

College Students' Classroom Participation and Learning Outcomes under the Outcome-Based Education: A Case Study of International Logistics Course

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How to cite this paper: Yao, D., Qiu, Y., Guo, Y. Q., & Cao, Y. Y. (2024). College Students' Classroom Participation and Learning Outcomes under the Outcome-Based Education: A Case Study of International Logistics Course. *Creative Education*, 15, 383-397.

<https://doi.org/10.4236/ce.2024.153023>

Received: February 22, 2024

Accepted: March 19, 2024

Published: March 22, 2024

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Abstract

The student-centered concept of Outcome-Based Education (OBE) requires more interaction from students in the classroom, emphasizing clear learning objectives and outcomes. To date, few studies have explored the relationship between college students' classroom participation and learning outcomes based on the OBE concept. Therefore, this paper constructed an index system for measuring classroom participation from three dimensions: behavioral participation, cognitive participation, and emotional participation. Learning outcomes were categorized into three aspects: knowledge acquisition, ability improvement, and quality enhancement. Using data from 59 college students in the International Logistics course, the study employed descriptive statistical analysis, Pearson correlation analysis, and independent sample t-test method to examine the relationship and differential factors between classroom participation and learning outcomes. The results indicate that: 1) Classroom participation is significantly positively correlated with learning outcomes; 2) Relatively stronger positive correlations exist between behavioral participation and knowledge acquisition, cognitive participation and ability improvement, and emotional participation and quality enhancement; 3) Classroom participation and learning outcomes are not related to gender, class, or leadership roles in the class, but there are noticeable differences in classroom participation and learning outcomes between students who have low GPA or have learning punishments compared to those with high GPA or without learning punishments. Based on these findings, this paper proposed several teaching strategies and suggestions that are of significant practical importance for improving college students' classroom participation and learning outcomes.

Keywords

OBE Concept, Classroom Participation, Learning Outcomes, College Students

1. Introduction

The quality of higher education serves as a crucial indicator of a country's development level and potential, among which undergraduate education stands out as the most fundamental foundation for ensuring the quality of higher education and serves as the primary battleground for cultivating highly skilled professionals. Classroom teaching, as the main channel for imparting knowledge, fostering capabilities, and developing critical thinking, plays a pivotal role in this process. With the increasing democratization of higher education and the rapid advancements in science and technology, the traditional model of classroom teaching centered around teachers, is no longer able to meet the demands of society for highly qualified professionals. Creating a new type of classroom that encourages active student participation, fosters positive communication, and promotes collaborative innovation is a crucial initiative for enhancing the effectiveness of classroom teaching and improving the quality of talent development.

Classroom participation is a crucial indicator reflecting the degree to which students actively engage in classroom teaching (Heid *et al.*, 2023; Holly *et al.*, 2024). Learning outcomes refer to the knowledge and ability acquired by students through classroom learning (Obeso *et al.*, 2023). Both are widely employed in assessing classroom quality. In traditional classrooms, teachers are the primary agents of instruction, and student tends to be passive, lacking proactive engagement, leading to low levels of classroom participation and suboptimal learning outcomes. The Outcome-Based Education (OBE) concept, characterized by a focus on student-centeredness, outcome orientation, and continuous improvement, can address these issues effectively (Xu *et al.*, 2023). This concept was first proposed by Spady (1994) to address the problem of insufficient outcomes in higher education. It has been widely adopted in countries such as the United States, Canada, the United Kingdom, and Australia, and is a key concept in the educational reforms of Western countries. Since becoming an official member of the Washington Accord in 2016, China, especially local engineering colleges and universities, has actively promoted the OBE concept and initiated a series of educational reforms.

The OBE concept transforms the traditional “teacher-centered” classroom reform into a “student-centered” classroom. In this paradigm, teachers and students coexist in a shared, interactive, and collaborative space. This approach empowers students with increased intellectual engagement and emotional experiences, facilitating better digestion and absorption of the knowledge learned. Furthermore, it fosters the development of students' problem-solving skills, communication abilities, and collaborative innovation. Therefore, the OBE con

cept plays a positive role in promoting college students' classroom participation and learning outcomes. It is an effective measure for improving the overall quality of classroom teaching.

However, existing research on the OBE concept predominantly focused on aspects such as instructional design, organizational structure, implementation, and evaluation under this framework, with many studies being qualitative in nature (Gao & Guo, 2021; Han & Liu, 2022; Wu & Xue, 2022). Simultaneously, research on student classroom participation and learning outcomes primarily centered around primary and secondary school students (Decristan *et al.*, 2023; Ahmmed & Uddin, 2022), often limiting the assessment of learning outcomes to singular aspects of performance and lacking a comprehensive consideration of students' overall qualities. Therefore, taking the International Logistics course as an example, this paper selects second-year college students who have completed the course as the research subjects. It designs a system of indicators for college students' classroom participation and learning outcomes based on the OBE concept, aiming to comprehensively understand students' classroom participation and achievements in the course. The study analyzes the correlation between classroom participation and learning outcomes. The research findings hold significant practical implications for teachers aiming to enhance classroom teaching dynamics and improve student learning outcomes.

2. International Logistics Course Design Based on OBE Concept

The International Logistics course is one of the core courses in logistics management majors at higher education institutions, characterized by its strong practical orientation. The teaching content is derived from real-world international logistics and related business operations. It encompasses various aspects such as international procurement management, international warehouse management, international transportation management, international trade practices, international freight forwarding, customs declaration practices, inspection practices, and insurance practices. This diverse knowledge base plays a crucial role in cultivating logistics professionals with an international vision (Li *et al.*, 2023). Applying the OBE concept to reform the teaching of the International Logistics course is an important component of enhancing the quality of talent development in logistics management.

1) Student-Centered Teaching Design

Students are the focal point of learning and should transition from being passive recipients to autonomous learners (Lee & Hannafin, 2016). In light of this, the International Logistics course departs from a singular lecture-based teaching method and advocates the organic integration of various teaching methods such as task-driven activities, group discussions, case studies, scenario simulations, and flipped classrooms. For instance, after the teacher explains the knowledge points and operational processes of "container liner transportation", students are organized into learning groups, with each student assigned a role such as a

shipper, freight forwarder, ship's agent, ship's chief mate, customs officer, etc. They are tasked with completing the container liner transportation of certain goods from Country A to Country B. By simulating real-world scenarios of container liner transportation, students actively engage in classroom learning, gaining a firsthand experience of the responsibilities and characteristics of actual international logistics positions. This approach not only avoids the ineffective memorization of operational processes but also enhances students' practical operational capabilities in international logistics business.

2) Outcome-Oriented Evaluation System

Based on the training objectives and graduation requirements of logistics management professionals, the course objectives for the International Logistics course are designed following the logical path of knowledge acquisition, ability improvement, and quality enhancement. To align with each course objective, there is a shift away from relying on final exams as the main assessment method. Instead, an emphasis is placed on increasing the process assessments. Students are encouraged to actively participate throughout the entire course, and an outcome-oriented evaluation system is established (Lv & Liu, 2023). The relationship between the evaluation system, course objectives, and graduation requirements is illustrated in Figure 1. Specifically, in evaluating students' mastery of foundational theoretical knowledge in the international logistics course, three assessment methods are employed: class quizzes, post-class assignments, and final exams. To assess students' ability to analyze and solve practical issues related to international logistics, four assessment methods are utilized: post-class assignments, specialized presentations, course reports, and final exams. Furthermore, to evaluate students' awareness of teamwork, independent learning, and innovation, two assessment methods are applied: specialized presentations and course reports.

3) Feedback mechanism with a focus on continuous improvement

The purpose of continuous improvement is to ensure and improve the quality

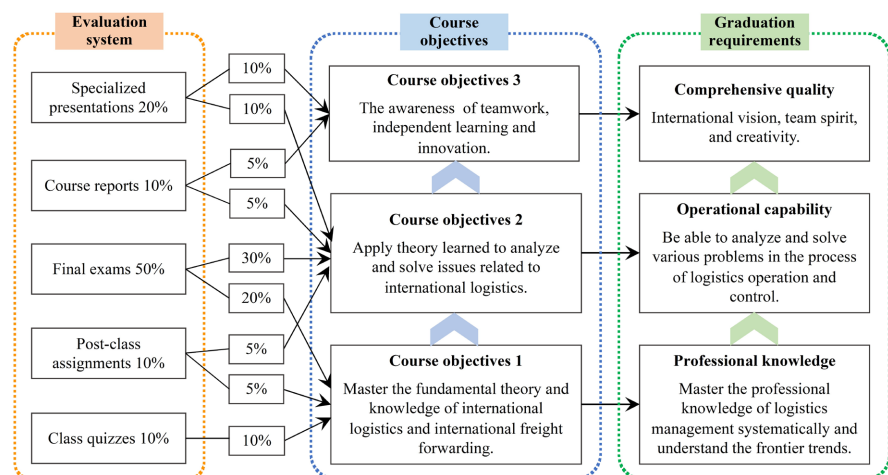


Figure 1. The relationship between evaluation system, course objectives and graduation requirements.

of the course continuously, creating a positive cycle of “evaluation-feedback-improvement” (Carlucci et al., 2018). The International Logistics course has established a three-level teaching quality feedback mechanism involving students, teachers, and teaching supervisors. Firstly, students can provide feedback on any issues during the teaching process to their teachers at any time through the classroom interactive teaching platform (namely cloud class). The teacher designs an evaluation questionnaire around the course outline, teaching design, learning outcomes, and other aspects. Then students participate in the evaluation survey and point out shortcomings. Secondly, after completing the teaching of each chapter in the course, the teacher makes a summary based on students’ classroom performance, class quizzes, and post-class assignments, identifies teaching problems in time, analyzes the reasons, and continuously optimizes and improves the teaching design. At the end of each semester, a comprehensive analysis of each student’s performance in achieving the three course objectives is conducted considering class quizzes, post-class assignments, specialized presentations, course reports, and final exams. Then improvement measures to further enhance the achievement of course objectives are proposed. Finally, the teaching supervisors from the college and school regularly inspect the teaching situation of the teachers, examining the appropriateness of their teaching methods, the comprehensiveness of the teaching content, the liveliness of the classroom atmosphere, the rationality of course assessments, and the retention of course teaching materials. Overall, the three-level teaching quality feedback mechanism promotes the continuous improvement of the International Logistics course.

3. Research Design

3.1. Measurement of Classroom Participation

The student-centered course teaching is committed to creating a classroom environment in which students are motivated to learn by their own learning needs, with guidance and assistance from the teacher. The classroom participation exhibited by students in this environment differs from that in traditional courses. Therefore, to accurately and comprehensively understand the elements of student participation in the International Logistics course, this study conducted a semester-long project observation. Throughout the observation, detailed records were maintained for the behaviors and feedback of all students. Finally, this paper divides classroom participation in the International Logistics course into the following three dimensions: 1) The behavioral participation of students in classroom teaching; 2) The cognitive participation of students in adopting different learning strategies to address their own needs; 3) The emotional participation displayed by students in the course, as shown in **Table 1**.

Regarding behavioral participation, attendance is the fundamental prerequisite to ensure students’ engagement in the classroom. The primary ways for students to interact with teachers are to actively answer questions and participate in group discussions. Therefore, this paper selects three indicators to represent

Table 1. Classroom participation index system.

Classroom participation	Indicator	Implication
Behavioral participation	Attendance rate	Students attend on time, not be late or leave early
	Number of questions answered	Students actively participate in teaching activities
	Number of group discussions participated	Students actively express their own opinions and ideas, while listening and understanding the opinions of others
Cognitive participation	Number of issues proposed	Students propose ideas or doubts based on their own needs
	Number of comments	Students have their own grasp and cognition of teachers and the classroom, and view the teaching process critically
Emotional participation	Course materials viewing rate	Students have an interest and expectation for further exploration and expansion of the course content

students' behavioral participation, i.e., attendance rate, the number of questions answered, and the number of group discussions participated.

Regarding cognitive participation, students can initiate seeking guidance and assistance from teachers based on their individual needs, rather than mechanically receiving knowledge. Hence, this paper chooses two indicators, namely the number of issues proposed and the number of comments, to represent the cognitive participation of students.

Finally, for the emotional participation dimension, as students become the subjects and focal points of the classroom, their motivation shifts from merely completing assigned tasks to an increasing desire for knowledge expansion and deepening. Therefore, this paper selects the indicator of course materials viewing rate to represent students' emotional participation.

3.2. Measurement of Learning Outcomes

According to Bloom's taxonomy of educational objectives, educational objectives can be categorized into three major domains: cognitive, skills, and affective. Therefore, the learning outcomes of the International Logistics course are measured in terms of knowledge acquisition, ability improvement, and quality enhancement. They primarily include professional knowledge, problem-solving abilities, international vision, and team cooperation (see [Table 2](#)).

Regarding knowledge acquisition, the course adopts three assessment methods, i.e., class quizzes, post-class assignments, and final exams, to assess students' mastery of international logistics fundamentals and international freight forwarding knowledge.

Regarding ability improvement, the course assesses students' ability to solve fundamental international logistics issues using four evaluation methods: post-class assignments, final exams, specialized presentations, and course reports. For example, students are examined on their capability to calculate transportation costs for international maritime, air, railway, and road cargo. They are also evaluated on their proficiency in completing import and export customs declarations, entry and exit cargo inspection forms, and handling customs

Table 2. Learning outcomes index system.

Indicator	Implication	Assessment method
Knowledge acquisition	Students are able to grasp the fundamental theories and knowledge of international procurement management, international warehouse management, and international transportation management. They are also familiar with the business processes of international maritime freight forwarding, international air freight forwarding, international railway freight forwarding, international road freight forwarding, and multimodal transportation.	Class quizzes (10%) Post-class assignments (5%) Final exams (20%)
Ability improvement	Students possess the ability to analyze and solve issues related to international logistics using foundational knowledge of international logistics.	Post-class assignments (5%) Final exams (30%) Specialized presentations (10%) Course reports (5%)
Quality enhancement	Students can track cutting-edge issues in international logistics, broaden international vision, enhance communication and expression skills, and develop an awareness of teamwork, independent learning, and innovation.	Specialized presentations (10%) Course reports (5%)

clearance, inspection and quarantine, and insurance procedures for general import and export goods.

Regarding quality enhancement, specialized presentations and course reports are employed to evaluate whether students can track and explore cutting-edge international logistics issues through team cooperation.

4. Results Analysis

4.1. Descriptive Statistical Analysis

For the data of classroom participation and learning outcomes indicators, this paper uses a classroom interactive teaching platform (namely cloud class) to record classroom observations. On this platform, teachers can upload academic literature, research reports, industry reports, video resources, and other course materials, as well as initiate teaching activities such as sign-in, brainstorming, group discussions, proactive speeches, special topic reports, and course reports. Any actions including viewing, participating, leaving comments, and soon by students can be recorded. Based on this, the classroom data of 59 students in the International Logistics course were obtained in this paper. The basic characteristics of 59 students are shown in **Table 3**.

Table 4 presents the descriptive statistical results of classroom participation and learning outcomes indicators. The mean represents the average level of each indicator; the median describes the central trend of each indicator; the maximum, minimum, and standard deviation represent the differences among students in each indicator, with a smaller standard deviation indicating a smaller difference among students in one indicator.

Specifically, among the class participation indicators, the median values of attendance rate, the number of questions answered, and the number of group discussions are higher than the mean values, indicating that students' behavioral

Table 3. Basic characteristics of students.

Attribute	Type	Frequency	Percent (%)	Total
Sex	Male	29	49.15	59
	Female	30	50.85	
Class	Class one	30	50.85	59
	Class two	29	49.15	
Class leader or not	Yes	18	30.51	59
	No	41	69.49	
Learning punishment or not	Yes	14	23.73	59
	No	45	76.27	
Grade Point Average (GPA)	$2.5 \leq \text{GPA} \leq 4$	40	67.80	59
	$0 \leq \text{GPA} < 2.5$	19	32.20	

Note: The learning punishment includes caution for learning, warning for learning, and warning for dropping out. It is usually determined based on the GPA of each semester and failing credits.

Table 4. Descriptive statistical results of indicators.

Variable	Indicator	Mean	median	Max	Min	SD
Class participation	Attendance rate	98	100	100	91.67	0.03
	Number of questions answered	10.05	11	13	6	1.67
	Number of group discussions participated	5.18	6	8	2	1.88
	Number of issues proposed	3.24	3	6	0	1.97
	Number of comments	2.32	2	5	0	2.41
	Course materials viewing rate	74.31	72	100	48	14.93
Learning outcomes	Knowledge acquisition	82.36	83	95	65	5.43
	Ability improvement	80.51	80	93	61	6.17
	Quality enhancement	79.10	79	92	67	6.77
	Integrative achievement	80.56	80	93	66	5.67

participation in class is generally above the average level. The standard deviation of the six indicators in descending order is attendance rate, the number of questions answered, the number of group discussions, the number of issues proposed, the number of comments, and the course materials viewing rate. It shows that students have small differences in behavioral participation, but relatively significant differences in cognitive participation and emotional participation.

Among the learning outcomes indicators, only the median of knowledge acquisition is greater than the mean, indicating that students' knowledge acquisition overall belongs to the upper middle level. The standard deviation of the three indicators, ranked from low to high, is knowledge acquisition, ability improvement, and quality enhancement, suggesting that students have relatively little differences in knowledge acquisition, but show great differences in ability

improvement and quality enhancement.

In summary, with regard to classroom participation, students have a good level of behavioral participation in class, while cognitive participation and emotional participation need to be improved. With regard to learning outcomes, students have achieved good results in acquiring knowledge, but there is room for improvement in their abilities and qualities.

4.2. Correlation Analysis

Correlation analysis is a statistical method that studies whether there is a correlation between variables and the strength of the correlation. This paper adopts Pearson correlation analysis to explore the direction and strength of the correlation between course participation and learning outcomes. The Pearson correlation coefficient ranges from -1 to 1 . When the coefficient value is greater than 0 , it indicates a positive correlation between the two variables; When the coefficient value is less than 0 , it indicates a negative correlation between the two variables; When the coefficient value is equal to 0 , it indicates that there is no linear correlation between the two variables. The larger the absolute value of the Pearson coefficient, the higher the degree of linear correlation. The basis for judging the correlation between variables is shown in **Table 5**.

The Pearson correlation coefficients between classroom participation and learning outcomes are shown in **Table 6**. On the behavioral participation dimension, the Pearson correlation coefficients between attendance rate and the four indicators of learning outcomes did not show significance, mainly because students maintained a high level of attendance and did not have significant differences. The Pearson correlation coefficient between the number of questions answered and knowledge acquisition is 0.656 , which is significant at the 0.01 level, indicating a significant positive strong correlation between the two indicators.

Table 5. Correlation judgment basis.

The absolute value of Pearson coefficient	Below 0.4	0.4 - 0.6	0.6 - 0.8	0.8 and above
Correlation strength	Weak correlation	Moderate correlation	Strong correlation	Extremely strong correlation

Table 6. The Pearson correlation coefficients between classroom participation and learning outcomes.

Variable	Knowledge acquisition	Ability improvement	Quality enhancement	Integrative achievement
Attendance rate	0.481	0.243	0.262	0.317
Number of questions answered	0.656**	0.542**	0.304*	0.587**
Number of group discussions participated	0.619**	0.558**	0.597*	0.655**
Number of issues proposed	0.581**	0.724**	0.599**	0.692**
Number of comments	0.346*	0.602**	0.461*	0.582**
Course materials viewing rate	0.429*	0.542**	0.818**	0.763**

Note: *represents $p < 0.05$, **represents $p < 0.01$.

The Pearson correlation coefficient between the number of questions answered and ability improvement is 0.542, and is also significant at the level of 0.01, indicating a significant positive moderate correlation between the number of questions answered and ability improvement. The Pearson correlation coefficient between the number of questions answered and quality enhancement is 0.304, which is significant at the 0.05 level, indicating a significant positive weak correlation between the number of questions answered and quality enhancement. Similarly, the correlations between the number of group discussions participated and knowledge acquisition, ability improvement, and quality enhancement are all significantly positive, and the strengths are strong, moderate, and moderate in order. It can be seen that there is a significant positive correlation between students' behavioral participation and learning outcomes. In particular, compared to the ability improvement and quality enhancement, the correlation between behavioral participation and knowledge acquisition is stronger.

On the cognitive participation dimension, the correlations between the number of issues proposed and knowledge acquisition, ability improvement, and quality enhancement all showed significant positive at the 0.05 level. Among them, the Pearson correlation coefficient between the number of issues proposed and ability improvement is the largest, exceeding 0.7, suggesting a significant positive strong correlation between the number of issues proposed and ability improvement. The Pearson correlation coefficients between the number of issues proposed and knowledge acquisition and quality enhancement are more than 0.5, but less than 0.6, indicating that the correlations between the number of issues proposed and knowledge acquisition and quality enhancement are moderate. The Pearson correlation coefficient between the number of comments and ability improvement is 0.602, which is significant at the 0.01 level, indicating a significant positive strong correlation between the number of comments and ability improvement. The Pearson correlation coefficients between the number of comments and knowledge acquisition and quality enhancement are 0.346 and 0.461, and are significant at the 0.05 level, showing a significant positive weak correlation and a moderate correlation, respectively. Overall, students' cognitive participation showed a stronger positive correlation with ability improvement compared to knowledge acquisition and quality enhancement.

Finally, on the dimension of emotional participation, there is a significant correlation between course materials viewing rate and quality enhancement at the 0.01 level, and the Pearson correlation value is greater than 0.8, indicating a significant positive strong correlation between course materials viewing rate and quality enhancement. At the same time, the Pearson correlation coefficients between course materials viewing rate and knowledge acquisition and ability improvement are both greater than 0.4 and are significant at the 0.05 level and 0.01 level, respectively, suggesting significant positive moderate correlations between course materials viewing rate and knowledge acquisition and ability improvement. It can be seen that students' emotional participation shows the strongest positive correlation with quality enhancement. It is easier for students to broa-

den their international vision and achieve quality enhancement through academic papers, video resources, research reports, and other resources.

The above correlation analysis shows that the three dimensions of classroom participation are not only significantly positively correlated with learning outcomes, but also have different correlation strengths. On the whole, there is a stronger positive correlation between behavioral participation and knowledge acquisition, cognitive participation and ability improvement, and emotional participation and quality enhancement.

4.3. Differential Analysis

Different types of students may have different performances in class participation and learning outcomes. Therefore, in order to further explore the differences in learning performance among different student groups, this paper divides students into different groups based on factors such as gender, class, whether they are class leaders, whether they have received learning punishments, and GPA level. Then, the independent sample t-test method is applied to analyze the differences in classroom participation and learning outcomes indicators among different student groups. The difference analysis results are shown in **Table 7**.

For the gender factor, the t-values of male and female students in all indicators of classroom participation and learning outcomes are not significant, indicating that there is no significant difference in classroom participation and learning outcomes among students of different genders. The independent sample t-test results of class and class leader or not are the same as gender, suggesting that there is no significant difference in classroom participation and learning outcomes among students from different classes and whether they are class leaders. For the factor of having learning punishment or not, the two groups of students did not show significant differences in the three indicators: attendance

Table 7. Results of difference analysis.

Variable	Indicator	Gender	Class	Class leader or not	Learning punishment or not	GPA
Class participation	Attendance rate	0.273	-0.527	0.502	-1.710	0.420
	Number of questions answered	-0.349	-0.190	0.797	-2.243*	2.430*
	Number of group discussions participated	0.369	-0.491	0.557	-1.375	1.636
	Number of issues proposed	-1.177	0.570	0.418	-2.281*	2.435*
	Number of comments	-0.559	0.616	0.177	-1.063	1.588
	Course materials viewing rate	0.482	-0.504	0.034	-2.194*	2.512*
learning outcomes	Knowledge acquisition	0.567	-0.622	0.162	-2.298*	2.321*
	Ability improvement	-1.215	0.809	1.603	-2.175*	2.192*
	Quality enhancement	1.741	-0.217	0.760	-2.085*	2.145*
	Integrative achievement	0.693	0.131	1.105	-2.164*	2.342*

Note: *represents $p < 0.05$.

rate, number of group discussions participated, and number of comments. However, students who had learning punishments had significantly lower times of questions answered, times of issues proposed, course material viewing rate, and all learning outcomes indicators at the 0.05 level compared to students who did not receive the learning punishment. This implies that students who have received learning punishments have lower participation in the classroom and poorer learning outcomes. Finally, regarding the GPA level factor, there is no significant difference between low GPA students ($GPA < 2.5$) and high GPA students ($GPA \geq 2.5$) in terms of attendance rate, number of group discussions participated, and number of comments. However, the number of questions answered, the number of issues proposed, course materials viewing rate, and all learning outcomes indicators of students with high GPA are significantly higher than those of students with low GPA at the level of 0.05, indicating that students with high GPA were more engaged in classroom learning and achieved better learning results. This conclusion reflects the consistency of students in their learning behavior.

The above difference analysis results indicate that students' classroom participation and learning outcomes are not related to gender, class, and whether they are class leaders, but are related to whether they have received learning punishments and GPA level. Therefore, teachers should pay more attention to the learning performance of students with learning punishments and low GPA in class. This will play an important role in improving classroom participation and learning outcomes.

5. Implications

According to the findings of the present study, the following teaching strategies and suggestions should be proposed to improve college students' classroom participation and learning outcomes.

- 1) Increase effective questioning in class to better improve college students' behavioral participation. The teacher should take into account the purpose, rigor, inquiry, and inspiration of the questions, and pay attention to the questions' quality rather than quantity. In order to stimulate students' interest and inspire their thinking, the teacher should design questions to be asked based on the teaching content before each class. In the classroom, the teacher should create an open and equal learning atmosphere as a guide, adjust the answering time based on the difficulty level of each question, and reward students according to their accuracy and speed of answering.

- 2) Emphasize the teaching organization form of group discussion to promote students' interaction, cooperation, and critical thinking. Before starting a group discussion, the teacher should set clear rules, including discussion questions, discussion time, participation methods, and soon. It is essential to define the goals and expected outcomes of the discussion, ensuring that students understand the objectives they are expected to achieve. Design interesting and challenging questions to encourage students to think deeply and generate compre-

hensive discussions from multiple perspectives. Assign different roles and tasks to group members, encourage students to leverage their strengths and take on responsibilities within the group to ensure that each student actively participates in the discussion. During the discussion, regularly observe the group to understand their progress, provide necessary guidance and support, and correct any inappropriate behavior. After the conclusion, encourage groups to share their discussion results to promote overall learning.

3) Introduce inquiry-based learning tasks and encourage students to pose their own questions and actively seek answers. At the beginning of the task, present one to two guiding questions. The design of these questions should arouse students' curiosity while having a certain level of depth to lead them to think and identify directions they are interested in. Guide students in using various sources of information to gather information about the questions they are exploring, such as the library, the internet, etc. Provide timely support and guidance during students' inquiry process. Organize regular sessions for students to share their discoveries, questions, and learning processes, promoting mutual inspiration and sparking more questions and reflections.

4) Provide more diverse and enriched course resources around the teaching content. This includes but is not limited to, utilizing various technological tools, such as educational platforms, online tools, and social media, to offer students a rich learning experience. Utilize open educational resource platforms to collect online teaching resources, including instructional videos, interactive simulations, online courses, etc. Share the latest relevant literature in the subject field to encourage students to update and expand their professional knowledge. Integrate course content with practical applications by introducing case studies, field visits, and industry practices, allowing students to apply theoretical knowledge to practical scenarios. Invite industry professionals or domain experts to participate in the classroom and share their practical experiences.

5) Focus on students with low GPA and provide personalized support, especially those who have received learning punishments. Understand each student's learning style, interests, strengths, and challenges. Collaboratively set clear learning goals with the students and help them comprehend the importance and practical applications of these goals. Offer timely and practical feedback on students' learning performance to help them understand their strengths and areas for improvement. Establish reward and incentive mechanisms to encourage students to strive for GPA improvement. Encourage students to participate in study groups, facilitating mutual learning and the exchange of experiences with peers, collectively facing academic challenges.

6. Conclusion

The OBE concept breaks the traditional teaching activity-centered education model, focuses on creating a classroom environment where students actively participate, and cultivates their comprehensive abilities. Therefore, it plays a

positive role in promoting classroom participation and improving learning outcomes for college students, and can more effectively achieve the training goal of applied talents. In this context, taking the course form of the International Logistics course as an example, this paper first constructs a classroom participation index system from three dimensions: behavioral participation, cognitive participation, and emotional participation, and divides learning outcomes into three aspects: knowledge acquisition, ability improvement, and quality enhancement. Then empirical analysis is conducted on the relationship between the classroom participation of college students and the learning outcomes. Finally, the following conclusions are drawn.

First, with regard to classroom participation, students are more likely to have good behavioral participation in class, while cognitive participation and emotional participation need improvement. With regard to learning outcomes, students are more likely to achieve good results in acquiring knowledge, but need to enhance their abilities and qualities. Second, the three dimensions of classroom participation indicators are not only significantly positively correlated with learning outcomes, but also have different correlation strengths. There is a stronger positive correlation between behavioral participation and knowledge acquisition, cognitive participation and ability improvement, emotional participation and quality enhancement. The classroom participation and learning outcomes of students are not related to gender, class, and whether they are class leaders, but are related to whether they have received learning punishments and GPA level.

Funding

Key Projects of Educational Teaching Reform and Research of Beijing Institute of Petrochemical Technology: Research on the Student-centered Teaching Reform of International Logistics Course (ZDFS GG202104004).

Key Projects of Educational Teaching Reform and Research of Beijing Institute of Petrochemical Technology: Research on the Evaluation Mechanism of Deep Learning Effect Achievement for Undergraduates in Application-oriented Universities.

Key project of Beijing Higher Education Association: Research on the Training Path of Composite Management Talents with Characteristics of “+Safety Emergency” to Serve the High Quality Development of the Capital (ZD202308).

The Excellent Young Talents Project of Beijing University Teacher Team Construction Support Plan in 2022 (Grant No. BPHR202203095).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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