THE INFLUENCE OF TEACHING METHODS IN CLASSROOM LEARNING ECOLOGICAL ENVIRONMENT ON SELF-REGULATION OF JUNIOR HIGH SCHOOL STUDENTS

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The Influence of Teaching Methods in Classroom Learning Ecological Environment on Self-Regulation of Junior High School Students

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Abstract

The classroom learning environment is a comprehensive entity composed of interpersonal relationships, rules and regulations, class ethos, material conditions, etc., and is an important component of classroom teaching. This study aims to explore the influence of teaching methods based on the classroom learning environment on middle school students' self-regulated learning. Convenient sampling was used for the questionnaire survey, with 276 middle school students in China's A city as the research subjects. The research results showed that teaching methods have a significant impact on middle school students' self-regulated learning; teaching methods have a significant impact on the classroom learning environment; the classroom learning environment has a significant impact on middle school students' self-regulated learning; the classroom learning environment plays an important role in the relationship between teaching methods and middle school students' self-regulated learning.

Keywords: junior high school students; teaching approaches; self-regulated learning; classroom ecological environment.

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Introduction

The classroom ecological environment refers to the synthesis of interpersonal relationship, rules and regulations, class style and material conditions, which involves classroom psychological atmosphere, social environment and physical environment (Muhua & Yule, 2011). In a student-centered learning environment, students are expected to take responsibility for their own learning, so as to develop a deep learning and understanding of knowledge (Lea *et al.*, 2003; Vermetten *et al.*, 2002).

Self-regulated learning, or autonomous learning, is the process by which students actively establish their own objectives for learning, determine their preferred methods of learning, track their progress, and continually evaluate the outcomes of their learning (Weiguo, 2000). The processes of monitoring and reflection are critical to self-regulated learning, as it is challenging to effectively maintain control and regulation over one's learning without accurate and honest assessment of one's performance (Viberg *et al.*, 2020). The study suggests that unless additional training given, students may find it difficult to accurately monitor their learning (Baars *et al.*, 2018; Thiede *et al.*, 2009), so it is particularly important for teachers to provide support in students' self-regulated learning process. In this process, the main way for teachers to influence students' self-regulation is the teaching approaches used by teachers.

Teaching approach is the measure and method adopted by the teaching subject to achieve teaching goals, and is a dynamic mode and existing state of teaching activities (Wang，2017). Teaching approach has a decisive influence on teaching results, and it is a method and form of strategic significance for students' development (Wenwu, 2009). According to Wijnen *et al.* (2017), different teaching approaches lead to diverse self-regulated learning abilities of students. Currently, most teaching takes place in classroom. Thus, the classroom ecological environment affects the degree of presentation of the teaching method when the teaching method is implemented, which in turn affects the cultivation of autonomous learning ability of student.

This study explores the impact of teaching methods on students' self-regulated learning using classroom learning ecological environment as an intermediary variable, with a view to providing theoretical support for school administrators and front-line teachers to support students' ability to improve self-regulated learning, thereby effectively improving the quality of education.

Literature Review

Teaching Approaches

Teaching approaches refers to the purpose of teaching and the teaching strategies adopted by teachers in order to achieve a certain teaching purpose. The teaching purpose includes various changes such as teachers passing subject content to help students change their concept of content, while teaching strategies include various changes from student-centered activities adopted by teachers to teacher-centered activities (Lasry *et al*.,2014). According to the relative status of teachers and students in classroom teaching, teaching approaches can be divided into two types: teacher-centered teaching approach and student-centered teaching approach. The former means that teachers occupy the dominant position in classroom teaching with students in a relatively secondary position. In teacher-centered class, classroom teaching is characterized by teachers' teaching with teachers' instruction occupying most of the time of classroom activities. Traditional lecture-based teaching is a typical representative of this teaching approach. Lecture teaching is also known as direct instruction, explicit teaching, or explanation teaching, teaching approach, etc. The latter means that in classroom teaching, students are in the main position with teachers in a relatively secondary position, in which classroom teaching is characterized by students' learning, and students' autonomous learning and group learning occupying the main time of classroom learning. Discovery learning, also known as problem-based learning, inquiry learning, experiential learning, exploratory learning that are advocated by constructivists, can be regarded as student-centered teaching approaches.

The main teaching approach explored in this study is the student-centered teaching approach. In student-centered teaching, learners gain understanding of subject knowledge through active participation in the learning process, and students' self-regulation ability plays a vital role in this process.

Self-regulation

According to Bandura (1986), self-regulation includes three processes: self-observation, self-judgment and self-reaction. Self-observation refers to tracking some special aspects of individual behavior or psychological function; self-judgment refers to comparing individual behavior with a certain standard; self-reaction refers to individual reasoning and motivational beliefs based on the results of behavior. These self-responses will regulate the self-observation and self-reaction in the next round of behavior, which means that self-regulation is a feedback cycle (Zimmerman & Schunk, 2011).

Self-regulated learning is a special form of learning which is different from externally regulated learning. The most prominent feature of self-learners is that they have practical control over their own learning, with which to control and guide

the cognitive and motivational processes to achieve their learning goals (Boekaerts & Cascallar, 2006). In Zimmerman's (2000) perspective, self-learners can actively monitor their own learning process and results, and can adjust and adapt to their own behavior, cognition and motivation if necessary in order to optimize their learning results. Xuanjing *et al.* (2020) held that the role of self-regulation is particularly important in student-centered learning, argued whether the learning process can be controlled by learners and achieve learning goals is affected by self-regulation, and determined that the learner's external environment can also have an impact on the learner's self-regulation of student-centered teaching methods. Fraser (1998) summarized that the learning environment refers to the social, psychological and teaching contexts that takes place and has an impact on students' achievement and attitude. Fraser's definition of learning environment was by far the clearest definition of learning environment by western scholars and is often quoted by many scholars.

From the point of view of constructivism, learning is a positive process of knowledge construction. Yuefei (2022) pointed out that the learning environment of constructivism pays attention to the process of knowledge construction, that is, encouraging high-quality thinking and helping students understand the structure and process of this construction. According to Anagün(2018), an effective constructivist learning environment should make students take responsibility for their own learning and support the cooperation and interaction between students and teachers and peers so as to cultivate initiative and initiative in the learning process. From the point of view of constructivism and drawing lessons from Fraser's view of learning environment, Magen-Nagar & Steinberger (2017) defined learning environment as a classroom atmosphere or climate related to the behavior of students and teachers, enabling the learning and teaching process of constructivism to be implemented.

In this study, the understanding of the classroom ecological environment is the classroom physical environment, interpersonal environment and cultural environment that can be perceived by students and have a direct or indirect impact on students' learning. Among them, the classroom physical environment mainly refers to the size of the classroom and the teaching equipment and its spatial arrangement in the classroom; the interpersonal environment mainly refers to the classroom psychological atmosphere composed of the interaction and emotional relationship between teachers and students and between students and students; the cultural environment mainly refers to the class cultural atmosphere such as class rules, class style and study style (Zhiying *et al.*, 2020). The implementation of teaching approaches and the degree of students' self-regulation will have diversified effects in different classroom ecological environments.

Relationship between variables

Numerous scholars have studied teacher-student interaction. Prosser and Trigwel (1997) explored the relationship between teaching style and teachers' perceived teaching environment with 46 teachers as subjects. A striking result was that teachers' perception of class size was related to their choice of teaching style. If the teacher decides that the class size is too large, then the student-centered-concept-shifting approach to teaching will not be adopted. This suggests that it is necessary to consider the design of learning and teaching environments to support teachers in choosing more effective teaching methods, especially the effect of class size (Prosser & Trigwel, 1997). Tenenbaum *et al.* (2001) compared the specific situation of students' perceived constructivist practice in the learning environment between face-to-face teaching and distance teaching on campus through questionnaires, observation and interview methods. The results suggested that in teaching using distance learning, teacher conversations take up most of the time (87%), teacher-student interactions and discussions only take up 3% of the time, while student-to-student discussions are almost non-existent. Tenenbaum *et al.* (2001) concluded that one of the reasons for this is that instructional designers and educators often lack knowledge of constructivist teaching principles, or because they are difficult to implement.

As such, according to the previous literature review, there are abundant researches on teaching approaches, self-regulation and classroom learning environment, but few studies clearly explored the relationship between teaching approaches and self-regulation and classroom learning environment . Existing studies have confirmed that teaching approaches have diverse effects on students' self-regulated learning and academic performance. Teacher-centered teaching provides more control over students' behavior and reduces students' confusion (Weinert & Helmke, 1995). Compared with teacher-centered teaching, student-centered teaching is a more valuable teaching approach for cultivating and improving students' self-regulated learning.

According to self-regulated learning's social cognitive model, the two-way interaction between environment and personal process shapes students' learning behavior (Schunk & Ertmer, 2000). More fundamentally, there is a highly reciprocal and causal interaction between classroom environment and students' self-regulated learning: students use their self-regulation ability to adjust the learning environment, which in turn promotes or hinders students' access to and use of self-regulated learning (Zimmerman, 2002). Based on the above discussion, the following research hypotheses are put forward.

H1: Teaching approach can significantly affect self-regulated learning.

H2: Teaching approaches can significantly affect the classroom learning ecosystem

H3: The classroom ecological environment can significantly affect self-regulated learning

H4: The classroom ecological environment plays a mediating role between teaching style and self-regulated learning

Methodology

Research Framework Diagram

Combined with the discussion of teaching approaches, classroom ecological environment, the relationship between self-regulated learning and the total number of the above literature, the research framework of the three variables is shown below.
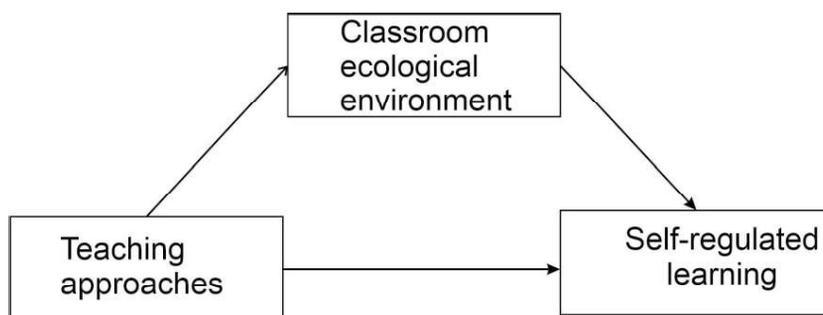

Figure 1. Research framework
Source: compiled by the authors.

Research Participants

Students from a junior high school in Kaili City, Guizhou Province were selected as the objects of study. This school has won a series of titles such as the Key School, the Green School, the Experimental School of Modern Educational Technology, the Training and Study Research Base of Primary and Secondary Schools, the New Campus Demonstration Base, and the Demonstration School for School-based Training in Guizhou Province, so it has a high regional representation. It can be a typical representative of high school in Guizhou. With the development and promotion of society, the influence of teaching approaches on students' learning is becoming more and more important, and it has become an important criterion for judging teenagers' learning ability. Self-regulation is an important index that affects the development of students' mental health, which has become a hot topic from many scholars. The classroom ecological environment plays an important role in the relationship between teaching approaches and students' self-regulation.

This study adopted convenience sampling to recruit participants. This sampling has the characteristics of strong purpose, high degree of standardization, being able to test a large number of respondents at the same time, and collecting a large number of research materials in a short time (Milosevic 2005). Gorsuch and McPherson (1989) recommended that the sample size of the respondents should be at least five times of the number of questions in the scale, and that it should be greater than one hundred. This study selected the classroom learning environment questionnaire with the largest number of questions, that is, a total of 40 questions. In terms of the number of questionnaires to be distributed, we identified 200 questionnaires, that is, five times the number of questions. However, 300 questionnaires were actually distributed at this stage considering that there may be invalid questionnaires, of which 276 were valid questionnaires.

Research Tools

The scale of teaching approaches used in this study was the questionnaire of teachers' teaching approaches developed by Trigwell & Shale (2004). The scale has 16 items consisting of two dimentions including teacher-centered information transmission teaching approach and student-centered concept change teaching approach. Using the Likert five-level scale method, the corresponding internal consistency reliability is 0.73 and 0.75 respectively, which shows good reliability and validity. All items are rated on a scale from Rarely Satisfactory (1 mark) to Always Satisfactory (5 marks). The classroom ecological environment scale used in this study was the classroom ecological environment questionnaire compiled by Tshewang *et al*., (2017). It includes eight dimensions: teacher support, student cohesion, task orientation, cooperation, equality, critical voice, personal relevance and student negotiation. Each dimension consists of 5 questions with a total of 40 questions. The internal consistency reliability of each dimension is between 0.60-0.77, with good reliability and validity (Tshewang *et al*, 2017).

The self-regulated learning scale used in this study was compiled by domestic scholar Fang Ping (2003), with a total of 18 items, including four subscales: Motivational strategies, metacognition, cognition and resource management strategies, goal strategies, academic will. A 5-point Likert scale was included, with higher scores indicating better self-regulated learning ability. The scale is compiled on the basis of the theory of self-regulated learning combined with the actual situation of middle school students in my country, and has good reliability and validity indicators. The Cronbach's Alpha coefficient is 0.862, and the Cronbach's Alpha coefficient of each dimension is between 0.80-0.95. It has good reliability and a high degree of use. It is currently an ideal tool for measuring the self-regulated learning level of middle school students in China (Teng & Huang , 2019).

Results and Discussion

Reliability and Validity Analysis

As for the reliability analysis, the reliability of the questionnaire and the scale was determined by the value of Cronbach's α. if the value of Cronbach's α is not less than 0.6, the reliability of the questionnaire and the scale is poor. If so, it is necessary to re-edit the questionnaire selection scale..The reliability of this questionnaire is shown in the following table.

Table 1. Reliability analysis

Variables	Cronbach's α	Bartlett's sphericity test	KMO
Teaching approaches	0.851	.000	.801
Self-regulated learning	0.875	.000	.817
Classroom learning environment	0.824	.000	.797

Source: compiled by the authors.

As can be seen, the reliability and validity of the three variables of teaching approach, self-regulated learning and classroom ecological environment all exceed the minimum requirements, which suggested a fair good reliability of this study, and thus the next step of statistical analysis can be carried out.

Correlation Analysis

In order to understand the correlation among students' teaching approaches, self-regulated learning and classroom ecological environment, Pearson correlation analysis was used to test the correlation among them. The results are shown in the table below.

Table 2. Correlation analysis

Variables	Teaching approaches	Self-regulated learning	Classroom learning environment
Teaching approaches	1		
Self-regulated learning	.620***	1	
Classroom learning environment	.627***	.644***	1

*Note: ***p<.001.*
Source: compiled by the authors.

Regression Analysis

For the test of intermediary effect, this study made a regression analysis of teaching approaches, self-regulated learning and classroom ecological environment, and explored the intermediary role of classroom ecological environment between teaching approaches self-regulated learning. In addition, it also discussed the predictive effect of teaching approaches on self-regulated learning, the predictive effect of teaching approaches on classroom ecological environment perception, and the predictive effect of classroom ecological environment on self-regulated learning. The results of regression analysis are shown in Table 3. The results show that in Model 1, that is, in terms of the teaching approach to self-regulated learning, β is .620, t is 18.602, and the significance is less than .001, which is significant, indicating that teaching approach can positively and significantly affect self-regulated learning. To simply put it, the higher the students' teaching approaches, the higher the self-regulated learning, and vice versa. Thus, H1 is assumed to be established in this study, that is, the teaching method has a positive and significant effect on self-regulated learning. In Model 2, that is, in terms of the teaching approach to classroom ecological environment, β is .627, t is 18.924, and the significance is less than .001, which is significant, indicating that teaching approach can positively and significantly affect classroom ecological environment. In other words, the higher the students' teaching approaches, the higher the classroom ecological environment, and vice versa. Accordingly, H2 is assumed to be established in this study and that teaching approaches have a positive and significant impact on the classroom ecological environment. In Model 3, in terms of classroom ecological environment to self-regulated learning, β is .644, t is 19.820, and the significance is less than .001, which is significant, indicating that classroom ecological environment can positively and significantly affect self-regulated learning. That is, the higher the students' classroom ecological environment, the higher the self-regulated learning, and vice versa. Thus, H3 is assumed to be established in this study and college students' classroom ecological environment perception has a positive and significant impact on self-regulated

learning. In Model 4, that is, in terms of the teaching approach to self-regulated learning, β is .356, t value is 9.163, and the significance is less than .001, which is significant; while in terms of the classroom ecological environment to self-regulated learning, β is .421, t is 10.821, and the significance is less than .001, which is significant. In addition, the β value of teaching approaches on self-regulated learning in Model 4 is significantly lower than that in Model 1, indicating that the classroom ecological environment plays an intermediary role between teaching approaches and self-regulated learning. Thus, hypothesis H4 is established, that is, the classroom ecological environment plays an intermediary role in the influence of its teaching approaches on self-regulated learning.

Table 3. Regression analysis and mediation effect test

Variables	Model 1 Self-regulated learning		Model 2 Learning ecological environment		Model 3 Self-regulated learning		Model 4 Self-regulated learning	
	β	t	β	t	β	t	β	t
Teaching approaches	.620	18.602***	.627	18.924***			.356	9.163***
Learning About The environment					.644	19.820***	.421	10.821***
R²		.384		.393		.415		.492
AdjR²		.383		.392		.414		.490
F		346.026***		358.130***		392.837***		267.818***

Note: 1.***p < .001. 2. β is the standardized regression coefficient.
Source: compiled by the authors.

Conclusion

According to the above statistical analysis, teaching approaches have a significant positive effect on both self-regulated learning and classroom ecological environment while classroom ecological environment has a significant positive effect on self-regulated learning. This is consistent with the research done by many other scholars such as Xiao (2021), Caiping (2021), Miao (2019), Hong & Wong, (2015). This study combines the classroom ecological learning environment with the group of junior high school students for the first time through statistical analysis. The results confirm that the classroom ecological learning environment has a partial mediating effect between teaching approaches and self-regulated learning. This conclusion is expected to provide richer theoretical support for research in the academic field.

Due to the influence of various factors and the limitation of social resources, this research is limited to junior high school students in Guizhou Province. In fact, the diverse influence of social micro-macro environment s and students'

region, grade, subject and other factors may lead to significant differences in the performance of teaching approaches on self-regulated learning. Therefore, further research can be carried out to explore the differences in self-regulated learning and classroom ecological learning in different grades and subjects to conduct more in-depth research.

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