



Exploring the potential of flipped learning in higher education in the post-Covid-19 era

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Abstract. This study examines the effectiveness of the learner-centered flipped classroom teaching model in exam-oriented educational settings. It addresses the challenge of motivating students to learn intrinsically and enhance their self-learning abilities. With the rise of online teaching tools due to the Covid-19 pandemic, online self-study and group interactions have become more accepted in formal courses. The study finds that the integration of the Outcomes-Based Education (OBE) flipped classroom teaching model helps students establish clear learning objectives, interact with teachers online for ongoing support, and inspires intrinsic motivation and self-efficacy. The research provides recommendations for course construction and teacher development, offering viable solutions for flipped classroom teaching. The study also explores the application of the Kirkpatrick evaluation model to assess the fourth-level outcome evaluation stage and discusses the potential reform of graduation requirements and professional training programs. The findings suggest that incorporating the flipped classroom with OBE teaching models can improve student learning outcomes, benefiting both educators and students. The evaluation of the flipped classroom can contribute to student-centered teaching strategies and the design of professional training programs.

Keywords: Higher education, Flipped classroom, Kirkpatrick model, Outcomes-Based Education.

1 Introduction

The COVID-19 pandemic has led to an increase in online teaching and the use of various communication tools, providing students with more diverse learning channels and enhancing their self-directed learning capabilities^[1]. Now the pandemic is no more threatening as before, and it is more feasible to adopt flipped classrooms in higher education under this favorable circumstance.

Traditionally, public management courses have been lecture-based, with an emphasis on subject-specific knowledge and solving linear problems. Research shows that a

comparison between lecture-based, proactive, and flipped classroom teaching methods in higher education has shown no significant difference in cognitive existence or learning performance^[2]. However, OBE flipped classroom method across all disciplines poses a challenge, making it all the more urgent to optimize flipped classrooms and enhance the development of students' innovative abilities.

While flipped classroom teaching methods have limited effectiveness in improving students' innovative awareness^[3], the OBE provides an expanded teaching process centered on students^[4]. The OBE model has been shown to be effective in improving teachers' teaching level and students' practical abilities. Moreover, it satisfies learners' needs and reflects the corresponding relationship between talent development plans, teaching content, and teaching objectives^[5]. In other words, OBE facilitates ongoing curriculum reform and talent development plan enhancement.

For the effective and long-lasting educational reform, assessing teachers' attitudes towards the implementation of OBE is crucial. Teachers need to view the entire OBE process as necessary and desirable. With the strong determination, purpose^[3], and collaborative efforts between school administrators, teachers, students, and other stakeholders, the successful implementation of this newly adopted higher education curriculum could result in desirable effects that might sometimes exceed the previous expectations. Recent teaching practices have shown that target-oriented models can effectively improve teachers' teaching level and students' practical abilities^[3].

After the impact of pandemic, online learning tools and platforms have rapidly become more popular and prevalent in higher education, providing more options for students. With the above mentioned in view, we therefore choose a public administration course taken by the sophomore students at a law school. There were 77 students enrolled in this class. This course was with a view to developing students' fundamental qualities as the future public servants and equipping them with an understanding of current trends in public administration. By integrating basic management knowledge with certain crucial public administration concepts, students are hopefully able to facilitate the necessary skills relevant to their future career more effectively.

To achieve these goals, we propose an OBE flipped classroom teaching concept that combines flipped classroom with the OBE mode. The teaching design is student-centered and allows students to choose public management themes that resonate with their responses, determine training goals based on their interests and needs, and share their viewpoints in classroom. The 90-minute teaching process is divided into three stages: the first 20 minutes are guided by the teacher in order to introduce basic theories and extract the learning points of the chapter in advance. The next 50 minutes are for students to analyze cases related to public management that they are interested in and learn through self-study, discussion, and speculation in class. In the last 20 minutes, teacher would once again lead the students to summarize the classroom content, and explain the next steps. The focus of the teacher-guided courses is to cultivate objectives that are compatible with graduation requirements. The OBE model lays the foundation for the construction of talent cultivation in college, ensuring that graduation requirements conform to the curriculum system

In conclusion, the implementation of the OBE flipped classroom teaching concept can offer a more effective approach to the discipline of public management in higher

education. With its emphasis on practical skill development and a student-centered approach, this teaching method, together with other necessary skills, has the potential to shape competent and well-equipped public servants capable of making significant contributions to society.

2 Method

As the learning evaluation method, which encompasses reaction evaluation, learning evaluation, behavior evaluation, and results evaluation.

2.1 Stage one learning satisfaction:

The first stage of our study focuses on reaction evaluation, primarily centered around classroom teacher-student interaction. During the teaching process, the observing teacher evaluates the interaction between "teaching" and "learning," and discusses with the teaching teacher after class to identify gaps between "teaching" and "learning" with a view to ensuring the effectiveness of learning. Data collected includes students' learning participation, attendance, and evaluation of teaching satisfaction with the teaching teacher.

2.2 Stage two learning evaluation:

In the second stage, learning evaluation employs a pre-test and post-test comparison method to understand the overall learning effectiveness. Most of students with the significant learning progress, the best learning status, and the worst learning status will be individually interviewed to explore potential factors that mediate learning changes

2.3 Stage three behavior evaluation:

The third stage involves behavior evaluation, which is challenging as far as the collection of evaluation data is concerned. However, this stage of evaluation is rather significant to our study. Therefore, after the flipped classroom ends, the observing teacher will use a participatory observation method to observe changes in student behaviors during the subsequent teaching process.

2.4 Stage four faculty development:

The fourth stage of the curriculum reform evaluation process aims to assess the impact of the reform on the department and the organization, specifically in terms of organizational changes. The main question to be answered is: "What has been the curriculum's impact on the college?" The effects of the faculty's professional development will be analysed and summarized through focus group discussions with administrative management personnel. The research framework shows in Figure 1

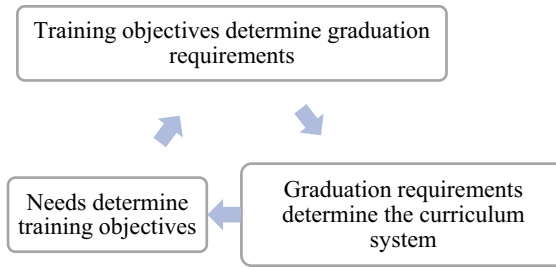


Fig. 1. The research framework

3 Result

3.1 Stage one: Reaction Level

The reaction level was carried out in collaboration between the teaching and observing teachers using action research methodology. The teaching approach used a combination of lecture and flipped classroom teaching methods. Before each class, pre- and post-tests, student satisfaction surveys, and surveys on participation in graduate school entrance exams were designed. The teaching teacher was responsible for guiding the flipped classroom teaching task and explaining the learning objectives to the students. Project members observed the interaction between the teaching teacher and students during class and recorded the course status for later review and analysis.

To assess the effectiveness of the teaching method, the evaluation criteria were divided into two categories: evaluation of the student's own learning outcomes and evaluation of the teacher's teaching. The feedback of 77 anonymous students was collected, with a score of 87.97 the students marked for their own learning outcomes and a score of 96.77 for the teacher's teaching respectively, which resulted in an overall score of 92.37. After obtaining the overall score, a frequency analysis was conducted on the feedback to identify the three most frequently mentioned phrases, which were "teacher" mentioned 33 times, "examination" mentioned 10 times, and "student" mentioned 9 times.

After reviewing and summarizing the feedback, we found that the students highly recognized the OBE flipped classroom teaching methods, considering this teaching method to be innovative and challenging for their self-learning ability. Students were able to understand their own learning outcomes through the pre- and post-tests.

3.2 Stage two: Learning Effectiveness Evaluation:

In the second stage of the Kirkpatrick model, the learning effectiveness evaluation was conducted based on pre- and post-test scores analysis. Two students were selected for the study: one with the best learning performance, and the other with poor learning effectiveness (Figure 2).

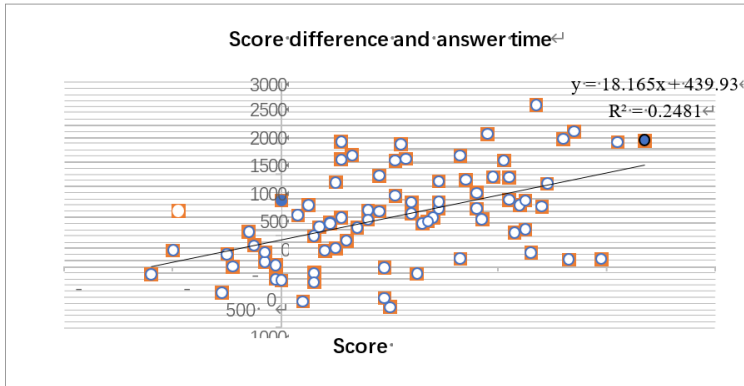


Fig. 2. Score difference and answer time

The overall attendance rate was high at 97.8%. The test consisted of 100 multiple-choice questions, with an average answer time of 32 minutes.

The analysis of test score data revealed that student number 68 showed the greatest improvement in scores, with a difference of 68 points between the pre- and post-tests. To ensure the validity of the interview sample, only students who answered the questions in more than the average time were included in the interview sample. The interviews conducted as part of the learning effectiveness evaluation provided valuable insights. Here's the summary of the feedback from these two students:

The student number 68 had the best learning performance and reported that the flipped classroom teaching approach helped him a lot. He explained that the goal-oriented teaching of the flipped classroom was beneficial for him, as it encouraged classroom interactions, reflection, and critical thinking. Through this approach, he was able to clearly see his past shortcomings, gain more confidence, and improve his understanding of public management. He was motivated to participate in scientific research and to take the postgraduate entrance exam. This student also appreciated the knowledge sharing and critical thinking that occurred between students in the flipped classroom. However, he mentioned that some students did not participate fully in the deliberation process, possibly due to the large class size (20230508-68)

The Student number 26 had a large learning gap and reported that he did not take the pre- and post- tests seriously, as he thought that the tests were not calculated as actual grades. However, the flipped classroom approach helped improve his pro-activity and presentation skills. He learned that his understanding of public management was insufficient and gained new knowledge by observing the speeches and thoughts of other students (20230508-26).

The student number 26 acknowledged that he was still not used to the flipped classroom approach and was relatively passive in his learning. However, seeing many of his classmates who are able to find information and improve their ability to learn independently motivated him to be more proactive.

3.3 Phase Three: Changes in Learner Behavior:

The results of the study showed that the flipped classroom approach was effective in improving students' learning outcomes, as evidenced by the significant increase in the average post-test scores when compared to the pre-test scores. The growth rate of 45% indicates that the OBE flipped classroom approach was able to enhance students' understanding of the subject matter.

Moreover, the observation of changes in student participation revealed that a significant number of students were able to improve their scores by more than 40 points, which suggests that the flipped classroom approach was particularly effective for these students. However, it should be noted that some students did not show significant improvement in their pre-test and post-test scores, indicating that the approach may not be suitable for all students or may require additional support for those who struggle to learn independently.

Overall, the study provides evidence that the OBE flipped classroom approach can be an effective teaching method for improving students' learning outcomes. However, further research is needed to explore how to best support students who may have difficulties with independent learning and to identify certain factors that contribute to the success of the flipped classroom approach.

This study analyses the effectiveness of a OBE flipped classroom approach in enhancing learning outcomes among public management students. The study used pre-test and post-test scores to evaluate the learning effectiveness of three students with different learning performances. As a result, we found that the flipped classroom approach significantly improved the average test scores from 46.87 to 67.94, indicating a growth rate of 45%. The study also observed changes in student behavior and found that the percentage of students willing to take the graduate entrance exam increased from 19.48% to 30.38% after the flipped classroom intervention.

In addition, the study conducted reliability analysis using SPSS to analyse the results of survey questionnaire, which was subjected to ANOVA. Analysis showed a statistically significant difference with a p-value of .036. These findings suggest that the OBE flipped classroom approach has a positive impact on students' willingness to take the graduate entrance exam (Table 1).

Table 1. Change in willingness to participate in the postgraduate entrance examination

Option	N	Mean	Standard Deviation
Be sure to participate	33	1.84	1.34
Willing but not confident	20	2.15	1.18
Under consideration	21	2.81	0.75
Not interested in participating	3	1.67	0.58
F	3.035		
P	0.036		

The study also interviewed students to gain insight into their experiences with the OBE flipped classroom approach. One student reported that the OBE flipped classroom helped him gain confidence and identify areas for improvement. Another student

mentioned that the flipped classroom approach improved their proactivity, but they were still relatively passive in their learning.

Overall, the study suggests that the OBE flipped classroom approach has the potential to enhance learning outcomes and increase students' willingness to pursue advanced studies. However, the study also highlighted the need for more student participation in the deliberation process, especially in large classes.

The OBE flipped classroom process was monitored by an observing teacher who recorded the interactions between the teacher and students and gained a full understanding of the students' learning situations [6]. After conducting the OBE flipped classroom, the original observing teacher used a participatory observation method to observe changes in learner behaviors. The observation focused on observable behavioral changes, aiming to understand changes in students' learning habits and behaviors, including interpersonal interaction and professional learning.

In the third stage of the study, a survey was conducted to gauge students' willingness to take postgraduate entrance exams, and participatory observation was carried out by the observing teacher. The observing teacher was a full-time teacher in the department who had a close understanding of the students' situation. The subsequent observation focused on changes in observable behaviors, aiming to understand changes in students' learning habits and behaviors, including interpersonal interaction and professional learning.

The results of this study indicate that there is no statistically significant difference in test scores before and after implementing the OBE flipped classroom. While this teaching method may not have a significant impact on improving test scores, it still provides benefits to students through the development of their self-directed learning skills and the ability to apply their knowledge in real-world situations.

In the third phase, surveys were conducted to explore changes in behavior. The results of surveys showed that the percentage of students willing to take the graduate entrance exam increased from 19.48% to 30.38% after the flipped classroom intervention. The survey questionnaire passed the consistency test with a Cronbach's alpha of .9. The analysis of variance (ANOVA) indicated a statistically significant difference. Participatory observation was also conducted, which revealed that learners generally improved their ability to self-study, think, and express themselves.

Regarding the willingness to take postgraduate entrance examinations, variance analysis showed significant change occurred. Through the observation of the teaching process, it was found that goal-oriented teaching with clear learning objectives could stimulate students' initiative, activate their internal learning motivation, and increase their confidence in taking postgraduate entrance examination.

3.4 Phase Four: Evaluation of Reform Effectiveness

Previous researches on flipped classrooms primarily focused on learners themselves, but this study aimed to explore the optimization of curriculum reform and development. In the final phase of the study, college-level administrators were invited to join a discussion in order to evaluate the effectiveness of the flipped classroom approach.

The discussion revealed that the OBE flipped classroom is a non-linear teaching model that poses certain challenges to teachers' professional competence and adaptability^[7]. However, OBE provides teachers with clear teaching goals, helps alleviate the pressure to demonstrate results and increases motivation, which ultimately leads to a positive impact on teacher development.

In conclusion, this study highlights the potential of the OBE flipped classroom teaching concept for curriculum reform and development in higher education. While previous researches mainly focused on learners, this study also involved teacher administrators in evaluating the effectiveness of this teaching approach. The joint discussion revealed that while the OBE flipped classroom model presents challenges in teachers' professional competence and adaptability, it also provides clear teaching goals, demonstrates teaching results, and increases teaching motivation, which ultimately leads to a positive impact on teacher development^[8].

The course design for public management can be divided into two parts, with the first part using traditional lecture-based teaching to establish theoretical foundations and the second part utilizing the OBE flipped classroom approach to improve students' application abilities, self-study skills, and critical thinking. Additionally, recording the course as online courseware can support teachers' ongoing development and provide them with opportunities to improve their skills in mixing and applying various teaching methods effectively^[9].

This study demonstrates the feasibility of optimizing the flipped classroom, particularly in the design of professional training programs in higher education, with a view to facilitating student-centered learning and improving learning outcomes. The OBE flipped classroom model brings both challenges and opportunities to teachers. Therefore, educators and educational leaders should continue to explore and optimize this teaching method to enhance the quality of education.

4 Conclusions.

This study explores the innovation of the teaching mode in the public administration course at the university based on the teaching philosophy of OBE flipped classroom. Through various research methods, such as questionnaire analysis, action research, participatory observation, and interviews, the study examines the teaching outcomes using the Kirkpatrick Evaluation Model. The study provides new evidence and models for the reform of talent development in college learning, laying the foundation for talent development of college students.

After analyzing the data, this study has found that the implementation of the OBE flipped classroom did not result in a statistically significant difference in test scores. However, it is important to note that this teaching approach still provides significant benefits to students' learning behavior, such as the development of self-learning and critical thinking ability in practical situations. Therefore, despite the lack of a significant change on test scores, the OBE flipped classroom approach remains a valuable pedagogical tool for promoting student-centered learning and enhancing the overall quality of education. We also found that OBE teaching model provides teachers

with clear teaching goals, and the pressure to demonstrate results and motivation, which has a positive impact on teacher development. We therefore recommend dividing the professional training program into theoretical examination classes and applied examination classes to reinforce students' basic professional knowledge before moving on to training in applied skills. Additionally, the course can be recorded as online courseware as part of teacher training materials, and teachers are supposed to improve their skills in mixing and applying various teaching methods, when given such opportunities as we mentioned above.

The course on OBE flipped classroom features three main innovations and breakthroughs

1. OBE Flipped classroom with needs-based training objectives: Traditional course design starts with the curriculum system and ends with internal needs, which may not meet external needs. This course adopts reverse course design, starting with needs (both internal and external), such that it determines training objectives based on needs, which determines graduation requirements based on training objectives, which lastly determines the curriculum system based on graduation requirements.
2. OBE approach, reducing the gap between learning and application: This course adopts a OBE teaching model design with "needs" as both the starting point and the end point. This ensures the consistency between educational objectives and results to the greatest extent, reducing the gap between learning and application.
3. Evidence-based approach, examining training objectives: This study innovatively uses the Kirkpatrick evaluation model to examine teaching effectiveness. It combines action research methods, questionnaires, interviews, observation methods, and focus group discussions to comprehensively verify the teaching effectiveness of OBE flipped classrooms. This approach enables us to penetrate deeper to understand the dynamics of classroom learning than the previous researches, focusing on the correspondence between talent development plans and course objectives. Therefore, it would be reasonable to say that such model provides a reference for future talent development plans and teaching reforms in college education.

In conclusion, this study highlights the potentials of the OBE flipped classroom as a complementary approach to traditional teaching methods. Although there are still many challenges ahead, our study has shown that the OBE flipped classroom approach indeed demonstrates its effectiveness in improving students' learning outcomes and developing critical thinking as well as proactivity skills. The COVID- 19 pandemic has accelerated the adoption of the flipped classroom model, but the exam-oriented education system remains a barrier to the unfolding of its full potential^[10]. Therefore, educational institutions should continue to explore and optimize this teaching approach to provide a more holistic and comprehensive learning experience for students. This study offers valuable insights into the effectiveness of the flipped classroom approach and provides recommendations for improving talent development in higher education.

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