

RESEARCH ON THE VALIDITY OF COLLEGE STUDENTS' COOPERATIVE LEARNING IN BLENDED TEACHING ENVIRONMENT: PROBLEMS AND COUNTERMEASURES

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Abstract: This paper takes college students as the research object, exploring the factors influencing the validity of their cooperative learning in the blended teaching environment by applying the theory of cooperative learning validity with blended teaching and student learning development theory. Through in-depth interviews and questionnaire surveys, it found that the low motivation of group members and uneven distribution of tasks led to slower progress in completing the assignments, which ultimately affected the validity of their cooperative learning. After that, this paper puts forward some strategies to promote the efficiency of college students' cooperative learning.

Keywords: Blended teaching; Cooperative learning; College student; Higher education

1 INTRODUCTION

The concept of blended learning both domestically and internationally has undergone three stages of evolution: the technology application stage (technological perspective), the technology integration stage (teacher perspective), and the "Internet+" stage (student perspective)^[1]. From the late 1990s to 2006, blended learning was mainly understood as a new learning approach, with a focus on the central role of technology in teaching and learning. From 2007 to 2013, scholars began to define and explore blended learning as an independent instructional model from the perspectives of teaching strategies and methods. Since 2013, attention has shifted to the changes brought to students by blended learning, as well as the support it provides for student learning. The concept of blended learning has officially evolved from "a mix of online and face-to-face instruction" to "teaching scenarios combining mobile communication devices, online learning environments, and classroom discussions."

Cooperative learning, on the other hand, is a structured and systematic learning strategy where 2-6 students of varying abilities form a small group to engage in learning activities collaboratively and mutually support each other to achieve group learning goals. The overall achievement is improved while individual learning levels are promoted, and group rewards are obtained^[2]. Since its emergence in the 1970s in the United States, cooperative learning has experienced two main stages. Initially, it was mainly based on experimental research in social psychology to explore effective cooperative principles and propose corresponding classroom strategies. Later, self-regulation theory was introduced to elucidate how cooperative learning can meet the psychological needs of learning and promote student development^[2]. With the development of information network technology, blended learning environments combining online and offline settings have gradually formed. In this context, what is the effectiveness of cooperative learning among college students? Currently, there is abundant research on blended learning and cooperative learning effectiveness individually, but there is a lack of studies that integrate both concepts.

This paper focuses on college students as research subjects to explore the factors influencing the effectiveness of cooperative learning in a blended learning environment. By analyzing the difficulties and causes of cooperative learning, improvement strategies are proposed to enhance the efficiency and effectiveness of cooperative learning among college students, thus providing guarantees for the transition of cooperative learning towards deep learning.

2 METHODOLOGY

2.1 Data Collection

2.1.1 Questionnaire design and distribution

The questionnaire aims at the college students in Guangdong province as the respondents. It is distributed in the form of online and offline combination by designing self-administered questionnaire. The questionnaire adopts multiple types of questions, including multiple choice questions, rating scale questions, open-ended questions, etc. The research information is obtained by counting the actual number or percentage of each question in the returned questionnaires, and the current learning status of college students is investigated based on the respondents' personal experience.

The purpose of this study is to explore the problems faced by college students in the mixed teaching environment in terms of cooperative learning, and how to help them improve the effectiveness of cooperative learning in the blended teaching environment.

2.1.2 Interview approach and sample selection

In this study, we conducted online interviews with teachers and students from different majors in colleges and universities in Guangdong Province to investigate the effectiveness of students' cooperative learning in a blended teaching environment. Through an in-depth understanding of teachers' and students' insights, experiences and opinions on cooperative learning in blended teaching, as well as their experiences and challenges in the practical teaching and learning processes, we aim to comprehensively understand and explore students' problems, confusions and successes in different majors, as well as their expectations and suggestions for teaching models. In addition, we aim to explore teachers' observations and experiences in the teaching process, as well as ways to improve their teaching methods. Through this research, we hope to provide a cross-disciplinary research perspective for cooperative learning in the blended teaching environment, provide empirical support for cooperative learning in the blended teaching environment in colleges and universities. As shown in Table 1.

Table 1. Interview sample information

	Teacher	Students
Liberal arts	2	4
Sciences	2	2

2.2 Data Analysis

2.2.1 Quantitative analysis of questionnaire responses

After data screening, we conducted further research on 101 students who are currently engaged in blended teaching mode and analyzed their cooperative learning status in the blended teaching mode. The results showed that 96.04% of students had adopted the cooperative learning mode in the blended teaching environment. Therefore, at present, almost all blended teaching modes adopt cooperative learning mode for teaching.

In addition, we also obtained the number of people who have carried out cooperative learning mode in blended teaching environment, accounting for 68.64% of the respondents, and more than half of the respondents have had such experience, indicating that the new teaching mode combined with blended teaching mode and cooperative learning mode has a high popularity rate in practical application.

Among the 278 students who carried out cooperative learning mode in blended teaching environment, 48.56% chose that teachers "mostly advocate" cooperative learning, teachers "all advocate" cooperative learning 31.29%, teachers "partly advocate" cooperative learning 17.63%, and no teachers "never advocate" cooperative learning. It can be seen that under the blended teaching environment, most teachers of specialized courses will choose the cooperative learning mode for teaching. Under this mode, 64.75% of people said they were willing to be higher, 32.01% said they were not willing, and only 3.24% said they were not willing. It can be seen that both teachers' Posting cooperative learning tasks and students' willingness to accept cooperative learning are higher in blended teaching environment. At the same time, based on the analysis of relevant data, it can be seen that the factors of arts and science majors do not affect the willingness of students to participate in cooperative learning in the blended teaching environment, and both of them have a high willingness to participate in cooperative learning. As shown in Table 2.

Table 2. Attitudes of teachers and students towards cooperative learning

		Frequency	Percentage%
Does your major teacher advocate collaborative learning (in a blended teaching environment)?	All advocate	87	31.29
	Mostly advocate (more than 75%)	135	48.56
	Partly advocate (less than 50%)	49	17.63
	Never advocate (less than 25%)	7	2.52
	Total	278	100.0
Are you willing to collaborate with other students to discuss and solve problems in your major?	Willing	180	64.75
	Neutral	89	32.01
	Unwilling	9	3.24

	Total	278	100.0
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In the process of professional course learning in the blended teaching environment, 29.5% of the students said that participating in cooperative learning is the requirement of the teacher in the classroom, and they do not want to participate in it. 54.68% of students said that participating in cooperative learning is the requirement of teachers in class, and they also have the willingness to participate; 1.44% of the students said that they were invited by their classmates and did not want to participate in cooperative learning; 8.99% of the students said that they were invited by classmates to participate in cooperative learning, and they also had the willingness to participate; 5.4% of the students said that they wanted to participate in cooperative learning activities completely spontaneously. In the process of group cooperative learning, 39.93% of the students said that they were actively involved; 52.52% of the students said they were generally involved; 6.47% of the students said they were passive participants; 0.72% of students said they never participated; 0.36 percent of students said they didn't care. In the process of group cooperative learning, 75.9% of the students said that there was a clear division of labor, 23.38% of the students said that there was a division of labor occasionally, and 0.72% of the students said that there was no division of labor.

To sum up, in the blended teaching environment, most students' group cooperative learning is based on the teacher's classroom requirements, followed by students' willingness to participate in cooperative learning, and a small number of students said they did not want to participate in cooperative learning. In the process of group cooperative learning, most students take the initiative to participate, while a few students say they never participate or don't care about it. Most students participate in cooperative learning groups with a clear division of labor, a few groups do not have a clear division of labor. Therefore, there are some problems in cooperative learning in blended teaching environment, such as students' lack of willingness to participate in cooperative learning, students' low participation degree and unclear division of labor within the group. As shown in Table 3.

Table 3. Problems of cooperative learning in blended teaching environment

		Frequency	Percentage%
How willing are you to participate in cooperative learning?	I don't want to participate in the demands of the teacher in class.	82	29.5
	I also have the willingness to participate in the demands of the teacher in class.	152	54.68
	Invited by my classmates, I didn't want to participate.	4	1.44
	Invited by classmates, but I also have the willingness to participate.	25	8.99
	Completely spontaneous and willing to participate in cooperative learning activities.	15	5.4
Total		278	100.0
How involved are you in group learning?	Proactive participation	111	39.93
	Neutral	146	52.52
	Passive participation	18	6.47
	Never participate	2	0.72
	Not to matter	1	0.36
Total		278	100.0
Is there a clear division of labor in your group?	Yes	211	75.9
	Sometimes	65	23.38
	No	2	0.72
	Total	278	100.0

In the learning process, 19.42% of the students think that cooperative learning helps them a lot; 67.72% of the students think that cooperative learning is helpful to them; 13.31% of the students think it is not helpful for them. 24.1% of the students believe that offline cooperative learning has higher validity; 7.19% of the students believe that online cooperative learning has higher cooperative learning validity; 58.63% of the students believe that the cooperative learning mode combining online and offline has higher validity; 10.07% of the students believed that there was no difference in the validity of cooperative learning among the three.

15.56% of the respondents believed that significant differences in group members' abilities and poor communication after randomization affected the validity of cooperative learning. 15.07% of college students believe that the main reason affecting the validity of cooperative learning is that team members are not serious and spend less time in cooperative learning. 12.46% of the respondents believe that the main reason is the unclear division of labor and unfair

task distribution in cooperative learning. In addition, 10.1% of college students believe that there is no effective evaluation mechanism in the process of cooperative learning, which can not stimulate the enthusiasm of team members. To sum up, cooperative learning in blended teaching environment is helpful to most students. At the same time, most students believe that the cooperative learning method combining online and offline has higher learning validity. The cooperative learning method combining online and offline can organically combine the advantages of both online and offline, so most students believe that this method has higher learning validity. According to table 4, the main reason for the low validity of cooperative learning is improper division of labor among group members. Group members are the main part of cooperative learning, while the mechanism of cooperative learning is the external framework for organizing group members. Therefore, problems in either part of cooperative learning will lead to low validity of cooperative learning.

Table 4. Analysis on the causes of problems in cooperative learning in blended teaching environment

		Frequency	Percentage%
Do you think cooperative learning is helpful for your major study?	Very helpful	54	19.42
	Somewhat helpful	187	67.27
	Not helpful	37	13.31
	Total	278	100.0
What kind of cooperative learning do you think is more valid?	Offline cooperative learning	67	24.1
	Online cooperative learning	20	7.19
	Collaborative learning that combines online and offline	163	58.63
	Make no difference	28	10.07
What do you think are the main reasons that affect the validity of cooperative learning?	Total	278	100.0
	A.In random grouping, there were significant differences in group members' abilities and poor communication	185	15.56%
	B.Team members are fluid and change frequently	102	8.6%
	C.The task is not clear, the learning goal is vague	126	10.6%
	D.The division of labor is not clear, and the distribution of tasks is unfair	148	12.46%
	E.The team leader lacks sufficient leadership ability and good cooperation mechanism	121	10.19%
	F.The attitude of the team members is not serious, and they devote less time	179	15.07%
	G.The lack of effective evaluation mechanism can not motivate team members	120	10.1%
	H.Time management difficulties	87	7.32%
	I.Network technology problem	25	2.1%
	J.The effect of cooperative learning is not satisfactory, which affects the further cooperative learning	93	7.83%
K.else	2	0.17%	

2.2.2 Qualitative analysis of interview transcripts

2.2.2.1 Adoption of cooperative learning in blended teaching environment

The popularity of online classes and the launch of platforms such as MOOC promoted the application and development of blended teaching. Online cooperative learning is more of a formality than offline, as students can communicate with their teachers and classmates online. On the other hand, offline is limited by space and time, and there are relatively fewer ways to communicate. However, online cooperative learning is easily affected by time, and sometimes it is not possible to carry out group discussions at the first time. Offline cooperative learning pays more attention to communication, can communicate face to face, and problems can be solved at the first time. In summary, the blended teaching approach takes into account both the advantages of online and the benefits of offline.

2.2.2.2 Attitudes toward cooperative learning in blended teaching environment

The results show that teachers and students tend to encourage cooperative learning. Teachers organize group discussions in the classroom, and the groups will be required to complete their assignments collectively after the class, students will be divided into various learning groups for easy grading and statistics. Teachers think this approach will certainly have a unique advantage over the teacher simply teaching the students, the students are of the same age, with a similar knowledge structure, and students have different reading habits, which is when there is a complementary place between them, the cooperation of the peers will reduce the pressure of learning to form a relatively easy learning environment, the students with good foundation can drive the students with the weaker foundation to help each other. Generally, cooperative learning can test the group's ability to cooperate, i.e. whether students can effectively deal with

the relationship between the leader and the led, how to turn the students' ideas into the group's consensus, and how to present the results of the discussion in a comprehensive manner, all of which will test the ability of team cooperation. Moreover, some teachers view that the use of cooperative learning in project-based learning tasks as advantageous. For example, in the existing basis for the discussion of new knowledge, the use of cooperative learning will be more effective than the individual completing the task alone because the team collecting the literature together can achieve the effect of one plus one is greater than two. After the collection of literature. Students can have complementary understandings in the process of reading and digesting, which is conducive to better understanding and expanding their thinking. For instance, mathematical modeling competitions are more suitable for cooperative learning because the use of cooperative learning can improve the efficiency of completing the task and create exercise opportunities.

2.2.2.3 Effectiveness and assessment of cooperative learning in blended teaching environment

Teachers perceive the effects of collaboration as positive, especially critical thinking. For example, students have to do critical thinking to conclude when reading materials in class, the learning effect will be great if using cooperative learning. Students will give each other certain pressure by cooperating, which in turn will produce good results. When teachers arrange the group to do classroom presentations, the group leader will carry out an effective division of labor, the group members will collect the materials, and then make the appropriate generalization together. After integration, the learning effect will be demonstrated through the rehearsal of the group.

In blended teaching environment, students' learning effects are mainly assessed through scores and evaluations. Teachers score statistics by combining individual and group performance, then score rewards can serve to reinforce cooperative group behavior. Otherwise, the teacher will use the scale prepared by the course team in advance, if it is an oral presentation, the teacher will use the corresponding scale to see how the group presents in the end, if it is a piece of written writing after the class, the corresponding assessment criteria will be used to assess, if it is an offline oral presentation, the teacher will ask every member of the group to participate and give students corresponding scores according to the student's performance, if it is a classroom written work, the final presentation is an overall finished product, usually the teacher will ask students to label their respective contributions with their names, to be able to let the teacher know which student contributed to each part. On the one hand, the method members evaluate each other can encourage cooperative learning, on the other hand, it can ensure that no classmates are lazy in the process of cooperation and everyone contributes to cooperative learning.

There are problems with the cooperative group itself. First, the motivation of group members is low. It is difficult for group members to discuss at the same time when they are engaged in cooperative learning, and it is difficult to textually organize the language of the ideas discussed, which leads to slower progress in completing the assignments. Some group members will complete the task indicators they should have done only after the task time deadline, resulting in the overall progress dragging. Secondly, when assigning tasks, it is easy to have an uneven division of labor, resulting in one student being too relaxed or another student's work being too complicated and more stressful. Some students pay more attention to the operation of the task itself, while others are more inclined to summarizing and data processing, which can't allow the whole group to master the learning objectives. In conclusion, the low motivation of group members and uneven distribution of tasks led to slower progress in completing the assignments, which ultimately affected the learning effect of the group.

While the traditional type of lecture involves the teacher passing on new knowledge, collaborative learning in a blended learning environment is an independent learning style. The teacher assumes the role of guiding students to learn and think independently. For example, how can the teacher make the group form a synergy in the form of cooperation, with each learner moving towards a common learning goal. In addition, there will inevitably be weak players in group work, how can the teacher identify such students when confirming the cooperative unit and how to utilize the motivation of each group member. In the whole process, is there any better supervision and process assessment besides peer assessment.

In blended teaching environment, in response to the lack of cooperative learning in some science courses, individualized and customized teaching for science courses and teachers' habits can help to facilitate the realization of cooperative learning in science courses. Cooperative learning is not only an expansion of learning styles, but also a test of students' soft skills, such as teamwork and communication skills, and the ability of teachers to use cooperative learning in a controlled manner. Meanwhile, it is also one of the most important technical issues whether there will be more suitable technical means to make cooperative learning in blended teaching environment better.

3 SUGGESTIONS ON IMPROVING THE EFFECTIVENESS OF COOPERATIVE LEARNING IN A BLENDED TEACHING ENVIRONMENT

Under the blended teaching environment, cooperative learning has become a common learning method used by teachers and students in various colleges and universities, which can improve students' teamwork abilities. However, the collaborative learning effectiveness of some students in the blended learning environment is unsatisfactory, and there is still much room for improvement. Based on the analysis results of the research data and the comparative analysis of the literature on cooperative learning in online teaching mode, offline teaching mode, and blended teaching mode, this paper will put forward suggestions on how college students can improve the effectiveness of cooperative learning in a blended teaching environment in the following aspects:

3.1 Improving Students' Recognition of Cooperative Learning under Blended Teaching

In the age of education combined with the Internet, the channels and ways for college students to learn have changed dramatically, such as MOOCs, blackboard and other online teaching platforms that allow students to enjoy the courses of top professors from the world's first-class universities without leaving their homes, and college students can experience the great significance of online teaching platforms in supporting personalized learning; at the same time, college students should not only keep pace with the times, have the consciousness of embracing modern technology, and have the desire and ability to explore the integration of modern technology and subject teaching, but also change their concepts that they should fully recognize the significance of blended teaching course construction, approve and independently promote the construction of blended teaching course construction in terms of their subjective initiative^[3]. Specifically, the following measures can be taken: (1) Explain the advantages of blended teaching: Teachers can explain to students the advantages of blended teaching, such as providing a more flexible learning time and place, combining online and offline resources for a richer learning experience, and facilitating independent and cooperative learning. Through concrete examples and data, students can understand the positive impact of blended learning on their cooperative learning. (2) Provide successful cases and empirical research: Teachers share successful blended learning cases and relevant empirical research findings to let students understand the successful application of blended learning and its positive impact on cooperative learning effectiveness and student engagement. (3) Emphasize personalized learning and independent learning: Blended learning can provide more opportunities for personalized learning and space for independent learning. By emphasizing this, students can understand that blended learning can better meet their learning needs and learning styles, thus increasing their acceptance of blended learning. (4) Guide students to participate in course design and feedback: In a blended learning environment, teachers can encourage students to participate in course design and feedback so that they have more opportunities to participate in the teaching and learning process, thus enhancing their understanding and level of acceptance of blended learning. (5) Provide support and guidance: Teachers can provide students with support and guidance specific to blended learning, such as maximizing the use of online resources, how to engage in collaborative learning, and how to solve problems in online collaborative learning, etc., to ensure that students gain the necessary understanding and knowledge so that they can become proficient in the use of online collaborative tools and platforms, enhance their willingness to participate and level of acceptance, and help them better adapt to the blended learning environments and thus better engage in collaborative learning activities.

3.2 Strengthening the Support and Construction of Blended Teaching Modes

Update the hardware facilities required for blended teaching and provide good support for the network environment to support the online teaching and access to resources required for blended teaching; accelerate the construction of a more complete network course^[3] to create a good atmosphere and environment for blended teaching, to help the mature development of the blended teaching model, and to provide a good blended teaching environment for cooperative learning.

3.3 Providing Training Courses for Teachers to Improving their Guiding Skills in Students' Cooperative Learning

Under the blended teaching mode, teachers cannot replicate the pedagogy of traditional classroom teaching but must have specialized pedagogical knowledge and competence in order to successfully conduct cooperative learning under blended teaching. Teachers need to have a forward-looking vision of teaching and learning, a philosophy that clarifies the direction of educational change and development, the qualities of courage, transparency, and openness, the ability to collaborate, the adaptive capacity for reflection, continuous improvement, innovation, and communication, and the possession of teaching strategies for data thinking and practicality, experiences with blended learning, and technical capacity to apply pedagogical tools^[1].

Therefore, there is a need to provide relevant courses and training for in-service teachers. Teachers need to participate in professional pedagogical skills training for collaborative learning in blended environments, which mainly consists of practical courses with mandatory participation and more comprehensive training courses with non-mandatory participation. Among the practical courses with mandatory participation, teachers are required to be proficient in operating online conferencing and teaching platform tools for organizing collaborative learning, and they are required to be able to guide students to use online collaboration tools, such as Google Docs, Microsoft Teams, etc., to facilitate students' online collaborative learning, real-time collaborative editing of documents, sharing of resources, and so on. Non-mandatory, more comprehensive training programs also include components that train teachers on how to prepare for, design, and motivate lessons in collaborative learning.

3.4 Constructing Innovative Cooperative Learning Platform for Students

In the blended teaching environment, based on effective offline interaction and avoiding the negative impact of online teaching, an online cooperative learning platform for colleges and universities is designed as a supplement and enrichment of offline teaching content.

The platform will have the following functions: (1) Provision of diverse collaboration tools. The platform will provide a variety of cooperation tools, such as real-time collaborative documents, online discussion boards, virtual whiteboards, video conferencing, etc., to meet the needs of different types of cooperative learning. The platform will also realize multiple functions on the same platform to reduce students' negative boredom due to the operation of multiple platforms. (2) Virtual teaching. Teachers design cooperative learning tasks in different contexts on the platform based on offline teaching content. According to the teaching tasks, students are placed in specific contexts, given specific identities, and required to complete the corresponding cooperative learning tasks, which ultimately achieves the goal of consolidating the offline learning results with interesting online cooperation. (3) Introduce gamification elements, such as a cooperative achievement system, cooperative task challenge, cooperative learning achievement ranking, cooperative reward mechanism, etc., to stimulate students' learning motivation and enthusiasm and increase the fun and participation of learning. (4) Social interaction functions. Provide social interaction functions, such as interactive communities among students or among teachers and students, a display area for students' work, a collection book of cooperative results, etc., to stimulate students' learning motivation and sense of achievement and to promote communication and cooperation among students. (5) Real-time feedback and assessment. The platform possesses real-time feedback and assessment functions, including real-time follow-up of task division and learning progress within student cooperatives, homework submission, teacher evaluation, and mutual evaluation of students within the group, which visualizes the effects of cooperative learning, helps teachers and student cooperatives understand the progress and learning situation in a timely manner, and facilitates the formation and development of a community of cooperative awareness in the form of a group. (6) Data analysis and reporting. The platform will provide data analysis and reporting functions, including data consolidation, which is the process of aggregating queries raised by students in the question area and consolidating similar questions to reduce the time cost for teachers to respond, thus enabling students to eliminate queries more quickly. This feature helps teachers understand student learning and performance and supports online and offline teaching decisions.

Constructing a new cooperative learning platform to provide students and teachers with a rich cooperative learning experience and to enhance their active participation and learning effectiveness in the online environment, forming an organic community that promotes each other online and offline.

3.5 Establishing a Personal Information Database of Students

Establishing a personal information database and scientific grouping through artificial intelligence is an innovative method that can help teachers group students more effectively and build learning communities in a blended teaching environment^[4].

First, each student is required to build and continuously improve a personal information base on the information platform created by the school, which includes information such as personal profile, learning interests, professional background, skill level, learning style, previous cooperative learning experiences, etc. Subsequently, teachers combine the tasks and objectives of group learning with the information in the students' information base, and the artificial intelligence will automatically complete the grouping according to the different learning tasks and the students' personalized information, flexibly adjusting the composition of the group members to ensure that each group is diverse and collaborative; and it will also give suggestions for the division of labor within the group so that a reasonable distribution between and within the groups can be achieved. Through the establishment of a personal information base and the use of artificial intelligence to conduct scientific and flexible grouping, teachers can better meet the students' individualized learning needs, form customized teaching, build a learning community to achieve common progress, and ultimately promote the effectiveness of students' cooperative learning in the blended teaching environment.

3.6 Establishing an Effective Evaluation and Supervision Mechanism

The establishment of effective evaluation and supervision mechanisms is crucial when conducting cooperative learning in a blended learning environment, as it can reflect the effectiveness of teaching methods in a timely manner. First, students' cooperative learning outcomes can be assessed by setting clear learning objectives and standards to ensure that they achieve the expected learning outcomes. Second, regular group discussions, homework assessments, and project presentations can be used to monitor students' performance and contributions in cooperative learning. Third, teachers can utilize online teaching platforms or tools to provide real-time monitoring and feedback on students' collaborative learning processes so as to identify and solve learning problems and challenges in a timely manner. Fourth, mutual assessment and self-assessment mechanisms are established among students to involve them in the assessment and supervision of cooperative learning and to promote mutual learning and supervision among students. Through the establishment of these assessment and supervision mechanisms, it can effectively ensure that cooperative learning carried out in a blended teaching environment is effectively supervised and assessed, enhancing students' learning effectiveness and cooperation ability.^[5]

4 CONCLUSION

Through the investigation and analysis of the learning status of college students in Guangdong Province, combined with the questionnaire and interview data, we deeply studied and analyzed the influencing factors of the validity of college

students' cooperative learning in China under the blended teaching environment. We conclude that the division of labor in group learning and four dimensions (cooperative learning input, cooperative learning strategy, cooperative learning outcome and cooperative learning motivation) are important factors affecting the validity of cooperative learning. Among them, subject characteristics^[6], student needs and resources also affect the validity of cooperative learning to a greater extent. Therefore, we propose corresponding solutions that can effectively improve the validity of cooperative learning: Enhance students' understanding of the value of blended teaching and learning, strengthen the support and construction of blended teaching and learning models, strengthen the training efforts for teachers in conducting cooperative learning in a blended teaching and learning environment, construct a new type of cooperative learning platform, set up a database of students' personal information, and establish an effective evaluation and supervision mechanism.

Through the above analysis and research, we hope to take the university students in Guangdong Province as samples to provide references and blueprints for all places, provide specific practical guidance and suggestions for cooperative learning under blended teaching environment, and further promote to improve the validity of cooperative learning among university students across the country under mixed teaching environment, so as to meet the development needs of national university education and teaching.

COMPETING INTERESTS

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