Research on the Strategies of Improving the Teaching Effect of Online Practice Courses in Colleges and Universities Based on Student Engagement

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Abstract. In the curriculum system of higher education, practice courses play an indispensable role, and are the transfer application platform and functional structure supplement of the knowledge learned in theoretical courses. However, practical courses often have special requirements for teaching conditions and teacher-student interaction, and there are many inconveniences in online development. How to make good use of online resources to give practical lessons has become a prominent problem for online teachers. This article starts with student engagement and analyzes the necessity of carrying out online practical teaching. Taking the undergraduate course "Principles of Economics" as an example, it studies the impact of student engagement on practical teaching and discusses how to improve online practical teaching. The practical method of teaching effect has certain reference value for the efficient development of online practical teaching.

Keywords: Online Teaching · Practical Courses · Engagement · Economics Principles

1 Introduction

The concept of Student Engagement was put forward at the end of the last century by the Western education community represented. The famous science historian Kuhn clearly defined it for the first time. In Kuhn's view, student engagement is a key factor in evaluating the effectiveness of teaching in universities [2]. University builders should pay more attention to the gains of learners in the process of university learning and their impact on the basis of condition building and reputation impact. Student engagement needs to measure the learning effect and effort level of learners in teaching activities [4]. A more quantified statement is the energy and time spent by them. Student engagement is an important factor in the healthy development of students, and it can play a significant and lasting role in promoting the effect of education [1]. At present, many

domestic and foreign universities have included it in the index system to measure the quality of education as a key indicator. It can be said that the engagement of students directly affects their own growth, the path to becoming a talent, and the education and training level of colleges and universities [5]. Higher education focuses on practice, and the practical courses in colleges and universities are the key link to improve students' comprehensive application ability and adapt to the first position [7]. In the case of the COVID-19 epidemic, the practical courses were also forced to be carried out online, but some problems and difficulties were faced more or less in teaching, students' enthusiasm and engagement in class were not satisfactory, and the teaching effect was far from satisfactory. There is a gap in offline teaching. Based on the relevant theories of student engagement, combined with the author's experience in teaching online practical courses, and collecting data through questionnaires, this paper studies the methods and means to improve student engagement in online practical teaching, and proposes for the subsequent development of online practical courses in mixed teaching.

2   Requirements for Students' Engagement in Online Practical Teaching

Since online teaching was fully launched nationwide, the Ministry of Education, major universities and even teacher training institutions have made tremendous efforts to this end, but some drawbacks still exist objectively. In order to obtain first-hand real data, we used the WeChat applet "Questionnaire Star" to conduct online surveys in two undergraduate classes that have just finished online teaching. A total of 69 copies of the title "Survey on Online Practice Courses of Blended Teaching" "The questionnaire (hereinafter referred to as the "questionnaire"), received 65 valid questionnaire feedback, the recovery rate was 94.2%. From the results of the questionnaire, for students, the problems of online teaching are concentrated in the inconvenience of communication with teachers and no writing on the blackboard. Sorting leads to unclear thinking logic, loose learning status, and inconvenient development of practical courses. 64.62% of those who chose the option of "practical classes could not be carried out or the effect of carrying out were not good" ranked first, as shown in Fig. 1. It can be seen that the problems encountered in the development of online practical courses have become one of the key factors restricting the quality of online teaching.

Because of the special requirements for equipment and places, practical teaching often faces greater difficulties in online development [6]. Due to the lack of simulation equipment, some practical teaching cannot be moved online. However, practical courses that can use the existing platform to carry out online teaching put forward higher requirements for students' engagement. The questionnaire showed that in the two lessons (90 min in total), only 24.62% of students were able to concentrate for more than 50 min, while less than 5% were able to concentrate for more than 70 min (as shown in Fig. 2). When teaching online theory classes, occasional distractions can be supplemented by the teacher's key repetitions, summary and other classroom links, which have little effect on the overall teaching effect. Practical classes mainly rely on the methods of operation, communication, and seminars in the classroom to consolidate knowledge and exercise abilities. If you can't concentrate and participate wholeheartedly, the effect of the class

Q 6 What do you think are the main disadvantages of online teaching?
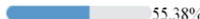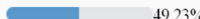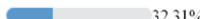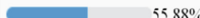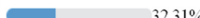[Multiple choice]

Options	Subtotal	Proportion	
Inconvenient communication between teachers and students, difficulty in feedback	36		55.38%
Without writing on the blackboard, the logical structure of knowledge is not clear	32		49.23%
Teachers' pace will become faster, and students will find it more difficult to accept	21		32.31%
The state of study is relatively free and loose, and it is difficult to concentrate	36		55.88%
Lack of supervision measures, there is a phenomenon of on-hook	21		32.31%
The practical class cannot be carried out or the effect is not satisfactory	42		64.62%
Number of valid entries in this question	65		

Fig. 1. Questionnaire results on the disadvantages of online teaching

Q 1 In general, how long do you have to stay focused for two class hours (90 minutes in total)?   [Single choice]
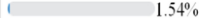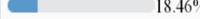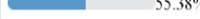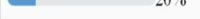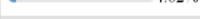
Options	Subtotal	Proportion	
Less than 10 minutes	1		1.54%
10-30 minutes	12		18.46%
30-50 minutes	36		55.38%
50~70 minutes	13		20%
70 minutes or more	3		4.62%
Number of valid entries in this question	65		

Fig. 2. The results of a questionnaire about the time spent on concentration of online teaching students

will be greatly reduced. In contrast, practical courses require a higher degree of student engagement to ensure the quality of teaching.

In addition, a higher degree of engagement in the teaching of practical courses can also enhance the sense of engagement of the students in the whole course, so that they can gradually realize their dominant position in the teaching activities, thereby enhancing the sense of gain and accomplishment, and realizing the effect of practical lessons on theoretical lessons [3]. The back-feeding of the whole course makes the teaching effect of the whole course better. From the results of the questionnaire, 53.85% of students believe that "increasing the proportion of comprehensive practice using online resources" is an effective means to increase their engagement in courses. It can be seen that the development of online practical courses is very necessary, and the degree of student engagement in them is the key to determining the quality of the courses (Fig. 3).

Q 7 What content do you think in online teaching can increase students' sense of participation?   [Multiple choice]

Options	Subtotal	Proportion	
Arrange students to give lectures in each class	7		10.77%
Teachers ask questions, students answer questions	29		44.62%
Increase the proportion of comprehensive practices using online resources	35		53.85%
Questions, exchanges and homework through the Rain Classroom platform	34		52.31%
Interaction through barrage in live lectures	35		53.85%
Number of valid entries in this question	65		

Fig. 3. The results of the questionnaire on the content design of online teaching to increase students' sense of engagement

3   Examples of Online Practice Courses of "Principles of Economics"

The undergraduate course "Principles of Economics" is a compulsory course for students majoring in procurement in our university. It has a total of 40 h, consisting of 34 h of theoretical teaching and 6 h of practical teaching. Among them, the practical course is a direct means for students to experience the economic life of project bidding and procurement, competitive negotiation, and supplier selection before embarking on the procurement job. The practical lessons of this course have low equipment requirements and can be carried out using the existing online open teaching platform.

Halfway through the theoretical teaching, we sent out a questionnaire to understand how to improve the sense of engagement of students in the practical class, aiming to study how to increase the engagement of students in the classroom design of the practical class. The survey results show that "arrange the content in advance for the practical class, release tasks", "group students reasonably, compete in groups, and everyone participates", "pay attention to the process record of the practical class, link with the usual grades, and urge everyone to participate" to increase engagement. Effective means.

After releasing the content of the practical course and the tasks of each group, most of the students were able to prepare the relevant content carefully. The simulation operation in the course was carried out very enthusiastically, basically restoring the real market operation activities. From the feedback after class, students' understanding of "price elasticity" and "supply and demand theory" has been significantly improved. At present, one cycle of online teaching has ended. From the feedback from students, the effect of online practical teaching is not inferior to offline teaching.

4   Strategies for Improving Student Engagement in Online Practice Teaching

Engagement in online practical teaching is a necessary condition to ensure that students achieve good teaching results and an important indicator to measure the results of blending teaching reform. Online practical courses also have unique advantages because they

are not limited by time and space. Therefore, it is necessary to focus on improving the classroom engagement of students in online practical teaching and ensuring the teaching quality of practical courses. Based on the analysis and research on the results of the questionnaire and the classroom practice of the "Principles of Economics" practical course, the main strategies are now summarized as follows:

4.1 Combining with Online Reality, the Teaching Design is Refined to Make Up for the Shortcomings

There is a time and space barrier between online teaching and learning. How to ensure real-time interaction in classroom teaching, and timely feedback of difficult problems must be properly resolved. Online teaching design, including the selection of teaching platform and the design of teaching content.

Choice of Teaching Platform. When choosing a teaching platform, we browsed and learned about most online teaching platforms, each with its own advantages. Finally, according to the teaching needs, the National MOOC platform, Rain Classroom, Tencent Classroom and Tencent Conference were selected. First, using the Chinese University MOOC platform to publish the preview content, so that students understand the main content of the practical class before the class; the lecture introduction link before the practical activity, in order to promote the formation of students' process thinking, choose Tencent class introduction, and the discussion area to answer questions; practice; During the course, we used Tencent conferences for students to speak and discuss. After class, we used Rain Classroom to post homework and tests to consolidate practical results.

Teaching Content Design. The practice class pays attention to the setting of scenarios. The stories and cases involved must not only deduct questions but also arouse students' interest in learning. Through case analysis and discussion, bold questioning, in-depth thinking, and no restricted areas for research. Assign predetermined tasks and requirements, pay special attention to developing and stimulating students' interest in economics-related content, so that each student is fully "immersed" in practice.

4.2 Pay Attention to the Early Stage of Building Momentum, and the Importance of Practical Courses is Deeply Embedded in the Heart

When explaining the curriculum design in the first class, the teacher needs to introduce the practical content of this course, so that students can establish the concept of the practical class at the beginning of the course study, and have a full understanding of its importance. Through the advance reminders and task releases two weeks before and the previous week of the practical class, students are allowed to clarify as early as possible what the practical class should do and what purpose should be achieved, and fully understand the key role of the practical class teaching content in the whole teaching process. Establish the awareness that you need to participate seriously and try your best to immerse yourself in the practical class.

4.3 Reasonably Divide the Work into Groups, and Everyone Participates in the Whole Process of Practical Teaching

Grouping personnel in advance is a convenient and efficient means to ensure engagement in practical courses. Groups are divided according to tasks and roles, and the size of each group is controlled at 3–6 people. If there are fewer personnel classifications, a certain type of personnel can be divided into multiple groups. For example, in the practical teaching of "Principles of Economics", when the number of students is large, the teams in the simulated production department can be divided into factory 1 group, factory 2 group, and factory 3 group. The smaller the number of people in each group, the higher their individual engagement.

4.4 Careful Link Design, Fragmentation and Relaxation of the Practice Process

Professor Yu Xinjie, the founder of Tsinghua University MOOC, said when talking about online teaching that online teaching sessions should be flexible and changeable, and the duration of a single session should not be too long, generally no more than 30 min. Practical teaching is more attractive to students than knowledge teaching in theoretical courses, and the engagement of students is often higher. However, if one lesson lasts too long, it will inevitably cause mental fatigue and decreased concentration. In order to ensure a high degree of student engagement and good teaching effects, it is recommended that the practical course should be divided into at least 3 or more parts, which mainly include teacher explanations, group discussions, group practice, result analysis, teacher comments, etc.

5 Summary and Outlook

During the COVID-19 epidemic, online teaching has been carried out in full swing nationwide and even around the world, which has spawned a large number of theoretical research results on online teaching, blended teaching and other aspects. However, practical courses are often excluded from online teaching due to limitations such as difficulty for students to participate, difficult to share equipment, and difficult to guarantee effects. This article uses the mobile WeChat applet "Questionnaire Star" to publish questionnaires to collect objective data, combined with the online and offline practical teaching experience of the school's "Principles of Economics" teaching team to conduct research, and analyze the importance of student engagement in online practical courses. It summarizes the experience of implementing the online practical teaching of the "Principles of Economics" course, and finally puts forward four suggestions to improve the engagement of students in the online practical class. Curriculum teaching effect under the model teaching mode has certain reference value.

The research done in this article focuses on student engagement and practical teaching effects. In the next step, we will continue to explore in depth on this basis, and introduce quality management and excellent quality management theories in management into the research process, from student satisfaction to acceptance evaluate the actual impact of engagement on course teaching in aspects such as the degree of engagement.

References

1. Cervera-Gasch, Agueda, Loreto Maciá-Soler, Desirée Mena-Tudela, and Víctor M. González-Chordá. 2018. Predictors of nurses' level of engagement in student care: A multivariable analysis. *Nurse Education Today* 65. (Complete).
2. Loftin, Collette, Lisa A. Davis, and Vicki Hartin. 2010. Classroom engagement: A student perspective. *Teaching and Learning in Nursing* 5 (3).
3. Smith, Jennifer N., Yvonne Phan, Mikala Johnson, Kaitlin Emmerson, and Shelley Otsuka. 2018. Describing pharmacy student engagement in an international, interprofessional medical mission trip as part of an advanced pharmacy practice experience (APPE). *Currents in Pharmacy Teaching and Learning* 10 (7).
4. Wozniak, Joey. 2018. Support services can boost student voter engagement. *Student Affairs Today* 20-21 (7).
5. Kouba, Karel. 2018. Determinants of student engagement in higher education governance: The case of student turnout in academic senate elections in Czechia. *Higher Education* 76 (1).
6. Wilmes, Sara E. D., and Christina Siry. 2018. Interaction rituals and inquiry-based science instruction: Analysis of student engagement in small-group investigations in a multilingual classroom. *Science Education* 102 (5).
7. Mäkelä, Tiina, and Sacha Helfenstein. 2018. Student engagement in learning environment improvement: Analysis of a co-design project in a Finnish upper secondary school. *Learning Environments Research* 21 (1).