

# The Smart Education Environment Construction Based on TOGAF Framework in the Intelligence Era

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**Abstract:** Following the trend of future education toward intelligence, this paper focuses on the inherent requirements of intelligence transformation and closely follows the needs of talent development. With the improvement of overall ability, it should adhere to the integration of information and intelligence. Through the organic integration of TOGAF's advanced concepts and characteristics, it rebuilds the information foundation and intelligent application system, innovating the demand scenarios and technical systems to realize a new type of teaching conditions system that is networked, digital, intelligent, personalized and diversified, and constantly improve services and guarantees.

## 1. Introduction

Focusing on the orientation and goal of running a school, this paper will adopt the overall technical framework for the construction of information and intelligent teaching conditions, follow the organizational framework (TOGAF) issued by international development organizations, actively promote the information and intelligent construction of teaching conditions in teaching, scientific research, management and other aspects, and promote the sharing of teaching resources and data through a series of standardized sorting of teaching processes<sup>[1-2]</sup>. Through the business cloud, data collection, cleaning, governance, and the ability to analyze big data on the cloud are carried out, and an intelligent service platform with full data support is built to provide managers with decision support for big data analysis.

## 2. Current Situation and Demand Gap

At present, in the process of promoting the transformation from informatization to intelligence, there are still several problems to be solved.

Information infrastructure cannot fully meet the needs of future development. At present, although the informatization construction infrastructure is relatively solid, focusing on intelligent application, there are still some practical problems such as the bandwidth between campuses needs to be expanded, computing storage capacity needs to be improved, operation and maintenance services are not strong enough, operation and utilization efficiency is not high enough, redundant disaster recovery mechanism is not optimized enough, and the intelligent application support of teaching and training means still has shortcomings. Based on the characteristics of the discipline, we have developed a variety of training equipment and innovative teaching models by means of theoretical guidance and practical training, relying on information technology, which has played an important role. But focusing on intelligent applications, there is still a gap between the incomplete simulation training system, the main equipment types not covered by intelligent applications, the use of teaching data to support personalized and diversified training, and the intelligent development of highly targeted compensation packages<sup>[3]</sup>. The intelligent management mode has not been deeply integrated into the school management link. The existing information systems are mostly distributed and built separately by each department, which can solve local business problems.

However, due to the lack of systematic design and integration, it is difficult to share data between systems, coordinate business, link events, and maintain uniformly.

### **3. Construction principle**

The demand for information and intelligent construction of the college is sorted out from the dimensions of teaching, scientific research, management, etc. to form an internal demand structure for information infrastructure, work content, work process and content standards, as well as intelligent services<sup>[4]</sup>. Through the construction of the Internet of Things, the information infrastructure realizes the interconnection of classrooms, laboratories, libraries, physical training ranges, shooting ranges and other teaching facilities. The standardization of business process and data service will develop data standards for teaching resources and teaching places through information and intelligent construction to form cloud data that can be shared and shared, achieve unified deployment, data sharing, process interconnection, and business linkage, and promote the standardization of business processes such as education and training, scientific research cooperation, and management decision-making, as well as the service of relevant data.

Business intelligence is based on the support of massive data. Through intelligent analysis algorithms, various intelligent general applications and professional applications for teachers are built, and service-oriented applications for students are built, such as one-stop service for admission and departure<sup>[5]</sup>. With the help of big data, we can summarize and analyze massive teaching information resources, provide high-quality courseware recommendation, intelligent resource matching, multimedia resource index and other intelligent lesson preparation functions, provide online reading resources, download resources, subscription resources and fuzzy matching search functions, guide the adjustment of teaching strategies, and promote the new and old inheritance of teaching ideas<sup>[6]</sup>. Developing a scientific research information service platform, it can query, retrieve, extract and analyze the massive scientific research information stored in various book and periodical databases, Internet science and technology news, professional databases, government statistical databases, patent databases and other data sources, and provide personalized services to scientific researchers. In the era of big data, the college informatization has massive data, which needs to be cleaned and labelled to provide high-quality data services. Network management environment operation and maintenance requirements: intelligently analyze the real-time status and traffic of each server, quickly find the abnormal situation of the current network, and analyze the causes of the abnormal situation<sup>[7]</sup>.

Intelligent media capital management. It solves the problems of complex operation, inaccurate classification, inconvenient query, slow update, etc. in traditional resource entry. Intelligently push resources to users of different disciplines and needs. Unicom's intelligent lesson preparation system provides online discipline resources to assist in the arrangement of teaching plans. By integrating the mature construction achievements of the basic platform of information services and other projects, we will build an all-round, high-level and open internal and external double circulation system of information based intelligent teaching conditions, strengthen the internal circulation, strengthen the external circulation, and promote the new layout of teaching conditions construction, demonstrate equipment in the service field and tackle key cutting-edge technologies, and accelerate the digital transformation and intelligent upgrading, Continuously improve the quality of high-quality professional talents.

### **4. The Design of Smart Education System Based on TOGAF Framework**

The technical architecture of this project is based on the basic platform of information services and the public infrastructure of business information systems, and comprehensively uses cloud computing, big data, the Internet of Things, 5G private networks, artificial intelligence, virtual reality and other advanced information technologies to build a teaching and training environment that organically connects physical space and information space.

The construction contents refer to the concept of four modernizations and five layers. The main

functions of the five layers are divided into four layers and one security and operation and maintenance system, namely, the intelligent business application layer, the intelligent hub layer, the business data support platform layer, the information infrastructure layer, and the security and confidentiality and operation and maintenance management system, which constitute the main construction functions of this scheme in Figure.1.

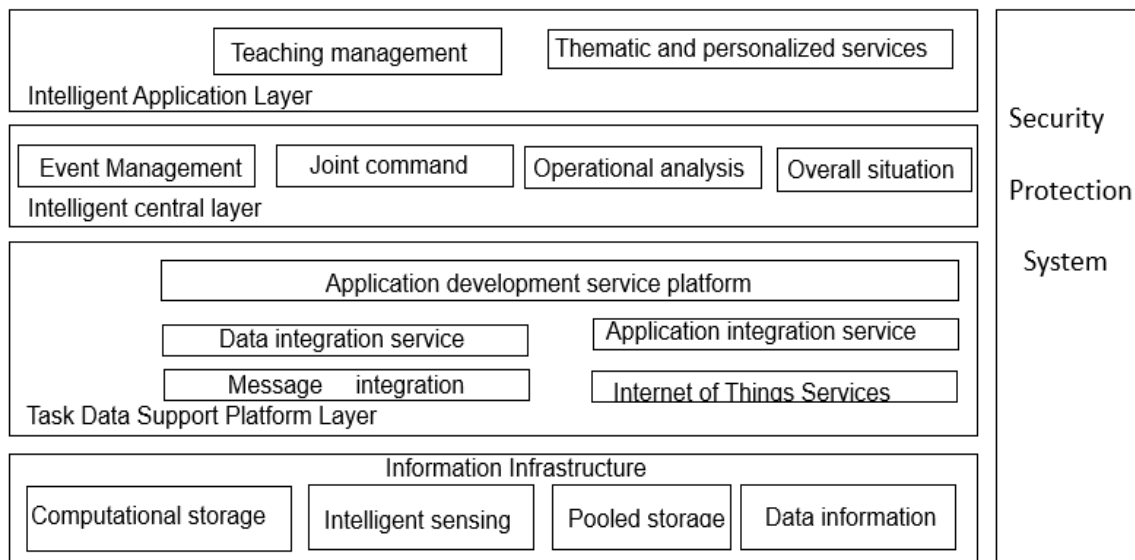


Figure 1 Overall technical framework of information and intelligent teaching conditions

**Intelligent application layer.** The business application layer includes the construction of general intelligence and special intelligence applications, in which the general intelligence application is the upgrading of the teaching management system; The special intelligent application is the application of engineering teaching and training, and it creates a ubiquitous intelligent teaching and training center in the form of thematic and personalized services.

**Intelligent central layer.** It provides an intelligent working platform and access, realizes online teaching, scientific research and services, and is the center of intelligent decision-making and intelligent services. Timely grasp the overall situation of the college, Intelligent central layer provide support for the management decision-making of the college, comprehensive school situation display, event management, linkage command, operation analysis, comprehensively grasp the overall operation of the college, relevant services for different groups based on the role, and realize the innovation of teaching management mode.

**Business data support platform layer.** Customized development of the business data support layer supports the application development service platform for the construction of the college's teaching conditions, including data integration services, application integration services, message integration services, Internet of Things services, big data analysis services, artificial intelligence services, application software agile development services, and positioning services, providing common basic components for the development of various business applications.

The business data support layer is a digital platform that supports the unified operation and management of the college. The platform realizes the access management of all subsystems downward through the Internet of Things and system integration services, and provides open access interfaces for data and business for applications upward through the service mode to create a unified, open, flexible and scalable college management business and data service platform.

**Information infrastructure layer.** The information infrastructure layer is a comprehensive platform integrating network, cloud data center and other infrastructure and teaching resources, integrating all kinds of resources such as intelligent sensors, communication networks, computing storage, security and confidentiality, data information and teaching sites, and has the capabilities of environmental Internet of Things intelligent perception, high-speed heterogeneous communication transmission, massive information collection and storage, educational data resource sharing,

distributed high-performance computing, etc, Realize unified resource management through cloud management and resource virtualization.

Security and confidentiality protection system and global operation and maintenance management system. The security protection system mainly realizes the management of confidential business and the control of confidential carriers. The global operation and maintenance management system establishes the operation and maintenance management system, system, process and operation requirements, and unifies the operation and maintenance, service continuity and service security from three aspects of organization, process specification and tool platform.

## 5. The System Characteristics

Task oriented. Based on business, it takes business application system as the starting point, create value around important applications, and ensure the stable operation of business.

Unified management. The operation and maintenance of the information system should consider the development needs, share the unified operation and maintenance of the application system, and ensure that users can enjoy information services at any time on the premise of meeting the security requirements.

Continuity. During the design, development and implementation of information system services consideration must be given to ensuring service continuity and providing corresponding disaster recovery mechanisms for application systems and information services related to important applications.

Security. Comply with relevant national requirements, the security requirements faced by the internal and external environment of the school, it protect important information assets in business operations.

Differentiation. Differentiated service models are required based on application classification and classification, and different service levels are provided based on application system levels. On the basis of meeting business needs, IT O&M constantly pursues excellent operation, efficient and high-quality delivery services.

## 6. Conclusion

The TOGAF architecture design method is a digital transformation architecture design method that is the most widely used and most completely defined in the industry, focusing on the business architecture of value stream, business capability, business process, etc., focusing on the information architecture of business objects, logical entities, etc., focusing on the application architecture of application system modules, etc., and focusing on the technical architecture of technical components, technical services, etc. The architecture carries out the top-level design of dual construction, combs the relationship between key business elements and elements, controls the evolution of the architecture, and plans a four tier architecture. On this basis, we will build a standard specification system, a security and confidentiality protection system and a global operation and maintenance management system to provide technical and operation and maintenance security for the construction and operation of information intelligent teaching conditions.

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