Accelerated digital transformation of higher education in the wake of COVID-19: a systematic literature review. International Journal of Changes in Education. 2025; 2(2):123-138.
[2] Islam, M.S., Hosen, A.S.M.S. Personalized course recommendation system: a multi-model machine learning framework for academic success. Digital. 2025; 5(2):17.
[3] Polin, K., Yigitcanlar, T., Limb, M., Washington, T. Smart campus performance assessment: framework consolidation and validation through a Delphi study. Buildings. 2024; 14(12):4057.
[4] Chigbu, B.I., Makapela, S.L. Data-driven leadership in higher education: advancing sustainable development goals and inclusive transformation. Sustainability. 2025; 17(7):3116.
[5] Singun Jr., A.P. Unveiling the barriers to digital transformation in higher education institutions: a systematic literature review. Discover Education. 2025; 4:37.
[6] Elbertsen, M., Kok, H., Salimi, N. Designing the future smart campus: integrating key elements to enhance user experience. Journal of Science and Technology Policy Management. 2025; 16(10):117-137.
[7] Alalawi, K., Athauda, R., Chiong, R., Renner, I. Evaluating the student performance prediction and action framework through a learning analytics intervention study. Education and Information

ISSN 2663-8169 Vol. 8, Issue 10: 9-16, DOI: 10.25236/IJNDE.2026.081002

Technologies. 2025; 30(3):2887-2916.
[8] Chang, Y.H., Chen, F.C., Lee, C.I. Developing an early warning system with personalized interventions to enhance academic outcomes for at-risk students in Taiwanese higher education. Education Sciences. 2025; 15(10):1321.
[9] Márquez, L., Henríquez, V., Chevreux, H., et al. Adoption of learning analytics in higher education institutions: a systematic literature review. British Journal of Educational Technology. 2024; 55(2):439-459.
[10] Dai, W., Lin, J., Jin, F.J., et al. Learning analytics for early identification of at-risk students and feedback intervention. Journal of Learning Analytics. 2025; 12(3):102-125.