Evaluation Index System of the Smart New Campus Construction of Universities

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Abstract

This paper identifies five environmental factors that influence the construction of the smart new campus of universities. The theoretical hypothesis is used to establish the influence factors of the smart new campus environment. On the assumption of reliability, validity test and normal test analysis, the mechanism of the main influence factors on the environmental validity of smart new campus of universities is clarified. This paper analyzes the factors of environmental validity of smart new campus. It puts forward the evaluation index system of the environment of smart new campus of universities. Using AHP to determine the index weight, the paper puts forward some suggestions and countermeasures on the construction of the evaluation index system of smart new campus of universities. The construction of the Smart New Campus of Universities should meet the need of the development education in China.

Keywords: *Smart campus, New campus of universities, Evaluation index system*

1. Introduction

Computerized information in universities began in the 1980 s, from the early and the construction of campus network, to the information system construction and gradually integrate digital campus construction, to the use of cloud computing, big data, such as the Internet of things the wisdom campus construction of the new technology. The informationization has deep into universities teaching, scientific research, service and management decisions. Many theories about the smart new campus of universities, many experts and scholars, such as Jiang Dongxing, Cheng Jiangang, Mi Yong are that in practice in the construction of the smart new campus of universities, the biggest difficulty is not from the technology, but rather "coordination and cooperation". The organization department of the coordination and cooperation restricts the problems existing in the smart new campus of universities construction and function of benefit [1].

Under the background of the increasingly extensive application of new technologies, the smart new campus of universities optimizes and improves the level of teaching, management and service of universities through the effective integration and interactive sharing of campus information resources, centering on teaching and research, and aiming at personnel training. In the end, it will provide the open and personalized teaching and research environment and the convenient and comfortable living environment for cultivating and conveying intelligent talents for the country. Internet and classroom, dining, learning, life, orientation activities, teachers and students interaction, school news and notice, logistics, library, educational administration and other aspects of the integration. Through the campus identity authentication login, the mobile APP to complete all functions. This requires the establishment of a unified development platform, the database needs to be stable and reliable, and has scalability and security. At present, there are five typical smart campus architecture :(1) Smart campus based on the Internet of things; (2) Build smart campus based on cloud computing; (3) Build smart campus based on Web GIS; (4) Build smart campus based on application services; (5) Build smart campus based on network three-dimensional technology. At the same time, the construction of smart campus in universities is faced with the challenges of information technology, business integration and construction operation mode.

The construction of smart campus in new campus of university has been agreed by experts and scholars, school administrators and teachers and students that it is an effective way to realize the perception, interaction and sharing of resources in campus, and to realize the "safe campus", "green campus", "harmonious campus", "ecological campus" and "scientific campus". In China, the new campus smart campus has the Internet high-speed ubiquitous [2]; Intelligent terminal is widely used; Team cooperation is convenient and full; Collective knowledge symbiosis and common prosperity; Business application intelligence fusion; External wisdom will be integrated and other characteristics. The development goals of the new campus of smart campus mainly include the cultivation of intelligent talents; Intelligent scientific research; Smart social services; Intelligent cultural inheritance and innovation; Intelligent management decision; Intelligent life services, etc.

Wisdom teaching, wisdom research, wisdom management, wisdom decision-making and wisdom service are the inevitable trend of the development of smart campus in universities. The new campus smart campus mainly includes the following functions [3]: (1) smart environment. The automatic sensing and adjustment of temperature and humidity in the study and living place of students, as well as the automatic adjustment of light brightness; Automatic detection of air pollution and noise; Automatic ventilation, automatic noise reduction; Fog and haze weather intelligent warning and bacteria exceed the standard of automatic reminder. (2) Intelligent management. Campus security monitoring; Intelligent access control; Automatic energy saving monitoring of water, heating and electricity; Intelligent office; Intelligent borrowing of books, instruments and equipment; Network fault intelligent alarm; Intelligent management of classrooms, seminar rooms, sports venues and conference rooms. (3) Intelligent teaching. Intelligently compose papers according to students' level; Online collaborative lesson preparation; Intelligent recommendation of teaching method and teaching mode. (4) Wisdom learning. Intelligent push of learning materials; Intelligent analysis of learning results; Digital records of personal growth; Career wisdom consulting; Intelligent aggregation of community, etc. (5) Intelligent research. Collaborative sharing of scientific research materials and conference information; Intelligent aggregation of research teams; Intelligent discovery of scientific research innovation, etc. (6) Intelligent life. Intelligent analysis of physical examination report; Intelligent recommendation of campus services; Intelligent making friends based on common interests and individual needs; Intelligent push of campus activities, etc.

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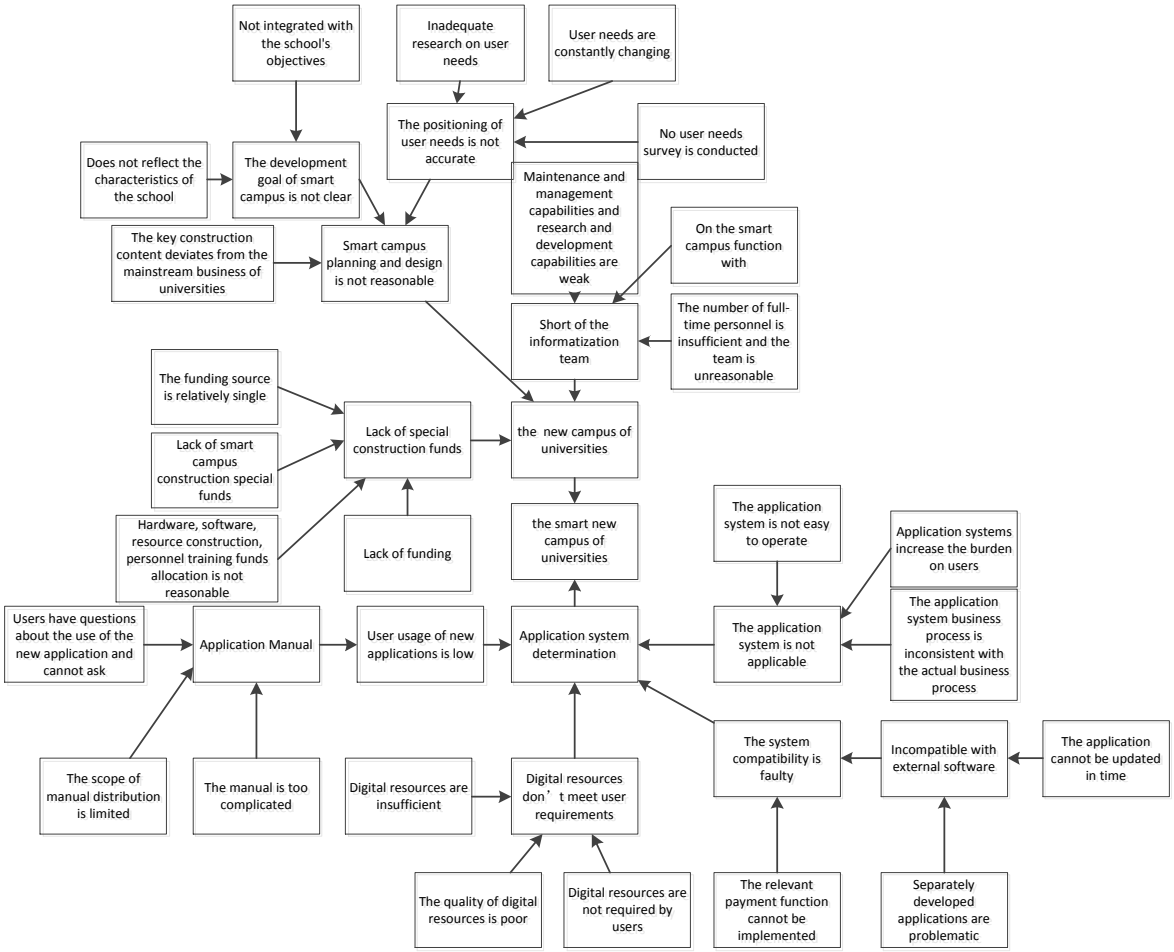

Fig 1: Analysis of reasons for the construction of smart campus in new campus of universities

At present, the universities are in pushing forward the construction of the smart new campus of universities especially need to build the new campus of universities, relying on large data, the Internet of things, cloud computing emerging technology actively and steadily move the wisdom campus construction, such as increasing in wisdom campus, on the basis of money, taking advantage of the universities on the professional talents, actively promote the construction of campus wisdom. However, at present, smart campus lacks unified construction standards and top-level design, which makes it difficult for universities to share internal data. There is independent construction of universities without data sharing, docking and interaction, as shown in Figure 1. Through the research on the evaluation index system of smart campus in new campus of universities, it will better guide the construction of smart campus in new campus of universities.

II. Selection of Influencing Factors of Smart Campus Evaluation Index System in New Campus of University

The construction of smart campus in the new campus is affected by many factors, which have different influences on each other and the whole smart campus in the new campus [4]. In this paper, the existing evaluation system of smart campus is integrated, a wide range of data is collected, combined with the characteristics of the new campus and smart campus, through consulting the opinions of relevant experts, after investigation and analysis, 152 labels are developed, and the original data is decomposed into individual independent events. Eighty-two concepts were assigned to the objects referred to by the above labels. After the process of categorization, thirty-eight categories were extracted, namely secondary subject words. Based on grounded theory and through the use of model to sort out and analyze the 18 categories, five main categories are obtained, which are infrastructure environment, digital

resources, management environment, integration and innovation, network security. After several revisions such as design and consistency screening, a progressive evaluation index system for smart campus of the new campus, consisting of target layer, criterion layer and indicator layer, is constructed for the purpose of improving the wisdom of the new campus (shows as Figure 2). The first level indicators include infrastructure environment, digital resources, management environment, integration and innovation, and network security.

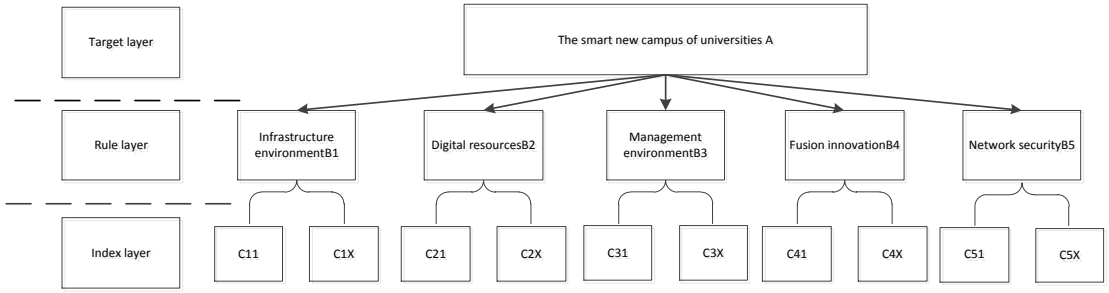

Fig 2: Evaluation index system of smart campus in new campus of universities

By using the questionnaire method, the criterion layer index of the evaluation index system of smart campus in the new campus of colleges and universities is obtained. At the same time, the bottom index layer is investigated and studied. A total of 38 measurement indexes can overview the criterion layer index, which can show the intelligent characteristics of the new campus on the whole.

III. Theoretical Hypothesis and Data Analysis of the Factor Effect of the Evaluation Index System of Smart Campus in New Campus of University

The intelligent construction of the new campus of universities should realize the sharing and coordination of digital resources under the premise of network security through the perfect infrastructure environment, the creation of a good management environment, the integration and innovation of resources. So as to promote the realization of the new campus of intelligent campus.

3.1 Theoretical assumptions

Based on the main influencing factors of the evaluation index system of smart campus in new campus of universities, the paper analyzes the mechanism of the improvement of smart campus in new campus of universities, and puts forward the theoretical assumptions of this study, as shown in Table 1.

Table 1 Theoretical assumptions

Problem set	Content
A	Infrastructure environment has a significant positive effect on the improvement of smart campus in the smart new campus of universities
A1	The planned area of the new campus has a significant positive effect on the infrastructure environment
A2	The new campus planning investment has a significant positive effect on the infrastructure environment
A3	Prefabricated constructions have a significant positive effect on infrastructure environment
A4	Network hardware facilities have a significant positive effect on the infrastructure environment
A5	Smart constructions has a significant positive effect on infrastructure environment
A6	Landscaping has a significant positive effect on the infrastructure environment
A7	Communication infrastructure construction has a significant positive effect on the infrastructure environment
A8	The construction of energy consumption monitoring platform has a significant positive effect on the infrastructure environment

A9	The number of campus buildings has a significant positive effect on the infrastructure environment
B	Digital resources have a significant positive effect on the promotion of smart campus in new campus of universities
B1	Digital teaching resources have a significant positive effect on digital resources
B2	Digital book resources have a significant positive effect on digital resources
B3	Digital academic resources have a significant positive effect on digital resources
B4	Digital employment resources have a significant positive effect on digital resources
B5	Digital enrollment resources have a significant positive effect on digital resources
B6	The allocation of digital professional resources has a significant positive effect on digital resources
C	Management environment has a significant positive effect on the improvement of smart campus in new campus of universities
C1	The number of cost management talents has a significant positive effect on the management environment
C2	The number of planning and management talents has a significant positive effect on the management environment
C3	The number of management talents in the early stage has a significant positive effect on management environment
C4	Design management talents have a significant positive effect on management environment
C5	Construction management talents have a significant positive effect on the management environment
C6	The talents with overseas study experience have a significant positive effect on the management environment
C7	The talents with a graduate degree or above have a significant positive effect on the management environment
C8	The talents with associate senior titles and above have a significant positive effect on the management environment
D	Fusion innovation has a significant positive effect on the improvement of smart campus in new campus of universities
D1	The integration of teaching and research has a significant positive effect on the integration innovation
D2	Management service integration has a significant positive effect on integration innovation
D3	Analysis and decision fusion has a significant positive effect on fusion innovation
D4	The integration of achievement and model innovation has a significant positive effect on fusion innovation
D5	The integration of teaching practice has a significant positive effect on integration innovation
D6	Research service integration has a significant positive effect on fusion innovation
D7	Knowledge fusion at home and abroad has a significant positive effect on fusion innovation
E	Network security has a significant positive effect on the improvement of smart campus in new campus of universities
E1	Security system has a significant positive effect on network security
E2	Security management mechanism has a significant positive effect on network security
E3	The training of security managers has a significant positive effect on network security
E4	The security management of classified projects has a significant positive effect on network security
E5	The security management of classified documents has a significant positive effect on network security
E6	Campus educational administration system security management has a significant positive effect on network security
E7	Campus office system security management has a significant positive effect on network security
E8	Campus network security maintenance has a significant positive effect on network security

3.2 Data collection

This paper collects data by means of questionnaire survey. The objects of the questionnaire are the personnel related to the construction of smart campus in new campus of universities [5]. A total of 139 questionnaires were sent out

and 139 were collected. The effective recovery was 100%.

3.3 Descriptive statistical analysis and reliability and validity test

3.3.1 Descriptive statistical analysis

Descriptive statistical analysis can be used to summarize and analyze the distribution of the survey objects, and to interpret the data of the questionnaire content, including the analysis of the mean value and standard difference of the data, etc. In this paper, descriptive analysis will be used to make statistics on each factor, and the specific results are shown in Table 2.

Table 2 Descriptive statistics

The serial number	mean value	The standard deviation	The median	Number of samples
A Infrastructure environment				
A1	0.604	0.491	1	139
A2	0.540	0.500	1	139
A3	0.302	0.461	0	139
A4	0.698	0.461	1	139
A5	0.619	0.487	1	139
A6	0.403	0.492	0	139
A7	0.604	0.491	1	139
A8	0.381	0.487	0	139
A9	0.108	0.311	0	139
B Digital resources				
B1	0.827	0.379	1	139
B2	0.712	0.454	1	139
B3	0.511	0.502	1	139
B4	0.525	0.501	1	139
B5	0.475	0.501	0	139
B6	0.612	0.489	1	139
C Management environment				
C1	0.496	0.502	0	139
C2	0.799	0.403	1	139
C3	0.367	0.484	0	139
C4	0.82	0.385	1	139
C5	0.381	0.487	0	139
C6	0.338	0.475	0	139
C7	0.381	0.487	0	139
C8	0.194	0.397	0	139
D Fusion innovation				
D1	0.691	0.464	1	139
D2	0.583	0.495	1	139
D3	0.482	0.501	0	139
D4	0.719	0.451	1	139
D5	0.619	0.487	1	139

D6	0.583	0.495	1	139
D7	0.331	0.472	0	139
E Network security				
E1	0.647	0.479	1	139
E2	0.597	0.492	1	139
E3	0.446	0.499	0	139
E4	0.554	0.499	1	139
E5	0.475	0.501	0	139
E6	0.669	0.472	1	139
E7	0.561	0.498	1	139
E8	0.374	0.486	0	139

3.3.2 The reliability test

In this paper, Cronbach's alpha is used to examine the reliability. In general, Cronbach's alpha is above 0.6, which is considered to be highly reliable [6]. When the Klonbach coefficient is greater than or equal to 0.9, the reliability is very good. The reliability test of the survey results is shown in Table 3.

According to Table 3, the Klonbach coefficient of the questionnaire is generally above 0.8, indicating that the reliability of the whole questionnaire is good and meets the requirements of reliability test, indicating that the influencing factors of smart campus in new campus of universities designed by the questionnaire have been truly reflected.

Table 3 Reliability analysis of Cronbach

Name	Calibration Items of Total Correlation(CITC)	The deletedα coefficient	The Coefficient of Cronbach α
A Infrastructure environment			0.806
A1	0.192	0.805	
A2	0.160	0.806	
A3	0.228	0.803	
A4	0.271	0.802	
A5	0.197	0.805	
A6	0.251	0.803	
A7	0.302	0.801	
A8	0.308	0.801	
A9	0.301	0.802	
B Digital resources			
B1	0.190	0.804	
B2	0.224	0.804	
B3	0.329	0.800	
B4	0.193	0.805	
B5	0.229	0.804	
B6	0.452	0.796	
C Management environment			
C1	0.247	0.803	
C2	0.196	0.804	
C3	0.182	0.805	
C4	0.213	0.804	
C5	0.352	0.799	

C6	0.191	0.805	
C7	0.256	0.803	
C8	0.407	0.798	
D Fusion innovation			
D1	0.333	0.800	
D2	0.228	0.804	
D3	0.183	0.805	
D4	0.274	0.802	
D5	0.348	0.799	
D6	0.235	0.803	
D7	0.466	0.795	
E Network security			
E1	0.346	0.799	
E2	0.420	0.797	
E3	0.294	0.801	
E4	0.312	0.801	
E5	0.423	0.797	
E6	0.338	0.800	
E7	0.247	0.803	
E8	0.41	0.797	
The standardized of Cronbach α: 0.807			

3.3.3 The validity test

In this paper, the overall validity of the scale is tested, mainly from the structural validity [7]. In this paper, factor analysis method is used to verify the structural validity of the questionnaire. The process of factor analysis mainly plays the role of dimension reduction, and a few factors are used to replace multiple original variables.

Before factor analysis, KMO method and Bartlett sphere test are first tried to verify whether the partial correlation between variables is small and determine whether the data is suitable for factor analysis. The closer KMO is to 1, the better the factor analysis is. It is generally considered that when KMO is greater than 0.5, factor analysis is suitable.

Bartlett sphere test is mainly used to test the distribution of data and the independence of variables. In the factor analysis of Spss, if the SIG value of the Bartlett sphere test is less than 0.05, the data is distributed in a sphere.

In this paper, the results of the questionnaire are input into SPSS16.0 software for analysis, and the results are as follows: KMO value is 0.597, Approx. Chi-Square is about 1328.068 in the Bartlett sphere test, and sig value was 0, supporting factor analysis. The specific results are shown in Table 4.

Table 4 Validity test

KMO and bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.597	
Bartlett's Test of sphericity	Approx. Chi-Square	1328.068
	Df	703
	Sig.	0.0000

Exploratory factor analysis is conducted on 139 questionnaires with 38 questions constructed in this paper. A total of

8 principal components are extracted by principal component analysis, and the characteristic root values are all greater than 1. The cumulative variance interpretation rate of 8 principal components is 47.446%<50%, indicating that the amount of information extracted from principal components is very limited (shows as Table 5), so factor analysis method is used. Factor analysis has the rotation function, which can rotate the analysis terms of the same factor together, as shown in Table 6.

Factor analysis is rotated using the varimax method in order to find the corresponding relationship between factors and study items. Table 6 shows the information extraction of factors for research items and the corresponding relationship between factors and research items. As can be seen from Table 6, the common degree value of all research items is higher than 0.4, which means that there is a strong correlation between research items and factors, and factors can effectively extract information [8].

Table 5 Principal component analysis

The Load Factor									Common degrees
The principal components	1	2	3	4	5	6	7	8	
Infrastructure environment A									
A1	0.264	0.198	-0.222	-0.432	0.273	0.332	0.125	0.326	0.651
A2	0.160	0.573	0.046	-0.172	0.247	-0.097	0.059	0.231	0.513
A3	0.247	0.441	0.149	0.206	0.262	-0.145	-0.059	-0.260	0.481
A4	0.365	-0.186	0.057	0.030	-0.147	-0.246	0.163	-0.164	0.308
A5	0.253	-0.369	0.306	0.439	-0.097	0.068	0.019	0.125	0.516
A6	0.301	0.327	-0.312	-0.172	-0.196	0.310	-0.055	-0.125	0.478
A7	0.436	-0.550	-0.032	0.097	-0.028	-0.145	-0.086	-0.093	0.541
A8	0.384	-0.075	0.190	-0.036	-0.414	-0.220	-0.031	0.082	0.418
A9	0.363	0.258	-0.128	-0.413	-0.097	-0.055	-0.077	-0.163	0.430
Digital resources B									
B1	0.267	-0.475	0.204	-0.324	0.201	0.103	0.197	0.153	0.556
B2	0.258	-0.008	0.291	0.267	-0.029	0.373	0.008	-0.222	0.412
B3	0.358	0.348	0.049	0.300	0.006	-0.203	0.417	0.316	0.656
B4	0.213	0.262	0.338	0.005	-0.123	-0.049	-0.342	-0.198	0.401
B5	0.293	0.155	-0.268	-0.290	-0.263	-0.082	-0.042	0.233	0.398
B6	0.557	-0.226	-0.140	0.136	-0.108	-0.049	-0.010	-0.141	0.434
Management environment C									
C1	0.280	0.197	0.415	-0.238	-0.217	-0.038	0.273	-0.218	0.517
C2	0.255	-0.395	0.345	-0.121	0.130	0.275	-0.231	0.080	0.507
C3	0.158	0.403	0.418	0.145	-0.055	0.101	0.461	-0.063	0.613
C4	0.276	-0.081	0.020	0.058	0.189	0.190	-0.101	0.118	0.183
C5	0.430	0.152	0.212	-0.255	-0.038	-0.382	-0.321	-0.099	0.578
C6	0.244	0.317	-0.444	0.354	-0.234	0.088	0.034	0.003	0.546
C7	0.344	0.112	-0.402	0.126	0.334	0.026	-0.055	-0.308	0.518
C8	0.484	0.049	-0.082	-0.176	0.297	-0.129	-0.177	-0.191	0.447
Digital resources D									
D1	0.430	-0.230	0.153	-0.349	0.101	-0.123	0.181	-0.034	0.442
D2	0.267	0.081	0.234	-0.056	-0.296	0.484	-0.137	-0.148	0.498
D3	0.200	0.091	0.342	0.265	0.505	-0.168	0.125	-0.112	0.547

D4	0.336	0.053	0.055	0.124	-0.357	0.033	-0.023	0.467	0.481
D5	0.459	-0.095	-0.331	0.007	0.283	0.196	0.017	-0.178	0.480
D6	0.320	-0.153	-0.150	0.107	-0.007	-0.427	-0.136	0.131	0.378
D7	0.554	0.149	-0.222	0.158	-0.030	0.171	0.176	0.019	0.465
Network security E									
E1	0.421	-0.273	0.108	-0.281	0.105	0.185	0.382	-0.040	0.535
E2	0.498	-0.009	0.177	0.102	0.070	0.141	-0.361	0.298	0.533
E3	0.297	0.377	0.411	-0.062	-0.125	0.050	-0.144	0.014	0.442
E4	0.380	0.108	0.027	0.082	0.301	-0.181	-0.022	0.232	0.342
E5	0.505	0.027	-0.037	0.249	0.222	0.127	-0.302	0.247	0.537
E6	0.450	-0.241	-0.244	0.177	-0.069	-0.042	0.341	-0.076	0.480
E7	0.312	-0.014	-0.176	0.232	-0.208	0.145	-0.057	-0.148	0.272
E8	0.528	-0.133	-0.227	-0.176	-0.280	-0.185	0.050	-0.055	0.497

Table 6 Factor analysis

Table of factor loading coefficients after rotation																
Name	The loading factor															Common degrees
	Factor1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10	Factor 11	Factor 12	Factor 13	Factor 14	Factor 15	
A Infrastructure environment																
A1	0.13	0.276	0.064	0.236	0.13	-0.652	-0.131	-0.137	0.057	0.163	-0.06	0.208	0.011	-0.05	0.052	0.713
A2	-0.009	0.016	0.43	0.042	0.157	-0.377	-0.066	0.374	-0.202	0.104	-0.155	0.18	-0.122	-0.197	0.17	0.689
A3	0.037	-0.184	0.482	0.274	0.257	-0.037	0.029	0.197	0.096	-0.171	0.105	-0.29	0.057	-0.094	-0.196	0.634
A4	0.277	0.065	-0.004	-0.132	0.319	0.257	0.302	-0.106	0.206	-0.271	-0.118	0.295	0.263	-0.082	-0.013	0.662
A5	0.036	0.273	0.118	0.177	-0.024	0.701	-0.091	0.014	0.067	-0.114	-0.018	0.218	-0.02	0.066	0.09	0.699
A6	0.254	-0.083	0.02	-0.036	0.229	-0.154	-0.173	0.13	0.322	0.515	0.074	0.034	-0.04	0.102	0.023	0.585
A7	0.27	0.277	-0.178	0.252	0.157	0.333	0.39	-0.191	-0.11	-0.002	0.142	-0.079	0.019	0.139	-0.058	0.630
A8	0.025	0.059	0.147	0.054	-0.011	0.114	0.767	-0.073	0.063	0.219	0.076	0.141	-0.1	0.126	0.094	0.748
A9	0.444	0.019	0.084	-0.001	0.112	-0.175	0.146	0.228	0.322	0.124	-0.116	-0.153	-0.015	-0.324	0.205	0.624
B Digital resources																
B1	-0.01	0.773	-0.022	0.023	0.003	0.037	0.066	-0.142	0.072	-0.047	0.083	0	0.048	-0.202	0.147	0.703
B2	0.061	0.028	0.113	0.132	0.053	0.085	0.092	0.13	0.084	-0.016	-0.004	-0.019	-0.029	0.821	0.097	0.762
B3	0.108	-0.085	0.705	0.082	0.02	0.108	0.061	-0.155	-0.116	0.193	0.016	0.163	0.253	-0.027	0.153	0.728
B4	0.081	-0.077	0	0.024	-0.058	0.105	0.002	0.834	0.038	0.04	0.024	0.035	0.059	0.16	0.067	0.762
B5	0.081	0.044	0.027	-0.007	0.047	-0.108	0.181	-0.017	-0.002	0.799	0.081	0.05	0.095	-0.065	-0.041	0.718
B6	0.247	0.178	-0.098	-0.007	0.348	0.289	0.071	0.096	0.097	0.078	0.399	0.239	0.174	-0.05	0.137	0.605
C Management environment																
C1	0.089	0.134	0.251	-0.267	-0.103	-0.166	0.274	0.269	0.347	-0.113	0.131	0.093	0.356	0.123	-0.04	0.648
C2	-0.036	0.63	-0.13	0.34	-0.001	0.232	-0.061	0.212	0.049	0.104	-0.082	-0.029	-0.17	0.155	-0.18	0.739
C3	0.031	0.049	0.76	-0.065	-0.14	-0.038	0.055	0.035	0.17	-0.057	0.001	-0.067	-0.026	0.237	-0.07	0.709
C4	0.01	0.12	-0.0	0.14	0.05	0.02	0.04	0.06	0.03	-0.03	0.06	-0.03	0.06	0.07	0.87	0.827

	3	3	16	1		7	4	2	7		2	8		6	5	
C5	0.144	-0.016	-0.004	0.211	0.142	-0.175	0.591	0.423	0.012	-0.086	-0.007	0.033	0.136	-0.114	-0.038	0.686
C6	0.348	-0.365	0.246	0.094	0.29	0.198	-0.219	-0.11	0.15	0.188	0.056	0.251	-0.269	-0.146	0.004	0.725
C7	0.149	-0.098	-0.012	0.065	0.788	-0.013	-0.089	-0.114	0	0.117	0.007	-0.074	0.091	0.121	0.041	0.721
C8	0.027	0.204	0.001	0.15	0.65	-0.166	0.291	0.117	0	0.039	0.099	-0.011	0.01	-0.087	0.031	0.635
D Fusion innovation																
D1	0.424	0.441	0.009	0.083	-0.049	-0.016	0.096	0.092	0.021	0.03	-0.114	-0.096	0.435	0.024	-0.223	0.665
D2	-0.034	0.091	0.044	0.148	-0.009	0.066	0.026	0.011	0.805	0.063	0.123	0.012	0.023	0.078	0.043	0.714
D3	-0.299	0.257	0.384	0.034	0.37	0.119	-0.08	0.251	-0.28	-0.146	0.178	-0.068	0.192	0.101	-0.053	0.710
D4	0.055	-0.014	0.022	0.198	-0.076	-0.004	0.133	0.091	0.033	0.049	0.106	0.823	0.046	0.006	-0.047	0.771
D5	0.515	0.123	-0.026	0.333	0.221	-0.185	-0.118	-0.061	-0.017	-0.13	0.269	-0.16	-0.016	0.061	0.093	0.621
D6	0.219	0.048	0.051	0.196	-0.028	0.329	0.158	0.102	-0.32	0.286	0.21	-0.171	0.108	-0.295	0.094	0.601
D7	0.504	-0.036	0.19	0.186	0.146	-0.069	-0.115	0.057	-0.006	0.128	0.173	0.239	0.145	0.276	0.081	0.576
E Network security																
E1	0.283	0.623	0.103	-0.126	0.11	-0.067	0.057	-0.045	0.042	0.026	0.037	0.068	0.047	0.169	0.151	0.578
E2	0.014	0.089	0.029	0.722	0.028	0.01	0.159	0.046	0.203	0.023	0.047	0.166	0.195	0.046	-0.045	0.672
E3	-0.114	0.115	0.397	0.163	0.101	0.037	0.154	0.375	0.355	0.076	-0.062	0.123	-0.164	-0.136	-0.096	0.592
E4	-0.001	-0.011	0.112	0.278	0.177	0.03	-0.068	0.022	-0.017	0.113	-0.032	0.066	0.764	-0.054	0.119	0.746
E5	0.176	-0.018	0.08	0.698	0.125	0.017	0.047	0.038	-0.028	-0.024	0.055	0.082	0.062	0.093	0.233	0.622
E6	0.489	0.157	0.092	0.022	0.064	0.005	0.093	-0.14	-0.196	-0.167	0.515	0.219	-0.046	0.06	-0.019	0.692
E7	-0.001	-0.035	0.013	0.077	0.04	0.027	0.041	0.025	0.147	0.158	0.843	0.021	-0.05	-0.006	0.044	0.773
E8	0.695	0.117	-0.031	0.039	0.029	0.141	0.214	0.114	-0.047	0.27	-0.021	0.062	0.021	-0.024	-0.058	0.662

IV. Comprehensive Effect Test

According to the results of grounded theory on the influencing factors of smart campus in new campus of universities and the analysis of conceptual model and theoretical hypothesis, the chi-square value, approximate root mean square error, goodness of fit index and other evaluation indicators are used to test the overall fitting degree of the model, as shown in Table 7. As can be seen from Table 7, the relative fitting index CFI is between 0 and 1. The closer it is to 1, the better the overall fitting of the model will be. It is generally considered that a RMSEA below 0.1 indicates a good fit.

The results of normality test show that the fitting degree of the model is high. As can be seen from Table 8, each path relationship is within the error range of about 0.10, indicating that these five influencing factors have a significant impact on the smart new campus of universities. Therefore, for hypothesis A, the infrastructure environment has A significant positive effect on the improvement of smart campus in the new campus of universities, and the hypothesis is valid. The same is true for B, C, D, and E. The simulation results show the influence effect and mechanism of the influencing factors of the smart new campus of universities [9].

Table 7 Fitting index of comprehensive effect model

Item	Chi-square value	Degrees of freedom	GFI	RMSEA	RMR	CFI	NFI	NNFI
Model	1054.08	655	0.722	0.066	0.021	0.488	0.289	0.451

Table 8 Normality test analysis results

Name	Sample size	Average	Standard deviation	Partial degrees	Kurtosis	Kolmogorov-Smirnov Test		Shapro-Wilk Test	
						statistic	p	statistic	p
Infrastructure environment A									
A1	139	0.604	0.491	-0.431	-1.841	0.394	0.000**	0.620	0.000**
A2	139	0.540	0.500	-0.161	-2.003	0.361	0.000**	0.634	0.000**
A3	139	0.302	0.461	0.871	-1.259	0.442	0.000**	0.577	0.000**
A4	139	0.698	0.461	-0.871	-1.259	0.442	0.000**	0.577	0.000**
A5	139	0.619	0.487	-0.494	-1.782	0.402	0.000**	0.616	0.000**
A6	139	0.403	0.492	0.400	-1.867	0.391	0.000**	0.623	0.000**
A7	139	0.604	0.491	-0.431	-1.841	0.394	0.000**	0.62	0.000**
A8	139	0.381	0.487	0.494	-1.782	0.402	0.000**	0.616	0.000**
A9	139	0.108	0.311	2.555	4.594	0.528	0.000**	0.357	0.000**
Digital resources B									
B1	139	0.827	0.379	-1.751	1.082	0.503	0.000**	0.457	0.000**
B2	139	0.712	0.454	-0.948	-1.118	0.449	0.000**	0.567	0.000**
B3	139	0.511	0.502	-0.044	-2.027	0.346	0.000**	0.636	0.000**
B4	139	0.525	0.501	-0.102	-2.019	0.353	0.000**	0.635	0.000**
B5	139	0.475	0.501	0.102	-2.019	0.353	0.000**	0.635	0.000**
B6	139	0.612	0.489	-0.463	-1.812	0.398	0.000**	0.618	0.000**
Management environment C									
C1	139	0.496	0.502	0.015	-2.029	0.342	0.000**	0.636	0.000**
C2	139	0.799	0.403	-1.505	0.269	0.49	0.000**	0.491	0.000**
C3	139	0.367	0.484	0.558	-1.713	0.409	0.000**	0.61	0.000**
C4	139	0.820	0.385	-1.685	0.853	0.5	0.000**	0.466	0.000**
C5	139	0.381	0.487	0.494	-1.782	0.402	0.000**	0.616	0.000**
C6	139	0.338	0.475	0.692	-1.544	0.424	0.000**	0.597	0.000**
C7	139	0.381	0.487	0.494	-1.782	0.402	0.000**	0.616	0.000**
C8	139	0.194	0.397	1.563	0.448	0.493	0.000**	0.483	0.000**
Fusion innovation D									
D1	139	0.691	0.464	-0.834	-1.324	0.438	0.000**	0.581	0.000**
D2	139	0.583	0.495	-0.339	-1.913	0.383	0.000**	0.626	0.000**
D3	139	0.482	0.501	0.073	-2.024	0.35	0.000**	0.636	0.000**
D4	139	0.719	0.451	-0.987	-1.04	0.453	0.000**	0.562	0.000**
D5	139	0.619	0.487	-0.494	-1.782	0.402	0.000**	0.616	0.000**
D6	139	0.583	0.495	-0.339	-1.913	0.383	0.000**	0.626	0.000**
D7	139	0.331	0.472	0.726	-1.494	0.427	0.000**	0.593	0.000**
Network security E									

E1	139	0.647	0.479	-0.624	-1.634	0.416	0.000**	0.604	0.000**
E2	139	0.597	0.492	-0.400	-1.867	0.391	0.000**	0.623	0.000**
E3	139	0.446	0.499	0.219	-1.981	0.368	0.000**	0.632	0.000**
E4	139	0.554	0.499	-0.219	-1.981	0.368	0.000**	0.632	0.000**
E5	139	0.475	0.501	0.102	-2.019	0.353	0.000**	0.635	0.000**
E6	139	0.669	0.472	-0.726	-1.494	0.427	0.000**	0.593	0.000**
E7	139	0.561	0.498	-0.249	-1.966	0.372	0.000**	0.631	0.000**
E8	139	0.374	0.486	0.526	-1.749	0.405	0.000**	0.613	0.000**
* p<0.05 ** p<0.01									

To sum up, through the analysis and comparison of the results, there is a cross relationship between the influencing factors of the new campus intelligence, infrastructure environment, digital resources, management environment, integration and innovation, and network security have a direct and positive impact on the smart new campus of universities. Although the influence of each factor on t the smart new campus of universities is different, the influence of each indicator on the smart new campus of universities needs further analysis.

IV. Establishment of Evaluation Index System of the Smart New Campus of Universities

4.1 General situation

According to the general construction principles of the evaluation index system of the smart new campus of universities, through the reliability and validity analysis and structural equation analysis of the influencing factors of the smart new campus of universities, 38 evaluation indexes that can better reflect the whole picture of the smart new campus of universities are finally determined, as shown in Table 9.

Finally, the evaluation index system of the smart new campus of universities is determined. Criteria layer is the first level of indicators, including infrastructure environment, digital resources, management environment, integration and innovation, network security. There are a number of bottom-layer indicators under the first-level indicators of each criterion layer, and there are 38 bottom-layer indicators in total. These indicators are the key to the level of intelligence of the new campus of universities, and also the focus of the evaluation index system.

Table 9 Overview of evaluation index system

Criterion layer index (5)		Index layer index (38)	
Name	The serial number	Name	The serial number
Infrastructure environment	A	New campus planned area	A11
		New campus planned investment	A12
		Prefabricated construction	A13
		Network hardware facilities	A14
		Construction intelligence	A15
		landscaping	A16
		Communication infrastructure construction	A17
		Construction of energy consumption monitoring platform	A18
		The number of buildings on campus	A19
Digital resources	B	Digital Teaching Resources	B21
		Digital Book Resources	B22

		Digital academic affairs resources	B23
		Digital Employment resources	B24
		Digital Enrollment Resources	B25
		Digital professionals allocate resources	B26
Management environment	C	The number of cost management talents	C31
		The number of planning management personnel	C32
		The number of early management talents	C33
		The number of design management talents	C34
		The number of construction management talents	C35
		People who have studied abroad	C36
		Master degree and above	C37
		Associate senior title and above	C38
Fusion innovation	D	Integration of teaching and research	D41
		Management Service Convergence	D42
		Analysis and decision fusion	D43
		Achievement and model innovation integration	D44
		Integration of teaching practice	D45
		Integration of scientific research services	D46
		Integration of domestic and foreign knowledge	D47
Network security	E	Security system	E51
		Safety management mechanism	E52
		Safety management personnel training	E53
		Security management of classified projects	E54
		Security management of classified documents	E55
		Campus educational administration system security management	E56
		Campus office system security management	E57
		Campus network security maintenance	E58

4.2 Determination of evaluation index weight of the smart new campus of universities

The analytic hierarchy process is used to determine the weight of indicators. The analytic hierarchy process can be divided into the following four steps:

4.2.1 Analyze the relationship between various factors in the system and establish the hierarchical structure of the system

According to the requirements of the evaluation index system of the smart new campus of universities, the number of layers is three. The top layer is the target layer of the smart new campus evaluation index system of universities, which has only one element, the smart new campus evaluation value of universities; The second level is the first criterion layer, including five dimensions, namely infrastructure environment, digital resources, management environment, integration and innovation, network security. The third level is the second criterion layer, including 38 elements as the criterion layer of the index system.

4.2.2 Pairwise comparison is made between the importance of each element in the same level and a criterion in the upper level, and pairwise comparison discriminant matrix is constructed.

After the establishment of the hierarchical structure of the evaluation index system for the smart new campus of universities, the relative importance of the index factors at the upper level and the related sub-indexes at the next

level are compared in pairs, and the specific scale value is expressed and written in the form of matrix, which is the judgment matrix.

4.2.3 Calculate the relative weight of the compared elements to the criterion by the discriminant matrix
We have n elements $n_1,\ n_2 \ldots\ldots n_n$For criterion C, the judgment matrix is A, Find $n_1,\ n_2, \ldots\ldots n_n$ the criterion C of the relative weight to $w_1,\ w_2 \ldots\ldots w_n$,it is a vector $W = (w_1, w_2, \ldots\ldots, w_n)^T$.

4.2.4 Calculate the composite weight of each layer element to the system target, and rank it
When using the method of AHP pair comparison to construct the judgment matrix, there is an unavoidable problem, that is, experts or investigators in the form of random or other factors, so that the recovery of the questionnaire subsystems and indicators of the upper system of the role of the degree of deviation.

4.3 Index aggregation method and calculation process
The order of the evaluation index system of the smart new campus of universities is "bottom-up", that is, the index layer is aggregated to form the second criterion layer index. The second layer index is aggregated to form the first criterion layer index, that is, the target layer index——the evaluation value of the smart new campus of universities

Specific calculation, using the weighted average method, in view of each indicator set corresponding weights, and then add the weight of each index value and the corresponding product, and can be assessed value. This method can highlight the characteristic of the smart new campus of universities characteristics, improve the efficiency of the smart new campus evaluation and fairness. The specific polymerization process is as follows:

$$S = \sum_{i=1}^{n} W_i \times V_i \qquad i \in [1, n] \tag{1}$$

Among them, S represents the intelligent evaluation value, W_i represents the weight value of each sub-index combination, and V_i represents the evaluation score of each sub-index.

SPSS was used for fuzzy comprehensive evaluation, and the weight of the evaluation model of the smart new campus of universities is obtained. The total ranking is shown in Table 10. As can be seen from the results in Table 10, the influencing factors of the smart new campus of universities are digital resources, integrated innovation, network security, infrastructure environment and management environment in order. The top 10 bottom indicators are digital teaching resources, the number of planning and management talents, the number of design and management talents, digital book resources, achievement and mode innovation integration, network hardware supporting facilities, teaching and research integration, security system, campus educational administration system security management, new campus planning area, building intelligence. Among them, the number of the planning management personnel, design, management talent in the second place, digital library resources and the achievement and pattern innovation fusion is in fourth rank, network hardware facilities and integration for teaching and scientific research as the sixth, security system, the school educational administration system and safety management in eighth place, the new campus planning area, intelligent building is in 10th rank [10].

Table 10 Ranking of the smart new campus of universities

Criterion layer index					Index layer index				
Name	NO	membership	Normalization of membership	ranking	Name	NO.	membership	Normalization of membership	ranking
Infrastructure environment	A	0.02	0.02	4	New campus planned area	A11	0.032	0.032	10
					New campus planned investment	A12	0.028	0.028	19
					Prefabricated construction	A13	0.015	0.015	35
					Network hardware facilities	A14	0.035	0.035	6
					Construction intelligence	A15	0.032	0.032	10

					landscaping	A16	0.020	0.020	28
					Communication infrastructure construction	A17	0.030	0.030	12
					Construction of energy consumption monitoring platform	A18	0.018	0.018	29
					The number of buildings on campus	A19	0.004	0.004	38
Digital resources	B	0.03	0.03	1	Digital Teaching Resources	B21	0.044	0.044	1
					Digital Book Resources	B22	0.037	0.037	4
					Digital academic affairs resources	B23	0.024	0.024	22
					Digital Employment resources	B24	0.027	0.027	20
					Digital Enrollment Resources	B25	0.024	0.024	22
					Digital professionals allocate resources	B26	0.029	0.029	16
Management environment	C	0.02	0.02	5	The number of cost management talents	C31	0.024	0.024	22
					The number of planning management personnel	C32	0.043	0.043	2
					The number of early management talents	C33	0.018	0.018	29
					The number of design management talents	C34	0.043	0.043	2
					The number of construction management talents	C35	0.018	0.018	29
					People who have studied abroad	C36	0.016	0.016	34
					Master degree and above	C37	0.018	0.018	29
					Associate senior title and above	C38	0.008	0.008	37
Fusion innovation	D	0.03	0.03	2	Integration of teaching and research	D41	0.035	0.035	6
					Management Service Convergence	D42	0.030	0.030	12
					Analysis and decision fusion	D43	0.024	0.024	22
					Achievement and model innovation integration	D44	0.037	0.037	4
					Integration of teaching practice	D45	0.030	0.030	12
					Integration of scientific research services	D46	0.030	0.030	12
					Integration of domestic and foreign knowledge	D47	0.014	0.014	36
Network security	E	0.03	0.03	3	Security system	E51	0.033	0.033	8
					Safety management mechanism	E52	0.029	0.029	16
					Safety management personnel training	E53	0.022	0.022	26
					Security management of classified projects	E54	0.027	0.027	20
					Security management of classified documents	E55	0.022	0.022	26
					Campus educational administration system security management	E56	0.033	0.033	8
					Campus office system security management	E57	0.029	0.029	16
					Campus network security maintenance	E58	0.017	0.017	33

V. Conclusions and Suggestions

5.1 The research conclusion

The development of the new campus of colleges and universities campus wisdom comes from professional talents gathered themselves together, and the influence factors of the smart new campus of universities, the core lies in the wisdom of the ascension of campus, its direct impact on the cluster development of the new campus of colleges and universities campus wisdom, the wisdom campus of campus construction of evaluation index system should focus on the study of the crystalline ascension of campus.

5.1.1 The evaluation perspective of the evaluation index system change of the smart new campus of universities
At present, the opinion of the smart new campus of universities has not yet been established standards, domestic colleges and universities mainly aimed at the evaluation of the smart new campus of universities influence factors produced by the "fruit", including the smart new campus of universities, the influence and the performance evaluation, on the influence factors of the research on the "cause" is less. Lack of attention to the special class of intelligent, lack of the construction of t the smart new campus of universities. Because the difference between the smart new campus of universities and other industries lies in the experience and immersion, the smart new campus of universities plays a very important role in the output of smart class. Therefore, it is necessary to deeply on the campus with the wisdom of campus class compatibility and coordinated degree, the smart new campus of universities environment satisfaction and fitness, the benign influence of the content of the in-depth study, to quantify the interaction between people and the environment, In order to build a more suitable environment for the development.
5.1.2 Study on evaluation index system of the smart new campus of universities to enhance research value
The smart new campus evaluation index system is through universities related management personnel of the smart new campus of universities, satisfaction research, finding the disadvantages, according to the use of specific experience for the purpose of improvement and development more than improve the hardware facilities to improve the "smart" of campus gathered force. Reducing the cost of school construction, promoting knowledge spillover, and serve for the gathering ability of the smart new campus of universities. The final result is to improve the management level of campus, and then bring about the promotion of social value, so as to improve the value and ranking of comprehensive evaluation.

5.2 Countermeasures and suggestions

5.2.1The study of evaluation index system should focus on improving the intelligence of new campus

The smart new campus of universities can not only bring about the promotion of modern science and technology life, but also improve the economic environment and social outlook. Colleges and universities are the main body of scientific and technological innovation, and provide a large amount of environmental, technological and human resources support for scientific and technological innovation. At the same time, the sustainable development of intelligent campus also provides a place and platform for the communication and interaction between teachers and students in spirit, culture and perception, and promotes the construction of intelligent city. In this process, the smart class which widely exists in the campus public space is the most direct experience of the intelligent environment, and the intelligent class needs a loose environment to develop the intelligent campus. It can be considered that the appropriate environment is the foundation of the smart new campus of universities. The evaluation index system of the smart new campus of universities should be able to find the main line running through the whole development of the smart new campus of universities and contain profound humanistic value, which can make the interaction between smart class and smart environment. It is not only the starting point of the development of the smart new campus of universities, but also the end result of the development of the smart new campus of universities.

5.2.2 The study of evaluation index system should focus on strengthening the integration of each function module of the smart new campus of universities

Only by tracing back to the source of the smart we fundamentally solve the problem of the smart campus construction in new campus of universities. The smart new campus is a phenomenon, which is a result of a large number of campus study, research, life and service. The construction of the smart new campus of universities is the responsibility of the professional management personnel. It can be seen that the smart new campus of universities is a result of the aggregation of related professional talents. The key link of how to fundamentally improve the aggregation degree of talents and smart management is to adapt to the life and development of smart management talents in the environment of the smart new campus of universities. The research on the smart evaluation index system of the smart new campus of universities should consider and analyze the demands of teachers and students and professional management talents fundamentally. In the process of continuously improving the intelligence of the new campus, the intelligent management ability should be further enhanced, so as to drive the development of the intelligence of related fields. Through the research on the evaluation index system, the clustering mechanism of diversity can be decomposed. Compared with the typical the smart new campus of universities in similar conditions, it can be used for reference for the relatively "unintelligent" campus, and the intelligent data can be converted into the added value of campus construction.

5.2.3 The study of evaluation index system should focus on optimizing the allocation of the smart new campus of universities

The development of smart campus can not only eliminate the management barriers of various departments in colleges and universities, but also adapt to the development of digital age. All kinds of resources should be allocated effectively to further promote the intelligent development of new campus. Evaluation index system is to solve how to break barriers restricting innovation strategy and the system, create new vigor and the potential of creating liberation, improve the efficiency of information, knowledge, technology, management and interests, strengthening results and innovation industry docking, enhance the contribution of scientific and technological progress and economic development.

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