

## Visual analysis of online and offline blended teaching mode research based on OBE teaching theory

Sun Zihui, Fan Qi, Tang Richeng<sup>\*)</sup>

*Dongguan City College, master/Engineer, China*

*Dongguan City College, PhD candidate/lecturer, China*

*\*) Dongguan City College, master / lecturer, China*

*\*) Correspondence: 872141751@qq.com*

### ABSTRACT

In 2020, the outbreak of the COVID-19 pandemic changed the teaching method from offline to online. However, the classroom structure of online teaching has not changed fundamentally, online education has not been substantively connected with the core procedure of course teaching, and the basic elements of classroom structure have not changed substantively either. With the visual analysis tool of China National Knowledge Infrastructure (CNKI) this research visually analyses the relevant literature on blended teaching mode based on OBE teaching theory, including the number of literatures, authors, research institutions, research highlights and other aspects.

**Keywords:** COVID-19; OBE; online and offline blended teaching mode

### RESEARCH BACKGROUND

In 2020, the outbreak of the COVID-19 pandemic changed the teaching method from offline to online, and universities took the opportunity to make online teaching operate efficiently and smoothly. However, the classroom structure of online teaching has not changed fundamentally, online education has not been substantively connected with the core procedure of course teaching, and the basic elements of classroom structure have not changed substantively either, so it is impossible to achieve the goal of building a new teaching structure. Many online teachings simply copies the offline teaching mode to the online, and the course construction, learning environment construction, curriculum resources development, learning activities organization and other ways continue the offline teaching mode without any new construction. Students are also passive learners in the classroom and transformed into active learning, unable to make good use of online resources, unable to structure, explore and integrate information by themselves.

With the post-COVID-19 era approaching, the integration of online and offline education will become the main teaching method for a long time. Therefore, with the visual analysis tool of China National Knowledge Infrastructure (CNKI) this research visually analyses the relevant literature on blended teaching mode based on OBE teaching theory, including the number of literatures, authors, research institutions, research highlights and other aspects [1]

### RESEARCH DESIGN

#### *The Data Source*

Based on the database of China National Knowledge Infrastructure (CNKI) from January 1, 2002 to July 10, 2022, with the method of "advanced search", with the retrieval field "theme", with key words "OBE concept" and "blended" teaching, excluding relatively inefficient document (the meeting), this research finally get 432 valid documents related to this study as the data source.

### Research Methods and Tools

This research adopts two ways to study the online and offline blended teaching mode based on OBE teaching theory. [2] The first one is bibliometric analysis, which reviews the literature related to the blended teaching based on OBE teaching theory in China in the past 20 years from the quantity of publications, research institutions and authors. Secondly, the visualization analysis method is used to draw the knowledge graph of relevant literature by using the information visualization tool provided by China National Knowledge Infrastructure (CNKI), and the in-depth interpretation of keyword frequency, centrality, cluster analysis is carried out to explore the research hotspots and development trends of the blended teaching mode based on OBE theory in Chinese universities. At the same time, this study provides a comprehensive understanding of the spatial distribution characteristics and cooperation of the authors and research units of the OBE-based blended teaching mode in Chinese universities.

## RESEARCH WORK

### Overview of Literature

Figure 1 can be obtained by drawing the publication trend chart of the literature on "OBE theory" and "blended teaching" of CNKI from 2002 to 2022. Figure 1 shows that the first literature on blended teaching research based on OBE theory was published in 2017, and the number increased sharply from 2019. It has been the "high incidence" period of this research since 2020, with a total of 383 articles published. With the outbreak of the COVID-19 pandemic, according to the announcement of the delay of classes in the spring semester of 2020, the Chinese Ministry of Education demand that classes in universities should be delayed, [3] but during this period, learning should not be suspended, instead, should be encouraged with the help of Internet resources and tools, for example, Dingding Learning, Chaoxing and MOOC. In the second semester of the 2019-2020 academic year, colleges and universities across the country have issued notices on online teaching, so as to realize "no suspension of learning, no suspension of teaching" through online courses. With the normalization of the epidemic, it is predicted that the research on blended teaching mode based on OBE theory will continue to increase and deepen in the future.

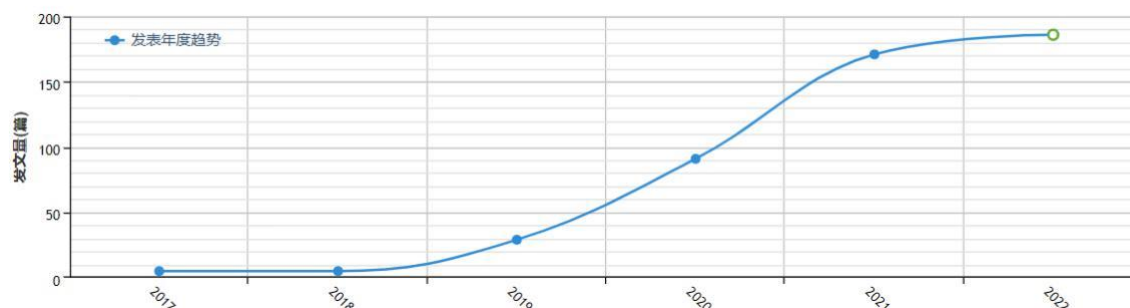
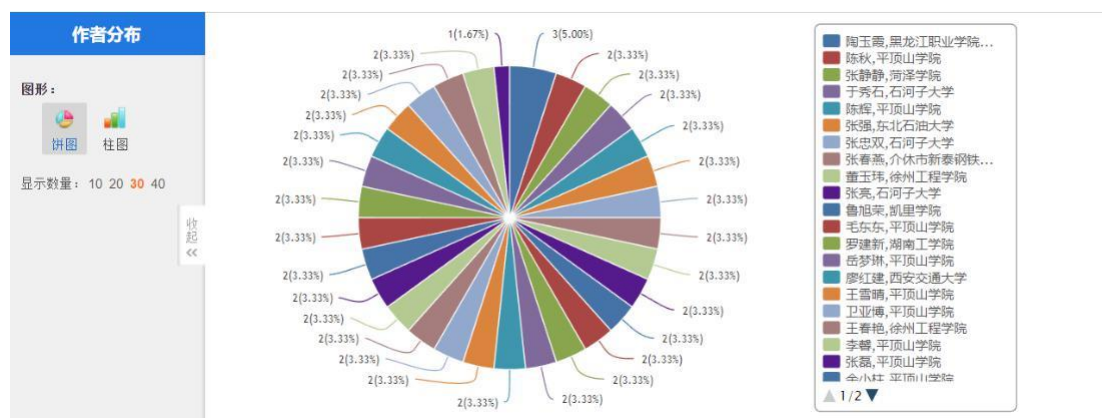


Figure 1. Publication trend of blended teaching research based on OBE theory

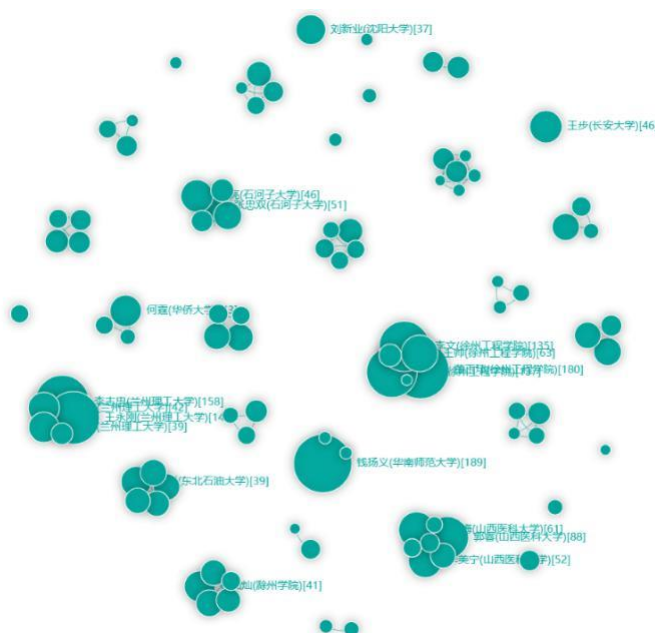
### Analysis of Author

According to the authors of the papers, the research situation of scholars in this field can be understood, which is conducive to the continuous tracking of the research trends of these scholars. According to the distribution map of authors of CNKI (Figure 2), the top four scholars in the number of published articles are Yuxia Tao, Qiu Chen, Jingjing Zhang and Xiushi Yu. Top of the list is Yuxia Tao from Heilongjiang Vocational School, whose research covers OBE+ Curriculum Ideology and Politics, blended teaching and inorganic and analytical chemistry. Qiu Chen of Pingdingshan College is ranked second. His research includes OBE teaching reform, blended teaching, and pharmaceutical management.



**Figure 2.** Author distribution of blended teaching research based on OBE theory

Using the correlation ranking of CNKI, the map that shows the cooperation of authors was drawn through the 50 articles with the highest correlation. The map can be used to understand the cooperation between different scholars (Figure 3). As can be seen from Figure 3, each node almost presents a separate point-like distribution, and only a few researchers have contact with each other. Most researchers in this field are in an isolated state, lacking research cohesion and sense of cooperation, and there are few core research teams.



**Figure 3.** Author Collaboration network diagram of blended teaching research based on OBE theory

### *Analysis of Research Institutions*

Because of the obvious difference of education developed in each region, and the uneven distribution of resources proportion between universities, the distinction of level between academic institution, this research is expected to find the representative and authoritative academic institution through analyzing those ranking the top ten according to the number of papers published on the topic of "OBE theory" and "blended teaching". As is shown in Table 1, Pingdingshan University has published as many as 11 articles in the past 6 years, and it is the core research institution in this field. Most of the research institutions ranking the top in terms of the number of papers are application-oriented universities and vocational and technical universities, which also shows that these universities pay more attention to the results-oriented teaching concept and blended teaching

Visual analysis of online and offline blended teaching mode research based on OBE teaching theory method. It can be seen that application-oriented universities and vocational and technical universities attach more importance to results-oriented teaching.

**Table 1.** Top Ten Research Institutions by number of publications

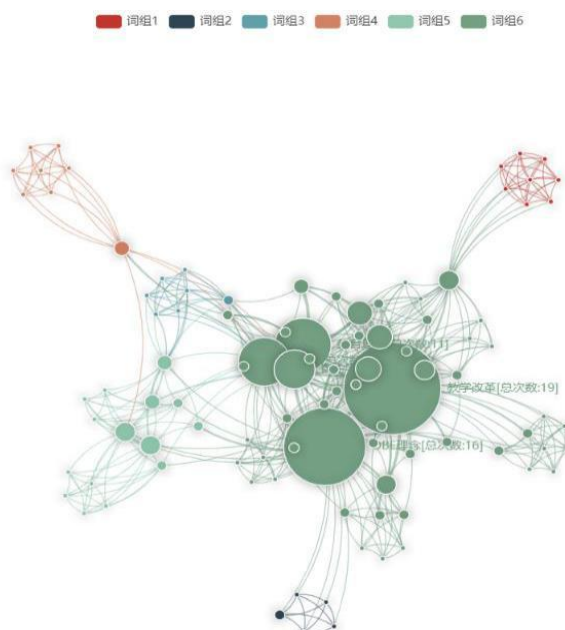
No.	Research institution	Number of papers published	No.	Research institution	Number of papers published
1	Pingdingshan University	11	6	Northeast Petroleum University	5
2	Heilongjiang International University	9	7	Inner Mongolia Agricultural University	4
3	Dalian Neusoft University of Information Technology	7	8	Luoyang Institute of Science and Technology	4
4	Lanzhou University of Technology	5	9	Heilongjiang Polytechnic	4
5	Shihezi University	5	10	Xi'an Eurasia University	4

### ***Analysis of Hot Research Topic***

Through the frequency distribution of keywords, the focus of the research topic can be shown, and its importance depends on the centrality of each node, which reflects the focus of researchers. Therefore, through the statistical analysis of keyword frequency and centrality, this study explores the hot topics of blended teaching mode in colleges and universities under the OBE theory.

### ***Frequency Analysis of Keywords***

By comparing the relevant data of keyword frequency of the 50 most relevant articles (FIG. 4), it reveals that "teaching reform" appeared 19 times, "teaching concept" 11 times, "independent learning" 8 times, "teaching quality" 5 times, and "curriculum ideology and politics" 4 times. Although these keywords are not selected search words, but their word frequency appears many times. It indicates that the blended teaching mode based on OBE theory is closely related to these topics, and researchers will continue to conduct in-depth research on this. On the other hand, it also shows that the blended teaching mode based on OBE theory is relevant to many fields. Only when all fields form a joint research, can the blended teaching mode be effectively promoted.



**Figure 4.** Co-occurrence network of keywords in blended teaching based on OBE theory

### ***Centrality analysis of Keywords***

Through the analysis of the relevant data of the keyword centrality, the centrality of the keyword "teaching reform" is relatively high, indicating that "teaching reform" is a hot research topic of blended teaching mode based on OBE theory. In recent years, application-oriented undergraduate teaching reform is mostly reflected in "results-based education", which emphasizes that students need to have clear, visible and verifiable results at the end of a learning experience. Its teaching reform emphasizes the "final result", which means that the teaching plan, teaching process and teaching evaluation have clear results, and teachers and students are always guiding what results they are trying to achieve.

### ***Cluster Analysis of Keywords***

#### ***Teaching Reform***

The key words of this cluster are "result-oriented", "teaching evaluation", "teaching quality", "teaching method", "teaching design" and so on. This part of the research discusses the direction of teaching reform. The researchers discussed the general structure of the course and carried out research from the aspects of teaching plan, teaching standard and teaching quality, which provided a certain theoretical basis for the teaching reform of applied universities. For example, MeiYunJun put forward the principle of "reverse teaching design, positive implementation" in the teaching of environmental engineering microbiology course, emphasized learners' principal role in the teaching and form the desired output by using the change of teaching mode, in order to form the correct academic evaluation framework. [4]

#### ***Teaching Concept***

The key words of this cluster are "OBE teaching concept", "teaching method", "outcome output" and so on. Under the background of the national emphasis on practical and innovative ability, most of the studies in this part explore the cultivation of high-tech applied talents to meet the needs of social production, construction, management and service. [5] For example, Pei-hua Gu puts forward the mode, the structure, the characteristics, the focus, the features and problems of OBE teaching mode in engineering education through the discussion of the practice of engineering education mode based on OBE in Shantou University. Gu's research provides a theoretical basis for the high efficiency, high quality and sustainable development of subsequent OBE teaching mode in engineering education. [6]

#### ***Independent Learning***

The key words of this cluster are "results-oriented education", "teaching activities", "teaching effectiveness", "individual differences" and so on. Most of the studies in this part provide a deep learning environment integrating "situation, interaction, experience and reflection", improve teaching effectiveness through results-oriented teaching activities, encourage students' subjective initiative, enhance students' awareness of independent learning, and thus promote the cultivation of students' innovative spirit. [7] For example, Zhao Lingfeng and other scholars' "Research on the revision of Applied Talent Training Program - Embodiment of the Teaching Design of the Blended Teaching mode based on the OBE concept" which proposed three concepts of "student-centered, results-oriented and continuous improvement" provided a new path for the construction of the subsequent curriculum evaluation system. [8]

## **SUMMARY AND PROSPECT**

In this study, the relevant literature on blended teaching mode based on OBE theory in the past 20 years collected in CNKI database was made full use of for in-depth interpretation, and the following conclusions were drawn in combination with the visualization tools provided by CNKI.

### ***Research Cooperation***

In terms of research cooperation, the cooperation network diagram of research institutions shows that there are few connected nodes, indicating that the research institutions are generally scattered and rarely cooperate. To promote the development of blended teaching mode, it is necessary to establish and improve a relatively perfect and close research cooperation mechanism, and strengthen the cooperation of researchers and research institutions.

In terms of research institutions, most of the institutions involved in the reform of the blended teaching mode of OBE theory are Applied Universities, and there is a serious lack of communication among universities and the core leading research institutions. In the future research, universities should pay attention to the cooperation of teachers' professional development, and further improve the research consciousness and scientific research literacy of researchers.

### ***Study of the Spatial and Temporal Distribution***

From the perspective of time and space, this field has developed rapidly and has great potential in recent years, which is of great significance and value. [9] The research of this field focuses on "basic research", "industrial guidance", "higher education", "basic and applied research", among which basic research accounts for 32.08%. From the perspective of subject classification and distribution, it mainly concentrates on "education", "language", "basic medicine", "company management", etc., among which education accounts for 54.15%. The research in this field is mainly based on "basic education", and many fields and subjects are designed, so researchers can put more applied research into practice. [10]

### ***Prospects for Future Research***

The Ministry of Education promotes the construction of first-class curriculum and actively promotes the deep integration of science and technology with education and teaching. With the application of emerging information technologies such as 5G information technology, artificial intelligence and big data in teaching practice, it provides technical support for blended teaching and realizes the organic integration of online and offline education organization, so as to push learners to have deeper learning. With OBE's theoretical mode of behaviorism psychology, teachers can make use of a scheduled teaching task to control the learning progress, set learners' "expected teaching output" as the minimum standard in the teaching process, moreover, there is no upper limit for the level of students, which leaves room for flexibility for teachers to stimulate students' creativity; [11] While emphasizing the correct "behavioral goals", it also emphasizes the vague "expressive goals", and does not make a rigid understanding, measurement and evaluation of learners' emotional development, aesthetic imagery and even higher-level knowledge. The "teaching output" is expected to be a procedural and persistent goal, rather than formulate specific objective standards for a class or a unit of teaching. Instead of being recognized by learners as an objective standard of information, knowledge can be regarded as an effective means to help learners understand various types and levels of it.

### **ACKNOWLEDGEMENT**

Funding: This study was funded by Dongguan City College 2021 "innovation and strong school project" construction project (grant number :2021yjg041)

### **REFERENCES**

- [1]Gao Han. (2021). Visual analysis of the research status of Hybrid Teaching Mode -- CiteSpace knowledge atlas analysis based on CNKI. Heilongjiang Science(13),8-11.
- [2]Shi Yiming. (2020). Analysis of online education under the background of the COVID-19. Journal of Kaifeng Vocational College of culture and art (05),92-94.
- [3]Wu Hanmei (2013). A probe into the construction of Ideological and Political Theory Teachers in higher vocational colleges. Journal of Ezhou University, 20(6), 3.
- [4]Mei Yunjun, Huang Lan, Hu Chun, Hu Wenyun, Zhang Shunxi & Liu Jun. (2018). Teaching reform and practice of Environmental Engineering Microbiology under the results oriented education concept (OBE). Microbiology Bulletin(03),609-615. doi:10.13344/j.microbiol.china.170683.



- [5]Zhou Xiaoyan. (2021). Research on online and offline Hybrid Teaching of "basic Thai" based on OBE concept. Journal of Chuxiong Normal University(06),96-100.
- [6]Gu Peihua, Hu Wenlong, Lin Peng, Bao nengsheng, Lu Xiaohua, Xiong Guangjing & Chen Yan. (2014). Engineering education model based on "learning output" (OBE) - practice and exploration of Shantou University Research on Higher Engineering Education(01),27-37.
- [7]Cheng Qiwen & Sun zaixong (2020). Practice and exploration of online classroom teaching Time education: late(7), 1.
- [8]Zhao Lingfeng, Gao Xueni & Yang Yan. (2020). Thinking and exploration of application - oriented talents training scheme based on OBE concept. Contemporary education practice and teaching research (11),91-92. doi:10.16534/j.cnki.cn13-9000/g.2020.1239.
- [9]Gao Han. (2021). Visual analysis of the research status of Hybrid Teaching Mode -- CiteSpace knowledge atlas analysis based on CNKI. Heilongjiang Science(13),8-11.
- [10]Guo zhe & Hu Dexin. (2017). Review of the research on private higher education in China in the past ten years -- Based on Bibliometrics and visual analysis. Modern education management(12),8-13. doi:10.16697/j.cnki.xdjygl.2017.12.002.
- [11]Gu Peihua, Hu Wenlong, Lin Peng, Bao nengsheng, Lu Xiaohua, Xiong Guangjing & Chen Yan. (2014). Engineering education model based on "learning output" (OBE) - practice and exploration of Shantou University Research on Higher Engineering Education(01),27-37.