

Application and Effect Analysis of Formative Assessment in Cooperative Learning of Architectural Undergraduates

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ABSTRACT

In today's education field, formative assessment has become a hot topic. This evaluation method can provide feedback for the teaching process and learning effect in time, so that teachers and students can make adjustments according to the actual situation. Especially in the cultivation of undergraduate students majoring in architecture, this evaluation method is particularly important. Architecture major requires students not only to have a solid theoretical foundation, but also to have good practical ability and teamwork spirit. Cooperative learning has been proved to be an effective teaching mode, which encourages students to learn from each other and help each other, thus improving teamwork ability, innovative thinking and problem-solving ability. The integration of formative assessment into cooperative learning can help students know their own learning situation in time, find out their shortcomings and adjust them in time. This study has deeply explored the practical application of formative assessment in cooperative learning for undergraduates majoring in architecture, hoping to provide strong theoretical support and practical direction for the educational model of architecture through detailed data and practical experience, and contribute to the architectural education in China.

KEYWORDS

Formative Evaluation; Architecture Major; Undergraduate Students; Cooperative Learning; Application Effect.

1. INTRODUCTION

In today's education field, formative assessment has attracted more and more attention because of its advantages of timely feedback and adjustment of teaching process and learning effect. In the education of architecture undergraduates, cooperative learning, as an effective teaching mode, is of great significance for improving students' teamwork ability, innovative thinking and problem-solving ability. This paper aims to explore the application of formative assessment in cooperative learning for undergraduates majoring in architecture, and provide theoretical support and practical reference for optimizing the teaching mode of architecture by analyzing its practical effect. We hope that through this study, we can contribute to improving the education quality of undergraduates majoring in architecture and cultivating more architectural talents with comprehensive quality.

2. OVERVIEW OF FORMATIVE ASSESSMENT THEORY

2.1. Definition and Characteristics of Formative Assessment

Formative evaluation, as an important evaluation method in the field of education, aims to adjust and optimize teaching methods and contents by continuously collecting and analyzing students' learning information in the teaching process, and then promote students' all-round development. Formative evaluation plays a vital role in cooperative learning of architectural undergraduates. The core definition of formative evaluation lies in its process and development. It not only pays attention to students' learning results, but also pays more attention to students' thinking process, skill mastery and emotional attitude in the learning process. Through the observation, recording and feedback of students' learning process, formative evaluation can provide timely information and help teachers identify the difficulties students encounter in learning, so as to provide targeted guidance and help. In the cooperative learning of architecture undergraduates, the characteristics of formative assessment are particularly prominent. First, it emphasizes students' subjectivity and participation. Students no longer passively accept knowledge, but become the main body of learning, actively participate in the evaluation process, and reflect and adjust their learning behavior through self-evaluation and peer evaluation. Formative evaluation is flexible and diverse. According to different learning tasks and teaching objectives, it can adopt a variety of evaluation methods and tools, such as observation records, works display, oral reports, etc., to fully reflect students' learning situation. In addition, formative evaluation also pays attention to the feedback and improvement of evaluation. Through timely feedback, students can understand their own learning progress and existing problems, so as to adjust their learning strategies and methods. At the same time, teachers can also improve the teaching methods and contents according to the evaluation results, so as to improve the teaching quality and effect.

The application of formative assessment in cooperative learning of architectural undergraduates is of great significance. It can not only promote the all-round development of students, but also improve the teaching quality and effect, and provide strong support for cultivating architectural professionals with innovative spirit and practical ability.

2.2. The Application Value of Formative Assessment in Architectural Education

The application value of formative assessment in architectural education is reflected in many aspects. First of all, it helps to promote students' autonomous learning. In the study of architecture specialty, students need to master a lot of theoretical knowledge and practical skills. Formative evaluation encourages students to reflect and adjust themselves in the learning process, and improve their learning efficiency and effect through continuous trial and error. This evaluation method can stimulate students' learning motivation and make them more actively participate in learning, thus deepening their understanding and mastery of professional knowledge. Formative evaluation is helpful to improve teaching quality. Through continuous attention and evaluation of students' learning process, teachers can find out the problems and difficulties existing in students' learning process in time, and then adjust teaching strategies and provide more accurate teaching guidance. This student-centered teaching method can not only improve the teaching effect, but also enhance the interaction and communication between teachers and students and create a more positive learning atmosphere. In addition, formative assessment also helps to cultivate students' teamwork ability and innovative spirit. Cooperative learning is an important way of learning in architectural education. Through formative evaluation, teachers can guide students to actively participate in teamwork, solve problems together, and cultivate students' communication skills and teamwork spirit. At the same time, formative assessment also encourages students to bring their innovative spirit into play and put forward unique opinions and solutions, thus cultivating their innovative consciousness and practical ability.

The application value of formative assessment in architectural education is reflected in promoting students' autonomous learning, improving teaching quality and cultivating students' teamwork ability and innovative spirit. Therefore, formative evaluation should be paid full attention to and effectively used in architectural education to promote the improvement of teaching quality and the development of students' comprehensive quality.

3. ANALYSIS OF COOPERATIVE LEARNING STATUS OF ARCHITECTURAL UNDERGRADUATES

3.1. Practice of Cooperative Learning in Architectural Education

In architectural education, cooperative learning, as an innovative teaching method, is gradually being widely used and practiced. This teaching mode emphasizes mutual assistance and cooperation among students, and solves problems together through teamwork, aiming at improving students' comprehensive quality and practical ability. In architectural education, cooperative learning is widely used in many teaching links. For example, in the course of architectural design, students are divided into several groups, and each group needs to complete a design project together. In this process, students need to give full play to their professional knowledge and skills, cooperate with each other, and jointly overcome the design problems. Through such cooperative learning, students not only improve their design ability, but also learn how to communicate and cooperate with others. At the same time, cooperative learning also plays an important role in the course of building construction technology. Students study construction technology and safety standards together in groups, and practice by simulating construction scenes. In the process of cooperative learning, students can learn from each other and learn from each other to improve construction skills and safety awareness together. In addition, cooperative learning is also reflected in extracurricular practical activities in architectural education. For example, schools can organize students to practice in construction sites, so that students can learn architectural knowledge in practice and exercise their cooperation ability. During the internship, students need to complete some practical tasks in groups, such as surveying and drawing, and deepen their understanding and understanding of architecture specialty through cooperation.

The practice of cooperative learning in architectural education presents the characteristics of diversification and deepening. Through cooperative learning, students not only improve their professional quality and practical ability, but also cultivate teamwork spirit and communication ability, laying a solid foundation for future career development.

3.2. Problems and Challenges in Current Cooperative Learning

Although its concept and practice have been widely recognized, there are still many problems and challenges in the cooperative learning of architecture undergraduates. First of all, cooperative learning requires students to have high teamwork ability and communication skills, but in practice, some students lack these necessary skills, which leads to communication obstacles in the process of cooperation and affects the learning effect. The knowledge system of architecture specialty is huge and complex, involving many theoretical knowledge and practical skills. In cooperative learning, how to effectively integrate these knowledge and skills, so that each member can give full play to their own advantages in cooperation, and at the same time make up for their shortcomings, is an urgent problem to be solved. In addition, because each student's knowledge background and learning ability are different, it also brings great challenges to cooperative learning. Moreover, cooperative learning needs to invest a lot of time and energy in preparation and coordination. However, in reality, due to the tight curriculum and heavy academic pressure, it is often difficult for students to spare enough time for in-depth cooperative learning. This leads to the fact that cooperative learning often becomes a mere formality, and it is difficult to achieve the expected results. The evaluation mechanism of

cooperative learning also needs to be improved. At present, many evaluation methods of cooperative learning still focus on individual achievements and ignore the overall performance of the team. This evaluation method not only can not truly reflect the effect of cooperative learning, but also may dampen students' enthusiasm for cooperation.

The problems and challenges in cooperative learning of architecture undergraduates are mainly manifested in students' teamwork ability, knowledge and skills integration, time arrangement and evaluation mechanism. In order to solve these problems, we need to strengthen the cultivation of students' teamwork ability and communication skills, optimize the teaching design and implementation mode of cooperative learning, and improve the evaluation mechanism of cooperative learning, so as to promote the effective application of cooperative learning in architecture undergraduates.

4. THE APPLICATION STRATEGY OF FORMATIVE ASSESSMENT IN COOPERATIVE LEARNING OF ARCHITECTURAL UNDERGRADUATES.

4.1. Formative Assessment in Cooperative Learning Implementation Principles

Formative evaluation plays a vital role in cooperative learning in the teaching process of architecture undergraduates. When implementing formative assessment, a series of principles should be followed to ensure the effectiveness of assessment and the smooth progress of cooperative learning. First of all, formative assessment should adhere to the student-centered principle. This means that the design and implementation of evaluation activities should fully consider students' individual differences and learning needs, and pay attention to students' performance and development in the process of cooperative learning. By observing and recording students' participation, communication and interaction, problem-solving ability and other aspects, teachers can get students' learning feedback in time, thus adjusting teaching strategies and promoting students' learning progress. Formative evaluation should pay attention to process. Different from traditional summative assessment, formative assessment pays more attention to students' performance and development in the learning process. Therefore, in cooperative learning, teachers should pay attention to observing and recording students' learning process, including students' thinking mode, cooperative skills and problem-solving strategies. Through in-depth analysis of students' learning process, teachers can evaluate students' learning situation more accurately and provide targeted guidance and suggestions. In addition, formative evaluation should also emphasize the importance of feedback and guidance. In the process of cooperative learning, teachers should give students timely feedback, point out the advantages and disadvantages of students in cooperative learning and formative evaluation, and provide specific suggestions for improvement. At the same time, teachers should also encourage mutual evaluation and self-evaluation among students, so as to promote students' self-reflection and self-learning ability.

The implementation principles of formative assessment in cooperative learning of architectural undergraduates include student-centered, process-oriented, feedback and guidance. The application of these principles will help to improve the effect of cooperative learning and promote the all-round development of students.

4.2. Selection and Application of Formative Assessment Tools and Methods

When discussing the application strategy of formative assessment in cooperative learning of architectural undergraduates, the selection and application of assessment tools and methods is particularly important. Formative assessment aims at promoting students' learning process and effect through continuous and timely feedback. Under the background of cooperative learning for undergraduates majoring in architecture, evaluation tools and methods should not only reflect the

characteristics of the major, but also effectively support cooperative learning. According to the characteristics of architecture specialty, we choose diversified evaluation tools, such as architectural works evaluation form, design process reflection log and teamwork ability evaluation form. These tools not only pay attention to students' learning achievements, but also pay attention to thinking development and skill improvement in the learning process. For example, the evaluation form of architectural works can quantitatively evaluate students' design creativity and practical ability, while the design process reflection log can help students sort out their ideas and improve their self-reflection ability. In the application of methods, we pay attention to the immediacy and interactivity of formative evaluation. Through regular group discussion and mutual evaluation, students can keep abreast of their peers' learning progress, so as to adjust their learning strategies and cooperation methods. At the same time, teachers also provide students with personalized learning suggestions and guidance through classroom observation and one-on-one feedback. This interactive evaluation method is helpful to stimulate students' learning motivation and promote the in-depth development of cooperative learning. In addition, we also collect and analyze students' learning data by means of modern information technology, such as online learning platform and data analysis tools. These data can objectively reflect students' learning situation and progress, and provide strong teaching support for teachers.

The selection and application of formative assessment tools and methods plays an important role in cooperative learning of architectural undergraduates. Through reasonable choice and flexible application, we can better promote students' learning and development and improve the effect and quality of cooperative learning.

4.3. Teachers' Role and Students' Participation Promotion Strategy

When discussing the application strategy of formative assessment in cooperative learning of architectural undergraduates, it is particularly critical to reshape the role of teachers and enhance the participation of students. In architectural education, teachers are not only the imparting of knowledge, but also the guide and evaluator of the learning process. The introduction of formative assessment requires teachers to play more roles as promoters and coordinators of students' cooperative learning in addition to their traditional roles. Teachers should change their thinking and shift the focus of evaluation from single result orientation to equal emphasis on process and result. They should encourage students to actively explore and boldly practice in the learning process, and give timely feedback and guidance by observing and recording students' performance in cooperative learning. At the same time, teachers need to have good communication skills, guide students to carry out effective discussions, promote exchanges and cooperation among students, and thus improve the overall learning effect. In addition, teachers should play a bridge role in cooperative learning, combine the theoretical knowledge of architecture specialty with practical operation, and guide students to apply what they have learned to practical problem solving. By organizing teaching activities such as project-based learning and case analysis, teachers can help students establish the connection between theory and practice, and cultivate students' comprehensive ability and innovative thinking. In improving students' participation, teachers need to design challenging and attractive learning tasks to stimulate students' interest and enthusiasm in learning. At the same time, by establishing a good classroom atmosphere and incentive mechanism, teachers can encourage students to actively participate in cooperative learning and give play to their own specialties and advantages. In addition, teachers can also use modern educational technology, such as online learning platform and virtual simulation experiment, to provide students with diverse learning resources and interactive ways, and further enhance students' participation and learning effect.

The application strategy of formative assessment in cooperative learning of architecture undergraduates requires teachers to make efforts in role change, process guidance, task design and technical support, so as to improve students' participation and learning effect.

5. ANALYSIS OF THE APPLICATION EFFECT OF FORMATIVE ASSESSMENT

5.1. Evaluation and Comparison of Students' Learning Effects

In the application of formative assessment to cooperative learning of architectural undergraduates, the evaluation and comparison of students' learning effect is particularly important. This evaluation method not only pays attention to students' learning achievements, but also attaches importance to students' performance and growth in the learning process. Through formative evaluation, we can have a more comprehensive understanding of students' knowledge mastery, skill application ability and teamwork spirit in cooperative learning. Compared with the traditional summative evaluation, formative evaluation pays more attention to the monitoring and feedback of students' learning process. In cooperative learning, formative assessment can find out the problems and shortcomings of students in the learning process in time through regular group discussion, project report and homework correction, and then provide targeted guidance and suggestions. This will not only help students correct their mistakes in time, improve their learning efficiency, but also stimulate their interest and enthusiasm in learning. In the cooperative learning of architecture undergraduates, the application effect of formative assessment is particularly remarkable. Through formative evaluation, students' professional knowledge in architectural design, structural analysis and material selection has been effectively consolidated and improved. At the same time, students' abilities in teamwork, communication and problem solving have also been significantly improved. This evaluation method enables students not only to acquire knowledge, but also to exercise their comprehensive ability in cooperative learning.

The application effect of formative assessment in cooperative learning of architectural undergraduates is remarkable, which not only improves the learning effect of students, but also promotes their all-round development. Therefore, in the future teaching practice, we should further popularize and apply formative assessment to better serve the cultivation and development of architectural undergraduates.

5.2. Cooperative Learning Atmosphere and the Improvement of Teamwork Ability

In the process of formative assessment applied to cooperative learning of architectural undergraduates, the promotion of cooperative learning atmosphere and teamwork ability is significant and positive. Through the implementation of formative assessment, students showed more interest and enthusiasm in the process of cooperative learning, and the learning atmosphere was obviously improved. In the study of architecture specialty, the cultivation of cooperative ability is very important. With the introduction of formative assessment, students pay more attention to teamwork in the learning process. They explore the concept and practice of architectural design together through group discussion and project cooperation. In this atmosphere, students can not only learn from each other and inspire each other, but also cultivate good communication and cooperation skills. At the same time, formative assessment also promotes knowledge sharing and resource integration among students. In the process of cooperative learning, students can make full use of their professional knowledge and skills, and solve the problems encountered in learning together through brainstorming. This process of knowledge sharing and resource integration not only improves learning efficiency, but also enhances students' sense of teamwork. In addition, formative assessment also encourages students to carry out self-evaluation and peer evaluation, which helps students to understand their own strengths and weaknesses and the strengths and weaknesses of other members of the team more objectively. Through self-evaluation and peer evaluation, students can better adjust their learning status, at the same time, they can better cooperate with team members and improve the overall effect of teamwork.

Formative evaluation has played an active role in cooperative learning of architectural undergraduates, which has significantly improved the cooperative learning atmosphere and teamwork ability. This

evaluation method not only helps to improve students' learning effect, but also helps to train them to become excellent architectural talents with teamwork spirit and innovation ability.

5.3. Students' Feedback and Opinions on Formative Assessment

During the application of formative assessment in cooperative learning for undergraduates majoring in architecture, students generally showed positive feedback and valuable opinions. They generally believe that formative assessment plays a significant role in promoting learning effect and enhancing cooperation ability. Students said that formative assessment gave them timely feedback in the learning process, which helped them to find and correct their own problems in time. Through constant evaluation and reflection, they can more clearly understand their learning progress and ability level, so as to adjust their learning strategies and methods in a targeted manner. At the same time, formative assessment also stimulates their interest and motivation in learning, which makes them more actively participate in cooperative learning. In the learning process of architecture major, students generally believe that formative evaluation is helpful to cultivate their critical thinking and innovative ability. In the evaluation process, they need to think deeply and analyze the specific learning tasks, which helps them to form the ability of independent thinking and problem solving. At the same time, formative evaluation also encourages them to put forward new ideas and ideas, which promotes the development of innovative thinking. In addition, the students also said that formative evaluation has a positive impact on improving their teamwork ability. In cooperative learning, they need to accomplish tasks together, communicate with each other and share experiences, which is helpful to cultivate their teamwork spirit and communication skills. Through formative evaluation, students can better understand each other's strengths and weaknesses, and then adjust their roles and positioning in the team to improve the overall effect of teamwork.

Students hold a positive attitude towards the application of formative assessment in cooperative learning of architecture undergraduates. They believe that this evaluation method is helpful to improve the learning effect, cultivate cooperation ability and innovative thinking, and also has a positive role in promoting the all-round development of individuals.

6. SUMMARY

This paper discusses the application and effect of formative assessment in cooperative learning for undergraduates majoring in architecture. Firstly, the theoretical basis of formative assessment and its value in architectural education are summarized. Then, it analyzes the current situation and existing problems of cooperative learning for undergraduates majoring in architecture. On this basis, the strategies of applying formative assessment to cooperative learning are put forward, including implementation principles, selection of assessment tools and methods, and measures to enhance teachers' role and students' participation. Through empirical research, the application effect of formative assessment is analyzed, and it is found that it is helpful to improve students' learning effect and teamwork ability, and at the same time, it has obtained positive feedback from students. This study provides a useful reference for cooperative learning in architectural education, and puts forward prospects and suggestions for future research.

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