



Research on Online Courses of Business Education Based on Information Technology During the Epidemic in China Taking a University in Guangzhou as an Example

Xingcheng Guo^(✉)

School of Management, Guangzhou City University of Technology, Guangzhou, China
guoxc2@gcu.edu.cn

Abstract. Under the normalization of epidemic prevention and control, business education has shown some new features: adapting to new business teaching methods has become the mainstream, and online teaching mode based on information technology has become the new normal. Objective this paper tries to find out the opportunities and challenges of online Courses in business education during the epidemic period. Methods this paper empirically investigates the online learning situation of business students during the epidemic period. It mainly uses one-way ANOVA (OWA) single-factor analysis to analyze the influencing factors of online learning engagement outcomes and extract common factors. Moreover, the online open course teaching model of the GSPOC based on information technology is established. Conclusion Under the normalization of epidemic prevention and control, business education will face the opportunities and challenges of GSPOC online course database based on the OBE concept, the construction of an online business learning management system (OBLMS), and the improvement of Business Education Evaluation System based on information technology in the future.

Keywords: Business Education · Epidemic · Online Courses · Information technology · OBE

1 Introduction

COVID-19 broke out, and countries around the world have suffered from it. The epidemic has had a great impact on all walks of life in countries around the world, including China. In the context of the normalization of epidemic prevention and control, online teaching has been actively implemented throughout the country. To realize the requirement of “no suspension of classes, no suspension of schools” in China, an online class teaching widely participated by teachers, students, parents, and the whole society has been rapidly launched throughout the country. Online classes based on information technology are mainly conducted in “online classrooms” with computers and mobile phones as the main media. “Online classroom” based on information technology has no real teaching

scene. It is a new teaching mode that replaces the traditional classroom with the home environment. For business education, both teachers and students have redefined the concept and mode of business education, adding new impetus to business education.

2 Literature Review

In early 2020, the whole of society suffered from COVID-19. The Ministry of Education issued an urgent notice on epidemic prevention and control, and education departments in many places across the country responded positively [1] (Jiajia Li, Feng Fang, 2020). In the face of the “human to human” characteristics of the epidemic and the increasingly severe situation, schools and other educational institutions, as places where people gather in large numbers, are prone to cross-infection [2] (Chaoui Zhang, 2020).

The impact of the epidemic on many physical education departments and institutions is unprecedented. For example, Qiaohu kids, a famous training institution with more than 160 chain stores in China, suddenly announced its closure during the epidemic period, which shocked the industry [3] (Yu Wu, 2020). As relatively fixed students, colleges and universities are also faced with the confusion of how to carry out teaching and learning during the epidemic period. To implement the guiding spirit of “no suspension of class and no extension of vacation”, universities have mobilized teachers to use the Internet platform to carry out online teaching [4] (Yingzhi Xiang, 2020). But, the level of educational informatization construction varies from place to place, and there have been many problems for many years, such as imperfect platform function, lack of teaching resources, and low utilization rate of students. The function and content of the existing campus learning platform still need to be improved, and mature information technology should be introduced into low-level cities and rural areas. Therefore, online teaching is both an opportunity and a challenge for business education in this epidemic period.

Online teaching during the epidemic period is a new teaching mode of “live network + Teaching” in business education. There are also various teaching platforms on the Internet, for example, Tencent conference, Dingding conference, Chaoxing live broadcast, etc. [5] (Yuchao Zhang, 2020). Online live broadcast lets students bid farewell to the traditional physical classroom class, instead of the computer terminal, mobile terminal free link into the class, and the convenience of listening to the class improves the attendance rate of students. However, it may be difficult to control the students’ participation in class and the seriousness of class attendance. For example, if some students join the online class, they may not be near the equipment.

This study takes the business education of the school of management, Guangzhou College of South China University of technology as an example to investigate and evaluate the learning engagement and outcome of business students during the epidemic period. This paper analyzes the main influencing factors of business education during the epidemic period and provides strategic suggestions for the future reform and development of new business education. Guangzhou City University of Technology is a multi-disciplinary application-oriented university approved by the Ministry of education in April 2006, which focuses on engineering and coordinated development of economy, management, literature, science, and art. It is a demonstration school of innovation and entrepreneurship education for college students in Guangdong Province, an intellectual

property pilot school in Guangzhou, and the first IACBE International Business Certification University in China. At present, the university has 14 experimental centers, including 5 basic experimental centers and 9 professional experimental centers, 268 laboratories, and 425 employment and practice bases. There is one National College Students off-campus practice base, two national mass innovation spaces, five provincial experimental teaching demonstration centers, 4 provincial student off campus practice bases, 1 provincial collaborative education platform, 3 provincial applied talents training demonstration majors, and 3 provincial professional comprehensive reform pilot projects, which provide strong support for the cultivation of high-quality applied talents.

Relying on the educational philosophy and resources of the South China University of Technology, Guangzhou City University of Technology aims to “cultivate good students and create good teachers”. It aims to cultivate applied and innovative management talents with international vision and “Internet plus” thinking by combining the theory and practice of business. At present, six majors of the college have passed the IACBE international business certification. All majors are run by international standards. Around the training objectives of applied talents, the college-level strategy of “standardization, information, and internationalization” is implemented. The school of management has established a teaching and training system for international business education and an evaluation system for students learning achievements. The teaching system has been continuously improved and is committed to cultivating first-class applied management talents.

3 Methodology

3.1 Research Development and Implementation

This research selects undergraduate students of business majors who have passed the IACBE international certification in the school of management of Guangzhou College of South China University of technology as the research object. The empirical research uses the “questionnaire star” online survey platform to conduct an online questionnaire survey and collect data information based on information technology. A total of 365 students were surveyed and 360 valid questionnaires were collected and the recovery rate of the questionnaire was 98.6%. Among the 360 questionnaires, 146 were for boys (40.55%) and 214 for girls (59.45%).

3.2 Learning Engagement and Outcome

The scale of this new survey scale of business students’ learning engagement and outcome during the epidemic period was developed by referring to the American College Students’ learning engagement scale (National College Students’ Learning Engagement Scale, NSSE) and Dixson MD’s online learning engagement scale(Online Learning Engagement Scale). Business students’ learning engagement was measured from three dimensions: course participation, curriculum enthusiasm, and after-school learning intensity. There were 20 items in the scale, and the Likert scale was used. The course participation includes the quality of the online course software technology platform, students’ late arrival and early leave, including objective factors and subjective factors; The

Table 1. Results of construction validity

Statistical test quantity	Scale of learning engagement in epidemic period	Learning outcome scale in epidemic period
GFI	0.945	0.923
AGFI	0.865	0.834
CFI	0.975	0.923
TLI	0.956	0.912
RMSEA	0.062	0.055
RMSEA 90%CI	0.072–0.077	0.040–0.068
RMR	0.057	0.071

Source: This table is original

degree of enthusiasm for the course includes chatting and communicating in an online class, asking questions in class and practicing interaction; learning intensity includes the completion of homework and online learning after class. The online course based on information technology satisfaction of students' learning outcome scale includes two aspects: Students' satisfaction with online teaching methods and courses.

4 Findings

4.1 Reliability and Validity Test

Cronbach's α (Cronbach's coefficient) is used to test the reliability of the scale. The coefficient of Cronbach's $\alpha > 0.8$, the higher the coefficient, the stronger the internal consistency. Generally speaking, the coefficient of Cronbach's $\alpha > 0.7$, it can be considered that the consistency between items is good. The coefficient of Cronbach's $\alpha = 0.825$ in this survey, and the coefficient of Cronbach's α of three subscales of the learning engagement scale: course participation, and after-class learning intensity were 0.847, 0.712, and 0.723, respectively. The coefficient of Cronbach's α of the learning outcome scale was 0.858, and the scale had good reliability.

In this study, confirmatory factor analysis (CFA) was used to analyze the validity. The goodness of fit index (GFI) and adjusted goodness of fit index (AGFI): it is generally believed that $GFI \geq 0.90$, $AGFI \geq 0.8$, both CFI and tucker Lewis index were greater than 0.9, the root mean square error (RMSEA) and root mean square residual error (RMR) is less than 0.08, it means that the model has a good fitting degree and the scale has good validity, As shown in Table 1.

4.2 Statistical Software Tools

SAS, SPSS, Stata, and other software is used to test the reliability and validity of the scale, and the data were analyzed. The students' personal basic information, the nature of curriculum content, and online teaching modes based on information technology of

teachers were taken as the influencing factors, and learning engagement and learning outcomes during the epidemic period were used as dependent variables. Single factor analysis (OWA) is used to compare the scores of multiple influencing factors, and one-way ANOVA single-factor analysis (OWA) is used to compare the scores of multiple influencing factors, Table 2.

5 Discussion

5.1 The Rotation Component Matrix

The average score of learning engagement during the epidemic period was 41.24 (total score of 65), of which the average score of course participation was 19.23 (total score of 25), the average score of learning enthusiasm was 16.24 (total score of 20), the average score of learning intensity after class was 14.25 (total score of 20), and the average score of learning outcome was 17.21 (total score of 25).

According to the statistical results of the scale data, the value of KMO is 0.844, Bartlett's spherical test $p < 5\%$ significance level, this index is suitable for factor analysis, with good validity. At the same time, factor analysis extracts three common factors. According to Table 3, the first common factor includes the ABG item, named advanced learning; the second common factor includes: the CDEF item, named reflection and promotion learning; and the third common factor includes the HI item, named practice-oriented learning. Three factors promote the circulation and business students' abilities and outcomes will have a qualitative leap after each cycle.

5.2 Construction of Online Open Courses Based on OBE

Business education can build online open courses based on information technology with OBE as the concept. The education concept of OBE (Outcomes Based Education) is to focus on students' learning achievements in talent cultivation, emphasize the orientation of expected learning achievements, adhere to the student-centered approach, cultivate students' active learning, and continue to improve the teaching process driven by students' continuous feedback [6] (Xianping Lin, Hongmei Zhou). In addition, the Education concept of OBE also focuses on the production of learning achievements for talent cultivation and curriculum construction, Pay attention to the three key points of "student center", "output oriented" and "continuous improvement". If the OBE results-oriented education concept is introduced into the design of online open courses based on information technology, it can enrich the training objectives, especially the applied education, and greatly promote the transformation and development of the education concept [7] (Changzheng Li).

The OBE-based online open-course education concept focuses on what abilities students can acquire and what they can do after receiving online courses based on information technology. The entire teaching process and all educational activities are based on the realization of expected learning results, emphasizing student-centered and active learning. This topic tries to build an OBE-based online open course model GSPOC. "Group (G) + SPOC (Small Private Online Course)" teaching mode, that is, "group +

Table 2. One-way ANOVA single factor analysis on learning engagement and outcome of business students in epidemic period

Project	Number (%)	Learning Engagement			Learning Outcome		
		mean value	F/t	P	mean value	F/t	P
Gender				0.834			0.002
Male	146(40.55)	45.32			15.34		
Female	214(59.45)	41.27			15.12		
Grade				< 0.01			< 0.01
Freshman	106(29.44)	38.75			14.23		
Sophomore	83(23.05)	43.56			15.26		
Junior	115(31.94)	42.78			17.34		
Senior	56(15.57)	44.53			16.23		
Results of last semester				< 0.01			0.487
Average score > = 90	23(6.38)	45.33			18.12		
Average score is 80–89	149(41.38)	44.23			17.36		
Average score is 70–79	126(35.00)	42.11			16.98		
Average score is 60–69	46(12.77)	41.01			16.23		
Average score < = 59	16(4.47)	37.28			13.24		
Is there an electronic textbook				0.891			< 0.01
Yes	197(54.72)	46.22			16.54		
No	163(45.28)	45.26			16.02		
Online teaching platform				< 0.01			< 0.01
Tencent Conference	125(34.72)	47.34			17.25		
DingDing Conference	47(13.05)	46.56			17.01		

(continued)

Table 2. (continued)

Project	Number (%)	Learning Engagement			Learning Outcome		
		mean value	F/t	P	mean value	F/t	P
Tencent classroom	89(54.72)	46.63			16.97		
Superstar	99(54.72)	44.78			14.23		
Do you attend online classes on time				< 0.01			< 0.01
Always	265(73.61)	45.23			16.74		
Sometimes	73(20.27)	42.12			15.23		
No	22(6.12)	39.24			15.01		
Is there a preview task				0.983			< 0.01
Always	167(46.38)	45.74			17.24		
Sometimes	175(48.61)	46.57			16.92		
No	18(5.01)	41.03			15.44		
Is the syllabus introduced				< 0.01			0.789
Yes	278(46.38)	46.72			17.23		
No	82(46.38)	45.23			16.11		
Whether to actively participate in online class interaction				< 0.01			< 0.01
Always	123(34.16)	43.23			16.13		
Sometimes	189(52.5)	44.21			15.34		
No	48(13.34)	41.79			15.23		
Is there online course recording and playback				< 0.01			< 0.01
Whole	178(49.44)	46.12			17.67		
Part	149(41.38)	47.29			17.28		

(continued)

Table 2. (continued)

Project	Number (%)	Learning Engagement			Learning Outcome		
		mean value	F/t	P	mean value	F/t	P
No	33(9.18)	43.27			16.89		
Whether to expand the content of teaching materials by using online courses				< 0.01			< 0.01
Always	112(31.11)	46.35			16.23		
Sometimes	189(52.50)	45.23			16.01		
No	59(16.39)	44.12			15.98		
Is homework assigned				< 0.01			< 0.01
Always	178(49.44)	47.19			16.91		
Sometimes	156(43.33)	46.24			16.06		
No	26(7.23)	45.77			15.89		
Do you want to continue online learning after class				< 0.01			< 0.01
《 = 1 h	190(52.77)	46.55			16.34		
1-3 h	143(39.72)	47.84			16.59		
》 = 3 h	27(7.50)	47.76			17.11		

Source: This table is original

small-scale (or small class) teaching” teaching mode, and the student-centered teaching mode has constructed GSPOC online course resources based on the OBE concept Architecture, which consists of five parts: students, teaching team, course resource database, student classrooms, and learning outputs. Figure 1 is a framework diagram of online course resources based on the concept of OBE.

5.2.1 Student-Centered Teaching Model Design

The whole teaching process and all educational activities of online open courses based on OBE are based on the realization of expected learning results, emphasizing student-centered, active learning, driven by continuous feedback from students, paying attention

Table 3. The rotation component matrix of learning engagement and outcome of business students during the epidemic period

	Composition		
	1	2	3
A. You will try your best to solve the difficulties in learning at home	0.876		
B. You will arrange the notes of extracurricular knowledge regularly after the online class	0.792		
C. Online course subjects will be seriously studied, regular and efficient review before the exam		0.722	
D. Try to find out the internal knowledge association of different online courses and learn them comprehensively		0.824	
E. You will review the notes to ensure a good grasp of the class content after the online class		0.722	
F. If you have any questions in online class, you will refer to the extracurricular materials or ask the teachers and students to understand the problems encountered in learning		0.832	
G. You Will look up different academic views or information, and form a preliminary new idea	0.713		
H. The knowledge and skills learned in the online course will solve practical problems			0.823
I. The severe epidemic prevention and control has inspired you to cherish the study of the course and make great efforts to apply it			0.715

Source: This table is original

to learning results, and sustainable improvement teaching and learning process [8] (Liu-jun Mo). A student-centered GSPOC teaching mode is built with the tool of Superstar Learning Channel based on Information Technology, Pay attention to improving students' enthusiasm for active learning and enhancing the interaction between teachers and students. This teaching mode first determines the teaching objectives of the course and the expected learning results that students need to achieve according to the course standards, then determines the teaching priorities and difficulties according to the learning content, develops specific teaching plans, and designs teaching plans in combination with the actual situation of students and constructs online resources such as student self-learning knowledge modules dominated by build network Micro Course based on information technology and student self-examination dominated by various exercises. In the teaching process, we can use information technology to build a flipped classroom teaching model that combines online and offline teaching and realize the teaching concept that students are the main body and learning results are the goal. Finally, the expected

learning results are evaluated from multiple perspectives and teaching evaluation and summary are made.

5.2.2 GSPOC Online Course Resource Architecture Design

Build a GSPOC online course resource database based on the OBE concept and supported by information technology, which is composed of five parts: students, teaching teams, course resources, student classes, and learning outputs, Fig. 1. As the core object of online course resource database service, students should be the center of all online course resource design, so that their learning can achieve the expected learning output. The teaching team includes experts, lecturers, and enterprise industry experts. The team builds and improves the basic information, self-learning resources, activity resources, and evaluation resources of online courses according to the defined learning output, provides learning services in various aspects such as learning assistance, supervision, and promotion, and coordinates the online learning resource system in all aspects. Curriculum resources include basic information, activity resources, self-study resources, and evaluation resources.

Among them, the basic information mainly includes various course resources, to guide students to carry out course resource screening and progress control. Activity resources refer to auxiliary resources designed to carry out various online and offline learning activities. Learning output refers to the output effect that the curriculum requires students to achieve after learning various curriculum resources, which is specifically manifested in the knowledge objectives and ability objectives that need to be achieved. Student classroom refers to the whole process in that students choose learning modules according to their actual conditions, learn by themselves through accessing online course resources, complete tests corresponding to each knowledge point, and complete group work through division of labor and cooperation.

6 Conclusion

The sudden outbreak of the epidemic has brought new opportunities and challenges to business education. Improving business students' learning engagement and outcome is an important goal of online course teaching design based on information technology. The results of this study show that the business students of Guangzhou City University of Technology, their learning engagement and outcome are above the average level, which reflects that the business students welcome online teaching, and also reflects the improvement of business students' self-active learning ability based on information technology during the epidemic period. Due to the normalization of epidemic prevention and control, some courses in schools still need online teaching based on information technology. Therefore, schools, teachers, and students need to further accelerate the adaptation and proficient online teaching methods and means. The online teaching of business education will face the following opportunities and challenges in the future.

(1) The transformation from traditional business education (TBE) to new business education (NBE). The traditional Application-oriented (AO) business education has been transformed into GSPOC online course based on the OBE concept, Fig. 2. Traditional

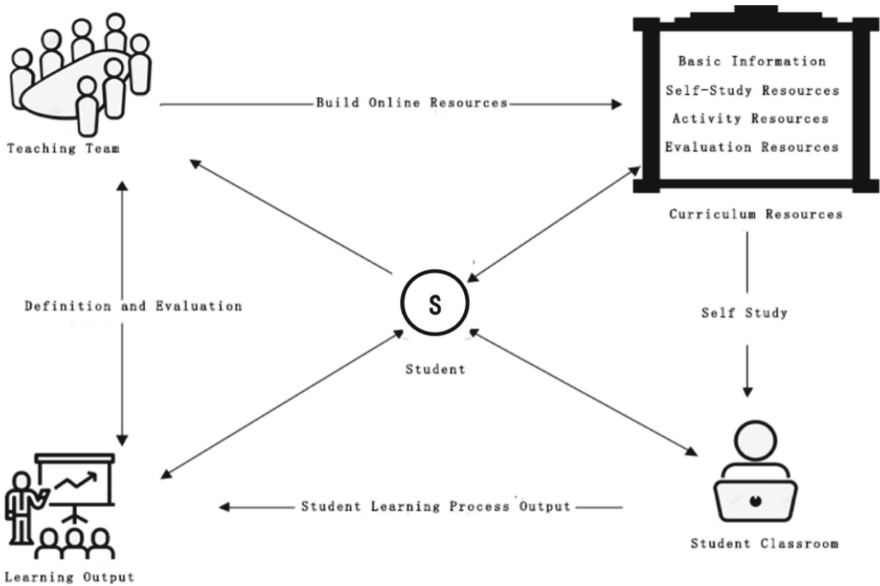


Fig. 1. Based on OBE concept online business education course resource database. Source: This figure is original

business is out of date. Under the normalization of epidemic prevention and control, the Application-oriented (AO) approach can not represent the development of business education. It will be the new business age and more and more online open business education is based on information technology. This is not only an opportunity to further enrich business education but also a challenge for business education, such as “Internet plus”, big data, artificial intelligence, sharing economy, and so on. It is in line with the expectations of business students for online learning engagement and outcome.

(2) Establish an online business learning management system (OBLMS) based on information technology. OBLMS includes all activities except classroom teaching. It becomes a platform for teachers to share teaching resources, record and play back key knowledge points of the course, students’ usual practice tests, submit assignments, and teachers’ evaluations, so that all activities of teaching and learning can be followed, and the application of assessment forms can replace the traditional examination, and improve the student’s ability of investment and active learning With the thinking of online



Fig. 2. The Evolution of New Business. Source: This figure is original

teaching based on information technology to optimize daily teaching and international talent training.

(3) Establish an online teaching quality evaluation system that adapts to various business education models and allows students to directly evaluate teaching based on information technology. Let business students use information technology more to participate in online course teaching evaluation, weaken or even cancel competing faculty peer evaluations, and strengthen direct interaction between students and teachers. Form a new online business education teaching-quality evaluation mechanism based on teaching-feedback-improvement-evaluation-improvement.

(4) During the epidemic period, the online open business education curriculum teaching mode based on the OBE concept and GSPOC was established to give full play to the main role of students in the teaching process. In the process of implementing the GSPOC teaching model, students need to actively learn online course resources based on information technology, actively search and use online course resources, reverse design teaching objectives, and teaching processes under the guidance of students' goal needs and ability achievements, It is a kind of "student-centered" "And combining the requirements of social industry posts on students' skill level, under the guidance of OBE concept, we designed a GSPOC online course resource system that meets the needs of students, built a student-centered teaching design model, and designed and improved online course resources based on this model. After several rounds of GSPOC practical teaching and resource use analysis, we enriched and improved the GSPOC Online course database, and actively explore the online course teaching mode applicable to diversified and personalized teaching of business students by using modern information technology.

(5) The implementation of online teaching not only needs teachers, students, and education managers, but also the participation and support of the whole society. The impact of the epidemic and work stoppage is both a constraint on online classes and special support. Because of the epidemic, business teaching will face more problems. Governments at all levels, learning institutions, and all walks of life should attach great importance to online learning, and make helping students and learning the top priority. Teachers, parents, community workers, information technology personnel, networks, and software companies need to work together to create conditions and provide network information technology support to ensure the smooth development of business teaching on time.

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