

The Informationized Teaching Evaluation Indicator System for College English Teachers

Guorong Shen*, Ying Li, Qi Zhang

School of Foreign Languages, Henan University of Technology, Zhengzhou, Henan, 450053, China
Shengguorong2006@163.com

*Corresponding author

Abstract: The big data analysis has been applied to the public education in some countries and has become an important force in the educational reform. However, the current research on data intelligence is still relatively weak. How to improve the teachers' data intelligence and make them possess the ability to implement teaching activities in the era of big data have become urgent problems. Based on researches about systemic summary of teachers' informationized teaching and its structure, this paper aims at building a scientific and effective informationized teaching evaluation indicator system for college English teachers, so as to render a basis for the measurement and evaluation of college English teachers' informationized teaching and provide reference for the implementation of college English teacher training activities.

Keywords: College English Teachers, Informationized Teaching, Evaluation Indicator System

1. Introduction

In the formulation of *Guide to College English Teaching* (2015), Institution of Higher Education Foreign Language Teaching Steering Committee of Ministry of Education emphasized that, the purpose was to achieve effective teaching by integration of modern information technology and College English teaching so as to improve quality and quantity of teaching materials, to update teaching methods and to change learning habits.”[1] To achieve the integration of modern information technology and College English teaching, the teachers should reposition the role of their own, update teaching ideas and improve their teaching ability. In the face of massive learning resources, the learning methods have undergone tremendous changes from the traditional models to e-learning, mobile learning, U-learning, smart learning and deep learning. These new learning methods provide a solid platform and basis for human information exchange and innovation development. However, these big data-based learning methods have not been adequately reflected in China's foreign language teaching. The traditional class teaching is still the mainstream. For example, the students accept teaching with the same mode, contents and progress, and they are subject to limited choice and utilization of technologies and resources. Therefore, it is essential to reconstruct a new appropriate and effective paradigm of foreign language teaching by relying on “Internet +”, so as to make China's foreign language teaching keep pace with the big data era.” (Chen Jian-lin, 2017). [2]Based on the researches on systemic summary of teachers' informationized teaching and its structure, this paper aims at building a scientific and effective informationized teaching evaluation indicator system for college English teachers, so as to render a basis for the measurement and evaluation of college English teachers' informationized teaching and provide reference for the implementation of college English teacher training activities.

2. Literature Review

There are prolific researches and discussions on “the informationized teaching ability”. Fan Wen-fang (2015) held that “teachers' informationized teaching ability included informationized teaching awareness, basic informational technology skills, informationized teaching design and implementation ability”. [3]Wang Wen-jun & Wang Wei-jun (2012) argued that “the informationized teaching ability was divided into six sub-abilities: the informationized teaching transfer ability, informationized teaching integration ability, the informationized teaching communication ability, the informationized teaching assessment ability, the informationized collaborative teaching ability, and the

ability to promote students' informationized learning". [4]According to Li Juan & Zhang Jia-ming (2011), "the informationized teaching ability was the theories and practices of informationized teaching attitude, informationized teaching concept, informationized teaching skills, informationized teaching implementation, and informationized teaching R&D necessary for teachers to meet the needs of professional development". Among these, the informationized teaching ability was divided into the informationized teaching design ability, the informationized teaching implementation ability and the informationized teaching monitoring ability." [5] According to Li Tian-long (2011), "In the narrow sense, the informationized teaching ability mainly referred to all abilities associated with specific teaching activities, including the information technology and subject curriculum integration ability, the informationized teaching design ability, the informationized teaching resource design and development ability, the informationized teaching implementation ability, the informationized teaching evaluation ability, and the informationized teaching monitoring ability." [6]The informationized teaching design referred to make full reasonable use of the student-centered modern information technology and information resources through the systematic approach, implement specific planning over the teaching objectives, teaching contents, teaching methods, teaching strategies, teaching evaluation and other teaching aspects, and created the process or program of the teaching system, so as to promote the efficiency and quality of learners. "Compared with the traditional teaching design ability, the informationized teaching design ability had undergone great changes in educational theory support, structural system, ability connotation and technical influence." (He Qiu-Lin, 2012).[7]

Many foreign experts also put forward the view of "the informationized teaching ability". Shulman & Taylor, H G. (1999) presented how to consider the "pedagogical content knowledge", and emphasized that the professionalism of teachers was an ability that distinguished teachers from pedagogical experts and general education experts, thereby constituting the core of fundamental professional subject matter knowledge. Pedagogical content knowledge (PCK) is particularly important for teacher knowledge and theory development. With the continuous development of information technology and education, the traditional PCK cannot explain the teaching abilities under the informationized environment. Based on Shulman's PCK, the American scholar Koehler & Mishra published TPACK (Abbreviation for Technological Pedagogical Content Knowledge) in 2005. [8]

This paper argues that the college English teachers' informationized teaching design ability includes the ability to understand and practice *College English Curriculum Requirements*, and the ability to analyze the learners and learning contents. In summary, the author believed that the college English teachers' informationized teaching ability is the core ability for college English teachers' professional development in the informationized society. It refers to the teacher's ability to organically integrate the information technology and information resources with the college English curriculum teaching activities under the guidance of modern education theory, so as to promote the students' development of informationized learning ability.

3. Research Methods

3.1 Indicator Questionnaire

(1) Extraction of Questionnaire Elements

With "informationized teaching" as the retrieval words and retrieval items as articles, a total of 1,925 articles were retrieved (2015-2022). With "the informationized teaching ability" as the retrieval words and retrieval items as articles, a total of 474 articles were retrieved (2015-2022). With the retrieval items as keywords, a total of 306 articles were retrieved. E-teaching ability and e-learning ability were used as keywords in SCOPUS, the world's largest digest and citation database, a total of 30 and 1,505 articles were collected respectively (2015-2022) from the article, abstract and keyword options. Moreover, a total of 10 and 26 articles were respectively collected from the article option with E-teaching ability and e-learning ability as keywords (2015-2022). Obviously, the foreign researches on the informationized teaching ability mainly focus on the study of e-learning, yet there is few studies on the related e-teaching ability. Since there are relatively few foreign studies about "the informationized teaching ability", this paper mainly summarizes the studies made during the period from 2015 to 2022. After identification and screening, a total of 160 articles related to this study were collected (topics concerning "the informationized teaching ability", "the college English teachers' teaching skills", "the informationized English teaching ability", "the development of college English informationized teaching ability", "the professional development of college English teachers"), and the elements about the teachers' informationized teaching ability questionnaire were selected.

(2) Questionnaire Design

After the initial completion of the questionnaire, the author conducted a questionnaire self-evaluation. The evaluation was implemented by referring to the standards mentioned by Qin Xiao-qing (2009: 130) in Questionnaire Self-evaluation Form (Whether double or multiple meanings were contained; whether generalized and vague words were used; whether it was a precondition or tendency; whether the answers might be monotonous; whether the sentence structures were simple; whether the sentences were too long; whether terminology was used; whether the reverse questions were used; whether it was beyond the respondent's knowledge). The author randomly arranged the current status and impact factors, randomly determined the order of questions, and adjusted 33 questionnaire questions. [9-11]

(3) Questionnaire Process

The author networked the questionnaire through wxj.cn platform and conducted the survey through the QQ group and Email to promote the questionnaire to college English teachers. The collected data were processed via the SPSS software, the structural validity and reliability of the questionnaire were examined, and the secondary indicators of the informationized teaching ability were reconfirmed indirectly. In this online survey, a total of 180 questionnaires were collected. The questionnaires were mainly delivered through the QQ group, Email and other platforms. On one hand, the researcher sent the questionnaire link address to college English teachers in a grouped way. On the other hand, the questionnaire link address was forwarded by other person. Therefore, the questionnaires were delivered in an open way with orientation to wide objects, resulting in difficulty in making statistics of the recovery rate. After testing, the author abandoned 3 invalid questionnaires with the completion time less than 510 seconds. The author selected 177 effective questionnaires, with an effective rate of 98.3%.

For the 177 effective questionnaires, there are 43 male respondents and 134 female respondents, accounting for 24.3% and 75.5% respectively (as shown in Figure 1).

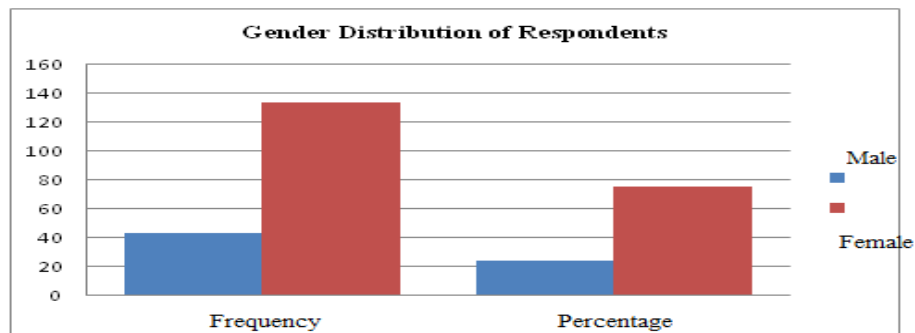


Figure 1: Gender Distribution of Respondents

The respondents' teaching experience is distributed over different years (as shown in Figure 2). Among them, 37 teachers have a teaching experience of less than 3 years, accounting for 20.9%; 74 teachers with 3-5 years, accounting for 41.8%; 38 teachers with 6-10 years, accounting for 21.5%; 28 teachers with more than 10 years, accounting for 15.8%.

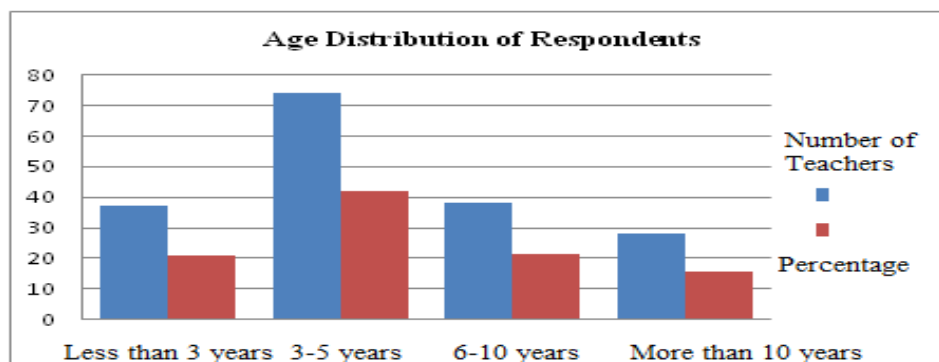


Figure 2: Teaching Experience Distribution of Respondents

The respondents have different qualifications, most of whom are undergraduate and postgraduate

students, accounting for 20.8% and 62.5% respectively (as shown in Figure 3).

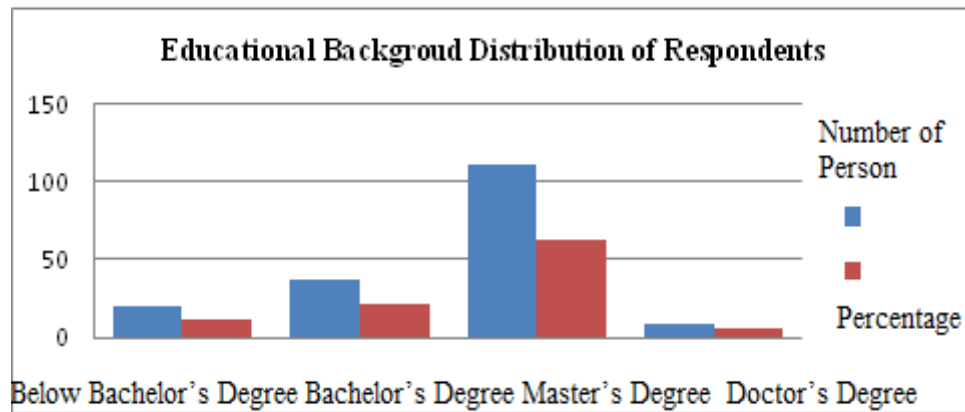


Figure 3: Education Background Distribution of Respondents

The titles of teachers are also different, with the majority of associate professors and teachers accounting for 38.9% and 26.4% respectively (as shown in Figure 4).

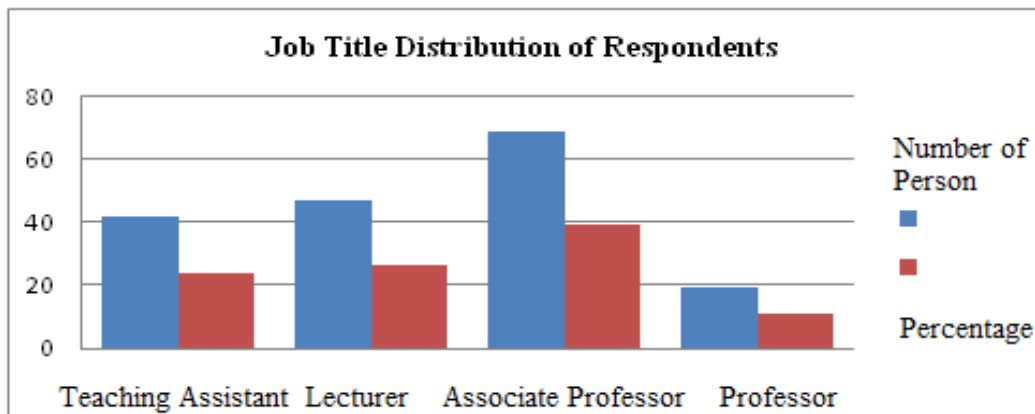


Figure 4: Title Distribution of Respondents

According to the IP addresses of the respondents, they mainly come from Shanghai, Jiangsu, Henan, Shaanxi, Jiangxi, Guangdong and other provinces. The questionnaires are characterized by hierarchy, extension and representation.

3.2 Indicator Weight Questionnaire

A total of 28 subjects were enrolled in this survey, including college teachers and visiting scholars as well as doctoral and master candidates having some research experience and expertise in this field.

4. Data Analysis

4.1 Exploratory Factor Analysis and Formation of the Indicator System

In the exploratory factor analysis, Principal Component Analysis was used in this study and Varimax rotation was used to maximize the load difference of each factor for easy interpretation. In order to determine the suitability of each dimension as an analytical factor, KMO (Kaiser-Meyer-Olkin) and Bartlett's test were conducted, and the MSA values were examined.

After exploratory factor analysis of the first dimension (i.e., the use of the information technology tools), it was found that when the KMO value was equal to .687 and greater than .60, and Bartlett's test was less than the significant level of .05. Therefore, a principal component could be extracted successfully (as shown in Figure 5).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measurement with sufficient samples.	.687
Bartlett's Test Chi-square approximation	150.293
Df	3
Sig.	.000

Component Matrix^a

	Components
	1
A1	.859
A2	.853
A3	.787

Extraction Method: Principal Components.
 a. 1 component has been extracted

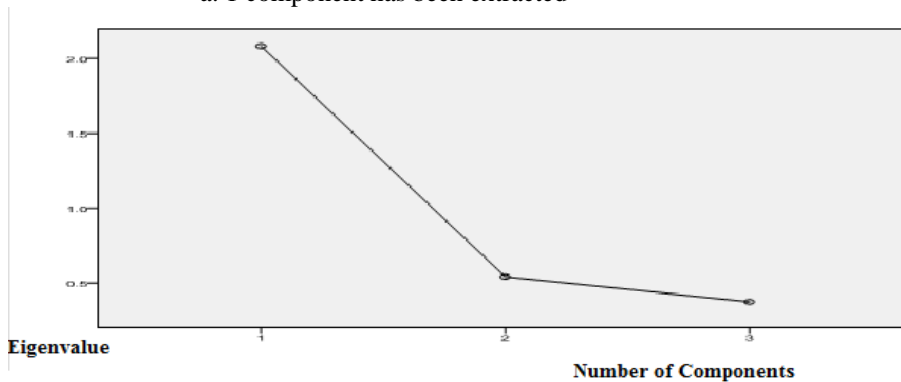


Figure 5: Principal Component Extraction Diagram for the First Dimension

After exploratory factor analysis of the second dimension (i.e., the informationized content knowledge ability), it was found that the KMO value was equal to .717 and greater than .60; Bartlett's test was less than the significant level of .05. Therefore, a principal component could be extracted successfully (as shown in Figure 6).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measurement with sufficient samples.	.717
Bartlett's Test Chi-square approximation	243.535
Df	6
Sig.	.000

Component Matrix^a

	Components
	1
A4	.748
A5	.837
A6	.886
A7	.662

Extraction Method: Principal Components.
 a. 1 component has been extracted

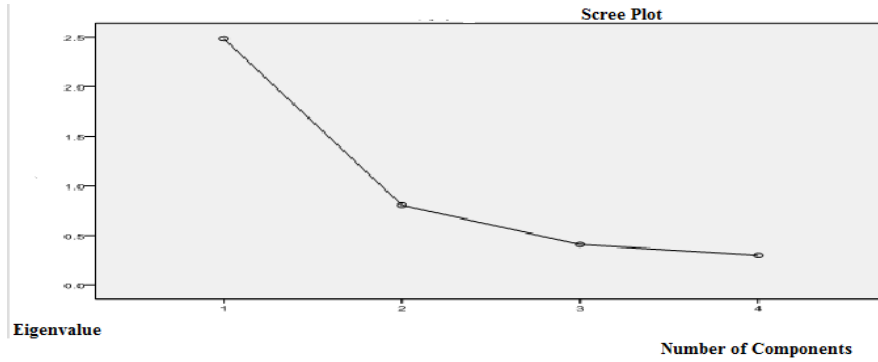


Figure 6: Principal Component Extraction Diagram For the Second Dimension

After exploratory factor analysis of the third dimension (i.e., informationized teaching design ability), it was found that the KMO value was equal to .885 and greater than .60, and Bartlett’s test was also less than the significant level of .05. Therefore, a principal component could be extracted successfully (as shown in Figure 7).

KMO and Bartlett’s Test

Kaiser-Meyer-Olkin measurement with sufficient samples.		.885
Bartlett’s Test	Chi-square approximation	1193.569
	Df	36
	Sig.	.000

Component Matrix^a

	Components	
	1	
A8		.836
A9		.834
A10		.764
A11		.807
A12		.676
A13		.850
A14		.788
A15		.804
A16		.849

Extraction Method: Principal Components.

a. 1 component has been extracted

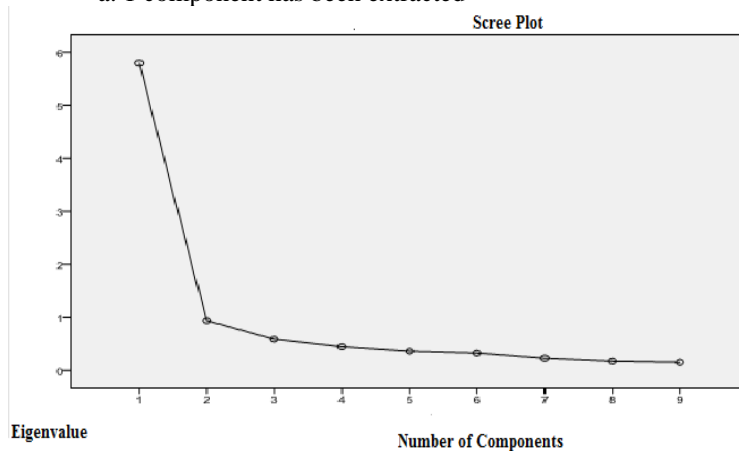


Figure 7: Principal Component Extraction Diagram for the Third Dimension

After exploratory factor analysis of the fourth dimension (i.e., the ability to implement teaching by using information tools), it was found that the KMO value was equal to .864 and greater than .60, and Bartlett’s test also reached the significant level of .05. Therefore, a principal component could be

extracted successfully (as shown in Figure 8).

After exploratory factor analysis of the fifth dimension (i.e., the informationized teaching research and reflection ability), it was found that the KMO value was equal to .676 and greater than .60, and Bartlett's test also reached the significant level of .05. Therefore, a principal component could be extracted successfully (as shown in Figure 9).

After exploratory factor analysis of the sixth dimension (i.e., the ability to promote students' informationized learning), it was found that the KMO value was equal to .878 and greater than .60, and Bartlett's test also reached the significant level of .05. Therefore, a principal component could be extracted successfully (as shown in Figure 10).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measurement with sufficient samples.		.864
Bartlett's Test	Chi-square approximation	478.278
	Df	15
	Sig.	.000

Component Matrix^a

	Components	
	1	
A17		.871
A18		.873
A19		.823
A20		.732
A21		.557
A22		.716

Extraction Method: Principal Components.
a. 1 component has been extracted

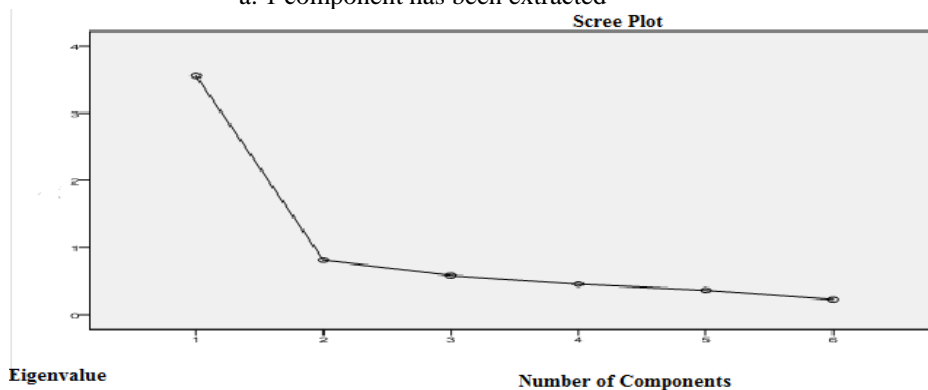


Figure 8: Principal Component Extraction Diagram for the Fourth Dimension

KMO and Bartlett's Test

Kaiser-Meyer-Olkin measurement with sufficient samples.		.676
Bartlett's Test	Chi-square approximation	249.194
	Df	6
	Sig.	.000

Component Matrix^a

	Components	
	1	
A23		.767
A24		.783
A25		.819
A26		.766

Extraction Method: Principal Components.
a. 1 component has been extracted

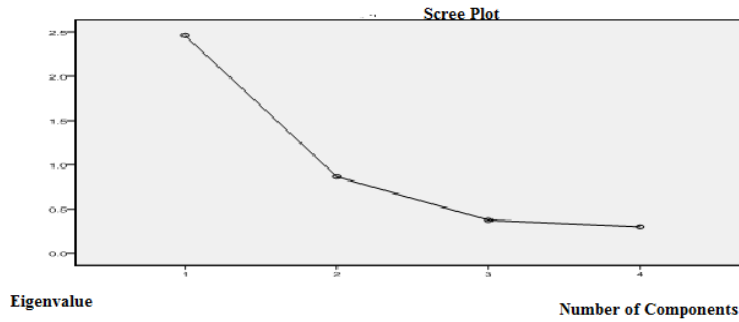


Figure 9: Principal Component Extraction Diagram for the Fifth Dimension

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin measurement with sufficient samples.		.878
Bartlett's Test	Chi-square approximation	490.331
	Df	21
	Sig.	.000

Component Matrix ^a	
	Components
	1
A27	.720
A28	.752
A29	.819
A30	.777
A31	.670
A32	.743
A33	.725

Extraction Method: Principal Components.
 a. 1 component has been extracted

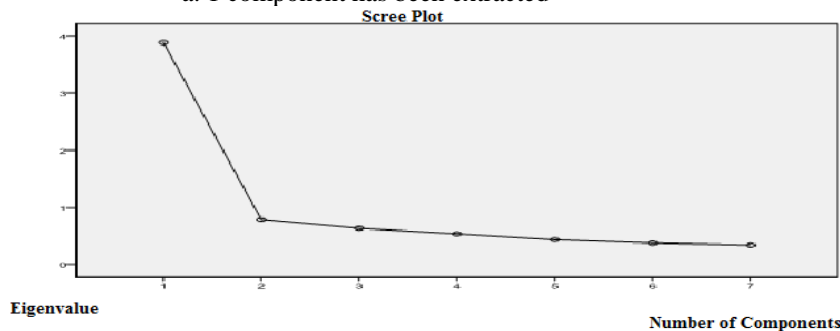


Figure 10: Principal Component Extraction Diagram for the Sixth Dimension

Based on the above analysis and induction, the informationized College English teaching ability indicator system was generated. It consisted of 8 main categories and 33 sub-categories. The college English teaching ability system was formed.

4.2 Indicator Weight Calculation

Weights are used to measure the relative importance of each indicator in the comprehensive evaluation, that is, the impact of changes in this indicator on the outcome while other indicators remain unchanged. It is a numeric value, usually expressed in relative numbers. The determination of weight will directly affect the result of the comprehensive evaluation. Any change of the indicator weight may change the superior and inferior order of the evaluated object.[12][13]

The determination of evaluation indicator weight coefficient is an essential part of the evaluation indicator system. In general, the weight coefficient is mainly obtained through two ways. The first is

the empirical method, that is, to ask the experienced experts and scholars. According to the importance of empirical analysis indicators in practice, the weight coefficients of all indicators might be determined. The second is the multivariate statistical method (Xie You-ru & Li Ke-dong, 2006), that is, some questions are designed in advance, the indicator items are listed to make the respondents to tick by the importance degree, and the statistical calculation is made over the investigation results. Afterwards, the size of weight coefficient might be determined by the sequence indicator w_i , and the statistical formula is $w_i = \frac{\sum a_{j \times n_{ij}}}{N \times \sum a_j}$, in which a_i stands for the score for each level; the more important the indicator is, the higher scores it has; n represents the number of respondents at each level of each indicator; N is the total number of respondents. Based on the limitations of various factors in the research process, this study mainly used the multivariate statistical method to obtain the weight coefficients of each evaluation index for college English teachers' informationized teaching ability. [14-19]

5. Conclusions

After this series of research process, the researcher finally established the college English teachers' informationized teaching ability index system. The evaluation indicator system includes the primary indicator, secondary indicator, indicator description, weight, evaluation level and score. The evaluation indicator weight distribution of college English teachers' informationized teaching ability is shown in Table 1.

Table 1: Evaluation Indicators for College English Teachers' Informationized Teaching Ability System

Overall Indicator	Primary Indicator	Weight	Secondary Indicator	Weight
Evaluation Indicators for College English Teachers' Informationized Teaching Ability	The Ability to Use Information Tools	0.17	Use of Teaching Devices	0.41
			Software Operation	0.39
			Use of The Internet	0.43
	Informationized Teaching Design Ability	0.20	The Ability to Understand and Practice <i>College English Curriculum Requirements</i>	0.33
			The Ability to Analyze The Learners and Learning Contents	0.32
			Design Ability	0.35
	The Ability to Implement Teaching by Using Information Tools	0.19	Development Ability	0.32
			The Ability to Motivate and Maintain The Learning Motivation	0.20
			The Teaching Content Shared Regeneration Ability	0.19
			The Ability to Conduct Online Learning	0.19
			The Ability to Manage The Teaching Process	0.21
			The Ability to Deal With Unexpected Situations	0.18
	Informationized Content Knowledge Ability	0.21	Informationized Communication Ability	0.17
			Informationized Evaluation Ability	0.18
			Digital Characterization of College English Learning Contents	0.34
			Recording and Processing of College English Learning Resources	0.32
	Informationized Teaching Research and Reflection Ability	0.19	Storage and Management of Digital University Learning Resources	0.28
			Digital Evaluation of Learning Resources	0.33
			Teaching Reflective Ability	0.24
			Research Information Retrieval Ability	0.24
			The Online Item Declaration Ability	0.22
			Informationized Data Analysis Ability	0.23
	The Ability to Promote Students' Informationized Learning	0.22	Informationized Teaching Innovation Ability	0.24
Informationized Teaching Self-Development Ability			0.23	
Online Self-Learning Ability			0.19	
Self-Control Ability			0.16	
Information Acquisition Ability			0.19	
Information Evaluation Ability			0.20	
		Information Management Ability	0.20	
		Information Processing Ability	0.18	
		Communication and Collaboration and Ability	0.20	

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References

- [1] Department of Higher Education of Ministry Higher Education. 2007. *College English Curriculum Requirements*. Shanghai: Shanghai Foreign Language Education Press.
- [2] Chen Jianlin. *Reconstructing the new paradigm of foreign language teaching in the era of big data*. *Social Sciences Weekly*. October 12, 2017, Period 005.
- [3] Fan Wenfang. (2015). *Normal major and training in the education informationized environment*. Beijing: Science Press.
- [4] Wang Wenjun. (2012). *Practical analysis on teachers' informationized teaching ability*. *Modern Distance Education*, (3):67-74.
- [5] Li Juan & Zhang Jiaming. (2011). *Research on the development strategies of informationized teaching ability in rural Primary and Middle School Teachers in Gansu Province*. *E-education Research*, (7):107-111.
- [6] Li Tianlong. (2011). *Exploration and Analysis of the Development Way of Informationized Teaching Ability of College Young Teachers*. *E-education Research*, (12):106-120
- [7] He Qiulin. 2012. *Research on the evaluation indicator system of science teachers' informationization teaching ability in Primary and Middle Schools*. Guangzhou: Master's Thesis of South China Normal University.
- [8] Stuhlmann, J. M., & Taylor, H G. (1999). *Preparing technically competent student teachers: A three year study of interventions and experiences*. *Journal of Technology and Teacher Education*, (4): 333–350.
- [9] Qin Xiaoqing. (2009). *Foreign language teaching questionnaire (Chinese Foreign Language Education Research Series)*. Beijing: Foreign Language Teaching and Research Press.
- [10] Abdumalikovna, P. Z. (2021). *The mechanism for increasing the social engagement of students in the process of teaching English (on the example of the process of preparing future economists)*. *ACADEMICA: An International Multidisciplinary Research Journal*, 11(4), 1859–1861.
- [11] Kummin, S., Surat, S., Kutty, F. M., Othman, Z., & Thompson, J. (2020). *The use of multimodal texts in teaching English language oral skills*. *Universal Journal of Educational Research*, 8(12), 7015–7021.
- [12] Ozkale, A., & Koc, M. (2020). *Investigating academicians' use of tablet PC from the perspectives of human computer interaction and technology acceptance model*. *International Journal of Technology in Education and Science*, 4(1), 37–52.
- [13] Riva, G., & Riva, E. (2020). *DE-ENIGMA: Multimodal human–robot interaction for teaching and expanding social imagination in autistic children*. *Cyberpsychology, Behavior, and Social Networking*, 23(11), 806–807
- [14] Al-Obaydi, L. H. (2020). *Risk-taking and self-actualization in EFL positive classroom environment*. *ELS Journal on Interdisciplinary Studies in Humanities*, 3(3), 352–365.
- [15] Almusharraf, N., & Engemann, J. (2020). *Postsecondary instructors' perspectives on teaching English as a foreign language by means of a multimodal digital literacy approach*. *International Journal of Emerging Technologies in Learning*, 15(18), 86–107.
- [16] Batubara, F., Derin, T., Putri, N. S., & Yudar, R. S. (2020). *Five factors influencing the student's motivation to learn English as a foreign language: A closer look into Montessori classroom environment*. *REiLA: Journal of Research and Innovation in Language*, 2(2), 76–84.
- [17] Magnusson, P., & Godhe, A. L. (2019). *Multimodality in language education—implications for teaching*. *Designs for Learning*, 11(1), 127–137.
- [18] Pérez-Marín, D., Paredes-Velasco, M., & Pizarro, C. (2022). *Multi-mode digital teaching and learning of human-computer interaction (HCI) using the VARK model during COVID-19*. *Educational Technology & Society*, 25(1), 78–91.
- [19] Shegay, A., Orazova, F., & Krivosheeva, G. (2020). *Possible writing techniques while teaching for students whose English is a foreign language*. *European Journal of Research and Reflection in Educational Sciences*, 8(6), 69–72.