

# Learning Rock Climbing Utilizing Task-driven Method: Effectiveness and Students' Satisfaction

Chunlong Zhang\*

Adamson University, Doctor of Philosophy in Education with Specialization in Physical Education and Sports, MANILA, The Philippines

\* Corresponding author: Chunlong Zhang (zhangchunlong109@126.com)

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**Abstract:** The purpose of this research was to evaluate the effectiveness and student satisfaction of the application of task-driven teaching methods in rock climbing teaching and to develop an enrichment program focused on improving teaching. A descriptive comparative research design was adopted, and a total of 220 physical education students from Guangdong Vocational Institute of Sport, Guangdong Baiyun University and Guangzhou Sport University were selected as the research subjects. The main research results show that on the premise that there is no significant difference in BMI, the teaching effect of using the task-driven method in climbing fundamentals, climbing techniques, mental preparation, equipment care, safety training, etc. is significantly higher than that of traditional teaching method (with significant differences); similarly, in terms of effective instruction, real climbing scenarios, goal setting, progress training, group and individual tasks, students are more satisfied with task-driven teaching methods than traditional teaching methods. There is a significant difference between them. There is a positive correlation between the effectiveness of teaching effects and student satisfaction, that is, the better the teaching effect, the higher the student satisfaction. Task-driven teaching method has significant advantages in improving student participation and practical application ability, but it also faces many challenges during the implementation process. Through strategies such as carefully designed tasks, effective classroom management, diversified assessment, teacher professional development, student guidance and support, and optimized resource allocation, these difficulties can be effectively dealt with and the smooth implementation of task-driven teaching methods and the improvement of teaching effects can be ensured.

**Keywords:** Task-driven Teaching Method; Rock-climbing; Effectiveness; Satisfaction.

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## 1. Introduction

Education is the foundation of building a country, the foundation of building a strong nation, and the fundamental way to promote China's comprehensive development and improve the quality of its people. The original intention of introducing leisure sports in our country is to serve the general public, and the mission of cultivating professional talents is to better and efficiently ensure the output of innovative, composite, and applied talents, thereby serving the needs of social development. The cultivation of leisure sports talents in China mainly relies on undergraduate colleges and vocational colleges, and the establishment of leisure sports majors is an inevitable product of the progress of the times. As of July 2023, there are a total of 177 universities in China offering leisure sports majors, including 95 undergraduate colleges and 82 vocational colleges. This study selected three typical representative universities in the Pearl River Delta region as research objects, including one public vocational college, one public undergraduate college, and the other private undergraduate college. Rock climbing is a fundamental course for leisure sports majors, with the main goal of cultivating professional rock climbing talents with professional skills and providing rock climbing guidance and services to the public. Therefore, the status of this course is very important and greatly helpful for students to learn other related courses and find employment.

Rock Climbing is a sport of climbing up natural or artificial rock walls, requiring people to continuously perform thrilling movements such as turning, pulling up, moving, and even jumping at various heights and angles. It combines fitness, entertainment, and competition, and is known as "ballet on the cliff". In the mid-20th century, rock climbing truly became

an independent sport, and at that time, rock climbing was generally dominated by natural rock formations. In 1983, it was not until the French invented artificial rock walls that rock climbing completed its embryonic and developmental process. In 2016, the International Olympic Committee confirmed that rock climbing became an official event at the 2020 Tokyo Olympics, and it will also be an official event at the 2024 Paris Olympics.

In recent years, with the country's emphasis on rock climbing and the increasing social recognition of the project, rock climbing has gradually entered various levels of campuses and become a popular sports event among young people. Therefore, teaching and research on rock climbing has gradually increased. However, traditional teaching methods have shown certain shortcomings in practical learning, stimulating learning interest and confidence, and improving students' climbing skills, making it difficult to meet the basic requirements of current information and technical teaching. Therefore, how to find more effective teaching methods, improve the teaching level of climbing courses, and enhance students' climbing skills has become an important topic in the research of climbing teaching methods.

Task driven teaching method is a teaching method that advocates learning through practice. The term "task" is interpreted in modern Chinese dictionaries as: defined tasks, assigned responsibilities. The meaning of driving is to enable students to consciously learn, allowing them to achieve a sense of achievement in learning by completing tasks carefully set by the teacher, thereby stimulating their desire for new knowledge, actively discovering and solving problems, and forming a good learning environment. It is a method that requires self-directed exploration and learning, with tasks as goal oriented, and students achieve

corresponding teaching goals by completing tasks.

The author analyzed the differences in student satisfaction with teaching and satisfaction with various influencing factors based on factors such as gender, grade, student background, and major, and studied the impact of each dimension on overall teaching satisfaction (Wang, 2021)<sup>[1]</sup>. In the "Survey on Student Satisfaction in Colleges and Universities", the author defines students' satisfaction with teaching quality as: "the feeling state formed by comparing students' perception of the quality of teaching in colleges and universities with their own expectations for the quality of school teaching" (Xu, 2023)<sup>[2]</sup>. The article "Survey on "Satisfaction" of Chongqing College Students" points out that "student satisfaction refers to students' overall emotional evaluation or opinion of all services received in colleges and universities." This article believes that student satisfaction refers to the inner psychological feeling that students, as direct and internal customers of higher education services, have about the quality of higher education teaching services they "purchase". This feeling is the effect that students actually perceive themselves. Results compared with initial expectations. It usually contains four aspects of content: concept satisfaction, behavioral satisfaction, audio-visual satisfaction and service satisfaction (Yang, 2023)<sup>[3]</sup>.

To sum up, students' satisfaction with teaching effects refers to students' comprehensive evaluation of teachers' teaching methods, content delivery, learning resource provision, and evaluation methods during the classroom teaching process. It reflects students' subjective feelings and overall satisfaction with the quality of education, knowledge mastery, learning experience and personal growth they receive. This satisfaction not only measures students' recognition of teaching content and format, but also reflects their overall satisfaction with teachers' teaching abilities, classroom interactions, course arrangements, and learning support.

## 2. Research Paradigm

### 2.1. Statement of the Problem

The study aims to determine the effectiveness and the students' satisfaction in learning rock climbing using the task-driven method in order to propose an enhancement program that shall intensify and strengthen the teaching of the mentioned physical activity.

Specifically, it will seek answers to the following questions: What is the profile of the respondents in terms of sex, age, BMI. What is the level of effectiveness in learning rock climbing using the task driven method in terms of: climbing fundamentals; climbing techniques; mental preparation; equipment care and safety training. Is there a significant difference between the assessed level of effectiveness in learning rock climbing using task driven method when the respondents' profile is used as a test factors? What is the level of students' satisfaction in learning rock climbing using the task driven method in terms of: effective instruction; real climbing scenario; goal setting; progress training; Group and individual task. Is there a significant difference between the assessed level of students' satisfaction in learning rock climbing using the task driven method when the respondents' profile is used as a test factor? Is there a significant relationship between the teaching of rock climbing using task driven method and the students' satisfaction? Based on the results of the study, what program may be

proposed to enhance the teaching of rock climbing using the task driven method.

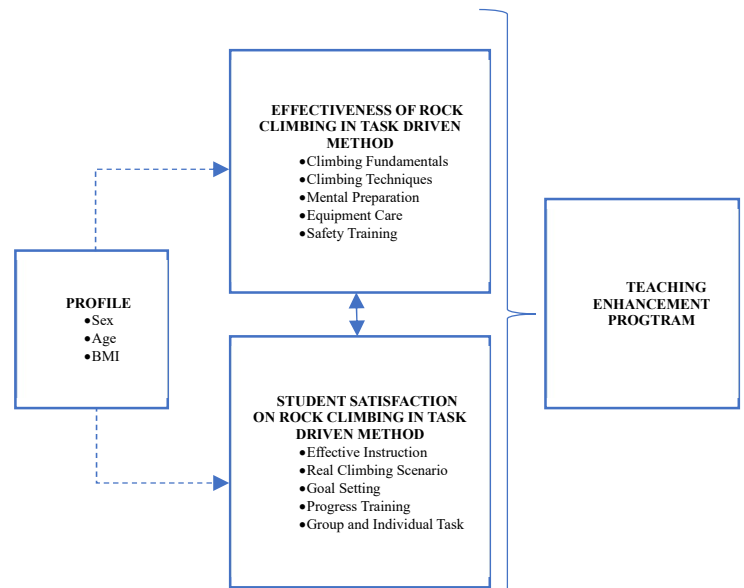


Figure 1. Research Paradigm

### 2.2. Scope and Delimitations

The focus of this study is to investigate the effectiveness and student satisfaction of task driven approach in rock climbing teaching in colleges and universities. This study will focus on students from Guangdong Vocational Institute of Sport, Guangdong Baiyun University, and Guangzhou Sport University who are required to take rock climbing courses for leisure sports majors in 2023. Among them, there are a total of 106 students of Guangdong Vocational Institute of Sport, 60 students of Guangdong Baiyun University, and 54 students of Guangzhou Sport University. These three schools will have 36 class hours of basic climbing courses in the last nine weeks of this semester, and an additional 36 class hours of advanced climbing courses will be studied in the first nine weeks of next semester.

### 2.3. Definition of Terms

**Rock-climbing.** Rock climbing is a mental sports activity in which climbers utilize human primitive climbing instincts, use various equipment for safety protection, and rely solely on the strength of their own hands and feet to control their body balance. They climb cliffs, crevices, rock surfaces, boulders, and artificial rock walls mainly composed of rocks.

**Task-driven teaching method.** Task driven teaching method refers to a learning system in which teachers design a series of tasks according to the needs of the teaching content, with tasks as the main thread. Teachers provide students with independent thinking and practical experience scenarios based on each small task, fully reflecting their subjectivity.

## 3. Methodology

### 3.1. Research Design

This study will employ the descriptive comparative-correlational research design. Descriptive research is the process of explaining what things are, describing phenomena that are universal and representative, aiming to propose causal hypotheses and provide clues for further investigation and research. Its task is to collect data, discover situations, provide information, and describe the main rules and characteristics of chaotic phenomena. This study will use descriptive

research methods to explain the data obtained from questionnaire surveys, and to describe the interrelationships between the variables used in the study. Through comprehensive evaluation, the effectiveness and student satisfaction of task driven teaching method in the teaching of rock climbing courses in colleges and universities will be determined, and an enhanced implementation plan will be proposed.

Comparative research design is a research method that involves comparing two or more groups, variables, conditions, or phenomena to determine similarities, differences, patterns, or relationships. This type of research design is typically used in various fields, including social sciences, economics, education, and political science. Comparative research enables researchers to gain a deeper understanding of the relationships between variables and conduct informed comparisons, thereby deepening their understanding of the topic.

### 3.2. Sampling Method

The survey selected 220 students from three schools who are required to take rock climbing courses for leisure sports majors in 2023 as the research subjects. Among them, there are a total of 106 students in four teaching classes of Guangdong Vocational Institute of Sport, 60 students in two teaching classes of Guangdong Baiyun University, and 54 students in two teaching classes of Guangzhou Sport University.

### 3.3. Research Instrument

This questionnaire was independently developed by me based on referencing questionnaires from other relevant researchers. The questionnaire is divided into two parts: the first part is a survey conducted by students on the effectiveness of task-based teaching method in climbing course teaching, including 5 parts: climbing basics, climbing techniques, psychological preparation, equipment maintenance, and safety training, with a total of 38 questions; The second part is a survey of students' satisfaction with the application of task-based teaching in rock climbing courses, including effective instruction, real climbing scenario, goal setting, progress training, group and individual tasks, and sustainability and applicability, with a total of 49 questions. The questionnaire shall undergo tests of validity and reliability.

### 3.4. Statistical Treatment of Data

Researchers will use SPSS 22.0 to organize, analyze, and interpret the collected data. Using independent sample t-test method to test whether there is a significant difference in satisfaction and effectiveness based on gender classification criteria. Use One-Way ANOVA to test whether there is a significant difference in satisfaction and effectiveness based on age and BMI as classification criteria. The Pearson correlation coefficient method is used to test whether there is a significant correlation between the satisfaction of respondents with using task driven teaching method in rock climbing classes and the effectiveness of teaching effectiveness.

## 4. Results, Analysis and Interpretation of Data

The first part of this chapter analyzes the gender ratio, age distribution, and BMI index of the surveyed students; The

second part analyzed the effectiveness of task driven teaching method in rock climbing class teaching and tested whether there were significant differences between them using gender, age, and BMI as grouping variables; The third part analyzed the satisfaction of students with task driven teaching method in rock climbing classes, and tested whether there were significant differences between them using gender, age, and BMI as grouping variables; The fourth part uses Pearson correlation coefficient method to test whether there is a significant correlation between the effectiveness of task driven teaching method and student satisfaction; The fifth part analyzes the sustainability and applicability of task driven teaching method; The sixth part analyzes the challenges encountered in teaching rock climbing courses using task driven teaching methods.

### 4.1. Basic Information of the Interviewed Students

Table 1 presents the gender status of the surveyed students, with 162 males accounting for 73.6% of the total population and 58 females accounting for 26.4% of the total population. Table 1 also shows the age distribution of the respondents, with 24 people under or equal to 18 years old accounting for 15.5% of the total population; There are 128 people aged 19-20, accounting for the highest proportion of 58.2%; 33 people aged 21-22, accounting for 15% of the total surveyed population; There are 22 people aged 23-24, accounting for 10% of the surveyed population; There are only 3 people aged 25 and above, accounting for 1.4%. The interviewed students are freshmen and sophomores, and according to China's education system, most of them are between the ages of 19 and 20. Some students may be slightly older due to repeating grades during their primary and secondary school years, while others have returned from the military and re enrolled.

**Table 1.** Basic information of the surveyed students

Sex	Frequency	Percentage	
Male	162	73.6%	
Female	58	26.4%	
<b>Total</b>	<b>220</b>	<b>100%</b>	
Age	Frequency	Percentage	
≤18	34	15.5%	
19-20	128	58.2%	
21-22	33	15.0%	
23-24	22	10.0%	
≥25	3	1.4%	
<b>Total</b>	<b>220</b>	<b>100%</b>	
BMI	Frequency	Percentage	Rank
≤18.5	20	9.1%	Underweight
18.51-24.9	175	79.5%	Normal
25-29.9	24	10.9%	Overweight
≥30	2	0.9%	Obese
<b>Total</b>	<b>220</b>	<b>100%</b>	

It displays the body mass index of the surveyed students before taking rock climbing classes. From the table, it can be seen that a total of 20 people have a BMI below 18.5, accounting for 9.1% of the surveyed population, and their evaluation results are lean; 175 people had a BMI between 18.51 and 24.9, accounting for 79.5% of the surveyed population, and their evaluation results were normal; A total of 24 individuals had a BMI between 25-29.9, accounting for 10.9% of all respondents, and their evaluation criteria were overweight; In addition, there are two students with a BMI greater than 30, accounting for 0.9% of the respondents, and

the evaluation result is obesity. This survey indicates that the BMI of the vast majority of respondents is within the normal range, with a relatively small proportion of lean and obese types, which is consistent with the fact that the respondents are all sports students.

#### 4.2. The Effectiveness of Task Driven Teaching Method in Rock Climbing Class Teaching and Testing for Significant Differences between Them Using Gender, Age, and BMI as Grouped Variables

Survey data shows that students believe that using task driven teaching methods to teach "rock climbing basics" is very effective, with an average score of 3.318 and a standard deviation of 0.525. The effectiveness of teaching "climbing theory knowledge" using task driven method is 3.295, the effectiveness of teaching "climbing equipment knowledge" using task driven method is 3.314, the effectiveness of

teaching "climbing site related knowledge" is 3.277, the effectiveness of teaching "climbing competition related knowledge" is 3.327, the effectiveness of teaching "climbing professional qualification certificate exam related knowledge" is 3.300, the effectiveness of teaching "climbing referee methods and event organization knowledge" is 3.318, the effectiveness of teaching "climbing injury prevention and control methods" is 3.300, and the effectiveness of teaching "the latest development trend of world climbing sports" is 3.291. Overall, task-based teaching methods are highly effective in teaching rock climbing theory courses, achieving a high level of effectiveness. In Chen's (2015) experimental study on task-based teaching method in volleyball elective courses in universities, it was found that task-based teaching method is more conducive to the improvement of students' theoretical knowledge and skill level in volleyball, as well as the application of skill level in competitions, and can significantly improve teaching effectiveness<sup>[4]</sup>.

**Table 2.** Climbing foundation of the surveyed students

Climbing Fundamentals	Mean	SD	Desc.	Inter	Rank
1.I can have a good grasp of the theoretical knowledge of rock climbing.	3.295	0.531	SA	HE	6
2.It has helped me to master the knowledge of climbing equipment.	3.314	0.532	SA	HE	3
3.I have mastered the relevant knowledge of climbing sites.	3.277	0.532	SA	HE	8
4.I have understood and mastered the relevant knowledge of rock climbing competitions.	3.327	0.517	SA	HE	1
5.I have mastered the relevant knowledge of the rock climbing professional qualification certificate examination.	3.300	0.565	SA	HE	4.5
6.I can quickly master the knowledge of rock climbing referee methods and event organization.	3.318	0.513	SA	HE	2
7.I quickly mastered the prevention and treatment methods for rock climbing injuries.	3.300	0.488	SA	HE	4.5
8.It easier for me to understand the latest development trends in world rock climbing sports.	3.291	0.521	SA	HE	7
<b>OVER-ALL</b>	<b>3.303</b>	<b>0.525</b>	<b>SA</b>	<b>HE</b>	<b>/</b>

From the survey data in Table 3, it can be seen that the task driven teaching method has a significant effect in teaching "climbing techniques", with an average effectiveness value of 3.313 and a standard deviation of 0.530. The effectiveness of "improving difficulty climbing skills" is 3.332, the effectiveness of "mastering upper protection techniques" is 3.305, the effectiveness of "mastering speed climbing techniques" is 3.327, the effectiveness of "learning knot techniques" is 3.314, the effectiveness of "mastering climbing techniques" is 3.309, the effectiveness of "improving climbing teaching guidance abilities" is also 3.309, the effectiveness of "improving climbing route planning abilities" is 3.327, and finally the effectiveness of "mastering climbing protection techniques" is 3.277. From the overall survey

results, it can be seen that the teaching effect of using task driven teaching method for climbing practice content is very ideal. The overall teaching effect is "Highly Effective". In terms of effectiveness ranking, it has the best effect on improving difficulty climbing, followed by "speed climbing technology" and "climbing route planning ability". Deng (2017) conducted an empirical study on the teaching effect of applying task-based teaching method to the teaching of track and field javelin general courses in sports colleges and departments in his "Application Research of Task Driven Teaching Method in Javelin General Courses in Sports Colleges and Departments - Taking Guangzhou Sports College as an Example"<sup>[5]</sup>.

**Table 3.** Climbing techniques of the surveyed students

Climbing Techniques	Mean	SD	Desc.	Inter.	Rank
1.It is conducive to improving my difficulty climbing skills.	3.332	0.509	SA	HE	1
2.I am proficient in the upper protection techniques for rock climbing.	3.305	0.535	SA	HE	7
3.My speed climbing technique has significantly improved.	3.327	0.534	SA	HE	2.5
4.I can learn knot techniques very well.	3.314	0.529	SA	HE	4
5.The teaching method currently used by the teacher can greatly improve my mastery of rock climbing techniques.	3.309	0.519	SA	HE	5.5
6.My ability to guide rock climbing teaching has significantly improved through the study of rock climbing courses.	3.309	0.536	SA	HE	5.5
7.My ability to plan climbing routes has greatly improved.	3.327	0.525	SA	HE	2.5
8.I have a good grasp of rock climbing protection techniques.	3.277	0.549	SA	HE	8
<b>OVER-ALL</b>	<b>3.313</b>	<b>0.530</b>	<b>SA</b>	<b>HE</b>	<b>/</b>

Legend:3.25-4.00 Strongly Agree (SA)/ Highly Effective (HE) ;2.50-3.24 Agree (A)/Effective(E);1.75-2.49 Disagree (D)/Ineffective(I);1.00-1.74 Strongly Disagree (SD)/Highly Ineffective(HI)

From Table 4, it can be seen that task-based teaching method also has a significant effect on improving students' mental preparation ability. The average effectiveness value is 3.301, the standard deviation is 0.526, and the overall evaluation is Highly Effective. From the perspective of each sub item, the effectiveness of enhancing students' interest in rock climbing courses is 3.277, the effectiveness of "effectively controlling their fear emotions" is 3.327, the effectiveness of "being able to quickly adjust their mentality and continue to work hard in the face of failure" is 3.300, the effectiveness of "having sufficient internal motivation to continuously improve their climbing skills" is 3.341, the

effectiveness of "enhancing confidence in their climbing ability" is 3.286, the effectiveness of "maintaining focus and calmness while climbing" is 3.295, the effectiveness of "setting specific climbing goals and striving to achieve them" is 3.282, and the effectiveness of "achieving pre class preview and post class review" is 3.286. The effectiveness is 3.300. Wang (2019) applied task-based teaching method to aerobics teaching in public sports courses in universities. The study showed that after using task-based teaching method to teach, the evaluation of students' learning attitude, self-confidence, and classroom teaching effect improved significantly compared to students under conventional teaching method<sup>[6]</sup>.

**Table 4.** Mental preparation of the surveyed students

Mental Preparation	Mean	SD	Desc.	Inter .	Rank
1.I am very interested in the compulsory course of rock climbing.	3.277	0.506	SA	HE	8
2.When climbing, I will be able to effectively control my fear emotions.	3.327	0.517	SA	HE	2
3.I failed during the climbing process, but I am able to quickly adjust my mindset and continue to work hard.	3.300	0.541	SA	HE	3.5
4.I have enough inner motivation to constantly improve my climbing skills.	3.341	0.521	SA	HE	1
5.I have great confidence in my climbing ability.	3.286	0.553	SA	HE	6
6.I am able to stay focused and calm during the climbing process.	3.295	0.505	SA	HE	5
7.I will set specific goals for each rock climbing and strive to achieve them.	3.282	0.534	SA	HE	7
8.In rock climbing class, I will do pre class preparation and post class review.	3.300	0.533	SA	HE	3.5
<b>OVER-ALL</b>	<b>3.301</b>	<b>0.526</b>	<b>SA</b>	<b>HE</b>	<b>/</b>

Legend:3.25-4.00 Strongly Agree (SA)/ Highly Effective (HE) ;2.50-3.24 Agree (A)/Effective(E);1.75-2.49 Disagree (D)/Ineffective(I);1.00-1.74 Strongly Disagree (SD)/Highly Ineffective(HI)

According to the statistics in Table 5, it can be seen that in terms of "equipment care", task-based teaching method can effectively promote students' mastery of equipment maintenance knowledge and skills. The average value of its effectiveness is 3.314, the standard deviation is 0.530, and the description of its use effect is "Highly Effective". From the perspective of each sub project, the effectiveness of "mastering knowledge and skills in climbing safety belt maintenance" is 3.291, the effectiveness of "mastering maintenance and skills in climbing ropes" is 3.332, the effectiveness of "mastering knowledge in rock wall

maintenance and upkeep" is 3.295, the effectiveness of "mastering maintenance and upkeep skills in climbing locks, ATC, GRIGRIGRI and other metal equipment" is 3.286, the effectiveness of "enhancing awareness of caring for and upkeep climbing equipment" is 3.377, and the effectiveness of "spreading knowledge and skills in cherishing and caring for climbing equipment" is 3.305. So overall, using task driven teaching methods for climbing courses can effectively enhance students' mastery of knowledge and skills in equipment maintenance and upkeep, and also contribute to the dissemination of awareness of caring for equipment.

**Table 5.** Equipment care of the surveyed students

Equipment Care	Mean	SD	Desc.	Inter .	Rank
1.I have mastered the knowledge and skills of maintaining rock climbing safety belts.	3.291	0.494	SA	HE	5
2.I have mastered the maintenance and upkeep techniques for climbing ropes proficiently.	3.332	0.535	SA	HE	2
3.I have learned the knowledge of rock wall maintenance and upkeep.	3.295	0.523	SA	HE	4
4.I have mastered the maintenance and upkeep skills of metal equipment such as climbing locks, ATC, and GRIGRI.	3.286	0.536	SA	HE	6
5.Through rock climbing courses, my awareness of maintenance and upkeep of climbing equipment has been further enhanced.	3.377	0.539	SA	HE	1
6.I will spread the knowledge and skills of cherishing and caring for climbing equipment to other classmates who are taking climbing classes.	3.305	0.551	SA	HE	3
<b>OVER-ALL</b>	<b>3.314</b>	<b>0.530</b>	<b>SA</b>	<b>HE</b>	<b>/</b>

Legend:3.25-4.00 Strongly Agree (SA)/ Highly Effective (HE) ;2.50-3.24 Agree (A)/Effective(E);1.75-2.49 Disagree (D)/Ineffective(I);1.00-1.74 Strongly Disagree (SD)/Highly Ineffective(HI)

From Table 6, it can be seen that using task driven teaching methods can effectively improve the mastery of knowledge and skills in safety training. The average effectiveness is 3.341, with a standard deviation of 0.521, and the description of teaching effectiveness is Highly Effective. The effectiveness of task driven approach in mastering "climbing safety knowledge" is 3.341, the effectiveness of mastering "climbing safety skills" is 3.355, the effectiveness of

understanding "the importance of wearing helmets for natural rock climbing" is 3.305, the effectiveness of understanding "the importance of mutual inspection between protectors and climbers before climbing" is 3.314, the effectiveness of understanding "the necessity of regular inspection, maintenance, and scrapping of climbing equipment" is 3.300, the effectiveness of understanding "the necessity of simple rope rescue for climbers" is 3.323, the effectiveness of understanding "compliance with various management

regulations of climbing sites" is 3.318, and the effectiveness of understanding "the necessity of regular inspection, maintenance, and scrapping of climbing equipment" is 3.300. The validity of the understanding of the "certified employment" regulation is 3.291. In terms of effectiveness ranking, "I have mastered climbing safety skills" ranks first, "I have a deeper understanding of climbing safety knowledge" ranks second, and "being able to perform simple rope rescue is necessary for climbing" ranks third. Climbing is

a high-risk sports activity, and there are strict inspection standards for the construction of climbing venues, climbing safety belts, ropes, and main locks internationally. Therefore, teaching, training, and competitions for climbing must strictly comply with relevant regulations. Task driven teaching methods can effectively improve students' understanding of safety training, enhance their safety awareness, and promote the healthy and sustainable development of climbing.

**Table 6.** Safety training of the surveyed students

Safety Training	Mean	SD	Desc.	Inter.	Rank
1.Through the study of rock climbing courses, I have mastered the knowledge of rock climbing safety very well.	3.341	0.521	SA	HE	2
2.I have acquired skills in rock climbing safety.	3.355	0.507	SA	HE	1
3.I have truly realized the importance of wearing a helmet when climbing natural rock walls.	3.305	0.543	SA	HE	6
4.I have realized the importance of mutual inspection between the protector and the climber before climbing.	3.314	0.538	SA	HE	5
5.Through the rock climbing course teaching, I realized the necessity of regular inspection, maintenance, and timely disposal of climbing equipment.	3.300	0.550	SA	HE	7
6.I have realized that simple rope rescue is necessary for climbing.	3.323	0.506	SA	HE	3
7.Through the course teaching, I began to understand the importance of complying with the management regulations of the climbing range.	3.318	0.522	SA	HE	4
8.I have come to understand that climbing is a high-risk project and the necessity of obtaining a certificate to work.	3.291	0.555	SA	HE	8
<b>OVER-ALL</b>	<b>3.318</b>	<b>0.530</b>	<b>SA</b>	<b>HE</b>	<b>/</b>

Legend:3.25-4.00 Strongly Agree (SA)/ Highly Effective (HE) ;2.50-3.24 Agree (A)/Effective(E);1.75-2.49 Disagree (D)/Ineffective(I);1.00-1.74 Strongly Disagree (SD)/Highly Ineffective(HI)

Table 7 uses the independent sample t-test method to test the relationship between the effectiveness of task driven rock climbing teaching and gender. Through the data, researcher can find that in "Climbing Fundamentals",  $t=1.232$ ,  $p=0.219>0.05$  indicates no significant difference between the two, in "Climbing Techniques",  $t=1.976$ ,  $p=0.051>0.05$  indicates no significant difference between the two, in "Mental Preparation",  $t=1.379$ ,  $p=0.169>0.05$  indicates no significant difference between the two, in "Equipment Care",  $t=0.169$ ,  $p=0.457>0.05$  indicates no significant difference

between the two. In terms of Safety Training,  $t=1.301$ ,  $p=0.196>0.05$  indicates no significant difference between the two. From the overall statistical results, it can be seen that all  $p>0.05$  have no statistical significance, so the author accept the hypothesis that there is no difference in the evaluation of the effectiveness of using task driven climbing teaching based on gender classification. Shi's (2023) research suggests that there is no significant correlation between the effectiveness of using task driven approach in college table tennis teaching and gender, which is consistent with the results of this study<sup>[7]</sup>.

**Table 7.** The relationship between the effectiveness of task driven learning in rock climbing and Sex

SID	Subject	Sex	Mean	t	Sig	Interpretation	Decision
1	Climbing Fundamentals	Male	3.326	1.232	0.219	Not Significant	Accept H0
		Female	3.239				
2	Climbing Techniques	Male	3.348	1.976	0.051	Not Significant	Accept H0
		Female	3.213				
3	Mental Preparation	Male	3.326	1.379	0.169	Not Significant	Accept H0
		Female	3.231				
4	Equipment Care	Male	3.328	0.169	0.457	Not Significant	Accept H0
		Female	3.276				
5	Safety Training	Male	3.341	1.301	0.196	Not Significant	Accept H0
		Female	3.254				

Legend:a=0.05

Table 8 uses one-way analysis of variance to test whether there is a difference in the effectiveness of using task driven climbing teaching based on age as a classification criterion. Divide individuals aged  $\leq 18$  into the first group, those aged 19-20 into the second group, those aged 21-22 into the third group, those aged 23-24 into the fourth group, and the remaining individuals aged  $\geq 25$  into the fifth group. In terms of "Climbing Fundamentals",  $F=1.591$ ,  $P=0.178>0.05$ ; in terms of "Climbing Techniques",  $F=0.662$ ,  $P=0.619>0.05$ ; in

terms of "Mental Preparation",  $F=2.153$ ,  $P=0.075>0.05$ ; in terms of "Equipment Care",  $F=1.998$ ,  $P=0.096>0.05$ ; in terms of "Safety Training",  $F=0.634$ ,  $P=0.639>0.05$ . From the overall statistical results, all  $p>0.05$ , so the researcher accept the hypothesis that there is no significant evaluation of the effectiveness of task driven rock climbing teaching by age classification. Zhang's (2021) study also suggests that age is not the determining factor affecting the effectiveness of task driven teaching in children's Latin dance, that is, the evaluation of task driven teaching effectiveness is not affected

by age factors, which is consistent with the results of this survey<sup>[8]</sup>.

**Table 8.** The relationship between the effectiveness of task driven learning in rock climbing and age

SID	Subject	Age	Mean	F	Sig	Interpretation	Decision
1	Climbing Fundamentals	≤18	3.315	1.591	0.178	Not Significant	Accept H0
		19-20	3.289				
		21-22	3.238				
		23-24	3.506				
		≥25	3.000				
		Total	3.270				
2	Climbing Techniques	≤18	3.415	0.662	0.619	Not Significant	Accept H0
		19-20	3.292				
		21-22	3.258				
		23-24	3.358				
		≥25	3.292				
		Total	3.323				
3	Mental Preparation	≤18	3.360	2.153	0.075	Not Significant	Accept H0
		19-20	3.279				
		21-22	3.216				
		23-24	3.511				
		≥25	2.958				
		Total	3.265				
4	Equipment Care	≤18	3.328	1.998	0.096	Not Significant	Accept H0
		19-20	3.311				
		21-22	3.222				
		23-24	3.508				
		≥25	2.889				
		Total	3.252				
5	Safety Training	≤18	3.426	0.634	0.639	Not Significant	Accept H0
		19-20	3.296				
		21-22	3.273				
		23-24	3.347				
		≥25	3.333				
		Total	3.335				

Legend:  $\alpha=0.05$ .

**Table 9.** The relationship between the effectiveness of task driven learning in rock climbing and BMI

SID	Subject	MBI	Mean	F	Sig	Interpretation	Decision
1	Climbing Fundamentals	≤18.5	3.243	1.283	0.281	Not Significant	Accept H0
		18.51-24.9	3.294				
		25-29.9	3.375				
		≥30	3.857				
		Total	3.442				
2	Climbing Techniques	≤18.5	3.456	2.772	0.042	Significant	Reject H0
		18.51-24.9	3.274				
		25-29.9	3.417				
		≥30	3.938				
		Total	3.521				
3	Mental Preparation	≤18.5	3.263	1.137	0.335	Not Significant	Accept H0
		18.51-24.9	3.296				
		25-29.9	3.323				
		≥30	3.875				
		Total	3.439				
4	Equipment Care	≤18.5	3.258	0.577	0.631	Not Significant	Accept H0
		18.51-24.9	3.310				
		25-29.9	3.361				
		≥30	3.667				
		Total	3.399				
5	Safety Training	≤18.5	3.438	2.272	0.081	Not Significant	Accept H0
		18.51-24.9	3.282				
		25-29.9	3.432				
		≥30	3.875				
		Total	3.507				

Legend:  $\alpha=0.05$ .

Table 9 uses one-way analysis of variance to test whether there is a difference in the effectiveness of using task driven

climbing teaching based on BMI as the classification criterion. This article divides  $BMI \leq 18.5$  into the first group according

to international standards, BMI=18.51-24.9 into the second group, BMI=25-29.9 into the third group, and finally BMI  $\geq$  30 into the fourth group. In the "Climbing Fundamentals" project,  $F=1.283$ ,  $P=0.281>0.05$ , indicating no significant difference between the two; In the "Climbing Techniques" project,  $F=2.772$ ,  $P=0.042<0.05$ , indicating a significant difference between the two; In the "Mental Preparation" project,  $F=1.137$ ,  $P=0.335>0.05$  indicates no significant difference between the two; In the "Safety Training" project,  $F=2.272$ ,  $P=0.631>0.05$ , indicating no significant difference between the two; In the "Equipment Care" project,  $F=0.081$ ,  $P=0.081>0.05$  indicates no significant difference between the two. From the overall survey results, it can be seen that except for "Climbing Techniques," other items have a p-value greater than 0.05, which is not statistically significant. This means accepting the null hypothesis and acknowledging that BMI is not a factor affecting the effectiveness of task driven teaching methods in students. However, from another perspective, BMI is indeed a factor that affects students' mastery of climbing skills. Due to the particularity of climbing projects, the more obese people are, the more difficult it is for them to climb upwards. Therefore, rock climbing is more suitable for students with lighter weight and better relative strength to participate in.

Table 10 uses the Pearson correlation coefficient method to analyze whether there is a relationship between student satisfaction and teaching effectiveness when using task driven teaching method for rock climbing courses in advance, and

whether the relationship between them is significant. From the overall survey results, it can be seen that the relationship between  $r>0.500$  and  $p<0.01$  is significant, thus rejecting the hypothesis that there is a significant positive linear correlation between the satisfaction of the respondents and the effectiveness of teaching. Analyze the relationship between "Climbing Fundamentals" and the satisfaction indicators from various sub items, with  $r>0.900$  and  $p<0.01$ , indicating a significant positive correlation between them; When  $r>0.500$  and  $p<0.01$  represent satisfaction among the various items in "Climbing Techniques", it indicates a significant positive correlation between them; There is a significant positive correlation between "Mental Preparation" and various items representing satisfaction, with  $r>0.900$  and  $p<0.01$ ; There is a significant positive correlation between "Equipment Care" and various items representing satisfaction, with  $r>0.900$  and  $p<0.01$ ; There is a significant positive correlation between "Safety Training" and the various items representing satisfaction, with  $r>0.500$  and  $p<0.01$ . From this perspective, the causal relationship between student satisfaction and teaching effectiveness is bidirectional. Efficient teaching can help students achieve good grades and master practical skills, and these positive learning outcomes will improve student satisfaction. Students with high satisfaction are more motivated and interested in learning, and this positive learning attitude helps to improve the effectiveness of teaching.

**Table 10.** The relationship between the effectiveness of using task driven teaching method in rock climbing teaching and student satisfaction

		r	p	Descriptive	Decision
Climbing Fundamentals	Effective Instruction	0.957**	0.000	Significant	Reject H0
	Real Climbing Scenario	0.953**	0.000	Significant	Reject H0
	Goal Setting	0.963**	0.000	Significant	Reject H0
	Progress Training	0.962**	0.000	Significant	Reject H0
	Group and Individual Task	0.959**	0.000	Significant	Reject H0
Climbing Techniques	Effective Instruction	0.531**	0.000	Significant	Reject H0
	Real Climbing Scenario	0.543**	0.000	Significant	Reject H0
	Goal Setting	0.543**	0.000	Significant	Reject H0
	Progress Training	0.560**	0.000	Significant	Reject H0
	Group and Individual Task	0.536**	0.000	Significant	Reject H0
Mental Preparation	Effective Instruction	0.951**	0.000	Significant	Reject H0
	Real Climbing Scenario	0.957**	0.000	Significant	Reject H0
	Goal Setting	0.961**	0.000	Significant	Reject H0
	Progress Training	0.961**	0.000	Significant	Reject H0
	Group and Individual Task	0.961**	0.000	Significant	Reject H0
Equipment Care	Effective Instruction	0.948**	0.000	Significant	Reject H0
	Real Climbing Scenario	0.948**	0.000	Significant	Reject H0
	Goal Setting	0.951**	0.000	Significant	Reject H0
	Progress Training	0.953**	0.000	Significant	Reject H0
	Group and Individual Task	0.952**	0.000	Significant	Reject H0
Safety Training	Effective Instruction	0.501**	0.000	Significant	Reject H0
	Real Climbing Scenario	0.517**	0.000	Significant	Reject H0
	Goal Setting	0.523**	0.000	Significant	Reject H0
	Progress Training	0.540**	0.000	Significant	Reject H0
	Group and Individual Task	0.509**	0.000	Significant	Reject H0

\*\*Correlation is significant at the 0.01 level (2-tailed).

### 4.3. Enhancement Program

To improve the effectiveness and student satisfaction of rock climbing courses in a task driven learning model, a comprehensive plan can be implemented. Firstly, it is necessary to transform the roles of teachers and students to make them aware of the benefits that task driven teaching

methods can bring, and to enhance the level of teaching teachers in using task driven teaching for teaching. Secondly, on the basis of soliciting opinions from experts, instructors, and students, supplement online course teaching resources, including teaching standards, lesson plans, teaching videos, animations, and exercises. Thirdly, improve the hardware facilities of the teaching venue, including the purchase and

installation of interactive conference tablets, venue lighting facilities, and automatic climbing protectors, to increase the learning effectiveness of students. Fourthly, it is necessary to optimize the curriculum design "tasks", enhance the scientificity of curriculum "task" design, make the curriculum "tasks" more in line with the teaching requirements of task

driven teaching method, and make teaching progress faster and more effective. Fifthly, establish a scientific and comprehensive curriculum evaluation system, so that the evaluation results can more objectively and truthfully reflect the learning effectiveness of students.

**Table 11. Enhancement program**

Results Area	Objective	Activity	Persons Involved	Time Frame	Budget	Expected outcomes
Strengthen the role transformation of teachers and students, and enhance their teaching skills	Master teaching skills, transform the role of teachers, and improve the effectiveness of course delivery.	1. The transformation of teachers' roles: traditional teachers are the protagonists in the classroom, and students are the supporting role in a passive position. The core idea of the "task driven approach" is "taking tasks as the main line, teachers as the leading role, and students as the main body", which requires that the roles of teachers and students must be transformed in classroom teaching.	Course leader and teacher	2 months	\$4,000	Transform the roles of teachers and students, and master task driven teaching skills.
		2. The transformation of student roles, due to the habit of "teachers teaching and students listening" developed over the years, students often lack initiative in completing tasks, resulting in objectively reduced teaching effectiveness.	Students in class			
		3. Strengthen the skill training of task driven teaching for teachers, and help them master the methods of using task driven teaching.	Course leader and teacher			
Supplement online course teaching resources	Enable students to have better online resources, preview in advance, understand course tasks, and complete homework after class.	1. Update the original online course standards and lesson plans according to the requirements of task driven teaching method.	Course leader and instructor	3 months	\$8,000	Enriching students' learning resources to improve learning and productivity.
		2. Create additional supplementary materials, such as instructional videos, animations, and after-school exercises to support learning.	Content developers, multimedia experts			
		3. Communicate with students, listen to feedback, and evaluate to identify areas for improvement.	Students and lecturers			
Improve the hardware facilities of the teaching venue	Enable students to have better learning and training conditions, so that they can use their spare time to enhance their practice effectiveness.	1. Follow a meeting tablet in the training room next to the climbing site to better integrate online and offline activities.	Project leader and construction personnel	6 months	\$50,000	Enhance student engagement to achieve better learning outcomes.
		2. Install lighting facilities on the climbing field to increase students' extracurricular practice time.	Project leader and construction personnel			
		3. Purchase 2 sets of automatic protectors to improve the efficiency of student climbing training.	Purchasing staff and lecturers			
Optimize course design "tasks"	Enhance the scientificity of course task design and better serve classroom teaching.	1. It is necessary to strengthen the connection between learning tasks and developmental goals, conduct in-depth exploration of the curriculum and teaching content of Rock Climbing, and design learning tasks based on the connections between various knowledge points.	Course leader and instructor	4 months	\$3,000	The course "tasks" are more in line with the teaching requirements of task driven teaching method, making teaching progress faster and more effective.
		2. Pay attention to the comprehensiveness and comprehensiveness of the task, complete the task in stages, and evaluate each stage.	Course leader and instructor			
		3. When designing learning tasks, pay attention to student differences to make the tasks more diverse and practical.	Course leader and instructor			
Develop more scientific curriculum evaluation standards	Develop a scientific and comprehensive curriculum evaluation system to serve rock climbing courses.	1. Improve summative evaluations, including written tests, practical tests, demonstrations, etc., to comprehensively evaluate students' knowledge and skills.	Course leader and instructor	4 months	\$3,000	To make the evaluation results more objective and truthful in reflecting the learning outcomes of students.
		2. Establish a vertical evaluation mechanism and create a learning record for students, focusing on their own growth rather than comparing them to other better students in the class collective.	Course leader and instructor			
		3. Introduce a mutual evaluation mechanism, which can provide students with opportunities to learn from excellent group experiences. Through mutual evaluation, good areas can be referenced, and mistakes made by oneself can also serve as a warning to everyone.	Course leader and instructor			

## 5. Conclusion

The following conclusions were drawn based on the findings of the study:

1) Applying the task driven approach to rock climbing teaching, the teaching effect is "efficient" in terms of climbing fundamentals, climbing techniques, mental preparation, equipment care and safety training. Students are "highly satisfied" in terms of effective instruction, real climbing scenario, goal setting, progress training and group and individual tasks, indicating that this teaching method has been recognized by students and is suitable for further promotion in rock climbing teaching.

2) The effectiveness of task driven teaching method, student satisfaction, and gender, age, and BMI were not significantly correlated, indicating that the personal information of the surveyor is not an effective factor affecting the application effect of task driven teaching method. This also provides a reference for promoting task driven teaching method to rock climbing classes in other age groups.

3) There is a significant linear positive correlation between the effectiveness of using task driven teaching method in rock climbing teaching and student satisfaction, which is statistically significant. This fully demonstrates that the good teaching effect and high recognition of rock climbing classes by students are related to the application of this task driven teaching method. The use of task driven teaching methods in rock climbing classes has improved classroom teaching effectiveness and increased student satisfaction. This positive relationship encourages teachers to continue using this teaching method, thereby enhancing students' learning outcomes in rock climbing classes.

4) Task driven teaching method has strong sustainability and applicability. Students are willing to continue learning courses taught using task driven teaching method and recommend similar courses to other students. This also indicates that task driven teaching method has strong vitality and is worth promoting in the teaching of other courses.

5) Teachers have also encountered many challenges in using task driven teaching methods for rock climbing classes, some of which come from the teachers themselves and some from the students. However, the reform of teaching methods should not be stopped just because of difficulties, as the benefits of reform far outweigh the costs. These difficulties are only temporary and can be reasonably resolved through appropriate means.

## 6. Recommendations

On the basis of the findings and conclusions made in the study, the following are hereby recommended:

1) Actively transform the roles of teachers and students. The core of the "task driven" teaching method is "task-based, teacher led, and student-centered". Therefore, teachers must change their roles from teaching and indoctrination to being good at organizing and guiding, from explaining on the podium to walking among students to communicate, discuss, and learn together; And students should also change from passive acceptance to active exploration, from the traditional supporting role in the classroom to the "leading role".

2) Reasonably design learning tasks. When designing "tasks", teachers should carefully consider each knowledge point, take into account all factors, and design and construct a series of typical operational "tasks" for students, so that they

can master knowledge, skills, and methods in completing the "tasks".

3) Scientifically divide study groups. When designing task scenarios in teaching, teachers should consider the learning situation of students themselves, and when grouping, they should consider the individual differences of students. When students perform tasks, they should grasp the timing of each task, guide them reasonably to complete the task, and promptly solve any problems that may arise during the process, in order to prevent the occurrence of "herding style" teaching.

4) Improve the curriculum evaluation mechanism. In the implementation of teaching, the evaluation and feedback of student task achievements also need to be taken seriously. While valuing the results, it is also important to value the performance of students in the learning process. Through the diversification of task evaluation, students can not only play a subjective role and participate in the entire evaluation process, but also improve their self-awareness and better self supervision and regulation in their learning career.

5) Strengthen classroom organization and management. When designing pre class teaching, in addition to designing the course content and process, attention should also be paid to the construction of the system for teaching activities. Corresponding rules and regulations should be formulated within the group, fully utilizing students' independent abilities to build a long-term management mechanism, and using the construction of the system to ensure the effective conduct of classroom activities.

6) When promoting task driven teaching methods, traditional teaching methods cannot be completely negated or abandoned. Suitable teaching methods should be selected according to the time, situation, and person to achieve the optimization of teaching methods and the maximization of teaching effectiveness.

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