The Development of Blended Teaching model Based on Deep Learning Theory to Enhance college students' critical thinking

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Abstracts

The purposes of the study are 1) to investigate the current situation of college students' critical thinking,2) to develop the blended teaching model based on deep learning theory to enhance college students' critical thinking, and 3) to access the efficiency of the instruction model. The Population is about 7,000 sophomores of G University in the semester 1 academic year 2023.The sample groups for this research were 1) 400 sophomores who participated in the questionnaire survey, 2) 50 sophomores who participated in a quasi-teaching experiment. The research instruments were 1) college students' critical thinking disposition scale,2) lesson plan of the "CIPSE" model, 3) examination paper of college students' critical thinking ability. The results were found that:1)college students' critical thinking level is generally good ($\bar{x}$ = 4.75),2)This study has developed a blended teaching model based on Deep Learning Theory named the "CIPSE" model,3)After teaching experiment, the data show that the "CIPSE" model has obvious functions in cultivating college students' critical thinking ability.

Keywords: Blended Teaching Model; Deep Learning Theory; Critical Thinking

Introduction

Critical thinking is a reasonable and reflective thinking, which emphasizes a cautious attitude towards opinions, hypotheses and arguments (Dong Yu, 2019: 14-21). Critical thinking encompasses both critical thinking disposition and critical thinking ability. Critical thinking disposition refers to the conscious mental states, willingness, and inclinations to judge consciously, which activates the development of an individual's critical thinking. Critical thinking ability involves the skill to employ critical thinking in solving complex problems. Critical thinking is a core competency of 21st-century talent, and as such, any educational system should establish the goal of nurturing individual adept in critical thinking (David Hitchcock,2012: 54-63).

Teaching is an essential way to cultivate talents in universities and an important means for fostering college students' critical thinking. As a teaching model deeply integrated with modern educational theory and technology, blended teaching combines the advantages of traditional classroom teaching and online education, and will surely play a transformative role in cultivating college students' critical thinking. The scholars believe that blended teaching can not only play the leading role of teachers in guiding, enlightening and monitoring the teaching process, but also allow students to fully participate and become active, active and creative participants (Yen and Lee, 2011: 138-145). Lee (2004:1) explored the promotion effect of individual learning and online collaborative case study on undergraduates' critical thinking. Wu Yanru (2014: 83-88) found that blended teaching designs based on problem-solving

strategies can enhance not only the critical thinking ability but also the critical thinking disposition. Furthermore, Yakob et al. (2020:3) discovered that multimedia teaching materials, including videos and animations, have a more significant impact on enhancing the critical thinking ability of college students.

Although existing research indicates the significant role of blended teaching in developing critical thinking among college students, some scholars have pointed out (Li Li and Gao Yanhong, 2021: 148-153) that, on the whole, current blended teaching in Chinese universities suffers from "shallow" design problems such as blended forms and inefficient blending. They suggest the active incorporation of deep learning theory for design. Deep learning theory emphasizes that learning is an active and critical process. It is led by teachers and centers around challenging learning themes, requiring wholehearted, active, and meaningful participation and successful experiences for development (Guo Hua, 2016: 25-32). Based on this analysis, the aim of this study is to construct a blended teaching model rooted in deep learning theory and explore its impact on fostering college students' critical thinking.

Research Objective

1. To investigate the current situation of college students' critical thinking.

2. To develop the blended teaching model based on Deep Learning Theory to enhance college students' critical thinking.

3. To access the efficiency of the blended teaching model based on deep learning theory through comparing the college students' critical thinking ability before and after the implementation of teaching model.

Research Methodology

Study object selection

According to the research purpose and research setting, this study chooses G University where the researcher works as the sample area. G University locates in Guilin, is a comprehensive university jointly established by the Ministry of Education of China and the People's Government of Guangxi Zhuang Autonomous Region is a key university in Guangxi with a long history and strong strength.

Population and sample

Population

The Population is about 7,000 sophomores of G University in the semester 1 academic year 2023.

The Sample Group

1.The sample group was purposively selected from the population of 7,000 sophomores at G University in the first semester of the 2023 academic year. A total of 400 students participated in the questionnaire survey. Among them, there were 78 males, accounting for 19.50 percentage, and 322 females, accounting for 80.50 percentage. Additionally, there were 228 liberal arts students, constituting 57.00 percentage of the sample, and 172 science and engineering students, making up 43 percentage. In terms of ethnicity, there were 276 Han nationality students, comprising 69 percentage, and 124 minority nationality students, constituting 31 percentage.

2.Fifty college students participated in a quasi-experimental study, selected randomly from a pool of 400 students who had previously taken part in the survey. Of the 50 participants, 15 were male, comprising 30.00 percentage, while 35 were female, making up 70 percentage of the sample. There were 28 liberal arts students, constituting 56.00 percentage, and 22 science and engineering students, accounting for 44 percentage. In terms of ethnicity, there were 37 Han nationality students, comprising 74 percentage, and 13 minority nationality students, accounting for 26 percentage.

The creation of research instruments

The research tools of this study include : 1) College Students' Critical Thinking disposition Questionnaire, includes truth-seeking, openness, analyticity, systematic ability, self-confidence, curiosity and cognitive maturity, with a total of 7 dimensions and 35 sub-items; 2)"CIPSE" Blended Teaching model; 3) Examination Paper of College Students' Critical Thinking Ability, includes understanding of critical thinking, analyzing ability, reasoning ability, identifying implicit assumption ability, evaluating arguments ability, decision-making ability, self-monitoring and reflective ability, with a total of 7 dimensions and 35 sub-items. The above three research tools have been reviewed by three external experts and passed IOC's recognition unanimously.

Data Collection

1. Through *College Students' Critical Thinking Disposition Questionaire*, using a 7-point Likert Scale format, from "strongly disagree" to "strongly agree", a total of 7 levels, as follows: "Strongly disagree" =1;"Not agree" = 2;"Not quite agree" =3. "Uncertainty" =4;"somewhat agree" =5; "Agree" =6;"Strongly agree" =7. This study investigates the current situation of critical thinking disposition of 400 sophomores from G university.

2. Through *Examination Paper of College Students' Critical Thinking Ability*, 50 students who participated in the quasi-teaching experiment were pre-tested and post-tested, and all the score data were recorded.

Data analysis

In this research, the data is analyzed by finding f, percentage, $\bar{x}$, SD, df and t-test. The researcher proposed a hierarchical classification of data analysis results.

Results
1. Investigate the current situation of college students' critical thinking.
The results of data analysis use tables as well as mean, standard deviation, interpretation (level of critical thinking), and ranking of all factors. After that, items of all dimensions are presented likewise.

Table 1 Mean and standard of data analysis on college students' critical thinking disposition
From Table 1, the general performance of college students' critical thinking disposition level is good ($\bar{X}$ = 4.75). Considering each item separately, it is found that decisions made by powerful people are correct decisions is the highest rank which is in the very good level($\bar{X}$ =6.16), followed by studying new things can enrich students' life($\bar{X}$ =5.60), while the best arguments often come from the instant feeling of a certain problem is the lowest rank which is in the quite poor level ($\bar{X}$ =3.10).

critical thinking disposition	$\bar{X}$	SD.	Interpret	Ranking
1.If there are four reasons to agree with something and only one reason to oppose it, students will choose to agree with it.	3.66	1.45	Common	34
2.Even if there is evidence that doesn't agree with students' idea, students will stick to their idea.	4.26	1.38	Common	31
3.It is impossible to be objective when students express their opinions.	4.68	1.50	Good	19
4.Students will only look for some facts that support their opinion, not some facts that oppose their opinion.	4.91	1.60	Good	16
5.Students don't know what standard should be used to measure most problems	4.37	1.55	Common	26
6.It's important for students to know what other people think about things.	5.33	1.28	Good	5
7.Students are trying to make less subjective judgments.	4.60	1.39	Good	23
8. Foreigners should learn Chinese culture, not ask Chinese to know their culture.	5.52	1.37	Very good	4
9. It's not that important to be open to different world views (e.g. evolution, theism).	5.08	1.56	Good	11
10. Everyone has the right to express their opinions, but students will ignore them.	4.89	1.57	Good	17
11. All students' beliefs must be supported by evidence.	5.09	1.38	Good	10
12. Students are logical persons.	5.01	1.09	Good	14
13. Students are good at dealing with problems in an orderly way.	5.02	1.10	Good	13
14. Students are not very logical persons, but students often pretend to be logical.	4.67	1.35	Good	20

15. When encountering problems, it is impossible to know which one is the better solution.	4.92	1.43	Good	15
16. Students always analyze the key point of the question before they answer it.	5.25	1.09	Good	6
17. Students can easily organize their thoughts.	4.61	1.16	Good	22
18. Students are good at planning a systematic plan to solve complex problems.	4.64	1.21	Good	21
19.Students often think about right and wrong in practice and experience.	5.15	1.16	Good	8
20. People think that students hesitate when making decision.	3.71	1.49	Common	33
21.Students appreciate their ability to think accurately.	4.33	1.31	Common	27
22.Tests that require thinking rather than answering by memory are more suitable for students.	4.59	1.43	Good	24
23.Students' curiosity and thirst for knowledge are appreciated by others.	4.30	1.21	Common	29
24.When faced with problems, because students can make an objective analysis, their peers will come to them to make decision.	4.14	1.34	Common	32
25.When making decision, others expect students to formulate appropriate guidelines for guidance.	4.31	1.28	Common	**28**
26.Studying new things can enrich students' life.	5.60	1.01	Very good	**2**
27.Before facing an important choice, students will try their best to collect all relevant information.	5.55	0.96	Very good	**3**
28.Solving difficult problems is fun.	5.14	1.19	Good	**9**
29.Students like to find out how things work.	5.06	1.23	Good	**12**
30.Students will try to learn everything, even if they don't know when they are useful.	4.69	1.38	Good	**18**
31.The best arguments often come from the instant feeling of a certain problem.	3.10	1.33	Quite poor	**35**
32.The so-called truth is nothing more than personal opinions.	4.43	1.66	Common	**25**

33.Students firmly believe in what they believe.	4.28	1.41	Common	**30**
34.The best way to solve difficult problems is to ask others for answers.	5.20	1.33	Good	**7**
35.Decisions made by powerful people are correct decisions.	6.16	1.16	Very good	**1**
Total	**4.75**	**1.32**	**Good**	

As the data analysis result shown above, it can be concluded about college students' critical thinking disposition from different dimensions as the table 2.

Table 2 Mean and standard of data analysis on college students' critical thinking disposition from different dimensions overall.

Critical thinking disposition	$\overline{\text{X}}$	**SD.**	**Interpret**	**Ranking**
1.Seeking truth (item1-5)	4.38	0.43	Common	6
2.Openness (item6-10)	5.08	0.32	Good	2
3.Analyticity (item11-15)	4.94	0.15	Good	3
4.Systematization (item16-20)	4.67	0.55	Good	4
5.Self-confidence (item21-25)	4.33	0.14	Common	7
6.Thirst for knowledge(item26-30)	5.21	0.34	Good	1
7.Cognitive maturity (item31-35)	4.63	1.02	Good	5
Total	**4.75**	**0.28**	**Good**	

From Table 2，college students' critical thinking level is generally good ($\overline{x}$ =4.75),and showing a relatively balanced state in seven dimensions. Considering each dimension separately, thirst for knowledge is the highest rank which is in the good level($\overline{x}$=5.21), followed by openness ($\overline{x}$ =5.08), while self-confidence is the lowest ($\overline{x}$ =4.33).

2.Analysis results to develop the blended teaching model based on deep learning theory to enhance college students' critical thinking.

After investigating the current situation of college students' critical thinking and studying Deep Learning Theory, the blended teaching model was constructed and was considered by three experts. The detail of the Blended Teaching Model based on Deep Learning Theory is presented as follows.

2.1 principle

Deep learning is a meaningful learning process. It requires that teaching design should be based on theme-based design, guide students to learn cooperatively and independently, and be able to talk to textbooks, students and themselves through online and offline. The specific principles are as follows：

（1）Student center: put students at the core of learning, encourage them to actively participate and explore, and stimulate their autonomous learning ability.

（2）Practice-oriented: Through practical cases, problems and challenges, students can apply critical thinking skills to real-world situations.

（3）Cooperative learning: encourage cooperation, discussion and knowledge sharing among students to promote mutual interaction and learning.

（4）Technology integration: using technology tools and online resources to provide students with more learning opportunities and personalized learning experiences.
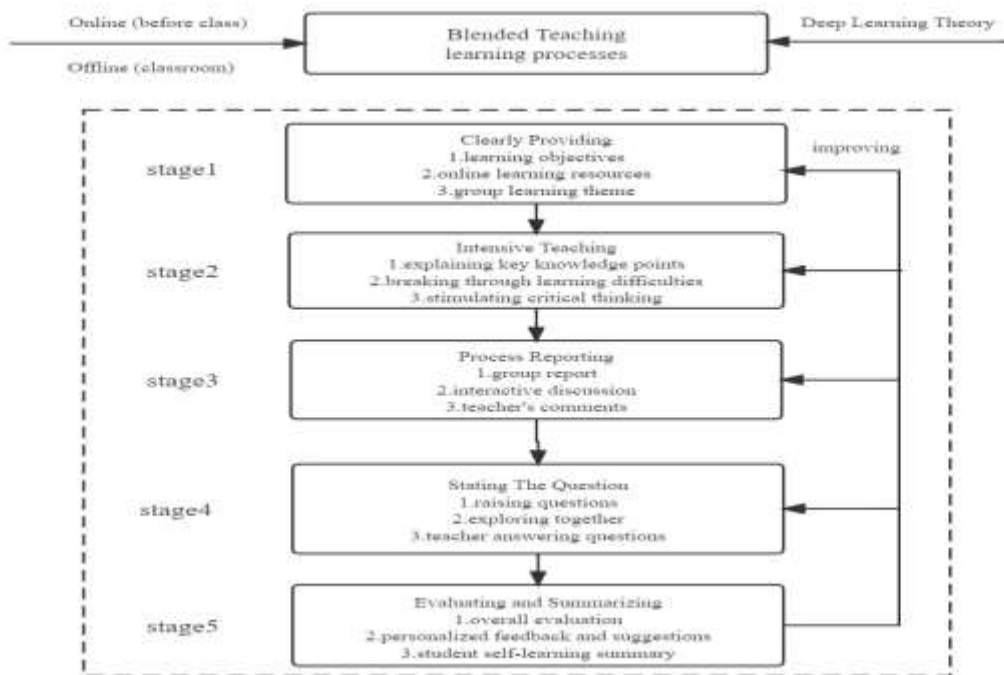
2.2 The "CIPSE" model

Figure 1 "CIPSE" blended teaching model based on deep learning theory

Stage 1 Clearly Providing: guide students to understand the learning requirements and evaluation criteria, and conduct autonomous learning through online mode, so as to have a preliminary perception of the learning content of each unit, and record the doubts and difficulties in learning, so that offline classes can continue to discuss the learning content more deeply, and at the same time clearly provide students to the ways, objectives and basic requirements of group cooperative learning.

(1) Learning objectives. Provide clear learning objectives and learning requirements to ensure that students understand the core concepts and skills of the course.

(2) Online learning resources. Provide online learning resources, including learning materials, online discussion forums, interactive learning platforms, etc., to support students' autonomous learning.

(3) Group learning theme. Delineate groups, each group is responsible for studying a specific learning theme, and requires each group to carry out interactive learning and in-depth discussion.

Stage 2 Intensive Teaching: in the initial stage of classroom teaching, teachers explain important knowledge points and difficulties clearly and thoroughly, but don't talk or talk less about general easy-to-understand knowledge points, so as to improve the efficiency and pertinence of teaching.

(1) Explain key knowledge points. Through in-depth explanation, teachers explain important concepts, improve students' understanding and mastery of the basic concepts and core content, help students establish a solid learning foundation, and lay a solid foundation for

further study.

(2) Break through learning difficulties. Through targeted explanation, guidance and counseling, teachers help students overcome the problems and difficulties encountered in learning, improve learning efficiency and enhance students' confidence and ability in learning.

(3) Stimulate critical thinking. Provide case analysis and practical problems to stimulate students' interest and trigger critical thinking.

Stage 3 Process Reporting: The study group reports the process, content and reflection of theme learning to the whole class. Each study unit arranges two study groups to report to the whole class, and other students in the class can ask questions about the content of the group report for interactive learning. This process mainly includes the following three steps.

(1) Group report. Arrange study groups to report and share their learning process, main findings and critical thinking through PPT.

(2) Interactive discussion. After PPT presentation other students can ask questions, express their opinions and have an interactive discussion.

(3) Teacher's comments. Teachers act as guides, encourage in-depth thinking and critical evaluation, and help students broaden their horizons and understand different viewpoints.

Stage 4 Stating the Question: Students sort out the difficulties and challenges encountered in online learning and send them to the intelligent learning platform. Teachers organize discussions to guide students to solve difficulties and challenges in learning together.

(1) Raising questions. Students will record the difficulties and challenges encountered in the online learning process and submit them to the intelligent learning platform or online discussion forum.

(2) Exploring together. Teachers organize discussions among students and encourage them to help each other and solve the difficulties and challenges submitted.

(3) Teacher answering questions. Teachers provide targeted guidance and solutions to guide students to think and try to solve problems.

Stage 5 Evaluating and Summarizing: Teachers evaluate and summarize online learning and classroom learning, and ask students to personally summarize the online and offline learning effects in this unit's theme learning, so as to evaluate and reflect on the learning process.

(1) Overall evaluation. Teachers summarize and evaluate students' online learning and classroom learning performance, including learning achievement, participation and critical thinking ability.

(2) Personalized feedback and suggestions. Teachers provide personalized feedback and suggestions to help students further develop and enhance their critical thinking ability.

(3) Student self-learning summary. Teachers require students to write a written summary of this topic study, including a review of the learning process, an assessment of their critical thinking ability, reflections on difficulties and challenges, and plans and goals for future study.

3.Analysis results to access the efficiency of the blended teaching model based on deep learning theory through comparing the college students' critical thinking ability before and after the implementation of teaching model.

Table 3 Comparison of pre-and post-test results of college students' critical thinking ability
From Table 3，

Critical thinking ability	Pre-test		Post-test	
	$\overline{x}$	S.D.	$\overline{x}$	S.D.
1.Understanding of critical thinking	3.56	0.58	4.70	0.58
2.Analyzing ability	3.16	0.87	3.68	0.68
3.Reasoning ability	3.52	0.86	3.74	0.69
4.Identifying implicit assumption ability	3.08	1.03	3.60	0.70
5. Evaluating arguments' ability	3.04	0.70	3.64	0.60
6.Decision-making ability	3.80	0.53	4.84	0.37
7.Self-monitoring and reflective ability	3.64	0.56	4.52	0.68
Total **23.80 1.95**			**28.72 1.63**	

college students' critical thinking ability has made great progress total of mean from 23.80 ($\overline{x}$=23.80) in the pre-test to 28.72 ($\overline{x}$=28.72) in the post-test. From each specific dimension, the average score of post-test has all made obvious progress compared with the pre-test, among which understanding of critical thinking has made the greatest progress, while reasoning ability is the smallest. Judging from the pre-test data, it is found that decision-making ability is the highest($\overline{x}$=3.80), followed by self-monitoring and reflective ability($\overline{x}$=3.64), while evaluating arguments' ability is the lowest ($\overline{x}$=3.04). From the post-test data, it is found that decision-making ability is the highest($\overline{x}$=4.84), followed by understanding of critical thinking ($\overline{x}$=4.70), while identifying implicit assumption ability is the lowest ($\overline{x}$=3.60).

Table4 t-test for pre-test and post-test scores of college students' critical thinking ability

Critical thinking ability		$\overline{x}$	S.D.	df	t	Sig.
1	Pre-test	23.80	1.95	49	27.631**	.000
2	Post-test	28.72	1.63			

**represents statistic significance at .01 level

From Table 4, there are statistic significant differences at .01 level between the pre-test and post-test scores of college students' critical thinking (t=27.631, p=0.000<0.01), in which the mean of the pre-test scores is 23.80 and the mean of the post-test scores is 28.72.

Conclusion

In the study of "The Development of Blended Teaching model Based on Deep Learning Theory to Enhance college students' critical thinking", the research results are as follow:
1. College students' critical thinking level is good ($\overline{x}$=4.75). From the seven specific dimensions of critical thinking disposition, thirst for knowledge is the highest rank which is in the good level($\overline{x}$=5.21), followed by Openness($\overline{x}$=5.08), while self-confidence is the lowest($\overline{x}$=4.33).
2. This study has developed a blended teaching model based on Deep Learning Theory named the "CIPSE" model. The "CIPSE" stands for the abbreviation of a five-stage teaching method employed during the instructional process: Clearly Providing, Intensive Teaching, Process Reporting, Stating the question, Evaluating and Summarizing. The model has been evaluated by three specialists and found to align with criteria of utility, feasibility, propriety, and accuracy.
3.After quasi-teaching experiment on the "CIPSE" model, the data show that the critical thinking ability of 50 sophomores who participated in the teaching experiment has been obviously improved, and the overall average score has increased from 23.80 to 28.72. After the paired sample t-test, it is found that there are significant differences (t=27.631, p=0.000<0.01)) in the pre-test and post-test scores of college students' critical thinking ability. This fully proves that the blended model based on Deep Learning Theory has obvious advantages and effects in cultivating college students' critical thinking ability.

Discussion

This study will discuss the conclusions according to the order of research purposes.
1. Discussion on the survey data of college students' critical thinking
1.1 From the investigation of the current situation of the critical thinking disposition of sophomores in Guangxi Normal University, we find that the overall performance of college students' critical thinking is good($\overline{x}$ =4.75).Compared with the investigation of Facione (1997:1), there is still a certain gap in the results of this investigation, which is mainly due to the fact that China school education has paid more attention to the teaching of knowledge and neglected the cultivation of students' critical thinking ability for a long time. However, compared with Liu Yi and Zhao Juming (2010: 81-85) survey of college students in China, the results of this survey are even better. There are two main reasons for this situation: First, the university surveyed in this study have stronger comprehensive strength than that surveyed by Liu Yi and Zhao Juming, so the quality of students will be better; Second, Liu Yi and Zhao Juming's survey took place in 2010. In recent years, China's education has gradually attached importance to the cultivation of students' comprehensive literacy, and accordingly students' critical thinking ability has been improved to a certain extent.
1.2 Further analysis shows that from the seven specific dimensions of critical thinking disposition, thirst for knowledge is the highest rank which is in the good level($\overline{x}$=5.21), which also confirms from the side that China's long-term emphasis on knowledge teaching and knowledge mastery has led to students' general desire and enthusiasm for knowledge. From the specific performance of each question, we found that students performed best in 35 questions "Decisions made by powerful people are correct decisions" ($\overline{x}$ =6.16), which shows that after more than 40 years of reform and opening up in China, especially after joining the WTO in 2001, China has fully integrated into the world, and students' subjective consciousness has become stronger, and they are no longer blindly superstitious about authority, which reflects the great progress of society and conforms to the actual situation of social development in China.

2. Discussion on the "CIPSE" model

Based on the Deep Learning Theory, this study constructs the "CIPSE" model, also known as the five-stage teaching method of blended teaching: Stage 1 Clearly Providing, Stage 2 Intensive teaching, Stage 3 Process Reporting, Stage 4 Stating the question, Stage 5 Evaluating and Summarizing. The "CIPSE" model fully embodies the student-centered and practice-oriented, emphasizes the multi-interaction between students and students, students and teachers, students and content, and students and external resources, and comprehensively evaluates students' learning achievements by adopting the evaluation mechanism combining formative evaluation and summative evaluation. This teaching mode can fully promote the better development of college students' critical thinking, and make learning become an active and meaningful exploration process, which is no longer a simple one-dimensional knowledge infusion. This teaching model was fully affirmed by experts because of its advanced design concept, clear operation stages and reasonable evaluation method, and three external audit experts unanimously passed the IOC's recognition (Wichean Intarasompan, and Jittawisut Wimuttipanya 2021:online).

The "CIPSE" model is a novel teaching approach that blends modern educational theory with technology and seamlessly incorporates deep integration with the Internet. Blended teaching has been generally regarded as the "new normal" of education in the 21st century (Norberg, A et al.,2011: 207-216.). Especially since the outbreak of the COVID-19 epidemic, blended teaching has shown a blowout development under the background of internet-enhanced education and has become an extremely important phenomenon and trend in the reform of university education. The "CIPSE" model is in line with the basic idea of the blended teaching model proposed by Yen J C and Lee C Y (2011:1), focusing on "interaction", emphasizing 1) the shift from teacher-centered to student-centered, 2) the interaction between students and students, students and teachers, students and content, students and external resources, and 3) the adoption of an evaluation mechanism combining formative evaluation with summative evaluation. Essentially, the "CIPSE" model is by no means a physical "mashup" of various online and offline teaching elements, but a chemical "fusion", aiming at achieving the optimal deep learning effect (Liu Hui et al., 2020; 82-87+108).

3. Discussion on the effectiveness of "CIPSE" model by comparing the data before and after the teaching experiment

3.1 After implementing the teaching experiment of the "CIPSE" model to improve college students' critical thinking ability, the scores of 50 students who participated in the teaching experiment have been significantly improved, and the overall average score has increased from 23.80 to 28.72, which fully demonstrates the effectiveness of the "CIPSE" model. This also proves that the use of digital tools can have a positive impact on students' critical thinking (Akylbek Meirbekov et al.,2022:44), because the use of digital tools can help students develop their abilities of setting realistic goals, self-control, self-reflection, self-awareness and cooperation (Saadati et al.,2021: 1-24, Intarasompun, W., Muangnual, P., and Punchatree, N. 2022:online).). In other words, blended teaching makes up for the shortcomings of traditional classroom teaching and pure online teaching, which can make students learn more effectively and is more conducive to the cultivation of students' critical thinking.

3.2 From the seven specific dimensions of critical thinking ability, it is evident that college students have shown improvement in each dimension of their critical thinking skills. Notably, there has been significant progress in their understanding of critical thinking, while their reasoning ability has shown comparatively slower growth. This suggests that the "CIPSE" model, being student-centered, interactive, and experience-oriented, has effectively increased

students' interest in learning and enhanced their grasp of critical thinking. Moreover, understanding critical thinking serves as the foundation for overall critical thinking ability and can be relatively quickly acquired with proper methods. On the other hand, reasoning ability entails a deeper comprehension, analysis, and inference of information, typically requiring prolonged training and practice. This also reminds us that we need to make a longer-term training plan for the deep-seated abilities of critical thinking, such as reasoning ability, identifying implicit assumption ability and reasoning ability, and we can achieve better results through systematic study, training and practice (Tosati, S. ., Sitthisopasakul, T., and Intarasompun, W. 2021: 124–137.).

       3.3 Deep learning pays attention to the deep participation of learners in the learning process and the construction and generation of students' existing experience in the learning process. In the blended instructional design, teachers' one-way orientation should be transformed into multi-directional demand, and multi-directional resources should be presented through the reconstruction of teaching time sequence, the transformation of teaching methods and the excavation of teaching content. The essence of this transformation actually require teachers to emphasize "student-centered" in the blended instructional design, emphasizing the cultivation of students' critical thinking activities under the effective guidance of teachers by means of the advantages of information technology and the combination of online and offline teaching methods. Therefore, the ultimate goal of carrying out mixed teaching is not to use various online platforms, to construct digital teaching resources or to carry out innovative teaching activities, but to effectively enhance the depth of most students' learning and meet the realization of students' "multi-directional" needs, so that knowledge can meet the needs of learners with different experiences in the process of construction, and then personalized interpretation of knowledge can be generated, thus truly realizing students' learning center position (Ren Zhanying, 2022: 5-11.). The "CIPSE" model, based on Deep Learning Theory and designed in this paper, emphasizes the central position of students in their learning process. It encourages active studying and critical thinking, enabling students to become true masters of their learning and fostering enthusiasm for learning, ultimately leading to positive learning outcomes.

Recommendation

       The "CIPSE" model is the result of researchers' teaching research and teaching practice for many years, which conforms to the current development trend of university education and students' individualized learning needs. When considering adopting "CIPSE" teaching mode, please ensure that your educational environment and objectives are consistent with the characteristics and advantages of this model. To better apply this model, the following are specific suggestions for teachers and university administrators.

Recommendation for teachers

       For teachers, in blended teaching, they should excel in guiding students' participation, assuming the role of facilitators and encouraging active engagement in discussions, questions, and problem-solving, fostering a supportive and open learning environment. Personalized support is paramount, necessitating an understanding of students' diverse learning needs and backgrounds and the provision of tailored guidance, suggestions, and evaluations based on individual circumstances. Furthermore, as the cornerstone of blended teaching, teachers should adeptly employ educational technology tools and continually enhance their digital literacy.

Recommendation for university administrators

For university administrators, universities should actively support teachers in acquiring the essential skills required for blended teaching. This support can include offering training courses, facilitating resource sharing, and providing educational technology assistance. Furthermore, a culture of innovation should be promoted. This can be achieved by encouraging teachers to explore new teaching methods and technologies. Simultaneously, universities should incentivize educators and researchers to engage in in-depth studies of the most effective practices in blended teaching and to share their research findings widely.

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