Original Paper

Reality Dilemma and Optimization Path of Student Information Management in China's Compulsory Education Schools: Based on Research from Nine Schools in Sichuan Province

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Abstract

Student information management in compulsory education schools is an important component of educational administration informatization and a crucial link in achieving educational informatization. The level of student information management in compulsory education schools directly impacts the overall advancement of educational informatization. Therefore, focusing on student information management in compulsory education schools, this empirical research was conducted through questionnaires and interviews at nine compulsory education schools in Sichuan Province, China. The study identified deficiencies in management concepts, information system construction, and institutional guarantee systems for student information management in compulsory education schools. Based on these findings, the paper proposes improvement strategies such as timely updating of management concepts, increasing financial investment, and optimizing student management information system modules.

Keywords

Compulsory education schools, Student management, Management informatization, Informatization dilemma, Informatization path

1. Introduction

With the deep integration of information technology and education, student management informatization has become an important pillar of the modern education system (Yang & Yan, 2023). Facing the requirements of the digital transformation era, compulsory education schools, as the core entities of basic education, have their student management informatization levels directly affecting the overall process of educational modernization. Currently, although China's compulsory education schools have made certain progress in informatization construction, they still face numerous challenges in actual operation. Therefore, conducting in-depth exploration of the current status, problems, and underlying causes of student management informatization in compulsory education schools, and proposing targeted optimization strategies, has important theoretical value and practical significance for enhancing

educational management effectiveness and promoting high-quality educational development. Based on this, this study takes nine compulsory education schools in Sichuan Province, China as research subjects, employing a combination of questionnaire surveys and in-depth interviews to systematically analyze key issues in the implementation process of student management informatization, aiming to provide scientific evidence for relevant policy formulation and practical improvements.

2. Data Collection and Overall Situation

2.1 Data Collection

Following the basic principle of "using points to represent the whole," a stratified sampling method was employed to select research subjects. From Chengdu, Mianyang, and Nanchong in Sichuan Province, one well-developed institution, one average-developed institution, and one relatively underdeveloped institution were selected from each area (nine schools in total). Data was collected through both "online and offline" methods, including questionnaires and interviews with students and staff related to information management in these nine compulsory education schools (specific information about interviewees is shown in Table 1). Based on the research results, this study objectively presents the current status of student management informatization in Sichuan's compulsory education schools, identifies deficiencies and their causes, and proposes targeted improvement strategies to provide reference for the construction of student management informatization in compulsory education schools in other provinces in China. A total of 420 questionnaires were distributed, with 413 returned. Among these, 6 were invalid, resulting in an effective questionnaire rate of 96.90%.

Table 1. Basic Information of Interview Subjects

Code	Age	Gender	Position	Code	Age	Gender	Position
W01	45	Male	Vice Principal	W08	40	Male	Principal Assistant
W02	44	Male	Vice Principal	W09	38	Female	Principal Assistant
W03	40	Male	Vice Principal	W10	38	Female	Office Director
W04	42	Male	Class Teacher	W11	56	Male	Class Teacher
W05	34	Female	Vice Principal	W12	37	Female	Class Teacher
W06	36	Female	Class Teacher	W13	31	Female	League Secretary
W07	42	Female	Class Teacher	W14	41	Male	League Secretary

2.2 Basic Situation of Student Management Informatization in Compulsory Education Schools

First, Overview of Information System Construction. Student management information systems are both a prerequisite for implementing educational management informatization and the foundation for serving student management informatization. This paper primarily conducts research and analysis on several aspects of student management information systems in compulsory education schools, including

academic administration, financial aid management, graduation management, fee payment management, physical and mental health management, ideological and political education management, daily life management, and exchange program management. The research findings show that in terms of system construction, 100.00% of the surveyed schools have established comprehensive academic administration and fee payment management information platforms; 51.00% of the surveyed schools still need improvement in information system construction for financial aid, daily life, and ideological and political education; and 26.00% of the surveyed schools show significant deficiencies in information system management for graduation and physical and mental health.

Second, Distribution of Management Personnel's Information Literacy Levels. In school management, administrative personnel, due to their close connection with students, become the "connecting intermediaries" between students and management departments and school leadership(Liming et al., 2023). Fully utilizing student management information systems is crucial for them to understand and execute management arrangements from superiors and promptly identify students' management needs, which is also a manifestation of their value. Therefore, understanding and analyzing the cognition and usage of student management information systems by student management personnel in compulsory education schools plays an important role in improving the construction of student management informatization systems. The survey shows that 67.50% of management personnel believe information literacy is simply using computers or networks, 26.70% believe information literacy is proficiently operating management information systems, and 5.80% believe management informatization means utilizing information technologies like the internet to analyze and judge data provided by platforms, providing instant and accurate information for school management decisions, thus achieving management informatization. Therefore, in terms of cognitive understanding, student management personnel in compulsory education schools have relatively outdated perceptions of student management information systems. In terms of application level, student management personnel in the surveyed compulsory education schools can all proficiently use student management information systems for daily management. Despite this, in actual operation, due to design flaws in the systems themselves and limitations of traditional organizational management concepts, management personnel in compulsory education schools still show obvious "imprints" of traditional management when conducting information-based management of students.

3. Reality Dilemma of Student Management Informatization in Compulsory Education Schools

3.1 Overall Management Concept Lag

First, management personnel have insufficient understanding of student management informatization. During the application of student management information systems, influenced by traditional organizational management concepts, student management personnel in compulsory education schools have not fully recognized the patterns and methods of student management informatization supported by information technology. They merely view it as a new tool rather than a profound transformation of

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student management. *"Student management informatization is nothing more than the application of modern information technology in student management, which is essentially just the use of a tool."* (W11) At the same time, most compulsory education schools have not established performance evaluation systems specifically targeting the information literacy of student management personnel, resulting in obvious situations where student management personnel in compulsory education schools "undervalue" the learning and mastery of information technology. *"The school doesn't assess it, and it doesn't have much to do with our professional title promotion, so participation in information technology skills training becomes casual."* (W02)

Second, there is an emphasis on administrative management rather than humanistic needs. During the construction of student management informatization, some compulsory education schools place great importance on building functional modules of student management information systems but lack necessary attention to how these systems are used and how to improve their efficiency. The construction of student management information systems in compulsory education schools serves not only to meet social development needs, adapt to educational informatization, and improve the efficiency of student management work, but more importantly to meet students' needs. Meeting students' needs is about better serving students and also embodies the practice of humanistic education, but the people-centered concept is not fully reflected in the management system usage process. Many student management information systems in compulsory education schools appear content-rich but in reality offer hollow services to students, and some system functions cannot even operate normally. *"Our student logistics support system has many functions, but some functions are just 'vases'-nice to look at but not practical. Many times, when these functions are used, the system crashes. Later, we automatically 'screened out' some functions."* (W03) This directly reflects that compulsory education schools, during the construction of student management informatization, have neglected the development goal and fundamental purpose of "people-centered, serving teachers and students."

3.2 Management Structure Vulnerabilities

First, system construction lacks unified planning. During the construction of student management informatization in compulsory education schools, there is insufficient recognition that informatization construction is a long-term and continuously updating dynamic process, and that the initial construction is only part of informatization advancement. In the later stages of informatization construction, it is still necessary to maintain and update the system based on problems identified during operation to improve student management informatization in schools. *"Our school's information system hasn't been updated for 10 years. We've brought this up to the school multiple times, but the school hasn't shown much response. This aspect wasn't given much importance during top-level design."* (W03)

Second, system sharing encounters "departmental barriers". There are many subsystems in the student management information systems of compulsory education schools. To integrate these subsystems and achieve a unified authentication and data-sharing system requires storing data from various systems on a single server or in a shared database, which poses a significant technical challenge for schools. Since

the student management information systems of various functional departments in compulsory education schools were built and purchased at different times, the development levels of information technology used in the relevant information system construction also differ. There are enormous differences in their data analysis capabilities and technical levels. These differences often lead to issues such as inconsistencies between systems, non-unified data platforms, and multiple repeated data entries, indirectly forming "information islands" between school departments. This makes it difficult to achieve information resource sharing and unification between departments, resulting in tremendous waste of human, material, and financial resources. In the research, the deputy head of the sample compulsory school then talked about, *"Much of the data related to teacher instruction is managed by the Academic Affairs Office. We rarely have access to their data, and coordination is always difficult. Unless a school leader intervenes, these matters cannot be accomplished."* (W01)

Additionally, there are instances where subsystem development is incomplete. Each subsystem has established functional modules needed for student management or those with high usage frequency, but some have only established corresponding sections without truly developing their functional modules in terms of content and operation. Consequently, they cannot fully realize efficient, intelligent, and information-based student management operations. For example, the student physical and mental health management system has set up functional modules such as online appointments, online consultations, psychological testing, psychological knowledge, and health activities. However, in actual operation, problems arise that do not reflect the characteristics of student management informatization in compulsory education schools, such as complicated appointment platform operations and untimely consultation responses.

3.3 Inadequate Development of the Guarantee System

First, insufficient funding. With the rapid development of society and continuous updates in information technology, the demands for relevant information systems in student management informatization construction in compulsory education schools are constantly changing. Existing hardware and software facilities and functional modules of management systems need to keep pace with the times and be continuously updated, which requires substantial financial investment. However, in practice, funding for maintenance and updates of student management informatization systems in compulsory education schools appears rather "insignificant". During interviews, it was found that some compulsory education schools face problems of insufficient funding, both in the initial investment stage and in the later process of system maintenance and updates. Evidently, financial investment is a problem that cannot be ignored in the construction of student management informatization in schools. *"For student management informatization systems in compulsory education schools, during the project approval process, it's usually a matter of 'how much money is available determines how much can be done', rather than 'how much money is needed to complete this task'."* (W06)

Second, lack of professional technical support personnel. With the continuous development of information technology, informatization talents have become essential professional staff in various

industries. Information technology personnel play an important role in system maintenance, upgrades, and other aspects, and are the fundamental guarantee for the effective operation of student management information systems in educational institutions. However, interviews revealed that most current student management information systems in compulsory education schools are mature software already designed by companies and purchased by relevant departments. After stable operation is achieved, few schools upgrade or maintain the systems. *"Some teachers in student management departments do not place enough emphasis on informatization, believing that information management systems are less convenient than the original offline methods using EXCEL and WORD."* (W11) At the same time, the problem of a lack of information technology talents in compulsory education schools is quite common, which directly leads to issues such as inadequate daily routine maintenance and insufficient technical support for student management information systems.

Third, imperfect guarantee mechanisms. Institutional systems play an extremely important role in any organization. As an organization, compulsory education schools also need a complete set of management systems for student management informatization construction to ensure safe and stable operation. The survey found that the construction of student management information systems in compulsory education schools is led by various departments, and each department only has a general institutional framework for information system construction and management. There is still a lack of corresponding institutional guarantees for aspects such as later-stage maintenance funding, training and evaluation of management personnel, and implementation mechanisms. *"Student management information system construction, especially in terms of application, requires in-depth cooperation between relevant departments such as the Academic Affairs Office, Student Affairs Department, and Admissions and Employment Office. However, in practice, there is obvious 'departmental' awareness between departments. As long as it's not routine work for a department, there will be mutual buck-passing or disputes, which is very common."* (W08)

3.4 Insufficient Application of Information Systems

First, incomplete functional modules. Student management information systems built at different periods, with different goals and tasks in various compulsory education schools, have personalized needs for system construction. However, the research found that the construction of student management information systems in most compulsory education schools has not fully considered the personalized needs of each school's management for information systems. This has resulted in problems such as inconvenient operation, non-user-friendly module design, and empty or monotonous interface content in some student management information systems. *"The student management information system design is particularly non-user-friendly; it's very complicated for us to operate, and it's the same for students. When the school initially developed this system, they didn't understand our or the students' needs."* (W07) *"Student management information systems often lack specificity in functional layout. For example, our school has a large number of ethnic minority students, but the information system did not consider this point in its functional design, causing us to still perform manual operations when compiling some*

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information about ethnic minorities." (W12)

Second, low system utilization. The main purpose of student management informatization construction is to serve and manage students. The degree to which students use the information management system directly affects the value of the information system and the actual efficiency of student management work. The research found that although each school has built a student management information system, in reality, apart from some student management systems with more complete functions and higher frequency of daily use by students, other student management information systems are not highly utilized. Moreover, students' purpose in using student management information systems is limited to obtaining their academic performance and some related information, while rarely accessing other information resources provided by the systems. Student management information systems have become an appendage constructed due to the needs of the times but have not played their due role in providing convenient service to students. Of course, this problem is more often caused by insufficient information management levels in schools. *"We rarely use some subsystems (of the student information management system); we forget them after learning, and are only proficient in systems that we use frequently."* (W08) *"We participate in relevant training every year, but overall, they are just some basics. Once there are complex and diverse needs, we can only turn to software companies, and sometimes we don't bother due to the hassle."* (W04)

4. Optimization Path for Student Management Informatization in Compulsory Education Schools

4.1 Transform Development Concepts and Improve Management Personnel's Understanding of Student Management Informatization

Conceptual cognition represents the thoughts, behaviors, standards, and evaluation criteria for things that people form during their long-term social development process. As individuals who constitute the cells of society, their conceptual cognition is precisely the internal factor that governs "implicit" social norms and behavioral standards (Van Rossum et al., 1985). In the development of real society, due to the existence of established conceptual cognition, people form mental sets, and these established thinking patterns often easily become hindering factors to social development. Undoubtedly, with the continuous progress and development of science and technology, corresponding values and thinking methods are necessarily required. If people's values and thinking methods cannot keep up with the requirements of the times' development in a timely manner, the obsolescence of conceptual cognition becomes inevitable, which will subsequently lead to behavioral lag. Therefore, in the face of information technology's impact on student management concepts and methods in compulsory education schools, student management personnel in these schools need to break the constraints of inherent conceptual cognition and mental sets, and promptly construct information management concepts that match information technology (Riedl et al., 2017).

First, establish people-oriented concepts. From the ideological perspective, fully recognize the importance of human-centered management principles for student management informatization

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construction in schools. Respect teachers and students, meet their needs regarding student management information systems, and achieve the integration of human needs with information technology. Second, transform service concepts. The purpose of constructing student management information systems in compulsory education schools is to serve students—it is a tool for serving students and a means to improve service quality and management efficiency. As the main users of student management information systems, student management personnel in compulsory education schools must establish the concept of "service first", proactively provide convenient and fast services, and enhance service awareness (Fan, 2023). Therefore, at the ideological level, compulsory education schools should guide management personnel to focus more on the overall development of the school rather than the interests of a particular individual or department; at the practical level, compulsory education schools should strengthen the education and training of student management staff, guiding them to develop habits of consciously applying management information systems and the concept of service-first through collective training methods such as lectures and training, as well as self-study and self-practice methods.

4.2 Increase Construction Investment and Create a Good Student Management Informatization Environment

First, strengthen the development of information management talent teams. Besides institutional guarantees, the smooth implementation of student management informatization in compulsory education schools depends most critically on human factors. In this regard, compulsory education schools should collaborate with information technology providers to strengthen the training and development of information management and support personnel. This enables them to master the maintenance and management methods of application systems, system operations, troubleshooting, management maintenance, and other technologies, achieving full utilization of student management informatization technology (Lytvyn et al., 2020).

Second, improve funding guarantee measures. Student management informatization construction in compulsory education schools is a long-term project. Requirements for funding guarantee systems are necessary both for the initial investment in hardware and software and for subsequent operation and maintenance. In this regard, compulsory education schools should provide special financial support for student management informatization construction.

Third, promote information platform construction through multiple approaches. With the continuous advancement of science and technology, when promoting the construction of student management informatization platforms in compulsory education schools, it is necessary to extensively adopt suggestions and requirements from teachers and students to improve management information systems, promoting standardization and humanization of information platform construction while following informatization construction standards. At the same time, with the increasing maturity of Internet of Things technology, compulsory education schools should fully utilize information technology and IoT technology together to build student management informatization platforms, promoting the development of student management informatization in compulsory education schools and realizing smart campus

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construction (Rao, 2024).

Fourth, strengthen institutional construction. From a management perspective, the establishment and implementation of rules and regulations can provide guidance for the behavior of staff and departmental development in compulsory education schools. From an educational perspective, rules and regulations also reflect moral standards, ideological norms, and political standards of a specific social period. School systems are generally composed of formal institutions, informal institutions, and implementation mechanisms. Therefore, in the institutional construction of student management informatization, compulsory education schools should not only establish organizational structures that ensure the normal operation of the school but also establish a complete set of management rules and regulations (Li, 2022). In addition, attention should be paid to the construction of informal constraint mechanisms such as customs, ethics, values, and ideology. This will ensure the appropriateness of student management informatization institutional construction in compulsory education schools to the greatest extent.

4.3 Optimize System Modules to Effectively Improve Student Management Informatization

First, continuously optimize student management information system modules. The purpose of educational informatization development is to better serve education, thus the purpose of student management informatization construction in compulsory education schools is to better serve all teachers and students. As one of the sources of informatization construction, the needs of teachers and students represent the direction of student management informatization development in compulsory education schools (Nong et al., 2023).Therefore, in practical operation, student management information systems in compulsory education schools should be based on classes, departments, and network platforms to extensively collect the needs of students, teachers, and management personnel regarding functional modules, service content, and other aspects of student management information systems. Subsequently, the collected specific data should be classified and screened in a targeted manner to identify current dissatisfaction or requirements for the management information system among school personnel. Based on this and according to actual needs, the functional modules in student management information systems of compulsory education schools should be improved and optimized to meet the needs of students, teachers, and management personnel for student management information systems, realizing humanized management in compulsory education schools (Li et al., 2022).

Second, improve the intelligent level of student management. The realization of student management informatization in compulsory education schools cannot be achieved solely by school leadership, management personnel, and teachers; it also requires students, as one of the key subjects of management activities in compulsory education schools, to promote the construction of student management informatization. Therefore, while actively requiring management personnel in compulsory education schools to use information systems, the role of students in information construction in compulsory education schools cannot be ignored. In the process of building student management information systems, compulsory education schools should, first, improve and optimize the construction of management information system modules to provide a simple and easy operating platform for management personnel

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and students, creating a good environment for intelligent student management. Second, for management personnel who are direct users of information management systems, they should proactively learn to operate management information systems, improve their own operational skills, and actively align with the needs of student management informatization.

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