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Research on Blended Teaching Practice of Business Statistics Data Analysis Course

Cuiping Ren[1], Junli Zhang[2]

[1]School of General Education, Xi'an Eurasia University, Xi'an 710065, China

[2]School of Finance, Xi'an Eurasia University, Xi'an 710065, China

Abstract

The practice of online and offline blended teaching of business statistical data analysis courses in colleges is studied. Firstly, the current situation of the problems in the teaching process are proposed. Secondly, OBE theory and the Seven-step method of teaching reform are applied to reform the teaching syllabus, curriculum design, assessment and evaluation. Finally, questionnaire survey on the teaching effect of the blended teaching model is conducted and the results are analyzed.

Keywords

Wisdom Teaching; Blended Teaching; Seven-step Method; Curriculum Matrix.

1. Preface

The development of information technology necessitates corresponding changes and innovations in college education. It is an important issue that we are facing today to build a networked, digital, personalized and lifelong education system that adapts to the development of the times. The implementation of educational reform in colleges and universities needs to rely on the information environment, change traditional teaching methods, enhance students' practical skills, innovate teaching modes, stimulate students' interest in learning and internal driving force, and improve the quality of education in colleges and universities. Colleges and universities should actively innovate the teaching mode of colleges and universities, and explore the deep integration of higher education informatization and college education. In the information environment, the blended teaching model can make use of the smart teaching tools in the new media era, provide convenience for students to learn actively, and provide some instructive practical explorations for teaching reform. "Business Statistical Data Analysis" is a compulsory course for the data science and big data technology major of the School of Finance of our school. This course is based on the needs of the industry and guided by the needs of customers. It allows students to experience and practice the entire process of data analysis from the dimensions of critical data thinking, data acquisition, data cleaning, data visualization, report writing, and project reporting. Driven by actual projects, it introduces data analysis projects in movie box office, second-hand housing, Internet of Vehicles and other industries to make students' training more realistic and challenging. Through learning, students can master the basic knowledge, tools and methods of data analysis, and have the ability to analyze data, realize data visualization, write data reports and business reports in the Internet environment, establish a data analysis framework, and improve the ability of business analysis. Under the current background of the new crown epidemic, colleges and universities are using teaching platforms and online teaching resources to carry out different teaching practices, and promote teachers to research effective teaching models, thereby improving teaching quality.

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2. Analysis of the Current Situation

The teaching schedule of "Business Statistical Data Analysis" is 32 hours, and it is divided into 5 knowledge modules: background introduction report, acquisition of competitive data, standardized competitive data, visual analysis, and data analysis report. At the beginning of the course, the teaching form was that after the teacher explained the knowledge points and demonstrated, the students practiced independently, the teacher guided and answered questions, and after the class, the students uploaded their own homework to create a class. Since September 2018, the course team has built the online learning course "Business Statistical Data Analysis" in combination with the Wisdom Tree platform. The teaching form is a mixed teaching mode of 16 hours each online and offline. The Wisdom Tree Platform course is divided into 6 chapters: Introduction, Data Acquisition, Data Cleaning and Organizing, Data Explanation, Data Visualization, Data Modeling and Practice. The following problems occurred during the course operation:

(1) Students' self-learning and deep learning ability is not high

Affected by traditional education, students have become accustomed to passive learning, which is difficult to stimulate students' enthusiasm and atmosphere for active learning. After encountering a problem, they prefer to rely on the smartphone to answer questions, rather than brainstorming. Students lose interest in learning and lack motivation for online courses. For the online part of the learning test, there will be some students who do not complete the learning and testing in time.

(2) Teachers are in the exploratory stage of the deep integration of online and offline teaching mode

The offline classroom is a teaching mode familiar to all teachers, and the online classroom is a learning environment familiar to contemporary students. Using modern smart teaching tools, according to the characteristics of the course, set up a variety of flipped teaching activities, not only to take into account the offline classroom explanation but also to make full use of the auxiliary functions of online teaching, so that information technology can be deeply integrated into classroom teaching, so as to mobilize students' enthusiasm to improve teaching quality.

(3) The evaluation of learning effect is imperfect and measurable

In the process of the blended teaching mode, the proportion of grades and the evaluation principles of the assessment link of the students' process evaluation need to be designed according to the learning content, and whether the students' knowledge, ability and literacy have reached the teaching objectives of the course. This requires redesigning the assessment program to conduct a comprehensive and reasonable assessment of students.

3. Exploration of Blended Teaching Mode

Faced with many problems in the construction of network resources, classroom teaching mode, students' learning methods, and teacher's teaching transformation, Professor Zhao Juming's Seven-step method of student-centered teaching reform is adopted to prepare lessons before class, teach during class, and tutor after class. Deeply integrate online learning and offline teaching to build a hybrid teaching model; strengthen students' ability to learn actively and think deeply; comprehensively strengthen the ideological and capacity building of teachers; add course ideological and political content design to course implementation.

(1) Revise the syllabus

In-depth study of blended teaching, PBL teaching method, problem solving theory, Seven-step teaching reform method, and OBE theory to consolidate the theoretical foundation. The author adopts Professor Zhao Juming's Seven-step method of student-centered teaching reform to explore the online and offline teaching reform of mathematics courses. The curriculum

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objectives are revised from three aspects: knowledge, ability and literacy. In the process of formulating teaching objectives, it is necessary to pay attention to the implementation of curriculum objectives and avoid formalization. Different teaching methods are designed according to the type of learning content from the dimension of students' acceptance of knowledge, such as: discussion method, teaching method, case introduction method, demonstration method, situational teaching method, etc. In terms of the design of course objectives, according to Bloom's Law, it is progressive from four levels. Knowledge level: master data acquisition, data cleaning and sorting, data visualization, data description and analysis methods, and learn to write data analysis reports. Comprehension level: Understand the industry background, be familiar with business problems, be able to select appropriate statistical charts to display data, and convert business problems into data-analyzable problems. Application level: It has the ability to process data independently, transform business problems into data-analyzable problems, propose solutions, and evaluate and solve problems in a short period of time. Innovation level: Familiar with the data analysis process, write data analysis reports, and propose solutions to problems. Teamwork spirit, able to cooperate with team members, communicate effectively and cooperate happily.

(2) Design a reverse curriculum matrix

Use the reverse curriculum design matrix method to integrate real project cases into the curriculum design. The steps are as follows: [1] Determine specific goals: Decompose and set goals from the knowledge, ability, and literacy acquired by students; [2] Design all exam questions: quizzes, mid-term and final tests; [3] Design students' learning methods: combine facts Arrange students' online learning based on sexual knowledge and simple principles; [4] design teachers' teaching methods for each chapter content according to students' learning methods; [5] determine the goals, teaching effects, students' learning methods, and teachers' teaching methods before and after Overall consistency; [6] distills the general goal of teaching. Use case introduction method, problem-driven method, project teaching method, group discussion and sharing, etc.

(3) Evaluation of the effect of the revised course

Referring to Professor Yue Qinghua's "Professional Top-Level Design and Syllabus Design under the OBE Concept", it is necessary to consider: the content of the assessment should be designed around the course objectives, the assessment methods and the degree of achievement of the course objectives, and the assessment scores should have clear standards. In the revision process, increase the assessment of students' usual learning process. Build a diversified and measurable evaluation system. Adhere to scientific and effective evaluation, improve result evaluation, strengthen process evaluation, explore value-added evaluation, and improve comprehensive evaluation. Make full use of the functional characteristics of current information technology to improve the scientificity, objectivity and professionalism of course evaluation. Improve the evaluation method combining formative evaluation and summative evaluation. Strengthen the examination of classroom participation and classroom discipline, and create a good learning atmosphere. Formative assessment is implemented according to a fixed time schedule in the teaching process, and examines students' real-time mastery of knowledge, including: homework, discussion participation, students' mutual assessment, online learning, in-class questions, and application development. Summative evaluation is implemented after teaching, evaluating students' learning results to test whether students have achieved the teaching objectives of the course in terms of knowledge, ability and literacy.

The assessment method of this course is: total grade = process assessment * 50% + final grade * 50%. Among them, the total score for the final grade is 100 points (30 points for the usual grade, 10 points for the chapter test, 20 points for the face-to-face class, and 40 points for the final exam); the total score for the process assessment is 100 points, divided into 5 modules. Teachers formulate themes according to the students' behavioral goals in the syllabus, and

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students' complete material collection, analysis, design and presentation as required. The requirements of the project are moderate in difficulty. According to the actual situation of the students, it focuses on examining the students' ability to analyze and solve practical problems, and focuses on improving the students' application of basic knowledge and skills and the cultivation of innovative consciousness, so as to effectively promote students' autonomous learning. The specific expressions are as follows:

Table 1. Course assessment method

Serial number	Project	Require	Test knowledge and ability	Score
1	Background introduction	Choose the data analysis topic you are interested in, collect information on the Internet, and write a background introduction. The topic selection is required to be clear and focused, rather than covering the entire industry, to be coherent and logical.	Ability to analyze, understand, summarize and refine business problems.	10
2	data collection	Use Octopus software to obtain network data. Requirements, the same topic as the background introduction, there are two types of qualitative variables and quantitative variables, the number of fields is not less than 10, and the number of records is not less than 1000.	The ability to use software to obtain network data: including the acquisition of detail pages, the acquisition of table data, the acquisition of map data, the application of regular expressions, and the setting of Ajax.	20
3	Data cleaning and organization	The data is cleaned and organized, and finally reflected in the form of a data description table. Requirements: The structure of the data description table is complete and beautiful, and the presentation is clear and accurate.	The principles and technical methods of data sorting mainly include: sorting, removing duplicates, special character processing, time data processing, vacancy value processing, data discretization and other operations.	20
4	Data sheet	To make a data description table in PPT, the requirements are: variable type, variable name, detailed description, value range, and remarks.	Classification of data, transformation of business problems, computing power of data statistics	20
5	data visualization	Perform descriptive analysis of the collated data, generate graphs and interpret them. Including: column chart, boxplot, bar chart, scatter chart, histogram, etc. The charts are required to be beautiful, clear in meaning, and correct in point of view.	Data exploration and analysis capabilities. Master the skills to draw and beautify charts in Excel; be able to understand business issues and interpret charts accurately	30

(4) Build a blended teaching model

[1] Preparation before class: (1) Self-built MOOC courses can be fully pushed to students before class through the Wisdom Tree platform, which is convenient for students to preview and

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watch repeatedly after class. (2) Design a hybrid teaching plan that integrates online and offline multi-links. Develop a teaching plan that integrates online and offline. The plan can reflect different teaching methods and different flipping methods for different content characteristics. Realize the close integration and integration of online and offline teaching links and content. (3) Set online learning content, learning tasks, learning objectives and requirements. Students need to complete the video learning required by the online classroom, and they can choose to watch the content that has been taught in the classroom as needed. Self-testing exercises are regularly released every week to help review the knowledge points that should be known during the week. Students are encouraged to use the platform for online discussions and mutual Q&A. Through the platform, teachers give comprehensive scores to students' learning situation, completion of practice questions, and participation in discussions.

[2] In-class teaching: (1) multi-screen teaching is realized by means of mobile devices, network platforms, etc. Using in-class practice, sampling and other methods, using smart teaching tools, setting up in-class exercises or questionnaires, and timely discovering learning blind spots and understanding learning needs. (2) Teachers can set up group research and discussion links to carry out inquiry learning according to the teaching content. (3) After students complete the project work, upload it to the school's free class platform, and teachers will provide targeted guidance based on the real-time feedback results, thereby promoting the construction of students' knowledge system.

[3] After-school tutoring: Use the teaching platform to push weekly self-assessment exercises, and use online forums to communicate (teaching tools, QQ groups, online discussions, and mutual Q&A) to solve students' problems in real time. Smart teaching tools or teaching platforms can export students' learning behavior data.

4. The Effect of Blended Teaching

Since the fall semester of 2018, a blended teaching practice has been carried out for 8 consecutive semesters of the course "Statistical Data Analysis for Business". At present, there are 8,331 students enrolled in courses, 47 schools, and 12,100 interactions. The main teaching objects of our school are the first- and second-year students of our school's business majors. among them, 582 students were taught in 2018, 625 were taught in 2019, and 888 were taught in 2020. The teaching form of the 2018 course is offline teaching, and the teaching form after 2019 is a hybrid teaching combining online and offline teaching. The average score in 2018 was 74.2 points, the average score in 2019 was 77.8 points, and the average score in 2020 was 79.4 points. From the perspective of students' performance, the teaching results have been significantly improved after the implementation of blended teaching. In order to understand the students' satisfaction with the blended teaching mode, a total of 200 students were randomly selected from the elective students in 2019 and 2020 to conduct a questionnaire survey. There were 176 valid questionnaires, and the effective recovery rate was 88%. The content of the questionnaire is as follows:

1. How satisfied are you with the online learning platform for this course?

   A Very satisfied B Satisfied C Basically satisfied D Not satisfied

2. How focused are you when you study on the online learning platform?

   A Very focused B Basically focused

   C Sometimes focused D Not at all focused

3. Has online learning improved your learning effectiveness?

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A Significantly improved B Slightly improved C Not at all

4. Will you take the initiative to log in to the learning platform to learn and watch videos?

A often B occasionally C never

5. Does the online and offline teaching mode invisibly increase your learning burden?

A No effect B A little pressure C A lot of pressure

6. Which of the following learning methods has brought you more benefits?

A offline classroom teaching method B online teaching method

C Teaching method combining online and offline (theory + practice)

7. What is your attitude towards self-learning using online resources?

A Completely learn when it is useful B Out of interest

C Course requirements

8. If you didn't understand it in class, which action would you prefer to take?

A think independently B ask students and teachers for help after class

C Asking teachers and classmates for help through social software

D Watching online courses repeatedly

9. What do you think is the advantage of online teaching compared to traditional teaching mode?

A more free and flexible time, you can take the initiative to arrange the time and place of study

B is more object-oriented and can communicate with more students

C can directly use the knowledge points that cannot be encountered to pause/repeatedly watch the video

D can post in the "discussion group", and teachers and students can interact anytime, anywhere

E rich learning resources

10. Do you think the course assessment is effective, reasonable and fair in evaluating students' usual learning process?

A yes B no

(1) Satisfaction with online learning: 90% of students are satisfied with the use of online platforms. This learning method does not increase the students' learning burden, and students are very interested in this learning method. 72% of students will choose to watch the platform learning videos repeatedly if they have doubts after class. 83% of students believe that the time freedom and convenience of online learning are the biggest features and advantages. (2)

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Students' initiative in learning: 61% of the students are basically focused in the learning process, about half of the students will take the initiative to log in to the learning platform to learn, and other students will learn because of the requirements of the course assessment. However, there will be some students who do not complete their studies in accordance with the course requirements, resulting in the lack of this part of the grades. It also reflects that students' autonomous learning ability and deep learning ability still need to be improved. In the follow-up teaching design, it is necessary to stimulate students' initiative, learning drive and enthusiasm. (3) Learning gains: 84% of students believe that online learning has improved their learning effectiveness, and recognize the learning gains this teaching mode brings to their own. 89% of students believe that the assessment of this course can effectively evaluate their own learning process and learning effect. In the specific interviews, some students believe that the students' mutual evaluation of the report and the group reporting link can be appropriately included in the assessment, which can promote the students' ability to express and communicate. In the later stage, the feasibility of this part needs to be considered in the formulation of the assessment plan and the teaching design.

5. Summary

The integration and innovation of informatization and classroom teaching in colleges and universities still needs a long process. The reform of classroom teaching in colleges and universities must always be based on the purpose of educating people, adhere to "education-oriented, technology-based", starting from the essential needs of education, reasonable Use information technology to promote the great transformation of higher education. The blended teaching practice research of business statistical data analysis aims to practice the educational concept of "student development as the center, student learning as the center, and learning effect as the center", making full use of modern educational technology to serve teaching, so that college teaching can be more the cultivation of good service talents. The above research results show that this teaching model can effectively improve students' academic performance, and students are very recognized for the convenience and freedom of online teaching resources. In the implementation process, there are still many issues that need to be further explored, such as how to design a more reasonable, effective and fair teaching effect evaluation, how to stimulate students' learning drive, etc., so as to better improve the quality of teaching to serve professional and social talents need.

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