DEVELOPMENT OF PROBLEM BASED LEARNING AND BLENDED LEARNING INSTRUCTIONAL MODEL FOR UNDERSTANDING OF PREVENTION SPORTS INJURY OF UNDERGRADUATE STUDENTS

YU ZHENGWEN

A thesis submitted in partial fulfillment of the requirements for
the Degree of Doctor of Philosophy Program in Curriculum and Instruction
Academic Year 2023

Thesis Title Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students

Author Mrs. Yu Zhengwen

Thesis Committee

..... Chairperson
(Assistant Professor Dr. Tanaput Chancharoen)

..... Committee
(Associate Professor Dr. Areewan Iamsa-ard)

..... Committee
(Assistant Professor Dr.Sarayuth Sethakhajorn)

Accepted by Bansomdejchaopraya Rajabhat Univeristy in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Curriculum and Instruction

..... Dean of Graduate School
(Assistant Professor Dr. Kanakorn Sawangcharoen)

..... President
(Assistant Professor Dr. Linda Gainma)

Defense Committee

..... Chairperson
(Associate Professor Dr. Chintana Kanjanavisut)

..... Committee
(Associate Professor Dr. Oraphan Butkatunyoo)

..... Committee
(Assistant Professor Dr.Saifon Songsiengchai)

Title	**Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students**
Author	**Yu Zhengwen**
Program	**Curriculum and Instruction**
Major Advisor	**Assistant Professor Dr.Tanaput Chancharoen**
Co-advisor	**Associate Professor Dr.Areewan Iamsa-ard**
Co-advisor	**Assistant Professor Dr.Sarayut Sethakhajorn**
Academic Year	**2023**

ABSTRACT

The objectives of this research were 1) to examine the factors for understanding of prevention sports injury of undergraduate students 2) to develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students and 3) to study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students. The population in phase 1 were 120 students and 3 lecturers respectively from Yulin Normal University, Guilin University and Hezhou University, the target groups in phase 2 are 5 experts to confirm model and the sample group in phase 3 were 40 students in Hezhou University. The instruments were (1) a set of questionnaire of students and lecturers (2) a set of questionnaire for confirming problem based learning and blended learning instructional model (3) lesson plans and (4) testing paper. Data were statistically analyzed by frequency, percentage, mean standard deviation, t-test for independent sample.

The findings were revealed that:

1. There are 2 Factors 1) internal factors and 2) externals factors from both the students and lecturers affecting students' understanding of sports injury prevention. Internal factors affecting understanding of prevention sports injury of undergraduate students in Guangxi Autonomous. There are 3 internal factors mainly include 1) Knowledge and experience 2) Psychology (motivation); 3) Guidance and

communicate and there are 4 external factors mainly include 1) Resources; 2) Teaching methods; 3) Evaluation; 4) Environment.

2. Problem based learning and blended learning instructional model consisted of principle and rationale, objectives, contents, method of teaching and materials, Evaluation. The Model included (1) Preparing Course Guide; (2) Pre-class preparation and introduction stage; (3) Problem-based classroom and offline teaching stage; (4) Post-class feedback improvement stage was 100% confirmed by 5 experts for further Implementation.

3. The results of implementing the developed problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

3.1 After the experiment, students' understanding of prevention sports injury was higher than that before the experiment at significance level 0.01.

3.2 The relative developmental scores of individual students'understanding of prevention sports injury is found Moderate level ($\overline{X}$=27.6257). 5 % of all students at "Very High" developmental level; 12.5% of all students at "High" developmental level; 27.5% of all students at "Moderate" developmental level; 55% of all students at "Low" developmental level. Indicating a significant improvement in understanding of prevention sports injury.

Keywords: Problem Based Learning; Blended Learning; Prevention Sports

Acknowledgement

For my appreciate I would like to thank Associate Professor Dr.Areewan Iamsa-ard for her insightful comments and encouragement, her guidance prompted me to refine my thesis from different angles, and she gave me valuable advice and help during my research process. She gave me unselfish guidance and support throughout my doctoral career. Her spirit of rigorous study and assiduous study has deeply influenced me and enabled me to make continuous progress in my studies. Whenever I was in trouble or had questions about my research or writing, she always steered me in the right direction. In addition to my advisors, I would like to thank Assistant Professor Dr.Tanaput Chancharoen, and Assistant Professor Dr.Sarayut Sethakhajorn for helping to improve my work completely.

I would also like to thank the experts who participated in the validation survey for this research project, verification investigations would not have been possible without their enthusiastic participation. At the same time, I would like to express my gratitude to all the students who enthusiastically participated in this study. Their support enabled me to conduct experiments and research smoothly.

In addition, I would like to thank my family and friends who have always supported me, encouraged me, and given me a solid backing in life. Without their support, I couldn't have finished this doctoral thesis.

Looking back on my doctoral career, I deeply feel the value of growth and harvest. In this process, I not only learned professional knowledge, but also learned how to cooperate with others and how to solve problems. These experiences will have a profound impact on my later life and career.

Finally, I would like to express my gratitude to all the scholars and experts who have helped me. Their research results and technical support enable me to complete this doctoral thesis better.

Yu Zhengwen

Contents

Contents (Continued)

List of Figures

List of Tables

Chapter 1
Introduction

Rationale

Sports Injury is a core course for students majoring in sports rehabilitation, and is also a professional elective course for other sports majors. The teaching purpose of this course is to enable students to be familiar with the theory and clinical knowledge of sports trauma and to be able to examine and treat sports injuries proficiently and quickly according to the clinical manifestations of human tissue injuries in practice. The mastery of knowledge and skills related to sports injuries is one of the goals of training sports rehabilitation professionals, and it is also one of the requirements for students to be competent in sports rehabilitation and sports protection (Ministry of Education Teaching Steering Committee, 2018).

The starting point of this course design is the needs of applied talents in sports rehabilitation in teaching practice. It is based on problems, uses online and offline mixed education and teaching as a means, is guided by teachers, takes students as the main body, and introduces cases and situations, online resources, etc., while solving problems while strengthening students' understanding of sports injury prevention. At the same time, this is also in line with the goals and requirements of Hezhou University for cultivating applied talents (Hezhou University, 2015).

Sports Injury course includes basic theory of sports trauma (classification and classification of sports trauma, etiology and pathology of sports trauma, overview of musculoskeletal system) and clinical practice (examination and diagnosis of sports trauma, rehabilitation treatment and treatment of sports trauma) discipline specificity Students are required to be able to quickly diagnose and treat different groups of people, different parts, and different injuries in clinical practice after mastering basic knowledge. Since I have been teaching sports injury courses at Hezhou University as a lecturer, I have found that students majoring in sports rehabilitation at Hezhou University have insufficient knowledge and skills related to sports injuries. Moreover, due to the complexity of knowledge and the diversity of inspection methods and

treatment methods, students may forget knowledge and operate irregularly in clinical practice. Xiao and Yu (2008) found through investigation that college students not only have insufficient access to sports injury knowledge and skills, but also have poor knowledge and skills mastery. Ge (2018) conducted a survey of students at Hebei Agricultural University and found that students not only lack knowledge of sports injuries, but also have poor ability to deal with sports injuries. Pan and Yao (2022) found that Chinese college students lacked knowledge and practical skills in cardiopulmonary resuscitation CPR. Ding, Liao and Zhu (2023) survey found that the unqualified rate of CPR first aid skills knowledge of non-medical college students is as high as 88.51%, indicating that non-medical college students have a low level of knowledge of CPR first aid skills, and most of them think that they cannot perform chest compressions and first aid skills correctly artificial respiration.

The sports injury course (Xiong, 2020) includes first aid and self-rescue knowledge, which can not only improve students' safety in sports, but also the knowledge and technology related to sports injuries is one of the core competitions for sports rehabilitation professionals. Xiao (2018) pointed out that the ability of Chinese students to discover and solve life, workplace and social problems is relatively low, many college students have relatively weak practical ability and workplace adaptability, and many key skills have not been cultivated. At the same time, if sports injuries are not treated or dealt with promptly, it may cause secondary injuries or aggravate the injury (Guo, 2008), leaving hidden dangers for post-injury recovery. Extensive bleeding, shock, fractures and other injuries can even lead to paralysis and death. Therefore, it is very necessary for sports rehabilitation students to learn sports injury courses and master the prevention and treatment of sports injuries.

Based on the importance of sports injury courses and sports injury prevention and treatment in the sports rehabilitation major of Hezhou university, I will conduct research on sports injury courses.

Zhang, Dong and Liu (2002) found that the PBL teaching model can strengthen the penetration and comprehensiveness between disciplines, stimulate students' enthusiasm, initiative and creativity in learning, and cultivate all-round development of high-quality talents with individual development advantages. Li,

Zhao, and Sun (2012) found that PBL is student-centered in the teaching model and uses teacher-guided problem-based teaching to maximize students' participation in the classroom and improve students' classroom quality. He (2020) found that teachers create problem scenarios based on students' knowledge and experience and guide students to focus on the problem, which can help students acquire new knowledge faster.

The blended learning model can not only break the limitations of traditional classroom teaching and narrow regional differences, but also help improve the teaching structure of the course. Knowledge interaction is carried out online through a series of links such as videos, teaching courseware, test questions, and discussion topics. Students can independently arrange their learning progress according to their learning characteristics and development needs. Diversified technologies support diverse learning needs, making up for the lack of classroom teaching can highlight the development of students' subjectivity and individuality. In the offline classroom, teachers and learners interact with each other through active, discussion, collaborative, commentary and other teaching activities. The overall grasp of activities is also conducive to the imparting of knowledge and the training of improving abilities. Tian (2005) and Song, Sun and Zhang (2023) found that in the exploration and practice of the blended teaching model, students have a higher interest in the teaching content during the teaching process, and at the same time enrich relevant knowledge and improve multiple abilities. found that in the exploration and practice of the blended teaching model, students have a higher interest in the teaching content during the teaching process, and at the same time enrich relevant knowledge and improve multiple abilities.

Xiao (2018) pointed out that Chinese students' ability to find and solve problems in life, the workplace and society is low, many college students' practical ability and workplace adaptability are relatively weak, and many critical skills have not been cultivated. Qi (2019), Hu (2021), and Hu, Xu, Li, Ma, and Liu (2023) pointed out that the blended teaching model based on problem-solving learning (PBL) can provide students with new learning thinking, improve students' ability to discover and solve problems, and also to a certain extent Promote the improvement of students' innovation ability and cooperation and communication ability.

Jin (2016) achieved good results in using the form of micro-lectures in sports injury courses. Lu and Huang (2019) also redesigned the teaching objectives and teaching content in the context of the integration of sports and medicine, and improved the sports injury courses. Further refinements were made, but did not fully exploit students' understanding of sports injury prevention.

The teaching model is developing from single to comprehensive, from focusing on "teaching" to focusing on "learning". In order to make full use of and give full play to the advantages of the problem teaching model and the blended teaching model, the author will conduct research on "Development of problem based learning and Blended learning instructional model for Understanding of prevention sports injury of Undergraduate students."

Research Questions

1. What are the factors for understanding of prevention sports injury of undergraduate students?

2. Is problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students at Hezhou University appropriate for further implementation and how?

3. What are the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students at Hezhou University?

Research Objectives

1. To examine the factors for understanding of prevention sports injury of undergraduate students.

2. To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

3. To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Research Hypothesis

After implementing development of problem based learning and blended learning instructional model, students' understanding of prevention sports injury will be higher than before the experiment.

Scope of the Research

Population and the Sample Group

Population

The total of 116 from 3 sections of students major the sports rehabilitation with different levels of proficiency – beginner, intermediate, and advanced, who enroll in Sport Injury Course at Hezhou University in semester 1 academic year 2023. Those sections involve the following.

38 students in section A

38 students in section B

40 students in section C

The Sample Group

There are 40 students who enroll in sports injury course at Hezhou University in the 1st Semester academic year 2023 by cluster random sampling.

Independent Variable

Problem Based Learning and Blended Learning Instructional Model

Dependent Variable

Students' Understanding of Prevention Sports Injury

Contents

According to this study, the researcher chooses Unit 1 Prevention and diagnosis of sports injuries (12 hours) and Unit 2 Sports injury treatment and rehabilitation (10 hours) for the experiment.

Time

Semester 1 of academic year 2023 (September- December 2023)

Advantages

To the students: First, they can enhance their understanding of sports injury prevention and establish new thinking habits. Problem-based learning and blended learning teaching models use independent inquiry or cooperative learning to carry out learning activities, promote and improve students' learning attitudes and interests, and improve students' collaboration abilities and self-efficacy.

To the lecturers: Timely and accurately discover the mastery of students' sports injury knowledge, so as to make teaching adjustments, guide students to further understand the knowledge and ability of sports injuries, and apply the development model to other courses.

To the institute: Teachers' teaching and students' learning can be evaluated from different dimensions, which is conducive to the development of teaching and opens up a new path for reforming education and teaching and improving the quality of education and teaching.

Definition of Terms

The factors affecting Understanding of Prevention Sports Injury of Undergraduate Students refers to the internal and external factors collected from students using questionnaire and interviews for lecturers designed by the researcher. The internal factors involve the information about students while external factors consist of information about the teacher and circumstances. In addition, the factors will be obtained by structured interviews with the lecturers.

Development of Problem Based Learning and Blended Learning Instructional Model refers to a new instructional framework which consists of the stable teaching activities and procedures. Such a developed instructional model with 5 components: 1) Principle & Rationale, 2) Objectives, 3) Contents, 4) Methods of teaching & Materials and 5) Evaluation, is confirmed by the experts in 4 aspects: 1) Utility Standards, 2) Feasibility Standards, 3) Propriety Standards and 4) Accuracy Standards (Stufflebeam and Social Impact, 2012) as the follows:

Utility Standards are intended to ensure that the developed instructional model will serve the information needs of intended users.

Feasibility Standards are intended to ensure that the developed instructional model will be realistic, prudent, flexible, and frugal.

Propriety Standards are intended to ensure that the developed instructional model will be conducted in conformity to teaching principles and provide positive results

Accuracy Standards are intended to ensure that the developed instructional model shows a measure of closeness to a true value.

Problem Based Learning (PBL) refers to a teaching mode in which teachers create problems related to sports injuries to guide students according to their knowledge and experience in sports rehabilitation, and encourage students to actively discover, analyze and solve problems through independent learning and group cooperation, so as to promote and improve students' learning interest, self-efficacy and cooperation ability. The basic teaching process of the PBL model can be divided into the following four steps:(Barrows and Tamblyn, 1980; Schmidt, 1993; Liu, 2003; Li, 2010; Wang, 2018; Duan, 2021; Rong, 2022)

Step 1: Preparation Phase

Stage 1: Determine teaching objectives

Stage 2: Teaching Content Analysis

Step 2: Introduction stage

Stage 1: Create problem situations and ask questions

Stage 2: Teacher guidance

Stage 3: Students find problems

Step 3: Discuss and solve problems together

Stage 1: Group cooperation

Stage 2: Analyze the problem

Stage 3: Making plans

Step 4: Display result

Stage 1: Discuss a problem

Stage 2: Group report

Step 5: Assessment feedback

Blended Learning (BL) refers to this study defined blended teaching model as the combination of two or more learning methods, integrating various

elements according to a certain proportion from different angles, with students as the main body and teachers as the main body. under the teaching concept of guidance, in order to achieve the teaching objectives and achieve the best teaching effect teaching method. According to the purpose of this study blended learning can be divided into the following 5 steps: (Lin, Wei and Chen, 2014; Li, 2020; Liu, 2021; Ding, 2022; Hong, 2023)

Step 1: Course Guide

The purpose is to familiarize students with the course and operating platform

Step 2: Preparation stage before class

Stage1: teachers provide resources

Stage2: students complete the task independently

Stage3: feedback formation

Step 3: In-class and offline teaching stage

Stage1: Problem introduction

Stage 2: Teacher explanation

Stage 3: Assign tasks and present results

Stage 4: Evaluate

Step 4: After-school improvement stage

Stage1: Supplementary learning resources

Stage2: Reflect on teaching

Problem Based Learning and Blended Learning (PBLBL) refers to problem based learning and blended learning is under the guidance of relevant educational theories and learning theories, teachers mix educational and teaching concepts, teaching platforms, students, teaching methods, and teaching calculations, and take students as the main body and problem-oriented to establish a relatively Stable online and offline teaching activities and modes. In this teaching mode, teachers need to prepare teaching resources in advance, guide students to find their own deficiencies in pre-class tests, teachers further guide students to master knowledge and skills during class, and further improve their knowledge after class. According to the purpose of this study, the problem based learning and blended learning divides the design into four stages: (Zhu 1997; Sun and Zhang 2015; Winter Sports Management Center of the General Administration of Sport of China 2022)

Step 1: Preparing Course Guide

Teachers upload learning resources such as course introductions to the Internet and briefly introduce the overall goals, learning content and course content of the course so that students can have a preliminary understanding of the course.

Step 2: Pre-class preparation and introduction stage

Teachers provide teaching resources before class, students complete learning tasks independently, and form preliminary feedback

Step 3: Problem-based classroom and offline teaching stage

Teachers can create situations based on learning feedback, organize students to discuss and study in groups, and present reports.

Step 4: Post-class feedback improvement stage

Teachers can supplement learning resources to help students consolidate reflection and improve.

Understanding of Prevention Sports Injury refers to the prevention of sports injuries includes three levels of prevention, the first level of prevention refers to the prevention of the cause; the second level of prevention is also called "three early" prevention, three early refers to early detection, early diagnosis, and early treatment; the third level of prevention Also known as late prevention, symptomatic treatment to prevent the progression of the disease. The understanding of sports injury prevention mentioned in this article refers to the students' ability to correctly judge, deal with and prevent sports injuries after learning sports injury related courses, mastering the knowledge of sports injuries. According to the purpose of this study, the cognitive evaluation of sports injury prevention can be divided into 4 dimensions. (Zhu, 1997; Sun and Zhang, 2015).

Dimension 1: Sports injury prevention

Mean the Students can understand the classification and incidence of sports injuries; The causes of sports injuries can be analyzed, so as to prevent sports injuries.

Dimension 2: Diagnosis and assessment of sports injuries

Mean the Students can understand the basic knowledge of clinical examination and diagnosis; complete clinical examination according to the athlete's

injury condition, inquire and record the medical history, analyze the situation and make a reasonable diagnosis.

Dimension 3: First Aid Treatment for Sports Injuries

Mean the Students can understand the basics of first aid; and be able to apply cardiopulmonary resuscitation techniques.

Dimension 4: Rehabilitation after Sports Injury

Mean the Students can understand the knowledge of rehabilitation assessment of sports injuries; and master sports therapy and physical therapy.

Undergraduate Students refers to the students who enroll in Sport Injury Course, semester 1 academic year 2023 at Hezhou University.

Hezhou University refers to a local full-time general undergraduate university in Hezhou City, Guangxi. It is a general higher education institution directly under China. It is qualified to award students with bachelor's degrees. It is a local applied university that trains basic education teachers and applied talents.

Research Framework

Based on the research objectives, relevant theories are compiled and studied i.e., Problem Based Learning and Blended Learning (Li, 2003; Zhuo 2012; Bai, 2008; Li, Zhao and Sun, 2012) and Understanding of Prevention Sports Injury (Zhu, 1997; Sun and Zhang, 2015). These thoughts and principles are employed as the foundation of the following the research framework is designed as shown in figure 1.1

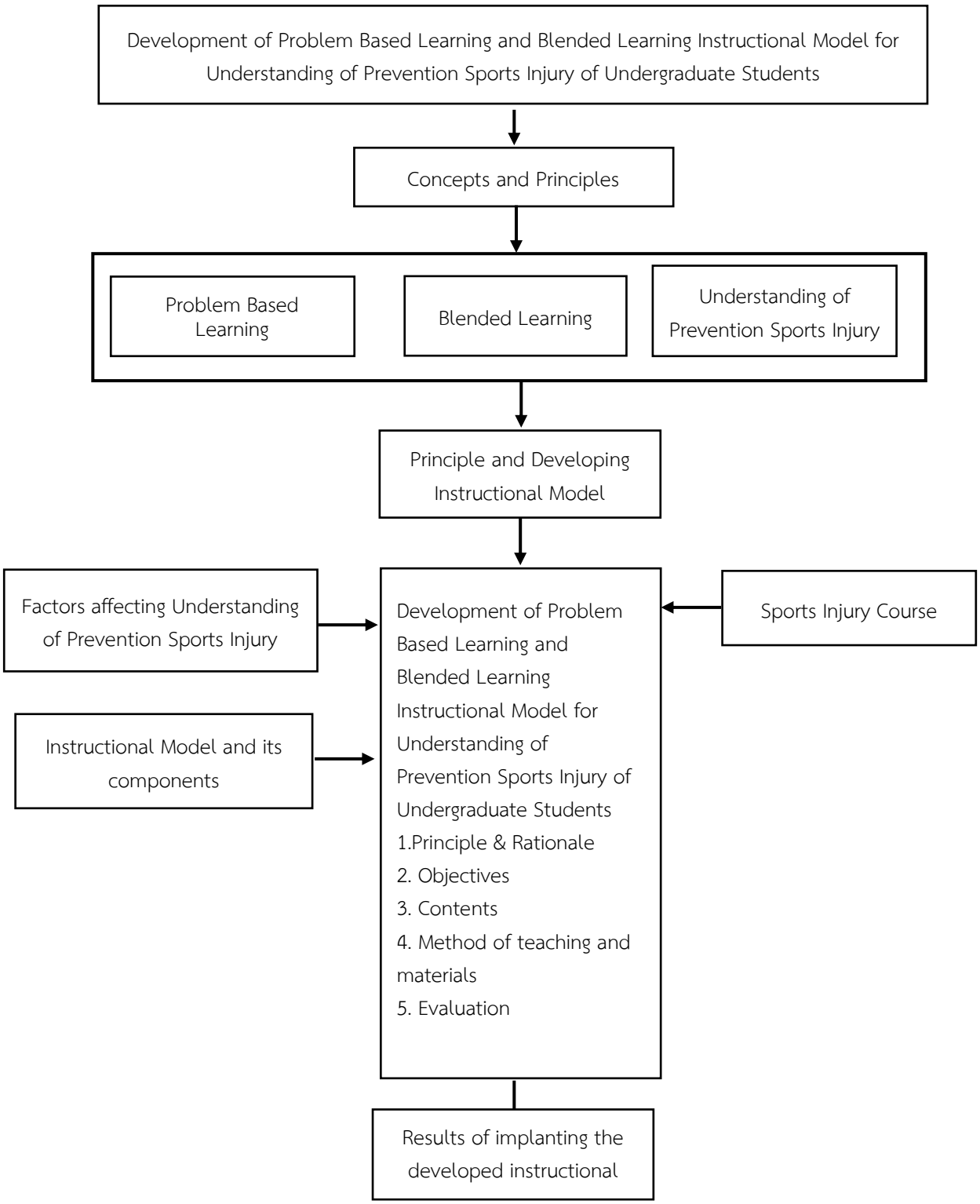


Figure 1.1 Research Framewor

Chapter 2
Literature Review

In the study of “Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students”, the researcher studied the documents concerning the following.

1. Sports Injury Course in Hezhou University
2. Development of Instructional Model
3. Problem Based Learning
4. Blended Learning
5. Understanding of Prevention Sports Injury
6. Related Research

The details are as follows.

Sports Injury Course in Hezhou University

Principle & Rationale

Health is an inevitable requirement for promoting people's all-round development. China attaches great importance to people's health, but issues such as population aging and changes in the spectrum of diseases have brought a series of new challenges to maintaining and promoting health. At the same time, there are insufficient health services and growing health needs. The contradictions between them are still prominent (State Council of China, 2016). In order to promote national fitness and sports consumption, strengthen non-medical health interventions, encourage hospitals to train and introduce sports rehabilitators, popularize fitness knowledge, organize fitness activities, and promote the formation of a disease management and health service model that integrates sports and medicine (General Office of the State Council of China, 2019). Liu (2018) pointed out that sports injury is one of the important reasons for the inability to carry out healthy activities, and the prevention, treatment and rehabilitation of sports injuries should be paid attention to. The sports injury course is offered by the School of Tourism and Sports Health of Hezhou University, and it is a professional core course. The leading courses in this

course are Exercise Anatomy and Exercise Physiology. This course is based on ability and people-oriented, and mainly cultivates talents who can deal with sports injuries. This course adopts a blended teaching mode with actual sports injury problems as the carrier, encouraging students to realize the integration of theory and practice in the process of solving problems individually or in groups. Through the study of this course, students should master the ability of sports injury prevention and treatment.

The Sports Injury course plays a supporting role in the cultivation of students' professional ability and quality. The basic knowledge of the types and classifications of common sports injuries, etiology and pathology in the course can improve the theoretical level of students. The examination, diagnosis, treatment and prevention of sports injuries not only require students to have a high theoretical level, but also require students to have strong professional practical skills.

Objectives

In 2018, the Ministry of Education issued the "National Standards for the Teaching Quality of Undergraduate Majors in Ordinary Colleges and Universities" (hereinafter referred to as the "National Standard") regarding the training objectives for sports rehabilitation professionals, pointing out that sports rehabilitation professionals "must master the basic theories and methods of modern rehabilitation, possess The skills of sports rehabilitation diagnosis and treatment and sports protection are competent for the work of sports rehabilitation and sports protection."

This course is designed to develop students' ability to cope with sports injuries. The first is to improve students' awareness of the theoretical knowledge related to the category, classification, and injury factors of sports injuries; the second is to improve students' ability to apply sports injuries in practice. The key is to train students in the application of sports injury treatment, so that students can accurately collect cases and examine injuries, and finally deal with different parts and types of injuries.

Curriculum Structure

There are 2 Units, 32 hours in sports injury Course. They are Unit 1 Prevention and diagnosis of sports injuries (12 hours) and Unit 2 Sports injury treatment and rehabilitation (10 hours).

Table 2.1 Chapters and Contents Used in the Present Study

Unit	Chapter	Contents	Times (32hrs.)
1. Prevention and diagnosis of sports injuries	1.1 Classification and causes of sports injuries	1.1.1 Classification by injury degree (light, medium and severe) 1.1.2 Classification of injury time (acute and chronic injury) 1.1.3 Classification according to the relationship with sports technique (technical injury, non-technical injury) 1.1.4 Classification according to the integrity of the damaged skin (open and closed injuries) 1.1.5 Classification according to the nature of the injury (sprain, contusion, strain, fracture, dislocation 1.1.6 Classification by human tissue structure (muscles, fascia, ligaments, joints, etc.)	6 hrs.
	1.2 Examination and diagnosis of sports injuries	1.2.1 Collection of medical and injury history 1.2.2 General examination 1.2.3 Local examination (examination, palpation, measurement, auscultation, joint range of motion examination) 1.2.4 Clinical examination of various sites (adson's sign, Supling test, Jackson test, Lasegue test, Patrick test, etc.). 1.2.5 Bone and joint X-ray examination 1.2.6 X-ray Computed Tomography (CT) 1.2.7Magnetic Resonance Imaging (MRI) 1.2.8 Ultrasound Imaging (USI) 1.2.9 Electromyography (EMG)	6 hrs.

Table 2.1 (Continued)

Unit	Chapter	Contents	Times (32hrs.)
2. Sports injury treatment and rehabilitation	2.1 Treatment of acute sports injuries	2.1.1 On-site first aid procedures 2.1.2 Emergency treatment of common sports injuries 2.1.3 Emergency treatment of traumatic shock	6 hrs.
	2.2 Rehabilitation training for sports injuries	2.2.1 The purpose and principles of sports injury rehabilitation training 2.2.2 Rehabilitation assessment of sports injuries 2.2.3 Sports injury rehabilitation training methods and basic procedures	4 hrs.
3. Sports injuries of various parts of the body	3.1 Applied anatomy of various parts of the body	3.1.1 Anatomical structure of head 3.1.2 Anatomical structure of neck 3.1.3 Anatomical structure of trunk 3.1.4 Anatomical structure of limbs, etc	6 hrs.
	3.2 Sports injury of various parts of the body	3.2.1 Injury mechanism of common sports injuries in various parts of the body 3.2.2 Clinical manifestations and treatment of injuries in various parts of the body	4 hrs.

Unit 1 and Unit 2 are chosen by the research for implementing the developed model in the present study.

The factors of Understanding of Prevention Sports Injury

The factors of understanding of prevention sports injury means the internal and external factors collected from students using questionnaire and interviews for lecturers designed by the researcher. The internal factors involve the information about students while external factors consist of information about the teacher and circumstances. In addition, the factors will be obtained by structured interviews with the lecturers.

The meaning of internal factors and external factors

There are scholars to define the meaning of definition of internal factors and external factors as follows:

Liu (1988) In the re-understanding of the concept of "internal cause" and "external cause", he proposed that internal cause refers to the factors that have internal, inevitable and essential connection with the movement of objects, while external cause refers to the factors that have non-essential connection with the movement of objects factor.

Pan & Fan (1994) pointed out that the internal cause is the basis of the change, the internal cause is the carrier and bearer of the change of things, and is the decisive factor of the change of things; the external cause is the condition of the change, which accelerates or Relief.

Le & Tian (2001) defined that among the influencing factors of problem solving, subjective factors such as the motivation of the problem solver, experience of success and failure, and anxiety, and objective factors such as the representation of the problem and the environment in which the problem is solved affect each stage of problem solving.

Li (2004) mentioned in the group of factors affecting learning motivation that internal factors refer to students as the main body of learning activities, and their own characteristics include age, personality, temperament, intelligence level, hobbies, etc.; external factors are External factors that affect learning activities include society, school, family, etc., as well as people's views, speeches, and opinions in ideology.

Kong and Zhang (2005) pointed out that teachers’ cognition, thinking, and subjective initiative are internal factors and the foundation of improving teaching quality in affecting teaching quality; External conditions such as improving and improving the quality of teaching are external factors.

Wu (2011) defined internal factors as physiological factors, personality factors, and intellectual factors that affect students' learning effects; external factors were defined as objective environmental factors that improve learning quality other than students' physical and mental factors.

Feng (2018) pointed out that the internal factors affecting students with learning difficulties are personality differences, such as learning ability, self-

confidence, values, etc.; the external factors are the growth environment, such as school education, family education, team atmosphere, etc.

Fan Jiayi (2023) explained the influencing factors of college students' online autonomous learning ability. Internal factors refer to ideals and beliefs, learning interest, learning strategies, and learning self-discipline; external factors refer to teaching platforms, teaching methods, and teaching cases.

From the above definition, internal factors refer to the internal nature that affects the development of people or things, such as attitudes, motivations, self-efficacy, communication skills, cognition, etc.; external factors refer to external causes or factors that affect the development and changes of people or things. Contradictions, such as teachers, teaching resources, teaching methods, school environment, team atmosphere, etc.

Development of Instructional Model

Definition of Instructional Model There are scholars to define the meaning of definition Instructional Model as follows:

Wu and Li (1998) proposed that the teaching model, also known as the teaching structure, is established under the guidance of certain teaching ideas or teaching theories, and has a relatively stable teaching activity structure framework and activity procedures.

Bruce, Marsha and Emily (2009) defined instructional model as the teaching mode is the learning mode, which is the mode of teaching by teachers and the mode of learning by students’ plan.

He and Shu (2009) defined instructional model as the teaching model is the intermediary between teaching theory and practice, and is the basic paradigm used to design courses, select teaching materials, and prompt teachers' activities.

Wu (2011) defined instructional model as the teaching model is a bridge connecting teaching theory and teaching practice, and it is a common concern of teaching theory workers and practitioners.

Cao (2015) defined instructional model as teaching model is an outline description of the teaching process from the combination of theory and practice using a systematic approach.

Liu (2016) defined instructional model as proposed that the teaching model is a systematic system that is formed in teaching activities and reveals universal laws in different fields and different levels of teaching.

Zhang et al (2016) defined instructional model as the teaching mode is a relatively stable structure and method of teaching activities formed in practice to achieve teaching goals under the guidance of certain teaching theories or teaching ideas, or a kind of Relatively stable standardized teaching operation system.

Chen, Zhan and Chen (2021) defined instructional model as the teaching model is the structural framework of teaching activities, and also a program of teaching activities, a teaching activity carried out by teachers and students under the guidance of teaching ideas and theories.

From the definition above, it can be concluded that instructional model refers to under the guidance of certain teaching theories and teaching ideas, it is a relatively stable teaching activity program to achieve teaching goals, including teaching content, teaching methods, teaching evaluation, etc. The teaching mode can be single or comprehensive, and its formation and application are affected by factors such as teachers, teaching materials, students, teaching theories and educational concepts.

The important of Instructional Model

There are scholars to define the important of instructional model as follows:

Wu and Wei (2008) believed that the development of different instructional model can stimulate students' interest and motivation in learning, cultivate students' divergent thinking, and guide students to explore and pursue their majors.

Li (2009) believed that using the teaching model can make students the main body of learning. Students invest more time and energy in self-study and thinking, and their innovation and practical abilities are significantly improved.

Tang (2014) believed that reforming the teaching model can cultivate students' problem awareness, improve students' academic performance, and play a positive role in stimulating students' interest in learning and alleviating anxiety.

Zhang (2017) believed that teachers design teaching models based on teaching objectives, teaching content, and students’ knowledge and ability levels, which can provide a deeper understanding of students’ development status and psychological characteristics, promote the good completion of teaching tasks, and is

important for improving students' comprehensive quality and Comprehensive development has positive significance and role.

Yin (2019) believed that the teaching model can meet the needs of modern education, can achieve the sharing of high-quality teaching resources, and is very important for cultivating students' knowledge acquisition abilities.

From the above definition, the importance of Instructional Model lies in meeting the needs of modern education, promoting the good completion of teaching tasks, enabling the sharing of high-quality teaching resources, and at the same time cultivating students' knowledge acquisition capabilities and improving students' comprehensive quality and comprehensiveness. Development has positive meaning and role.

Problem Based Learning

Definition of Problem Based Learning (PBL)

There are scholars to define the meaning of definition problem based learning as follows:

Li (2003); Zhuo (2012) defined the problem-based teaching mode refers to placing teaching in complex problem situations, and students solve complex, practical or real problems in the form of group cooperation to learn hidden problems. The knowledge behind the problem, a way to develop problem-solving skills teaching mode.

Bai (2008) pointed out that the ability to solve problems refers to the ability to accurately grasp the key to the problem, put forward opinions or plans to solve the problem, use effective resources to implement the plan, and make adjustments and improvements in the process.

Li, Zhao and Sun (2012) defined that the PBL teaching model is a comprehensive, systematic, student-centered and teacher-guided teaching form based on problems, and its purpose is to maximize students' participation in the classroom degree, improve the quality of class.

Meng (2014) defined that the problem based learning is a teaching model developed with the support of information technology combined with constructivism.

Duan (2021) defined that the PBL model is a teaching model that starts from the problem, takes the student as the main body, the teacher as the guide, and the students discuss in groups.

He (2020) defined that the teachers create problem scenarios based on students' knowledge and experience, guide students to take problems as the core, actively discover, analyze and solve problems through independent learning and group cooperation, so as to acquire new knowledge teaching mode.

From the definition above, this study believes that problem based learning (PBL) a teaching mode in which teachers create problems related to sports injuries to guide students according to their knowledge and experience in sports rehabilitation, and encourage students to actively discover, analyze and solve problems through independent learning and group cooperation, so as to promote and improve students' learning interest, self-efficacy and cooperation ability.

Components of Problem Based Learning (PBL) There are scholars to define the components of Problem Based Learning as follows:

Le, and Tian (2001) defined that the components of PBL Subjective factors such as motivation, experience of success or failure, anxiety, and cognition of the problem solver, and objective factors such as problem expression and the environment in which the problem is solved will also restrict the solution of the problem.

Hou and Hou (2011) defined that the implementation of the PBL teaching model is affected by many factors such as teaching resources, teacher strength and student quality.

Li (2012) defined that the influencing factors in problem-based learning teaching include the following three main factors: 1) The fundamental influencing factors of teachers: 2) Students are the key influencing factors 3) Teaching management is an important guarantee

Zhong (2020) defined that the believes that the influencing factors of PBL teaching mode mainly include the following four aspects: 1) teaching design 2) teacher factors 3) student factors 4) learning resource factors.

Cho, Cho, Cho, Jeong, and Cho (2021) defined that the final selection of PBL components includes 1) incorporation of real-life problem, 2) collectiveness,

3) solution formulation, 4) learner proactiveness, 5) evaluation by the learner, 6) integration of a planning process, and 7) facilitation by the instructor.

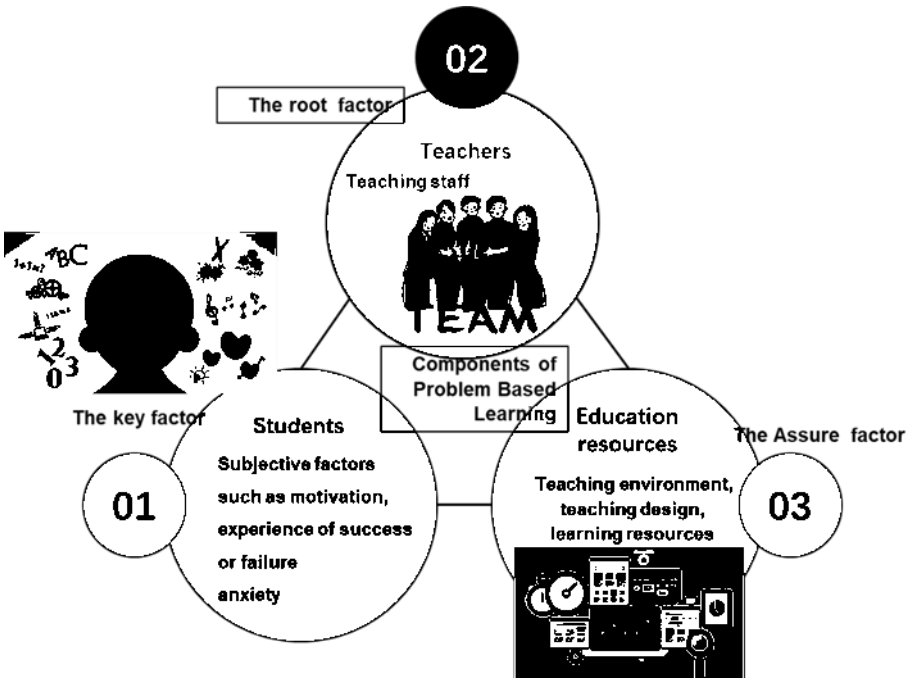


Figure 2.1 Elements of Problem Based Learning (Li (2012); Zhong (2020)

From the above definition, the elements of problem-based learning mainly include students (students' thinking, cognition, motivation, etc.), teachers (teaching team, etc.), teaching resources (teaching design, learning resources, teaching environment, etc.)

The step to Problem Based Learning

There are scholars to define the step to teach problem based learning as follows:

Barrows and Tamblyn (1980), Schmidt (1993) defined that the problem-based teaching mode includes the following steps in the operation link:

Step 1: Create problem situations and ask questions

Stage 1: Describe the problem and clarify unknown terms and concepts

Stage 2: Define the problem and list the phenomena and events to be explained

Step 2: Analyze problems and organize division of labor

Brainstorming. Encourage students to draw on as many explanations as possible, relying on prior knowledge and common sense

Step 3: Explore and solve problems;

Discussion. Judging the many proposed explanations to determine which one best reflects the explanation of the principles or mechanisms in the document.

Step 4: Display results;

Share and synthesize their findings to form a final, plausible explanation for a phenomenon or event

Step 5: Evaluation feedback.

Test whether the knowledge and skills acquired by students are sufficient to explain phenomena or solve problems.

Liu (2003) defined that the role of the teacher and the design of the problem are very important. The design of the teacher's activities can follow the three processes of anchoring-supporting-retreating, so PBL is divided into the following 7 steps.

Step 1: Anchor handling stage.

Stage 1: Determining Teaching Objectives

Stage 2: Leading students to analyze the content

Stage 3: Leading students to ask the main questions

Step 2: Support Phase

Stage 1: Overall discussion of the value and rationality of the problem

Stage 2: Organize the Group

Stage 3: Initiate Questions, Internalize Questions List knowns and unknowns, and make a plan

Step 3: The Retirement Phase

Review materials, analyze materials and methods, and draw conclusions

Step 4: Group summary report

Step 5: Learning Assessment

Step 6: Modify the method and form a general conclusion

Step 7: Solve the problem and start a new problem

Li (2010) defined that the basic teaching process of the PBL model can be divided into the following 6 steps:

Step 1: Preparation stage

According to the teaching objectives and class schedule, design the corresponding knowledge points and time

Step 2: Introduction stage

Create situations and problems that are closely related to students' lives and presented in a variety of ways

Step 3: Problem Stage

Discuss issues independently or collaboratively

Step 4: Plan phase

Division of labor based on purpose-finding and problems

Step 5: Implementation Phase

Check and find information

Step 6: Evaluation Phase

Give evaluations and suggestions based on student performance

Wang (2018) divided the PBL teaching model into the following three steps when designing a teaching process with "problems" as the main line.

Step 1: Discover and ask questions

Stage 1: Create problem situations based on teaching materials

Stage 2: Teacher-led

Stage 3: Students find out what the problem is

Step 2: Analyze and solve the problem

Stage 1: Students are divided into groups

Stage 2: Searching for Information

Stage 3: Analyze and discuss

Stage 4: Develop a plan

Step 3: Summarize and reflect on the problem

Stage 1: Group summary and scoring

Stage 2: The teacher summarizes the reflection and scores each group

Stage 3: Teacher summarizes course content

Duan (2021) defined that the basic teaching process of the PBL model can be divided into the following four steps:

Step 1: Select teaching columns and conduct teaching analysis

Teaching objectives, teaching objects, teaching content analysis

Step 2: Make a teaching plan and set up a cooperative group

Including: learning activity design, teaching tool design

Step 3: Design the teaching process and carry out teaching implementation

Stage 1: Create the situation and introduce the problem

Stage 2: Presenting material, asking questions

Stage 3: Discuss and solve problems together

Stage 4: Group report, review and summary

Step 4: Conduct teaching reflection and improve teaching implementation

Rong (2022) divided the teaching process into the following six links when conducting PBL teaching:

Step 1: The teacher analyzes the learning situation, analyzes the teaching objectives, creates problem scenarios, and asks questions

Step 2: Students divide into groups and analyze the problem

Step 3: Collect information and discuss together

Step 4: Form a plan and share results

Step 5: Summarize and apply;

Step 6: Class Evaluation

Stage 1: Students' self-evaluation and peer-evaluation

Stage 2: The teacher evaluates the results of the activity and the performance of the students

Table 2.2 The results of the synthesis of PBL teaching steps

Component \ Author	Barrows and Tamblyn (1980)	Schmidt (1993)	Liu (2003)	Li(2010)	Wang(2018)	Duan (2021)	Rong (2022)	Frequency
Step 1								
Determine teaching objectives								
Teaching Content Analysis								
Step 2								
Create problem situations and ask questions	√							
Teacher guidance								
Students find problems								
Step 3								
Group cooperation	√							
Analyze problem	√							
Making plans								
Step 4								
Discuss a problem	√							
Group report								
Step 5								
Assessment feedback	√							

According to Table 2.2, the researcher analyzed the steps and components of PBL teaching, which included Barrows and Tamblyn (1980); Schmidt (1993); Liu (2003); Li (2010); Wang (2018); Duan (2021); Rong (2022). The researchers selected components with a frequency of 4 or more according to the standard, as this PBL teaching Pattern steps. Which can be synthesized in 5 steps as follows:

Step 1: Preparation Phase

Stage 1: Determine teaching objectives

Stage 2: Teaching Content Analysis

Step 2: Introduction stage

Stage 1: Create problem situations and ask questions

Stage 2: Teacher guidance

Stage 3: Students find problems

Step 3: Discuss and solve problems together

Stage 1: Group cooperation

Stage 2: Analyze the problem

Stage 3: Making plans

Step 4: Display result

Stage 1: Discuss a problem

Stage 2: Group report

Step 5: Assessment feedback

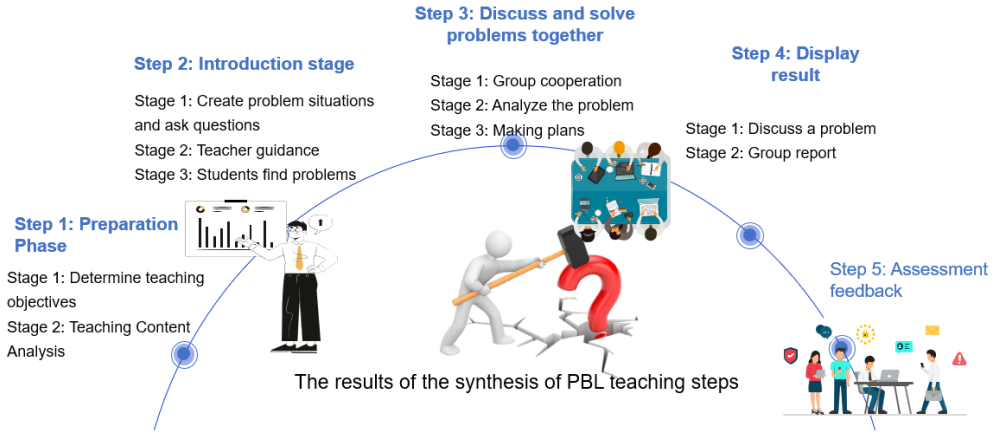


Figure 2.2 The results of the synthesis of PBL teaching steps (Barrows and Tamblyn, 1980; Schmidt, 1993; Liu,2003; Li, 2010; Wang, 2018; Duan, 2021; Rong, 2022)

Blended learning

Definition of blended learning

There are scholars to define the meaning of definition blended learning as follows:

Singh and Reed (2001) defined that blended learning to guide the "right" people at the "right" time with the "right" learning technology, the "right" individual

learning style and the "right" skills to achieve teaching objectives and learning optimization of goals.

He (2004) defined that blended teaching is a combination of the advantages of traditional learning and online learning.

Tian and Fu (2004) defined that blended teaching as “a mixture of various learning methods, media resources, learning content, and learning environments.

Chen (2011) The blended teaching is to present the optimal learning effect by selecting suitable teaching content transmission and technical means for specific content and learners.

Gao, Guan and Zhu (2021) defined that blended teaching as Online and offline interactive teaching refers to a new hybrid teaching mode that can realize online interaction and offline interaction with the help of two-line interactive carriers.

Tian (2021) defined that blended teaching as blended teaching mode is a mode that not only pays attention to the main position of students, but also emphasizes the leading role of teachers. It implements teaching activities with the help of two teaching resources, interviews and the Internet, so as to achieve the goal of improving teaching efficiency.

Zhao (2021) defined that blended teaching as blended teaching mode is a combination of two or more learning methods. It takes students as the main body of teaching activities and combines the advantages of traditional teaching and digital teaching. A new teaching mode with good teaching effect.

Cheng (2022) defined that blended teaching as the blended teaching mode is not only a mixture of two teaching forms, such as problem-based, debate-based/online learning, etc., but also includes a deep interactive integration of various teaching strategies and teaching organizations.

Sheng (2022) defined that blended teaching is a process of integrating online and offline learning content and specific objects, using suitable teaching media and technical means to impart teaching knowledge, and then obtaining good teaching effects.

From the above definition, this study defined blended teaching as the combination of two or more learning methods, integrating various elements according to a certain proportion from different angles, with students as the main body and teachers as the main body. Under the teaching concept of guidance, in

order to achieve the teaching objectives and achieve the best teaching effect teaching method.

The important of blended learning

There are scholars to define the important of blended learning as follows:

Zhu and Meng (2003) defined that blended learning can concentrate the advantages of various media and learning modes. The focus of the teaching mode is not what to mix, but how to mix to achieve the best teaching effect.

Liang (2020) defined that the importance of the blended teaching is reflected in the improvement of teachers' teaching design ability, teaching implementation ability and teaching evaluation ability.

Teng (2021) defined that importance of the blended teaching is reflected in the following three aspects: 1) Online resources can create the best learning conditions for students and realize the advancement of knowledge; 2) Offline teaching activities can promote the thinking of knowledge and skills. 3) The teaching mode can form process evaluation and summative evaluation, so as to promote the optimization of teaching effect.

Pian (2022) defined that the importance of blended teaching is reflected in breaking the limitations of students' learning time and space, providing a broader space for students' discussion and communication, and promoting students' enthusiasm and initiative.

Wang (2022) defined that the importance of the blended teaching reflects the effective combination of online and offline to maximize educational equity and provide students with high-quality educational resources. It is mainly reflected in the following three aspects: 1) The diversity of teaching resources, teaching methods, and teaching forms increases students' interest in learning and promotes students' enthusiasm and initiative; 2) Promotes the comprehensive and individualized development of students, Improve independent innovation ability and problem-solving ability; 3) Close the relationship between teachers and students, and strengthen the connection between students, parents and teachers.

Cheng (2022) defined that the important of blended learning as combines the optimization and combination of various learning resources to achieve better learning effects, that is, the mode of 1+1>2 is realized. He believes that the importance of the teaching mode is mainly reflected in four aspects: 1) increasing the number of

students The degree of freedom of learning improves the initiative and enthusiasm of students in learning, promotes the socialization of education and the life of learning; 2) the diversification of educational resources increases the interaction between teachers and students; 3) the equal and effective use of educational resources makes up for traditional teaching 4) Network resources increase the connection of educators in different regions and improve the utilization rate of professional knowledge and technology.

Hong (2023) defined that the importance of the blended teaching teachers can make full use of network resources and use teaching platforms to interact with students carry out interactive communication, pay attention to the analysis of students' learning situation, and design personalized teaching case, urge students to complete their studies on time according to the schedule.

From the above definition, the importance of the blended teaching mode is reflected in the rational use of various elements and teaching resources, the strengthening of the relationship between teachers and students, and the improvement of students, teachers, teaching activities and teaching effects.

Components of blended learning

There are scholars to define the components of blended learning model as follows:

Carman (2005) defined that the blended teaching has the following five key components that constitute the blended learning process:

1) Live Events

Teachers and students participate in teaching at the same time, mainly referring to the teaching environment

2) Self-Paced Learning

Students arrange their own learning progress according to their own time, interests, etc.

3) Collaboration

Teacher-led, student-centered collaborative inquiry-based learning

4) Assessment

Before and after measurement and evaluation of students' knowledge, skills and thinking

5) Performance Support Materials

Provide relevant reading materials to enhance students' knowledge acquisition, transfer and creativity.

Chen (2006) defined that the various factors of the blended learning are related to each other, mainly including the following four elements.

1) teacher

Instructor of learning, designer of teaching materials and learning process

2) students

subject of learning activities

3) Textbooks

Three-dimensional and dynamic teaching content

4) Teaching media

The carrier, transmission channel and learning tool of teaching information

Feng, Wang, and Wu (2018) defined that the components of blended learning as the composition of blended teaching includes the following three dimensions: preparation, design and implementation, and influence, and believes that this framework is suitable for analyzing the practice and research of blended teaching

(1) Readiness: readiness for the conditions for carrying out blended teaching

Includes: Teacher, Student, Institutional Preparation

(2) Design and implementation: reflect the actual application level of blended teaching.

It includes four elements: blended teaching strategies, models, theoretical framework, and support.

(3) Impact: Reflect the effectiveness of blended teaching.

Including: the evaluation of blended teaching (framework, methods and tools) and the effect, satisfaction and influencing factors of blended teaching.

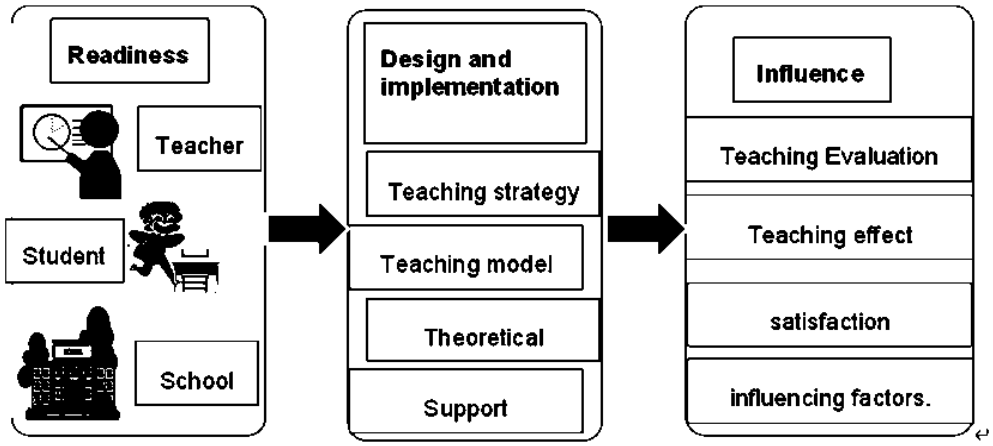


Figure 2.3 Elements of blended learning (Feng, Wang, and Wu (2018)

Huang, Martin, Zheng, & Zhang (2009) and Luo (2018) both defined that according to the design path of "front-end analysis-activity and resource design-teaching evaluation design", the mixed teaching mode should include the following four elements:

1) Front-end analysis

Including learner characteristics analysis, teaching content analysis, teaching environment analysis

2) Teaching activity design

3) Teaching resource design

Including learning resource design, teaching strategy formulation

4) Teaching evaluation design

Measurement and evaluation through learning process evaluation, course assessment evaluation, and activity participation evaluation.

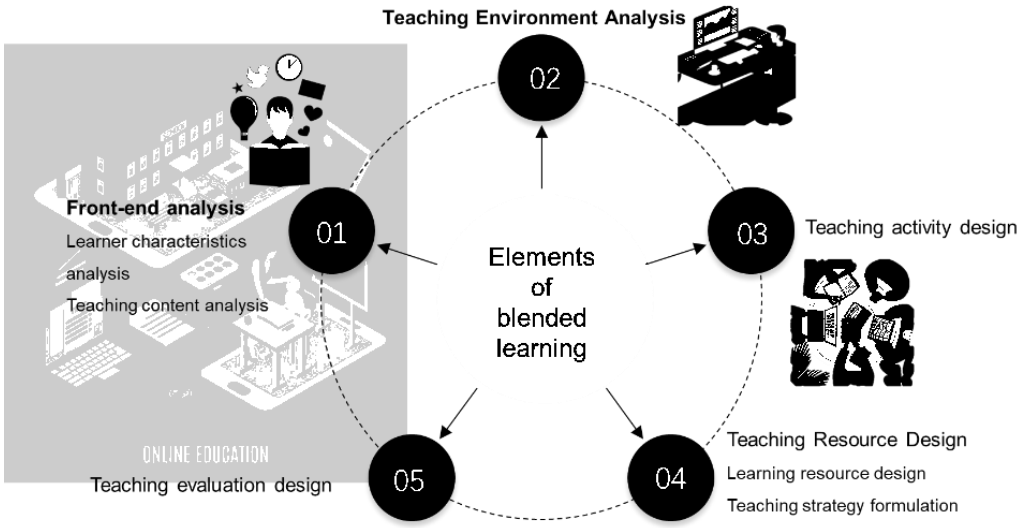


Figure 2.4 Elements of blended learning

(Huang, Martin, Zheng, & Zhang (2009) and Luo (2018)

From the definition above, Elements of blended learning mainly include front-end analysis, teaching environment design, teaching resource design, teaching activity design, teaching evaluation design.

The step to teach blended learning

There are scholars to define the step to teach blended learning as follows:

Lin, Wei, and Chen (2014) defined that the step to teach blended learning model as according to the related teaching theory of blended teaching, referring to domestic and foreign classrooms and combining teaching objects and teaching resources, the implementation of blended teaching mode mainly includes the following three steps:

Step 1: Study before class

According to the resources provided by the teacher, students learn independently and discuss in groups to promote the development of students' subjective initiative

Step 2: Classroom experiment

stage 1: Students' preliminary presentation

stage 2: Student, teacher and student comments

stage 3: Teacher-led

stage 4: Completing the experiment

Step 3: Reflection after class

Teachers reflect on teaching, students further consolidate knowledge

Li (2020) defined that the teaching of blended learning involves four steps as follows:

step1: Course guide

The main purpose is to be familiar with the course completion and the functions and operating procedures of the online platform, attract students' interest in learning, and improve students' learning autonomy.

step2: Self-study before class

The purpose is to allow students to preview the chapter content in advance and build a cognitive structure

Stage 1: Determining Learning Objectives and Learning Tasks

Stage 2: Watch resources such as videos or courseware

Stage 3: Create a discussion area and build a learning community to collect common problems

Stage 4: Completing the online test questions

Step3: Internalization of knowledge in class

According to the self-test data and the content of the students in the discussion area, the teacher combines the teaching content and key and difficult points to give classroom lectures

Stage 1: Question introduction, students answer

Stage 2: Teacher Explains

Stage 3: assigning tasks and presenting results

Stage 4: Evaluation

Step4: Summary and reflection after class

Stage 1: Learning Resources Supplement

Stage 2: Discuss Learning

Liu, C. (2021) runs through "mixing" into three stages: before class, during class and after class:

Step 1: Preparation stage before class

Stage 1: Release of learning resources

Stage 2: Students learn independently

Stage 3: Feedback Formation

Step 2: In-class offline multi-perspective environment teaching

Stage 1: Teachers give lectures and key explanations

Stage 2: Student Observation and Interaction

Stage 3: Arranging homework and testing

Stage 4: Students internalize their thinking

Stage 5: Evaluation

Step 3: Offline interactive thinking after class

Stage 1: Students Consolidate Knowledge

Stage 2: Teacher Reflection Summary

Ding (2022) divided the teaching process into three steps: pre-class, in-class and after-class in the hybrid teaching model based on SPOC.

Step 1: Pre-class preparation stage

The pre-class stage focuses on independent learning and difficult feedback

Stage 1: Release of learning resources

Stage 2: Students learn independently

Stage 3: Difficult Feedback

Step 2: In-class teaching stage

The class focuses on solving difficult problems and communicating

Stage 1: Students communicate in groups

Stage 2: Teacher explains difficult problems

Stage 3: The teacher releases the task

Stage 4: Students internalize their thinking and complete tasks

Stage 5: Summary Evaluation

Step 3: In the after-class improvement stage, a tripartite (self-evaluation, student peer evaluation, and teacher evaluation) evaluation is formed.

After class, it is mainly to complete homework and evaluate and improve.

Hong (2023) defined that the teaching of blended learning as including the following four steps:

Step1: Teaching preparation stage, there are two forms of teaching preparation stage.

Teachers prepare course construction platforms according to students' situation and course characteristics; teachers select high-quality courses from the course resources on the network platform, and lead students to familiarize themselves with the learning, discussion, quiz and other content in online courses in advance.

Step2: Pre-class stage

Students enter the course in advance, complete the course video, online course Q&A, and exchange in the discussion area.

Step3: Classroom stage

Stage 1: The teacher provides targeted guidance based on the students' online quizzes and questions and answers.

Stage 2: Students complete special classroom training, achievement display, and teacher-student comments

Step 4: After-school Stage

Stage 1: Teachers answer questions online, students reflect and correct mistakes.

Stage 2: Teachers evaluate and reflect on teaching methods and teaching conditions, and optimize teaching methods.

Table 2.3 The results of the synthesis of blended learning teaching steps

Component \ Author	Lin. Wei. and Chen (2014)	Li (2020)	Liu (2021)	Ding (2022)	Hong (202)	Frequency
Step1						
Familiar with courses and operating platform		√		√	√	3
Step 2						
Teachers provide resources	√	√	√	√	√	5
Students' complete tasks independently	√	√	√	√	√	5
Feedback formation		√	√	√	√	4
Step 3						
Problem introduction	√	√			√	3
Teacher explanation		√	√	√	√	4
Assign tasks and present results		√	√	√	√	4
Evaluate		√	√	√	√	4
Step 4						
Supplementary learning resources		√		√	√	3
Reflect on teaching	√	√	√		√	4

According to Table 2.3, the researcher analyzed the steps and components of blended learning teaching, which included Lin, Wei and Chen (2014); Li (2020); Liu (2021); Ding (2022); Hong (2023). The researchers selected components with a frequency of 3 or more according to the standard, as this blended learning teaching Pattern steps. Which can be synthesized in 4 steps as follows:

Step 1: Course Guide

The purpose is to familiarize students with the course and operating platform

Step 2: Preparation stage before class

Stage1: teachers provide resources

Stage2: students complete the task independently

Stage3: feedback formation

Step 3: In-class and offline teaching stage

Stage1: Problem introduction

Stage 2: Teacher explanation

Stage 3: Assign tasks and present results

Stage 4: Evaluate

Step 4: After-school improvement stage

Stage1: Supplementary learning resources

Stage2: Reflect on teaching

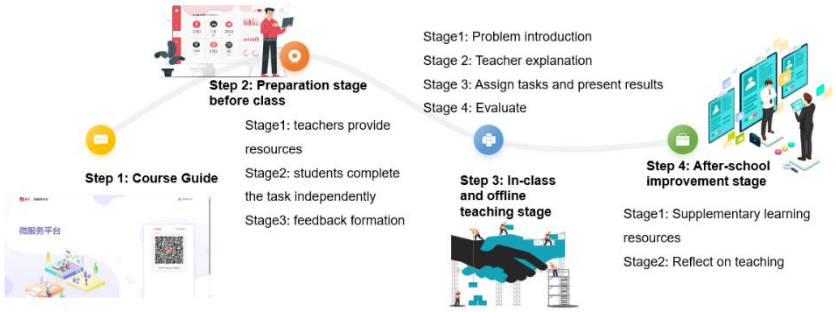


Figure 2.5 The results of the synthesis of blended learning teaching steps (Lin, Wei and Chen, 2014; Li, 2020; Liu, 2021; Ding, 2022; Hong, 2023)

Table 2.4 Connecting Problem-Based and Task-Based Learning Instructional Models

Problem Based Learning + Blended Learning			
PBL S.1+BL S.1	**PBL S. 2+BL S.2**	**PBL S.3 S.4+BL S.3**	**PBL S. 5+BL S.4**
PBL: Preparation Phase + BL: Course Guide	PBL: Introduction stage + BL: Preparation stage before class	PBL: Students find problems + PBL: Display result + BL: In-class and offline teaching stage	PBL: Assessment feedback + BL: After-school improvement stage
▼	▼	▼	▼
Problem Based Learning and Blended Learning			
S.1	**S.2**	**S.3**	**S.4**
Preparing Course Guide	Pre-class preparation and introduction stage	Problem-based classroom and offline teaching stage	Post-class feedback improvement stage

PBL Problem Based Learning

BL Blended Learning

Step 1: Preparing Course Guide

Teachers upload learning resources such as course introductions to the Internet and briefly introduce the overall goals, learning content and course content of the course so that students can have a preliminary understanding of the course.

Step 2: Pre-class preparation and introduction stage

Teachers provide teaching resources before class, students complete learning tasks independently, and form preliminary feedback

Step 3: Problem-based classroom and offline teaching stage

Teachers can create situations based on learning feedback, organize students to discuss and study in groups, and present reports.

Step 4: Post-class feedback improvement stage

Teachers can supplement learning resources to help students consolidate reflection and improve.

Components of development curriculum

There are scholars to define components of development curriculum as follows:

Zhang and Kong (2006) defined that development of online courses not only requires the teaching content organized by the established teaching objectives and teaching strategies, but also needs the supporting environment of online teaching. Therefore, including course development is divided into the following 5 parts: 1) course introduction 2) teaching content 3) virtual teaching 4) course Resource 5) Online test.

Xiao and Li (2010) defined that curriculum development is the core factor of the reform of the curriculum system, which involves curriculum target orientation, development concept, curriculum structure, curriculum content and other related issues.

Wang (2018) defined that Curriculum development includes 1) the origin of the course 2) the goal of the course 3) the content of the course, 4) the course type of the course 5) implementation and evaluation 6) the theme course resource package.

Yu (2020) defined that professional curriculum development is conducive to the renewal of educational concepts, not only can improve teachers' scientific research ability, curriculum development ability and teaching ability, but also help teachers to rebuild curriculum training objectives and curriculum system, and better implement curriculum. He pointed out that curriculum development refers to the completion of the entire development process in the curriculum plan, which mainly includes the determination of the following five aspects: 1) curriculum objectives 2) selection of curriculum content 3) development of teaching materials 4) implementation of the curriculum 5) evaluation of student learning effects.

Sun, Sun and Jia (2021) defined that Curriculum development is the process of transforming behavioral goals into learning activities, and it is the process of completing curriculum production in accordance with curriculum design instructions and requirements. Curriculum development includes four links:1) curriculum objective2) curriculum content 3) curriculum implementation 4) curriculum evaluation.

From the information above, the instructional model employed in the present study involve 5 components in line with the theories above i.e., principle and rationale, objectives, contents, methods of teaching & materials and evaluation.

The development of Problem Based Learning and Blended Learning Instructional Model

The means a new instructional framework which consists of the stable teaching activities and procedures. Such a developed instructional model with 5 components: 1) Principle & Rationale, 2) Objectives, 3) Contents, 4) Methods of teaching & Materials and 5) Evaluation, is confirmed by the experts in 4 aspects: 1) Utility Standards, 2) Feasibility Standards, 3) Propriety Standards and 4) Accuracy Standards (Stufflebeam and Social Impact, 2012) as the follows:

Utility Standards are intended to ensure that the developed instructional model will serve the information needs of intended users.

Feasibility Standards are intended to ensure that the developed instructional model will be realistic, prudent, flexible, and frugal.

Propriety Standards are intended to ensure that the developed instructional model will be conducted in conformity to teaching principles and provide positive results

Accuracy Standards are intended to ensure that the developed instructional model shows a measure of closeness to a true value.

From the definition above: The researcher has confirming instructional by 5 experts for objective 2.

Understanding of Prevention Sports Injury

There are scholars to define understanding of prevention sports injury as follows :

Sun (2004) defined that starting from the third-level prevention of sports injuries, effective measures should be taken to control sports injuries or eliminate the factors causing injuries.

Yang (2008) defined that Students' understanding and mastery of the relationship between sports and sports injuries, the definition and classification of sports injuries, and the prevention of sports injuries.

Qiu, Qin and Cui (2015) defined that the awareness of sports injury prevention refers to "in sports activities, the participants' understanding of the causes and consequences of various sports injuries in different sports activities Intuitive judgment and subjective feelings of potential objective risks such as.

CAI (2017) defined that Athletes pay attention to the prevention of sports injuries ideologically, reduce the occurrence of sports injuries through relevant prevention cognitive concepts, and maintain a positive attitude to deal with sports injuries to minimize the degree of injury.

Chen (2020) defined the understanding of prevention sports injury as people who exercise can understand the positive effects of sports and master the methods and abilities to prevent sports injuries and deal with them after the injuries.

Wang (2022) defined the understanding of prevention sports injury as college students’ basic understanding and understanding of content including prevention knowledge of sports injuries, causes of sports injuries, injury locations and treatment methods, etc.

From the information above, the prevention of sports injuries includes three levels of prevention, the first level of prevention refers to the prevention of the cause; the second level of prevention is also called "three early" prevention, three early refers to early detection, early diagnosis, and early treatment; the third level of prevention Also known as late prevention, symptomatic treatment to prevent the progression of the disease. The understanding of sports injury prevention mentioned in this article refers to the students' ability to correctly judge, deal with and prevent sports injuries after learning sports injury related courses, mastering the knowledge of sports injuries.

Dimensions of understanding of sports injury prevention

Zhu (1997) defined that the understanding of sports injury prevention includes the following five dimensions:

Dimension 1: Have certain basic knowledge of sports injury treatment.

Dimension 2: Clarify on-site handling procedures.

Dimension 3: Adopt appropriate and diverse treatment methods for sports injuries.

Dimension 4: Standards for the treatment of sports injuries.

Dimension 5: The treatment results are in compliance with regulations and the trauma is significantly improved.

Sun and Zhang (2015) defined that the understanding of sports injury prevention includes the following four dimensions:

Dimension 1: Sports injury prevention

Dimension 2: Diagnosis and assessment of sports injuries

Dimension 3: First Aid Treatment for Sports Injuries

Dimension 4: Rehabilitation after Sports Injury

Winter Sports Management Center of the General Administration of Sport of China (2022) defined the understanding of sports injury prevention into three levels

Dimension 1: Primary prevention, Improve health and prevent injuries from occurring.

Dimension 2: Secondary prevention: early diagnosis, early correct treatment, and prevention of functional loss (i.e. treatment).

Dimension 3: Tertiary prevention: focuses on reducing or correcting existing dysfunction and preventing the occurrence of underlying diseases (i.e. rehabilitation).

Table 2.5 The results of the synthesis of Dimensions of understanding of sports injury prevention

Component \ Author	Zhu (1997, p196)	Sun and Zhang (2015)	Winter Sports et al (2022, p132)	Frequency
Sports injury prevention		√	√	2
Diagnosis and assessment of sports injuries	√	√	√	3
First Aid Treatment for Sports Injuries	√	√	√	2
Rehabilitation after Sports Injury		√	√	2

According to Table 2.5, the researchers analyzed the awareness dimensions of sports injury prevention, which included Zhu (1997, p196); Sun and Zhang (2015); Winter Sports Management Center of the General Administration of Sport of China (2022). The researchers selected components with a frequency of 2 or more as the cognitive dimensions of sports injury prevention based on the repetitive steps identified by the academic community, which can be synthesized through the following 4 dimensions:

Dimension 1: Sports injury prevention

Mean the Students can understand the classification and incidence of sports injuries; The causes of sports injuries can be analyzed, so as to prevent sports injuries.

Dimension 2: Diagnosis and assessment of sports injuries

Mean the Students can understand the basic knowledge of clinical examination and diagnosis; complete clinical examination according to the athlete's injury condition, inquire and record the medical history, analyze the situation and make a reasonable diagnosis.

Dimension 3: First Aid Treatment for Sports Injuries

Mean the Students can understand the basics of first aid; and be able to apply cardiopulmonary resuscitation techniques.

Dimension 4: Rehabilitation after Sports Injury

Mean the Students can understand the knowledge of rehabilitation assessment of sports injuries; and master sports therapy and physical therapy.

Table 2.6 Summarizes the connections between Content, Problem Based Learning and Blended Learning, Understanding of Prevention Sports Injury, Instruments/ Activities, Unit 1 and Unit 2 Decision Making (22 hours)

Unit / Chapter /Time	**Method**	**Problem Based Learning and Blended Learning**				**Understanding of Prevention Sports Injury**				**Instruments / Activities**
		$S._1$	$S._2$	$S._3$	$S._4$	$D._1$	$D._2$	$D._3$	$D._4$	
1. Prevention and diagnosis of sports injuries (12 hrs.)										
1.1 Classification and causes of sports injuries (6 hrs.)	PBL+BL	T	L	L+T	L+T	√				
1.2 Examination and diagnosis of sports injuries (6 hrs.)	PBL+BL	T	L	L+T	L+T		√			
2. Sports injury treatment and rehabilitation (10 hrs.)										Pretest-Posttest
2.1 Treatment of acute sports injuries (6 hrs.)	PBL+BL	T	L	L+T	L+T			√		
2.2 Rehabilitation training for sports injuries (4 hrs.)	PBL+BL	T	L	L+T	L+T				√	

S.1 Preparing Course Guide

S.2 Pre-class preparation and introduction stage

S.3 Problem-based classroom and offline teaching stage

S.4 Post-class feedback improvement stage

S. Step T. Teacher L. Learner

D.1 Sports injury prevention

D.2 Diagnosis and assessment of sports injuries

D.3 First Aid Treatment for Sports Injuries

D.4 Rehabilitation after Sports Injury

Related Research

In the study of "Problem Based Learning and Blended Learning Instructional Model", the researcher studied the documents concerning the following

Chen (2012) studied "Problem Based Learning and Blended Learning Instructional Model" The results had founded that Introducing network-assisted learning resources into PBL classroom teaching, the blended classroom teaching form can not only optimize the current PBL teaching, but also improve students' independent learning ability and problem-solving ability.

Chu et al (2020) studied "Problem Based Learning and Blended Learning Instructional Model" The results had founded that this teaching model can not only improve the quality and effect of teaching, but also cultivate students' enthusiasm for learning, scientific thinking, team spirit, and problem-solving abilities.

Fan, Liang and Yu (2023) studied "Problem Based Learning and Blended Learning Instructional Model" The results had founded that this teaching model helps students clarify their thinking through online and offline mixed teaching resources and teaching activities. It not only promotes the development of theories in related fields, but also improves students' learning efficiency, expands the depth and breadth of students' learning, and promotes talent cultivation. achievement of goals.

Xin (2023) studied “Problem Based Learning and Blended Learning Instructional Model” The results had founded that According to the current teaching situation of university physics courses, "online and offline" resources are integrated, and according to the teaching concept of whole-process classroom guidance and effect evaluation, students are stimulated to participate in the whole process within limited classroom time, and students are guided to complete the "problem-oriented - The main teaching line of "sorting out problems - guiding students - solving problems" has promoted the development of data-based and real-time evaluation mechanisms.

Liu, Sun and Tian (2023) studied “Problem Based Learning and Blended Learning Instructional Model” The results had founded that the application of problem-based blended teaching in preventive medicine courses found that there was no significant difference in academic performance, self-efficacy, self-learning ability, and cognitive strategies among short-term teaching students. However, over a longer period of time, there are significant differences in the performance of college students, which has a positive impact on college students' cognitive adjustment and learning motivation.

To sum up, Chinese scholars have analyzed and researched the problem-based mixed teaching mode from different aspects (evaluation mechanism, effectiveness, teaching effect, student autonomy, etc.), and different disciplines have achieved remarkable teaching results. The effect shows that this teaching mode is feasible.

In the study of “Prevention Sports Injury”, the researcher studied the documents concerning the following.

Zhang, Meng and Zhu (2014) studied “prevention sports injury” the results had founded that trainees lack effective ways to acquire relevant knowledge, have weak awareness of first aid, and have insufficient practice of first aid skills. The vast majority of trainees do not really master the necessary daily emergency rescue knowledge and skills.

Li, Wang, Su and Chen (2020) studied “prevention sports injury” the results had founded that When a sports accident occurs, college students have poor

abilities in first aid and nursing skills such as assessing the severity of the injury, stopping bleeding, fixing fractures, and cardiopulmonary resuscitation.

Song, Chen and Mo (2022) studied “prevention sports injury” the results had founded that Students do not have enough understanding of sports injuries, do not pay much attention to the prevention and treatment of sports injuries, and have a low level of ability to deal with sports injuries.

Liang (2005) studied “prevention sports injury” the results had founded that People with sports injuries should be mobilized as early as possible to promote recovery and not develop further sequelae.

Li (2014) and Du (2017) studied “prevention sports injury” the results had founded that Early treatment of sports injuries (emergency rescue for sports injuries) can save lives at critical moments, reduce disability rates, and promote rapid recovery.

To sum up, early prevention and treatment of sports injuries is very beneficial to the recovery of injuries. However, current sports injury knowledge and sports injury treatment skills of college students are still relatively poor and need to be further improved.

Chapter 3
Research Methodology

This research used Problem Based Learning and Blended Learning Instructional Model of Research. This research is divided into 3 phases.

Phase 1 was conducted to answer research **objective 1**: To examine the factors for understanding of prevention sports injury of undergraduate students.

Phase 2 was conducted to answer research **objective 2**: To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Phase 3 was conducted to answer research **objective 3**: To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

The details are as follows.

Phase 1 was conducted to answer research objective 1: To examine the factors for understanding of prevention sports injury of undergraduate students.

Population

Group 1: The former 120 from 3 sections of students who enroll in Sport Injury Course in semester I of academic year 2022 from 3 Universities in Guangxi Autonomous Region.

1) 40 students from Yulin Normal University

2) 40 students from Guilin University

3) 40 students from Hezhou University

Research instrument

The questionnaire for students

Designing instrument 1 (The questionnaire for students)

1. Study Sport Injury course and factors affecting understanding of prevention sports injury of undergraduate students.

2. Design a questionnaire on factors to improve understanding of prevention sports injury of undergraduate students in Guangxi Province.

The questionnaire consists of three parts. The first part is the commonly used data of the respondents, including gender, school and age. In the second part, there are 30 influencing factors, 15 internal factors include knowledge and experience (3 questions), psychological motivation (3 questions), communication and communication skills (3 questions), self-efficacy (3 questions), and critical thinking (3 questions) wait. External reasons include 15 questions, including teaching resource materials (5 questions), teaching methods (5 questions), environment (3 questions), evaluation (2 questions), etc.

3. Present the draft of questionnaire to the advisors for checking correctness and completion.

4. Assess the validity of questionnaire on factors to improve understanding of prevention sports injury of undergraduate students by 5 experts (List name in Appendix A) through Index of Item-Objective Congruence (IOC) according to the criteria shown below. (Rovinelli and Hambleton, 1977; Hambleton, 1980; Turner and Carlson, 2003).

+1 = Sure that the contents are related to the topics

0 = Not sure that the contents are related to the topics

-1 = The contents are not related to the topics

The acceptable items must have the IOC values not less than 0.5. The IOC calculated from the validation measures 1.

5. Design Likert 5-point rating scale questionnaire on the following score rating criteria.

5 means strongly agree

4 means agree

3 means neutral

2 means disagree

1 means strongly disagree

Quality Validation

Using IOC by 5 experts to test the quality of questionnaire.

Data Collection

1. Ask for permission for data collection.

2. Collect data from the assigned students using the developed questionnaire.

Data Analysis

The factors affecting Understanding of Prevention Sports Injury obtained from the students are interpreted using mean interpretation criteria proposed by Phongsri (2011)

4.51-5.00 means Highest

3.51-4.50 means High

2.51-3.50 means Moderate

1.51-2.50 means Few

1.00-1.50 means Fewest

Descriptive statistics, frequency, mean (μ) standard deviation (σ)

Group 2: The lecturers who are teaching sports injury course from 3 colleges in Guangxi Autonomous Region.

1) Lecturer from YuLin Normal University

2) Lecturer from Guilin University

3) Lecturer from HeZhou University

Research instrument

The interview for the lecturers

Designing instrument 2 (The interview for the lecturers)

1. Study literature on sports injury, and factors affecting Understanding of Prevention Sports Injury

2. Design the draft of open-ended interview on 2 factors Internal factors (5 questions) and external factors (5 questions) affecting Understanding of Prevention Sports Injury of Undergraduate Students.

3. Present the draft of open-ended interview to the advisors for checking correctness and completion.

4. Assess the validity of open-end interview on factors affecting Understanding of Prevention Sports Injury for the students by 5 experts (List name in Appendix A) through Item-Objective Congruence (IOC) according to the criteria as shown below: (Rovinelli and Hambleton, 1977; Hambleton, 1980; Turner and Carlson, 2003).

+1 = Sure that the contents are related to the topics

0 = Not sure that the contents are related to the topics

-1= Sure that the contents are not related to the topics

The acceptable items must have the IOC values not less than 0.5. The IOC calculated from the validation measures 1.00

5. Do the open-end interview in three local university in GuangXi. The open-end interview type can only be answered by the lecturers.

Quality Validation

Using IOC by 5 experts (List name in Appendix A) to test the quality of open-end interview.

Data Collection

1. Ask for permission for data collection.

2. Collect data from the assigned lecturers using the developed interview.

Data Analysis

Content analysis

Output Phase 1

Obtain important information that is used as a basis for examine the internal factors and external factors to promote Understanding of Prevention Sports Injury of Undergraduate Students from the former students and lecturers. And take the result to do Problem Based Learning and Blended Learning Instructional Model. By Table 3.1

Table 3.1 Summary how to conduct research from Phase 1

Topics	Details
Research process	Phase 1: was conducted to answer research objective 1
Research objective	To examine the factors for understanding of prevention sports injury of undergraduate students.
Conduct research	Designing instrument 1 (The questionnaire for students) Designing instrument 2 (The interview for the lecturers) Assess the validity by 5 experts (List name from Appendix A)
Target group	1: The former 120 from 3 sections of students who enroll in Sport Injury Course in semester I of academic year 2022 from 3 colleges in Guangxi Autonomous Region. 2: The lecturers who are teaching sports injury course from 3 colleges in Guangxi Autonomous Region.
Instrument	1.Questionnaire for students Part 1: is about Common data of the respondent in overall (N=120) Part 2: Internal factors 15 numbers, external factors 15 numbers Part 3: suggestion 2. 10 questions to interview for lecturers Part 1: is about Common data of the respondent in overall (N=3) Part 2: 10 Questions (both Internal factors and external) factors Part 3: suggestion
Data analysis	1.Descriptive Statistics i.e., Frequency, mean (μ) standard deviation (σ) for questionnaires 2.Content analysis for interview
Output	The result factors affecting for understanding of prevention sports injury of undergraduate students.

Phase 2 was conducted to answer research objective 2: To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Research instrument

Conformity Assessment Form of Problem Based Learning and Blended Learning Instructional Model in terms of accuracy standard, propriety standard, feasibility standard, and utility standard.

Designing instrument (the questionnaire for IOC)

1. Study related concepts, principles, process about developing instructional model, including results in terms of factors affecting Understanding of Prevention Sports Injury from research objective 1.

2. Design the development of Problem Based Learning and Blended Learning Instructional Model to enhance understanding of prevention sports injury for undergraduate students to be the handout which consists of the stable teaching activities and procedures. Such a developed instructional model with 5 components: 1) Principle & Rationale, 2) Objectives, 3) Contents, 4) Methods of teaching & Materials and 5) Evaluation, is in 4 aspects standards: 1) Utility standards, 2) Feasibility standards, 3) Propriety standards and 4) Accuracy standards.

3. Design a questionnaire on confirming the appropriateness of the instructional model in terms of accuracy standards, propriety standards, feasibility standards, and utility standards.

4. Present the draft of open-ended interview to the advisors for checking correctness and completion.

5. Assess the validity of the questionnaire of the appropriateness of the instructional model by 5 experts (List name in Appendix A) through Item-Objective Congruence (IOC) according to the criteria as shown below: (Rovinelli and Hambleton, 1977; Hambleton, 1980; Turner and Carlson, 2003).

+1 = Sure that the contents are related to the topics

0 = Not sure that the contents are related to the topics

-1 = Sure that the contents are not related to the topics

The acceptable items must have the IOC values not less than 0.5. The IOC calculated from the validation measures 1.00.

6. Design the conformity assessment form of Problem Based Learning and Blended Learning Instructional Model.

Data Collection

1. Ask for permission of data collection

2. Collect appropriateness of the instructional model in terms of accuracy standard, propriety standard, feasibility standard, and utility standard from the 5 experts (List name in Appendix A) using the developed conformity assessment form of hybrid learning technology model.

Data Analysis

Descriptive analysis i.e. frequency and percentage.

The acceptable items must not be less than 100%.

Output Phase 2

Problem Based Learning and Blended Learning Instructional Model the appropriateness of which is confirmed by experts for further implementation. The acceptable items 100%. By Table 3.2

Table 3.2 Summary how to conduct research from Phase 2

Topics	Details
Research process	Phase 2: was conducted to answer research objective 2
Research objective	To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.
Conduct research	Designing instrument 1 (IOC from 5 experts in development problem based learning and blended learning instructional model)
Conduct research	Designing instrument 2 (Confirming development problem based learning and blended learning instructional model by 5 experts)
Target group	5 experts confirming development problem based learning and blended learning instructional model

Table 3.2 (Continued)

Topics	Details
Instrument	1.The questionnaire for IOC 2.Designing instrument about the questionnaire on confirming the instructional
Data analysis	Descriptive analysis i.e. frequency and percentage.
Output	Problem based learning and blended learning the appropriateness of which is confirmed by experts for further implementation. The acceptable items 100%.

Phase 3 was conducted to answer research objective 3: To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Population

The total of 116 from 3 sections of students with different levels of proficiency – beginner, intermediate, and advanced, who enroll in Sport Injury Course at Hezhou University in semester 1 academic year 2023. Those sections involve the following.

38 students in section A

38 students in section B

40 students in section C

The Sample Group

There are 40 students from section the sports rehabilitation major who enroll in Sports Injury Course at HeZhou University in the 1st Semester academic year 2023 by simple random sampling.

Research Design

Table 3.3 Experimental Design

T1	X	T2
Pre- test	Problem based learning and blended learning instructional model	Post-test

T1 means Pre-test

X means Problem based learning and blended learning instructional model

T2 means Post-test

Research instruments

1. Lesson plans problem based learning and blended learning instructional model

2. Pretest and Posttest

Designing instrument 1 (Lesson plans)

1. Study from handout about development of problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

2. Design lesson plans composed the objectives, contents, method of teaching, material, resource learning and evaluation.

3. Present the lesson plan to the advisors for checking correctness, completion and improvement.

4. Assess the validity of the designed lesson plans by 5 experts (List name in Appendix A) through Item-Objective Congruence (IOC) according to the criteria as shown below: (Rovinelli and Hambleton, 1977; Hambleton, 1980; Turner and Carlson, 2003).

+1 = Sure that the contents are related to the topics

0 = Not sure that the contents are related to the topics

-1 = Sure that the contents are not related to the topics

The acceptable items must have the IOC values not less than 0.5. The IOC calculated from the validation measures 1.00

5. Develop and implement curriculum plans for the experimental group.

Designing instrument 2 (Pretest and Posttest)

1. Study and design understanding of prevention sports injury of undergraduate students with 4 dimensions. Dimension 1) Sports injury prevention, 2) Diagnosis and assessment of sports injuries, 3) First Aid Treatment for Sports Injuries,4) Rehabilitation after Sports Injury.

2. Present 100 about the Pre and post test for lecturers to the advisors for checking correctness, completion, and improvement.

3. Assess the validity of the designed Pre and post test for lecturers by 5 experts (List name in Appendix A) for checking Index of Item-Objective Congruence (IOC), consider the passage following the content as shown below: (Rovinelli and Hambleton, 1977; Hambleton, 1980; Turner and Carlson, 2003).

+1 = Sure that the contents are related to the topics

0 = Not sure that the contents are related to the topics

-1 = The contents are not related to the topics The acceptable items must have the IOC values not less than 0.5. The IOC calculated from the validation measures 1.00.

4. Took the pre-post test to improve and experiment another group not sample group to find the quality of testing.

5. Conduct a try-out of the developed pretest and posttest with group of samples for analyzing difficulty value (p), discrimination power (r), and reliability (KR-20). The calculated p value 0.000, 0.69 for r value, and Very good for reliability.

The criteria of difficulty value (p) (Punnee, Leekitchwatana. 2016)

0.81 – 1.00 – Very easy (To delete)

0.60 – 0.80 – Easy (Available)

0.40 – 0.59 – Moderate (Good)

0.20 – 0.39 – Difficult (Good)

0 – 0.10 – Very difficult (To delete)

The criteria of, discrimination power (r) (Punnee, Leekitchwatana. 2016)

0.40 - 10.00 – Highest–Very Good

0.30 - 0.39 – High – Good

0.20 - 0.29 – Moderate – Available

0.10 - 0.19 – Low – Can not used any

0.01-0.09 – Lowest – Can not used

0.00 – Non – Can not used

-1.00–0.01– Reverse Direction–Can not used

6. Conduct KR-20 measure 0.716.

Data Collection

1. Ask for permission of data collection.

2. Collect students' learning outcomes by using pretest before the experiment.

3. Carry out the experiment.

4. Collect students' learning outcomes by using posttest after the experiment.

Data Analysis

Descriptive statistics – MEAN and standard deviation

Inferential statistics – Paired t-test for dependent samples

Relative Developmental Scores proposed by Kanjanawasee (2009, pp.266-267) as shown below.

$$\text{Relative Developmental Scores} = \frac{\textbf{Posttest Scores} - \textbf{Pretest Scores}}{\textbf{Total Scores} - \textbf{Pretest Scores}} \times 100$$

The calculated scores from the formula above will be interpreted according to the criteria below.

Table 3.4 Criteria of interpreting learning outcomes by relative developmental scores

Relative Developmental Scores	Developmental Level
76 - 100	Very High
51 - 75	High
26 - 50	Moderate
0 - 25	Low

Output Phase 3 (Pretest-Posttest)

After implementing learning and blended learning instructional model, students' understanding of prevention sports injury will be higher than before the experiment. By Table 3.5

Table 3.5 Summary how to conduct research from Phase 3

Topics	Details
Research process	Phase 3: was conducted to answer research objective 3
Research objective	To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.
Conduct research	1.Designing instrument 1 (Lesson plans) 2.Designing instrument 2(Pretest and Posttest)
Target group	1. Design lesson plans by format given. 2. There are 40 students from section the sports rehabilitation major who enroll in Sports Injury Course at HeZhou University in the 1st Semester academic year 2023 by simple random sampling.
Instrument	1. Lesson plans problem based learning and blended learning instructional model 2. Pretest and Posttest
Data analysis	1.Descriptive statistics – MEAN and standard deviation 2.Inferential statistics – Paired t-test for dependent samples
Output	After implementing learning and blended learning instructional model, students' understanding of prevention sports injury will be higher than before the experiment.

Chapter 4
Results of Analysis

In the study of "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students", the researcher studied the documents concerning the following.

Part 1: Analysis results serving objective 1–To examine the factors for understanding of prevention sports injury of undergraduate students.

Part 2: Analysis results serving objective 2–To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Part 3: Analysis results serving objective 3–To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

Data Analysis Results

Part 1: Analysis results serving objective 1–To examine the factors for understanding of prevention sports injury of undergraduate students.

This section presents analysis results serving objective 1 using table and description in terms of MEAN, standard deviation, interpretation (Level of Attitude), and ranking of all factors in overview. After that, items of all factors are presented likewise.

Table 4.1 Common data of the respondent in overall (N=120)

Data	Frequency	Percentage
1. Gender		
A. Male	83	69.17
B. Female	37	30.83
Total	**120**	**100.00**
2. Age		
A. below 18 yrs.	1	0.83
B. 19-20 yrs.	38	31.67
C. 21-22 yrs.	64	53.33
D. over 23 yrs.	17	14.17
Total	**120**	**100.00**

From table 4.1 the common data of the respondent in overall the most gender is male, 69.17%. It can be seen that there are significantly more men than women participating in this question. The most age is 21-22, 53.33%.

Table 4.2 The result of questionnaire from students in overview (N=120)

No.	Factors	μ	σ	Level	Ranking
	Internal factors (respondents)				
1	Students are very interested in sports injury course.	4.28	1.06	High	9
2	The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.	4.37	0.97	High	6
3	Students feel that sports injury course is the great significance to personal growth and development in future.	4.48	0.91	High	1
4	Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.	4.45	0.84	High	3

Table 4.2 (Continued)

No.	Factors	μ	σ	Level	Ranking
5	Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals.	4.45	0.88	High	3
6	Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.	4.32	0.93	High	8
7	The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	4.48	0.81	High	1
8	Students find it easy to stick to coursework and milestones.	3.95	1.11	High	15
9	Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.	4.23	0.93	High	13
10	Students believe that communication can improve Understanding of Prevention Sports Injury.	4.43	0.81	High	5
11	Students know how to choose appropriate communication styles and attitudes in different situations.	4.25	0.96	High	11
12	Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.	4.32	0.89	High	7

Table 4.2 (Continued)

No.	Factors	μ	σ	Level	Ranking
13	When students deal with complex problems, they can also collect relevant information calmly and methodically.	4.25	0.90	High	11
14	Students believe prior knowledge contributes to increased awareness of sports injury prevention.	4.27	0.93	High	10
15	Students can quickly select the optimal solution to solve sports injury-related problems in different situations.	4.23	0.93	High	14
	Total Average	**4.32**	**0.92**	**High**	
	External factors				
1	In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.	4.38	0.86	High	6
2	The lecturer chooses the appropriate teaching method according to the characteristics of the sports injury course and the tasks and goals of the sports injury.	4.38	0.92	High	6
3	The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	4.44	0.87	High	1
4	In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate	4.35	0.93	High	12

Table 4.2 (Continued)

No.	Factors	μ	σ	Level	Ranking
	understanding of prevention sports injury of undergraduates.				
5	The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.	4.37	0.92	High	9
6	The lecturer will select the appropriate teaching materials and network resources according to the course.	4.43	0.85	High	3
7	The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury	4.39	0.87	High	5
8	In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of the course and the objectives of each stage.	4.36	0.89	High	10
9	In the sports injury course, the lecturers will guide the students to correctly understand the learning content.	4.36	0.92	High	10
10	In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better.	4.44	0.89	High	1
11	The campus has a stable high-speed network for teaching guarantee, and supports the understanding of	4.31	0.92	High	15

Table 4.2 (Continued)

No.	Factors	μ	σ	Level	Ranking
	prevention sports injury majoring in sports rehabilitation.				
12	The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.	4.38	1.01	High	8
13	The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to improve understanding of prevention sports injury.	4.33	0.91	High	13
14	The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation.	4.31	1.02	High	15
15	During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	4.41	0.93	High	15
	Total Average	**4.38**	**0.93**	**High**	

Table 4.2 Indicates that internal factors affecting understanding of prevention sports injury of undergraduate students in Guangxi Autonomous Region overall found at High level (μ=4.32). Considering only each item, it was found that factor No.3 Students feel that sports injury course is the great significance to personal growth and development in future and No.7 The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving are the highest mean (μ= 4.48), follow factor by No.4 Using problem based learning and blended learning

instructional model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge and No.5 Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals are the highest mean (μ =4.45) and the fewest mean is factor No.8 Students find it easy to stick to coursework and milestones (μ =3.95).

For external factors affecting understanding of prevention sports injury of undergraduate students in Guangxi Autonomous Region overall found at High level (μ =4.38). Considering only each item, it was found that factor No.3 The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates and No.10 In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better are the highest mean (μ =4.44), follow by factor No. 6 The lecturer will select the appropriate teaching materials and network resources according to the course (μ=4.43) and the fewest mean are factors No.11 The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation and The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems and No.15 During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses. (μ=4.31).

Table 4.3 Common data of the respondent in Yulin Normal University. (N=40)

Data	Frequency	Percentage
1. Gender		
A. Male	23	57.50
B. Female	17	42.50
Total	**40**	**100.00**
2. Age		
A. below 18 yrs.	1	2.50
B. 19-20 yrs.	14	35.0
C. 21-22 yrs.	15	37.50
D. over 23 yrs.	10	25.00
Total	**40**	**100.00**

From table 4.3 the common data of the respondent in A. Yulin Normal University. the most gender is male, 57.5%. There are slightly more men than women participating in this question. The largest number of people in the survey sample are those aged 21-22, accounting for 37.5%, followed by those aged 19-20, accounting for 35%. The number of people below 18 years old is the smallest, accounting for only 2.5% of the total sample.

Table 4.4 The result of questionnaire from students in Yulin Normal University. (N=40)

No.	Factors	μ	σ	Level	Ranking
	Internal factors (respondents)				
1	Students are very interested in sports injury course.	4.00	1.04	High	14
2	The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.	4.13	0.94	High	11
3	Students feel that sports injury course is the great significance to personal growth and development in future.	4.40	0.81	High	1
4	Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.	4.33	0.73	High	3
5	Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals.	4.30	0.85	High	4
6	Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.	4.10	0.87	High	13

Table 4.4 (Continued)

No.	Factors	μ	σ	Level	Ranking
7	The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	4.35	0.74	High	2
8	Students find it easy to stick to coursework and milestones.	3.95	1.06	High	15
9	Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.	4.20	0.82	High	8
10	Students believe that communication can improve Understanding of Prevention Sports Injury.	4.25	0.87	High	6
11	Students know how to choose appropriate communication styles and attitudes in different situations.	4.13	0.95	High	11
12	Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.	4.18	0.96	High	9
13	When students deal with complex problems, they can also collect relevant information calmly and methodically.	4.25	0.81	High	6
14	Students believe prior knowledge contributes to increased awareness of sports injury prevention.	4.15	0.86	High	10
15	Students can quickly select the optimal solution to solve sports injury-related problems in different situations.	4.30	0.82	High	4
	Total Average	**4.20**	**0.88**	**High**	

Table 4.4 (Continued)

No.	Factors	μ	σ	Level	Ranking
	External factors				
1	In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.	4.33	0.80	High	2
2	The lecturer chooses the appropriate teaching method according to the characteristics of the sports injury course and the tasks and goals of the sports injury.	4.20	0.94	High	9
3	The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	4.23	0.89	High	7
4	In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates.	4.15	0.95	High	12
5	The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.	4.20	0.88	High	9
6	The lecturer will select the appropriate teaching materials and network resources according to the course.	4.18	0.93	High	11

Table 4.4 (Continued)

No.	Factors	μ	σ	Level	Ranking
7	The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury	4.15	0.95	High	12
8	In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of the course and the objectives of each stage.	4.23	0.86	High	7
9	In the sports injury course, the lecturers will guide the students to correctly understand the learning content.	4.15	1.00	High	12
10	In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better.	4.35	0.83	High	1
11	The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation.	4.25	0.84	High	5
12	The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.	4.325	1.43	High	2
13	The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to improve understanding of prevention sports injury.	4.275	0.87	High	4

Table 4.4 (Continued)

No.	Factors	μ	σ	Level	Ranking
14	The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems.	4.05	1.11	High	15
15	During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	4.25	0.93	High	5
	Total Average	**4.22**	**0.94**	**High**	

Table 4.4 Indicates that internal factors affecting understanding of prevention sports injury of undergraduate students in Yulin Normal University overall found at High level (μ=4.20). Considering only each item, it was found that factor No.3 Students feel that sports injury course is the great significance to personal growth and development in future is the highest mean (μ=4.40), follow factor by No.7The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving is the highest mean (μ=4.35) and the fewest mean is factor No.8 Students find it easy to stick to coursework and milestones (μ=3.95).

For external factors affecting understanding of prevention sports injury of undergraduate students in Yulin Normal University overall found at High level (μ=4.22). Considering only each item, it was found that factor No.10 In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better is the highest mean (μ=4.35), follow by factors No.1 In the sports injury course, The lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries and No.12 The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching are the highest mean (μ=4.33) and

the fewest mean are factors No.14 The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems (μ=4.05).

Table 4.5 Common data of the respondent in Guilin University. (N=40)

Data	Frequency	Percentage
1. Gender		
A. Male	32	80.00
B. Female	8	20.00
Total	**40**	**100.00**
2. Age		
A. below 18 yrs.	0	0.00
B. 19-20 yrs.	12	30.00
C. 21-22 yrs.	25	62.50
D. over 23 yrs.	3	7.50
Total	**40**	**100.00**

From table 4.5 the common data of the respondent in Guilin University. the most gender is male, 80.00%. There are significantly more men than women, and the proportion of men is 4 times that of women. The most age is 21-22 yrs, 62.50%.

Table 4.6 The result of questionnaire from students in Guilin University. (N=40)

No.	Factors	μ	σ	Level	Ranking
	Internal factors (respondents)				
1	Students are very interested in sports injury course.	4.63	0.59	Highest	8
2	The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.	4.65	0.53	Highest	5
3	Students feel that sports injury course is the great significance to personal growth and development in future.	4.65	0.62	Highest	5
4	Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.	4.73	0.55	Highest	2
5	Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals.	4.68	0.66	Highest	3
6	Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.	4.68	0.62	Highest	3
7	The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	4.78	0.42	Highest	1
8	Students find it easy to stick to coursework and milestones.	4.20	1.09	High	15

Table 4.6 (Continued)

No.	Factors	μ	σ	Level	Ranking
9	Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.	4.40	0.93	High	14
10	Students believe that communication can improve Understanding of Prevention Sports Injury.	4.65	0.62	Highest	5
11	Students know how to choose appropriate communication styles and attitudes in different situations.	4.55	0.78	Highest	10
12	Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.	4.50	0.72	High	11
13	When students deal with complex problems, they can also collect relevant information calmly and methodically.	4.25	0.81	High	6
14	Students believe prior knowledge contributes to increased awareness of sports injury prevention.	4.58	0.71	Highest	2
15	Students can quickly select the optimal solution to solve sports injury-related problems in different situations.	4.45	0.82	High	12
	Total Average	**4.57**	**0.70**	**Highest**	
	External factors				
1	In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.	4.60	0.63	Highest	8
2	The lecturer chooses the appropriate teaching method according to the	4.60	0.71	Highest	8

Table 4.6 (Continued)

No.	Factors	μ	σ	Level	Ranking
	characteristics of the sports injury course and the tasks and goals of the sports injury.				
3	The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	4.65	0.58	Highest	3
4	In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates.	4.65	0.66	Highest	3
5	The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.	4.60	0.81	Highest	8
6	The lecturer will select the appropriate teaching materials and network resources according to the course.	4.65	0.48	Highest	3
7	The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury	4.60	0.59	Highest	8
8	In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of	4.58	0.59	Highest	14

Table 4.6 (Continued)

No.	Factors	μ	σ	Level	Ranking
	the course and the objectives of each stage.				
9	In the sports injury course, the lecturers will guide the students to correctly understand the learning content.	4.63	0.59	Highest	6
10	In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better.	4.60	0.74	Highest	8
11	The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation.	4.68	0.57	Highest	1
12	The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.	4.48	0.99	High	15
13	The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to improve understanding of prevention sports injury.	4.60	0.63	Highest	8
14	The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems.	4.68	0.57	Highest	1

Table 4.6 (Continued)

No.	Factors	μ	σ	Level	Ranking
15	During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	4.63	0.71	Highest	6
	Total Average	**4.61**	**0.66**	**Highest**	

Table 4.6 Indicates that internal factors affecting understanding of prevention sports injury of undergraduate students in Guilin University overall found at Highest level (μ=4.57). Considering only each item, it was found that factor No.7 The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving is the highest mean (μ=4.78), follow factor by No.4 Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge is the highest mean (μ=4.73) and the fewest mean is factor No.8 Students find it easy to stick to coursework and milestones (μ=4.20).

For external factors affecting understanding of prevention sports injury of undergraduate students in Guilin University overall found at Highest level (μ=4.61). Considering only each item, it was found that factor No.11 The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation and No.14 The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems are the highest mean (μ=4.68), follow by factors No.3 The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates; No.4 In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates and No.6 The lecturer will select the appropriate teaching materials and network resources according to the course are the

highest mean (μ=4.65) and the fewest mean are factors No.12 The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching (μ=4.48).

Table 4.7 Common data of the respondent in Hezhou University. (N=40)

Data	Frequency	Percentage
1. Gender		
A. Male	28	70.00
B. Female	12	30.00
Total	**40**	**100.00**
2. Age		
A. below 18 yrs.	0	0.00
B. 19-20 yrs.	12	30.00
C. 21-22 yrs.	24	60.00
D. over 23 yrs.	4	10.00
Total	**40**	**100.00**

From table 4.7 the common data of the respondent in Hezhou University. the most gender is male, 70%, the most age is 21-22 yrs, 60% .

Table 4.8 The result of questionnaire from students in Hezhou University. (N=40)

No.	Factors	μ	σ	Level	Ranking
	Internal factors (respondents)				
1	Students are very interested in sports injury course.	4.39	1.13	High	8
2	The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.	4.50	1.01	High	3

Table 4.8 (Continued)

No.	Factors	μ	σ	Level	Ranking
3	Students feel that sports injury course is the great significance to personal growth and development in future.	4.58	0.92	Highest	1
4	Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.	4.47	0.80	High	6
5	Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals.	4.55	0.72	Highest	2
6	Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.	4.34	0.88	High	9
7	The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	4.50	0.76	High	3
8	Students find it easy to stick to coursework and milestones.	3.87	1.02	High	15
9	Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.	4.26	0.76	High	10
10	Students believe that communication can improve Understanding of Prevention Sports Injury.	4.50	0.679	High	3

Table 4.8 (Continued)

No.	Factors	μ	σ	Level	Ranking
11	Students know how to choose appropriate communication styles and attitudes in different situations.	4.24	0.82	High	11
12	Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.	4.47	0.60	High	6
13	When students deal with complex problems, they can also collect relevant information calmly and methodically.	4.24	0.71	High	11
14	Students believe prior knowledge contributes to increased awareness of sports injury prevention.	4.24	0.88	High	11
15	Students can quickly select the optimal solution to solve sports injury-related problems in different situations.	4.11	0.80	High	14
	Total Average	**4.35**	**0.84**	**High**	
	External factors				
1	In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.	4.39	0.79	High	12
2	The lecturer chooses the appropriate teaching method according to the charac teristics of the sports injury course and the tasks and goals of the sports injury.	4.53	0.73	Highest	5
3	The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	4.65	0.68	Highest	1

Table 4.8 (Continued)

No.	Factors	μ	σ	Level	Ranking
4	In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates.	4.42	0.79	High	11
5	The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.	4.45	0.80	High	9
6	The lecturer will select the appropriate teaching materials and network resources according to the course.	4.63	0.59	Highest	1
7	The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury	4.61	0.60	Highest	3
8	In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of the course and the objectives of each stage.	4.45	0.69	High	9
9	In the sports injury course, the lecturers will guide the students to correctly understand the learning content.	4.47	0.73	High	8
10	In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to	4.55	0.72	Highest	4

Table 4.8 (Continued)

No.	Factors	μ	σ	Level	Ranking
	help students learn better.				
11	The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation.	4.16	0.95	High	15
12	The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.	4.50	0.80	High	7
13	The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to improve	4.26	0.92	High	14
14	The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems.	4.37	0.94	High	13
15	During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	4.53	0.80	Highest	6
	Total Average	**4.46**	**0.77**	**High**	

Table 4.8 Indicates that internal factors affecting understanding of prevention sports injury of undergraduate students in Hezhou University overall found at High level (μ=4.35). Considering only each item, it was found that factor No.3 Students feel that sports injury course is the great significance to personal growth and development in future is the highest mean (μ=4.58), follow factor No 5 by Students willingly and proactively use the abilities learned in the sports injury course to help

injured individuals is the highest mean (μ=4.55) and the fewest mean is factor No.8 Students find it easy to stick to coursework and milestones (μ=3.87).

For external factors affecting understanding of prevention sports injury of undergraduate students in Hezhou University overall found at Highest level (μ=4.46). Considering only each item, it was found that factor No.3 The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates and No.6 The lecturer will select the appropriate teaching materials and network resources according to the course are the highest mean (μ=4.63), follow by factors No.7 The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury is the highest mean (μ=4.60) and the fewest mean are factors No.11 The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation (μ=4.16).

The amount of lecturers' interview by table 4.9

Table 4.9 Common data of the respondents in overall (N=3)

Data	Frequency	Percentage
1. Gender		
A. Male	2	66.70
B. Female	1	33.30
Total	**3**	**100.00**
2. Experience teaching		
A. below 3 yrs.	0	0.00
B. 4-6 yrs.	2	66.70
C. 7- 9 yrs.	1	33.30
D. over 10 yrs.	0	0.00
Total	**3**	**100.00**
3. Age		
A. below 25 yrs.	0	0.00
B. 26-30 yrs.	2	66.70
C. 31-35 yrs.	1	33.30
D. over 35 yrs.	0	0.00
Total	**3**	**100.00**

Table 4.9 (Continued)

Data	Frequency	Percentage
4. Professional title		
A. Professor	0	0.00
B. Associate Professor	1	33.30
C. Assistant Professor	0	0.00
D. Lecturer	2	66.70
Total	**3**	**100.00**

From table 4.9 the common data of the respondents in Guangxi Autonomous Region. The most gender is male, 66.70%, the most Experience teaching is 4-6 yrs.,66.70%, the most age is 26-30 yrs., 66.70%, there are two lecturers, accounting for 66.70%, one Associate Professor.

Interview Lecturers Results

After the results from interview with the 3 lecturers, the factors affecting students' learning achievement can be concluded as follows.

Internal Factors

Knowledge and experience

3 lecturers are masters of physical education, proficient in sports injury related knowledge, with high professional knowledge, ideas and abilities. 2 lecturers have 4-6 years of teaching experience and 1 lecturer has 7-9 years of teaching experience. 3 lecturers have rich experience in subject teaching knowledge and mature application of teaching strategy knowledge. They like the course of sports injury very much, and can use different ways to teach and evaluate, which can better mobilize students' enthusiasm and develop students' thinking.

Psychology (Motivation)

3 lecturers love teaching and are willing to devote themselves to teaching. When students encounter learning difficulties or cannot successfully complete the course, they all have a sense of social responsibility and are willing to guide students in appropriate ways. The three lecturers said that vivid explanation, correct guidance, the use of teaching resources in the teaching process, and inspiring and instructive teaching methods can stimulate students' confidence and interest to a certain extent. In different periods of learning sports injury courses, instructors will actively

communicate with students to keep students curious and fresh through different ways, so as to help students master the knowledge and skills of sports injury courses.

Guidance

As the main undertakers of education, the three lecturers play a crucial role in guiding students' learning. Good instructor guidance can not only improve the learning effect of students, but also promote the overall development of students. In the course of teaching, the three lecturers can find the shortcomings of students in time, and guide students to establish correct learning attitudes and values by changing teaching methods, creating teaching situations, and conducting effective communication. Lecturers can stimulate students' learning interest and motivation by setting examples and teaching by example, and guide students to form a positive and diligent learning attitude.

External Factors

Materials

Lecturers believe that rich teaching resources have a very important impact on students, which can directly affect the learning effect and development of students. Online courses, multimedia textbooks, laboratory equipment, etc., these resources can meet the learning needs and interests of different students, and help them better understand and master knowledge. High-quality teaching resources can provide a rich learning experience that stimulates students' interest and curiosity. For example, interactive textbooks, simulation experiments, and multimedia presentations can enrich learning and help students better absorb knowledge. However, the quality of teaching resources and the way they are used can also have a negative impact, which can lead to reduced learning outcomes if resources are used improperly or are not suited to the needs of students. Therefore, educators need to propose the selection and design of teaching resources to maximize student learning and development.

Method of teaching

All three lecturers said that teaching methods have an important impact on students' learning results. Two lecturers have a single teaching method, but the lecturers said that they would learn a variety of mixed teaching methods such as online, offline or online and offline as soon as possible according to the teaching content and students' learning situation, and would use a variety of teaching

methods such as question, project and exploration to teach students, so as to inspire students to have deeper thinking and solve problems in life.

Evaluation

The lecturer believes that assessment and measurement play an important role in the field of education. Assessment and measurement are often accompanied by feedback, which can help to understand students' strengths and weaknesses and guide students to improve learning strategies and skills. Assessments can also provide a basis for personalized learning. By understanding each student's strengths and areas for improvement, educators can provide them with appropriate materials and support to meet their individual needs. Educators can use the results to improve their teaching methods. By analyzing student performance, they can identify weaknesses in teaching and make necessary adjustments to better meet students' needs.

Environment

All three lecturers said that teaching environment is an important basis for the effective implementation of teaching activities. Although the influence of teaching environment on teaching is sometimes not immediate, its potential influence cannot be ignored. The good learning atmosphere created by the classroom learning environment, multimedia equipment and good teacher-student relationship provides good teaching conditions for students' learning. All three instructors promote an interactive and collaborative learning environment. They encourage group discussions, which can enhance students' social interaction, teamwork skills and mutual learning.

Collected from both groups of informants, the researcher synthesizes those factors dividing them into 2 main types – internal and external factors as shown in table 4.10 below.

Table 4.10 Summary of factors affecting understanding of prevention sports injury of undergraduate students

Students' opinion		Lecturers' opinion		Synthesized opinion	
Internal Factors	**External Factors**	**Internal Factors**	**External Factors**	**Internal Factors**	**External Factors**
1) Knowledge Students feel that sports injury course is the great significance to personal growth and develop ment in future and The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	1) Materials and Method of teaching: During the teaching process, lecturers will use shared teaching resources such as teaching platforms, interactive teaching spaces, and live broadcast software to help students learn better.	1) Knowledge and experience Lecturers are proficient in sports injury related knowledge, has good professional knowledge, concept and ability, and has rich teaching experience.	1) Materials: Lecturers can find online courses, build multimedia teaching materials, experimental equipment and other teaching resources.	1) Knowledge and experience The rich knowledge and experience of lecturers can better mobilize the enthu siasm of students, and better teach students related knowledge of sports injury courses, which is helpful to the future growth and development of students.	1) Materials: Both lecturers and students believe that rich teaching resources have a very important impact on students and directly affect the learning effect and development of students.

Table 4.10 (Continued)

Students' opinion		Lecturers' opinion		Synthesized opinion	
Internal Factors	**External Factors**	**Internal Factors**	**External Factors**	**Internal Factors**	**External Factors**
2) Psychology (Motivation) Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge and Students willingly and proactively use the abilities learned in the sports injury	2) Method of teaching The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	2) Psychology (Motivation) Lecturers love teaching and are willing to devote themselves to teaching. When students encounter learning difficulties or cannot successfully complete the course, they have a sense of social responsibility and are willing to guide students in an appropriate way.	2) Method of teaching The lecturer said that according to the teaching content and students' learning situation, he will learn a variety of mixed teaching methods such as online, offline or online and offline as soon as possible, and will use a variety of teaching methods such as question, project and exploration to teach students	2) Psychology (Motivation) Lecturers love teaching, are willing to devote themselves to teaching work, and students have good learning motivation, all of which help to promote students' awareness and understanding of sports injuries.	2) Method of teaching Both lecturers and students agreed that combining teaching methods with the objectives and knowledge competencies in the sports injury curriculum would help to raise students' awareness of sports injury prevention.

Table 4.10 (Continued)

Students' opinion		Lecturers' opinion		Synthesized opinion	
Internal Factors	**External Factors**	**Internal Factors**	**External Factors**	**Internal Factors**	**External Factors**
course to help injured individuals.					
3) Communication and communication skills Students believe that communication can improve Understanding of Prevention Sports Injury.	3) Evaluation During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	3) Guidance: As the main undertaker of education, lecturers play a vital role in guiding students' learning.	3) Evaluation Lecturers believe that a variety of assessment methods, such as online and offline, can help to understand students' strengths and weaknesses and guide students to improve learning strategies and skills.	3) Guided and communication: The guidance of lecturers and the communication between teachers and students can further promote students' learning.	3) Evaluation Both lecturers and students agree that different assessments can better identify student needs as well as weaknesses in teaching, so that necessary adjustments can be made.

Table 4.10 (Continued)

Students' opinion		Lecturers' opinion		Synthesized opinion	
Internal Factors	External Factors	Internal Factors	External Factors	Internal Factors	External Factors
	4) Environment The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.		4) Environment Lecturers advocate the establishment of a good classroom learning environment, multimedia equipment teacher-student relationship.		4) Environment Both lecturers and students agree that a good learning environment can enhance students' understanding and awareness of sports injury courses

From table 4.10 There are three internal factors affecting college students' understanding of sports injury prevention. 1) Knowledge and experience; 2) Psychology (motivation); 3) Guide and communicate. The rich knowledge and experience of lecturers can better mobilize the enthusiasm of students, and better teach students the relevant knowledge of sports injury courses, which is conducive to the future growth and development of students. Lecturers love teaching, are willing to devote themselves to teaching work, and students have good learning motivation, all of which help to promote students' awareness and understanding of sports injuries. The guidance of lecturers and the communication between teachers and students can further promote students' learning.

The external factors affecting college students' understanding of sports injury prevention mainly include 4 points: 1) resources; 2) Teaching methods; 3) Evaluation; 4) Environment. Both lecturers and students believe that rich teaching resources have a very important impact on students and directly affect the learning effect and development of students. Both lecturers and students agreed that combining teaching methods with the objectives and knowledge competencies in the sports injury curriculum would help to raise students' awareness of sports injury prevention. Both lecturers and students agree that different assessments can better identify student needs as well as weaknesses in teaching, so that necessary adjustments can be made. Both lecturers and students agree that a good learning environment can enhance students' understanding and awareness of sports injury courses.

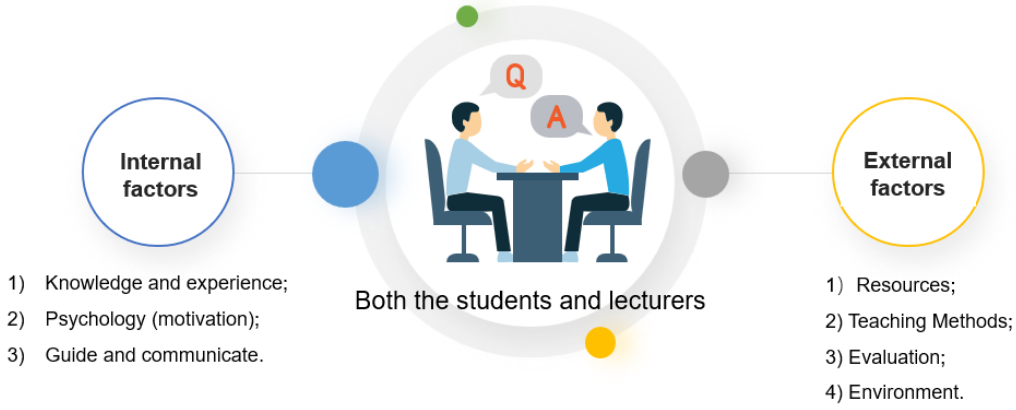


Figure 4.1 Summary of factors affecting
Understanding of prevention sports injury of undergraduate students

Part 2: Analysis results serving objective 2–To develop problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

To serve objective 2, the collected data of confirming the appropriateness of 5 components of instructional model are analyzed in 4 areas, i.e., utility, feasibility, propriety, and accuracy and presented by frequency and percentage of the specialists as shown in table and description below.

Table 4.11 Frequency and percentage of confirmability of utility, feasibility, propriety, and accuracy of the instructional model components in 5 areas by specialists

No	Problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students	Opinion of the specialists															
		Utility				Feasibility				Propriety				Accuracy			
		Agree		Disagree		Agree		Disagree		Agree		Disagree		Agree		Disagree	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Principle and Rationale	5	100	0	0	5	100	0	0	5	100	0	0	5	100	0	0
2	Objectives	5	100	0	0	5	100	0	0	5	100	0	0	5	100	0	0
3	Contents	5	100	0	0	5	100	0	0	5	100	0	0	5	100	0	0
4	Methods of Teaching & Materials	5	100	0	0	5	100	0	0	5	100	0	0	5	100	0	0
5	Evaluation	5	100	0	0	5	100	0	0	5	100	0	0	5	100	0	0

From Table 4.11 the confirmability of each component of the instructional model by 5 specialists can be elaborated as follows.

Principle and Rationale

The utility of principle and rationale of the instructional model is confirmed to be appropriate by 5 specialists or 100% of all specialists; feasibility by 5 specialists or 100%; propriety by 5 specialists or 100%; and accuracy by 5 specialists or 100%.

Objectives

The objectives of principle and rationale of the instructional model is confirmed to be appropriate by 5 specialists or 100% of all specialists; feasibility by 5 specialists or 100%; propriety by 5 specialists or 100%; and accuracy by 5 specialists or 100%.

Contents

The contents of principle and rationale of the instructional model is confirmed to be appropriate by 5 specialists or 100% of all specialists; feasibility by 5 specialists or 100%; propriety by 5 specialists or 100%; and accuracy by 5 specialists or 100%.

Methods of Teaching & Materials

The methods of teaching & materials of principle and rationale of the instructional model is confirmed to be appropriate by 5 specialists or 100% of all specialists; feasibility by 5 specialists or 100%; propriety by 5 specialists or 100%; and accuracy by 5 specialists or 100%.

Evaluation

The evaluation of teaching & materials of principle and rationale of the instructional model is confirmed to be appropriate by 5 specialists or 100% of all specialists; feasibility by 5 specialists or 100%; propriety by 5 specialists or 100%; and accuracy by 5 specialists or 100%.

In conclusion, the unanimous confirmation by the specialists in terms of utility standards, feasibility standards, propriety standards, and accuracy standards attests to the robustness of the development of problem based learning and blended learning instructional model. It strongly suggests that this model, with its components, is well-positioned to enhance students' understanding of prevention sports injury.

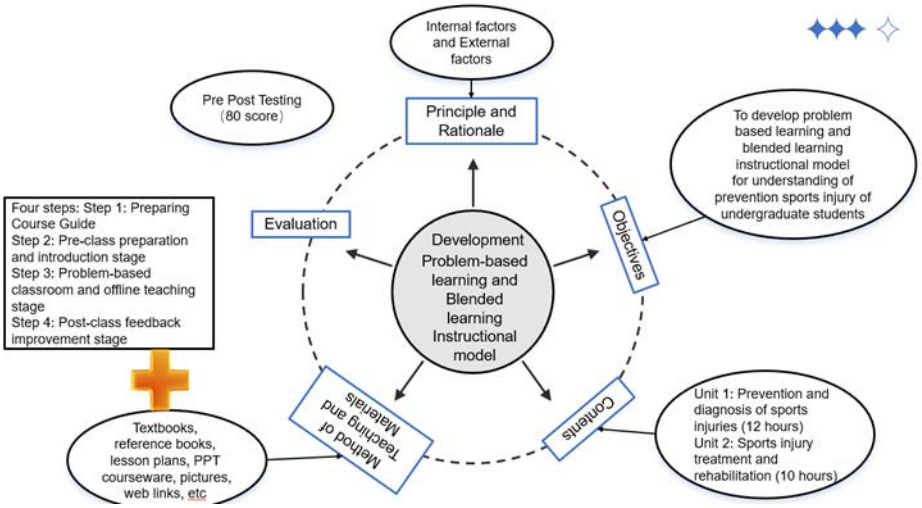


Figure 4.2 Development problem based learning and blended learning instructional model

Part 3: Analysis results serving objective 3–To study the results of implementing problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students. (Pretest-Posttest)

Objective 3 analysis results are presented in 2 ways in this section: (1) comparing Student sports injury learning achievement between before and after the experiment using t-test for one-sample group which provide significant difference between before and after Learning, and (2) reporting individual relative development score (gained score) according to developmental rate as specified in chapter 3 with table and figure.

Table 4.12 The results of the sample group of students' sports injury learning achievement before and after learning.

Group	Scores	n	$\overline{X}$	S.D.	t	df	Sig.
Sample Group	Pretest	40	38.03	6.104	-7.782	39	.000
	Posttest	40	49.05	12.006			

*p<0.01

From table 4.12, the pretest average score is $\overline{X}$=38.03, S.D.=6.104, posttest average score is $\overline{X}$=49.05, S.D.=12.006. The posttest score is higher than pretest score 11.02. The results from t-test shows t-value of -7.783 which is higher than t-distribution (Normal distribution) and p value = 0.000 (*p < 0.01). It can be concluded that the impact of sports injuries on the academic performance of the sample group students before and after study is very significant.

Table 4.13 Relative developmental score of students' sports injury learning achievement of the sample group students.

No.	Pretest Score (80)	Posttest Score (80)	Relative developmental score (100)	Development Level
1	54	61	27	Moderate
2	52	70	64	High
3	50	60	33	Moderate
4	47	49	6	Low
5	45	68	66	High
6	44	78	94	Very High
7	43	57	38	Moderate
8	43	47	11	Low
9	42	56	37	Moderate
10	42	65	61	High
11	42	65	61	High
12	41	44	8	Low
13	41	63	56	High
14	41	43	5	Low
15	39	52	32	Moderate

Table 4.13 (Continued)

No.	Pretest Score (80)	Posttest Score (80)	Relative developmental score (100)	Development Level
16	39	41	5	Low
17	38	51	31	Moderate
18	38	41	7	Low
19	37	48	26	Moderate
20	37	47	23	Low
21	36	77	93	Very High
22	36	46	23	Low
23	36	45	20	Low
24	36	45	20	Low
25	35	50	33	Moderate
26	35	40	11	Low
27	35	38	7	Low
28	35	47	27	Moderate
29	34	51	37	Moderate
30	34	35	2	Low
31	34	43	20	Low
32	33	33	0	Low
33	32	43	23	Low
34	32	40	17	Low
35	32	36	8	Low
36	32	44	25	Low
37	32	46	29	Moderate
38	31	34	6	Low
39	30	32	4	Low
40	26	31	9	Low
Total Average	**38.03**	**49.05**	**27.6257**	**Moderate**

Table 4.13, in overview, the relative developmental scores of individual students' students' sports injury learning achievement is found at Moderate level ($\overline{X}$ =27.6257).

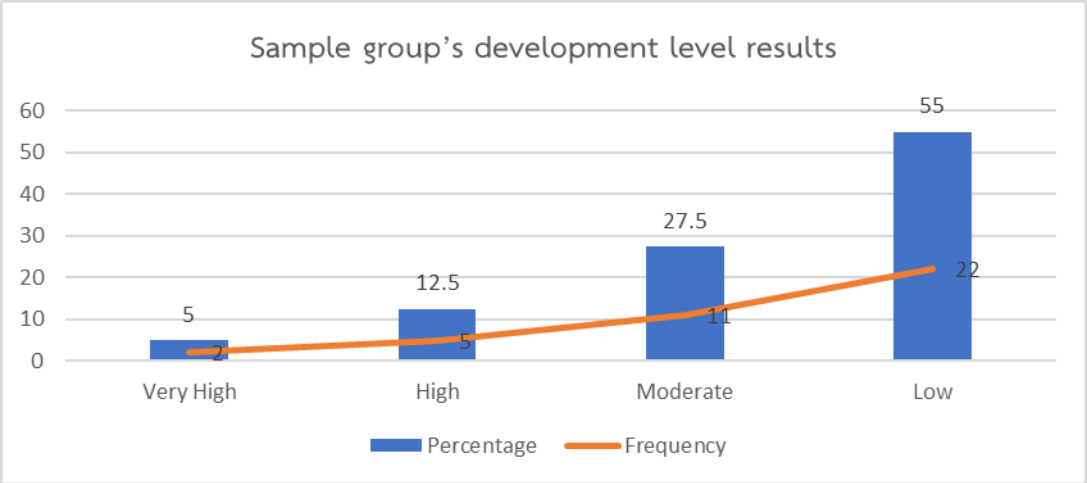


Figure 4.3 Sample group's development level results.

Figure 4.1, Indicates that there are 2 students or 5 % of all students at "**Very High**" developmental level of sports injury learning achievement; 5 students or 12.5% at "**High**" developmental level; 11students or 27.5% at "**Moderate**" developmental level; and 22 students or 55% at "**Low**" developmental level.

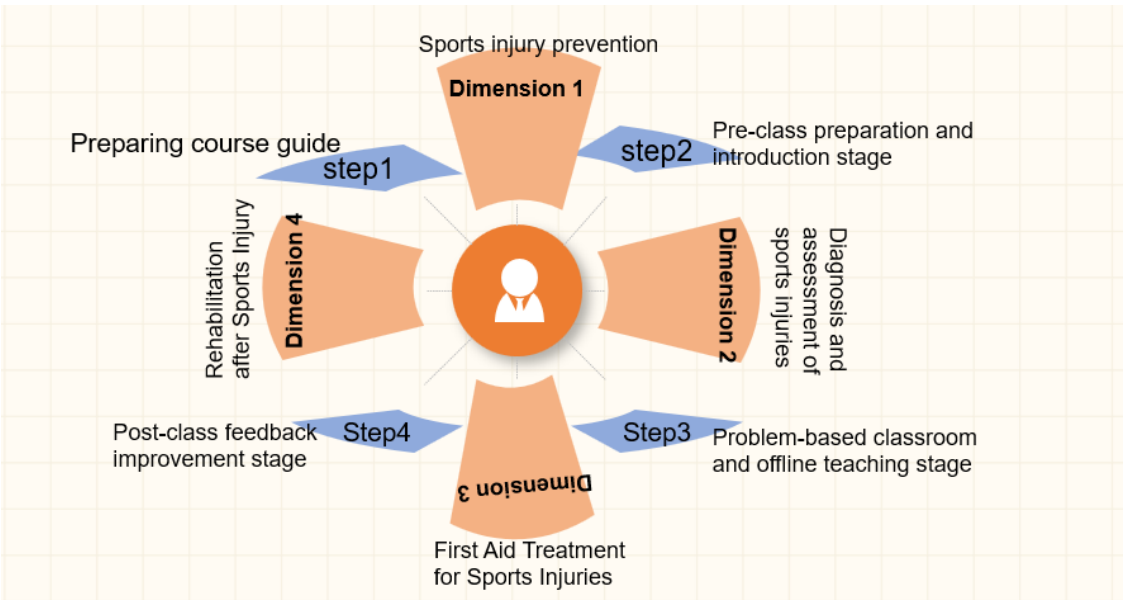


Figure 4.4 Development of problem based learning and Blended learning instructional model for Understanding of prevention sports injury of Undergraduate students

Chapter 5
Conclusion Discussions and Recommendations

After analyzing and presenting data analysis results in chapter 4 as serving all research 4 research objectives of the present study “Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students”, it can be concluded and discussed as follows. Further, some approaches are recommended on basis of the findings.

Conclusion

From the objectives of research

1. There are 2 Factors 1) internal factors and 2) externals factors from both the students and lecturers affecting college students' understanding of sports injury prevention. Internal factors affecting understanding of prevention sports injury of undergraduate students in Guangxi Autonomous. There are 3 internal factors mainly include 1) Knowledge and experience 2) Psychology (motivation); 3) Guidance and communicate and there are 4 external factors mainly include 1) Resources; 2) Teaching methods; 3) Evaluation; 4) Environment.

2. Problem based learning and blended learning instructional model consisted of principle and rationale, objectives, contents, method of teaching and materials, Evaluation. The Model included (1) Preparing Course Guide; (2) Pre-class preparation and introduction stage; (3) Problem-based classroom and offline teaching stage; (4) Post-class feedback improvement stage was 100% confirmed by 5 experts for further Implementation.

3. The results of implementing the developed problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

3.1 After the experiment, students’ understanding of prevention sports injury was higher than that before the experiment at significance level 0.01.

3.2 The relative developmental scores of individual students’understanding of prevention sports injury is found Moderate level ($\overline{X}$ =27.6257). 5 % of all students at “Very High” developmental level; 12.5% of all students at “High” developmental

level; 27.5% of all student at “Moderate” developmental level; 55% of all students at “Low” developmental level. Indicating a significant improvement in understanding of prevention sports injury.

Discussions

1. There are 2 Factors 1) internal factors and 2) externals factors from both the students and lecturers affecting college students' understanding of sports injury prevention. Internal factors affecting understanding of prevention sports injury of undergraduate students in Guangxi Autonomous. There are 3 internal factors mainly include 1) Knowledge and experience 2) Psychology (motivation); 3) Guidance and communicate and there are 4 external factors mainly include 1) Resources; 2) Teaching methods; 3) Evaluation; 4) Environment concerning the following:

1.1 Data obtained through surveys of learners and interviews with lecturers indicate

that internal factors can affect learners’ learning of sports courses. As Teng and Fan (2007), Chen (2003) and Zhang (2016) and other scholars pointed out, internal factors affect learning effects to varying degrees. The improvement of internal factors will improve the quality of teaching and promote the effectiveness of teaching success. Ninedek and Kelt (2000) considered communication skills, positive attitude, intrinsic motivation, and realistic goal setting as important aspects of effective rehabilitation. Wan and Zhu (1995) Tang (2005) proved existing knowledge and experience in internal factors can help understand the knowledge encountered in the learning process and transform it into Psychological perception directly affects students' understanding and mastery of knowledge.

1.2 Zhu (2001) pointed out that various teaching methods, methods, resources, etc.

can stimulate learning motivation to varying degrees, thereby further arousing students' learning interest and enthusiasm, thereby further improving learning performance. Everson and Millsap (2004), Feng (2007) believed that environmental factors among external factors affect students' learning engagement and have a positive impact on students' learning motivation. Wang (2002) and Wang (2017) proved that adopting effective teaching strategies to solve problems is conducive to improving the quality and effect of teaching. Deng and Chen (2012)

believed that external factors and internal factors are complementary and work together to make teaching more complete and have an important impact on learning.

2. Problem based learning and blended learning instructional model was 100% confirmed by 5 experts for further Implementation concerning the following**:** The 5 components of the instructional model are confirmed by five specialists to be appropriate for further implementation. The confirmability results can be supported by unanimous agreement from the specialists across all components, utility standards, feasibility standards, propriety standards, and accuracy standards. In the detailed analysis, it's noteworthy that:

The principle and rationale of the instructional model was unanimously confirmed by all the specialists in terms of its utility standards, feasibility standards, propriety standards, and accuracy standards. These suggests that the underlying theory and reasoning of the development of problem based learning and blended learning instructional model are robust and conducive to enhance undergraduate students' understanding of prevention sports injury.

The objectives of the instructional model were agreed upon by all specialists. This unanimity indicates that the goals set by the model are clear, relevant, and aimed at enhancing students' learning achievement.

The contents component also received a 100% confirmability score from all the specialists, underlining that the learning material and topics are suitable and well-designed for the model's aim.

The methods of teaching & materials were confirmed to be useful, utility standards, feasibility standards, propriety standards, and accuracy standards.

The evaluation component was unanimously confirmed by all specialists, underlining the effectiveness and appropriateness of the evaluation and feedback mechanisms to assess, and enhancing students' understanding of prevention sports injury.

In conclusion, the unanimous confirmation by the specialists in terms of utility standards, feasibility standards, propriety standards, and accuracy standards attests to the robustness of the development of problem based learning and blended learning instructional model. It strongly suggests that this model, with its

components, is well-positioned to enhance students' understanding of prevention sports injury.

3. The results of implementing the developed problem based learning and blended learning instructional model for understanding of prevention sports injury of undergraduate students.

3.1 After the experiment, students' understanding of prevention sports injury was higher than that before the experiment at significance level 0.01, concerning the following**:**

After adopting problem-based learning and blended learning teaching methods, undergraduate students performed very well in preventing sports injuries, with a p-value of 0.000 (*p<0.01). The mean score for predictions was $\overline{X}$=38.03, S.D.=6.104, while the mean score for subsequent measurements was $\overline{X}$=49.05, S.D.=12.006. The average score on the post-test exceeded the pre-test score of 11.02 points. Clearly, adopting a blended learning approach can significantly improve students' academic performance. As Deslauriers, Schelew, and Wieman (2011) described the blended teaching approach, student engagement and academic performance are significantly enhanced. Therefore, teachers can try to apply this model to the teaching of other courses to promote the overall improvement of students' learning abilities. Of course, if you want to achieve or even exceed the effects of traditional classroom teaching, careful teaching design is required.

3.2 The relative developmental scores of individual students' understanding of prevention sports injury is found Moderate level ($\overline{X}$=27.6257). 5 % of all students at "Very High" developmental level; 12.5% of all students at "High" developmental level; 27.5% of all student

at "Moderate" developmental level; 55% of all students at "Low" developmental level. Indicating a significant improvement in understanding of prevention sports injury concerning the following**:**

Students' relative development scores for sports injury academic achievement were overall Moderate ($\overline{X}$=27.6257), meaning that 2 students or 5% of all students achieved "very high" for sports injury academic achievement level of development; 5 students, or 12.5%, are in the so-called "high" development stage; among 11 students, 27.5% are in the so-called "moderate" development stage; among 22 students, 55% of people are in the so-called "low" stage of development.

The problem-based blend teaching method mentioned by Hui (2022) can meet the individual needs of students and improve their language skills and thinking abilities, but at the same time, it must also ensure the seamless connection between online and offline teaching.

Recommendations

The findings from the present study bring twofold suggestions: applicability of the results and future research.

1. To increase the students' awareness and understanding of sports injuries, to have a strong interest in this course and conduct in-depth communication and sharing during interactions with teachers. During the learning process, the lecturer should strengthen thinking, communication and expression of their own opinions.

2. To use the quality various ways of the method of teaching.

3. To use a variety of different resources and materials and adopt various learning methods, to let the students can understand and master knowledge more deeply, thus improving their learning results.

4. The lecturers have the way how to guide students to engage in inquiry-based learning to ensure that each student receives sufficient attention, must control the connection between students' online and offline knowledge to ensure that students have a learning progress is monitored and they are provided with personalized guidance where necessary.

5. The lecturers have a guidance, further activating and enhancing students' problem-solving skills, and cultivating their innovative thinking abilities with high-quality online learning resources, required resources, organize various interesting learning activities for students, and ensure that students can review homework in time and check the completion of tasks.

6. The institute in order to promote teaching progress and improve educational quality, higher education institutions should deepen the research and expansion of online teaching platforms to meet the various needs of teachers and students and ensure that they have richer resources to use, thereby Improve learning outcomes more effectively to strengthen the training of teachers in teaching theoretical knowledge and practical skills, and conduct in-depth research on how to

use blended learning technology teaching methods to ensure the high quality of teaching.

Future Research

1. Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of another skills of Undergraduate Students.

2. Development of another in structural model for understanding of prevention sports injury of undergraduate students.

3. Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of another Course of Undergraduate Students.

References

Bai, J. T. (2008). "Quality Education Ability Cultivation and Training", *Henan People's Publishing House*, p. 11

Bao, Q. (2005). Common sports injuries and prevention in tennis. *Journal of Nanjing Institute of Physical Education: Natural Science Edition*, 4(2), 62-65.

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education* (Vol. 1). Springer Publishing Company.

Bruce, J., (USA) Marsha, W., & (USA) Emily, C. (2009). *Teaching mode*. Beijing: China Light Industry Press.

Burke, J. and Larry, C. 2004. *Educational Research*. 2nded. Boston: Pearson Education Inc.

Cai, A. H., Zhou, Y. Y., & Jiang, Y. (2009). Research on the correlation between learning motivation and learning adaptability of nursing college students. *Journal of Nursing*, 16(6), 19-22.

CAI, J. J. (2017). *A study on Cognition and Prevention of Sports Injury among varsity athletes of Beijing Sport University*. Bei Jing: Beijing Sport University.

Carman, J. M. (2005). Blended learning design: Five key ingredients. *Agilant Learning*, 1(11), 1-10.

Chen, J. (2011). *Experimental Research on High School Information Technology Blended Learning Mode Based on New Curriculum Reform*. Henan: Henan Normal University.

Chen, J. T., Zhan, J. M., & Chen, H. D. (2021). *Research and Practice on Deep Integration of Information Technology and Curriculum*, Changchun, Jilin University Press.

Chen, P. F. (2020). *Study on the influence of sports WeChat public accounts on middle-aged people's sports cognition and exercise behavior*. Shanxi: Shanxi Normal University.

Chen, Q. M. (2012). *Research on the construction of PBL blended classroom teaching model and resource platform*. (Doctoral dissertation, Zhejiang University of Technology).

Chen, S. D. (2003). Correlation analysis of environmental factors and English learning. *Research on Higher Education in Science and Engineering*, (2), 111-113.

Chen, S. J. (2006). Analysis of Teaching Structure Elements in Blended Learning Mode. *Journal of Qujing Normal University*, 25(3), 94-98.

Cheng, Y. F. (2022). *Research on the Mixed Teaching Mode of Safety Education in Electric Power Enterprises.* Jiangxi: Jiangxi Normal University.

Cho, H., Cho, S. M., Cho, B. M., Jeong, S. H., & Cho, S. Y. (2021b). A Study on Key Components of Problem-Based Learning through Literature Review. *Journal of Problem-based Learning*, 8(2), 69–74. https://doi.org/10.24313/jpbl.2021.00045

Chu, M., Chen, X., Pei, J., Li, Y., Xu, L., Yao, Y. F., ... & Wang, Y. D. (2020). Design and application of problem-based blended teaching in medical immunology experimental teaching. *Chinese Journal of Immunology*, 36 (18), 2257.

Deng, P., & Chen, Y. P. (2012). Analysis of bilingual teaching model of communication based on internal and external factors. *Today's Media*, (9), 139-141.

Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved the learning effect of college students' physics courses. *Science*, 332(6031), 862-864.

Ding, L. H., Liao, Z, H., & Zhu, L. N. (2023). A cross-sectional survey on the knowledge needs of cardiopulmonary resuscitation and first aid skills among non-medical college students. *Clinical Medicine Practice*, 32(7):557-560.

Ding, L. W. (2022). *Research on Application of SPOC Mixed Teaching Mode for Cultivating Higher Order Thinking Ability of College students -- A case study of Modern Educational Technology Course*. Jilin: Yanbian University.

Du, S. T. (2017). The role of prevention and early treatment of sports injuries in physical education teaching. *Contemporary Sports Science and Technology*, 7(7), 17-18.

Everson, H. T., & Millsap, R. E. (2004). Beyond individual differences: Exploring school effects on SAT scores. *Educational Psychologist*, 39(3), 157-172.

Fan, Q. Z., Liang, M., & Yu, C. L. (2023). A Preliminary Exploration of Goal-Problem-Oriented Blended Teaching Reform -- Taking "Environmental Engineering Microbiology" as an Example. *Education and Teaching Forum*. (5):66-69

Feng, J. (2007). The impact of art teaching environmental factors on students' learning motivation. *Art Exploration*, 21(1), 65-65.

Feng, K. R. (2018). The internal and external causes of "students with learning difficulties". *Collection*, 19.

Feng, X. Y., Wang, R. X., & Wu, Y. J. (2018). A Review of the Research Status of Blended Teaching at Home and Abroad--Based on the Analytical Framework of Blended Teaching. *Journal of Distance Education*, 36(3), 13-24.

Fraenkel, J. R. and Wallen, N.E. (2006). *How to Design and Evaluate Research in Education*. 6thed. New York: McGraw-Hill Companies, Inc.

Gao, H. M., Guan, Y. J, & Zhu, R. P. (2021). Research on the Innovation of English Teaching in Colleges and Universities. *Jilin People's Publishing House*.

Ge, Y. Z. (2018). *Research on the Self-prevention and Handling Ability of Sports Injuries of Non-Physical Education Students in Regular Universities--Taking Hebei Agricultural University as an Example*. Hebei: Hebei Normal University.

General Office of the State Council of China. (2019). *Document issued by the State Council: Promote national fitness and sports consumption and promote high-quality development of the sports industry*. from https://www.gov.cn/gongbao/content/2019/content_5433722.htm

Guan Yan Report Network. (2022). *China Sports Rehabilitation Industry In-depth Research and Development Prospect Research Report (2022 ~ 2029)*. Retrieved August 8, 2023 from https://www.chinabaogao.com/pdf/62/85/606285.pdf

Guo, J. (2008). Common motor system injuries and self-help. *Family Medicine: Second Half of the Month*, (8), 40-41.

Hambleton, R. K. (1980). *Test score validity and standard-setting methods*. In R. A. Berk (Ed.), Criterion-refernced measurement: The state of the art (pp. 80-123). Baltimore: The John Hopkins University Press.

He Zhou University. (2015). *Strengthening practical education: the only way to cultivate applied talents*. Retrieved August 8, 2023 from https://www.hzxy.edu.cn/info/1130/2144.htm

He, F. M. (2020). *Practical research on the cultivation of high school students' biological problem-solving ability based on PBL teaching mode* (Master's thesis, Guangxi Normal University).

He, K. K. (2004). Viewing the New Development of Educational Technology Theory from Blending Learning (Part 1). *Audiovisual Education Research*, (3), 1-6.

He, X. Y., & Shu, J. J. (2009). Discrimination and Analysis of Teaching Models. *Vocational and Technical Education*, (35), 21-22.

Higher Education Teaching Steering Committee of the Ministry of Education. (2018) *National Standards for Undergraduate Professional Teaching Quality in Ordinary Colleges and Universities*. Beijing: Higher Education Press.

Hong, Y. H. (2023). Practical Research on the Blended Teaching Mode Based on "MOOC+SPOC"--Taking the Course of "Corporate Financial Practice" as an Example. *Business Accounting*, (7):125-129.

Hou, Z. J., & Hou, J. Z. (2011). Influencing factors and countermeasures of the implementation of PBL teaching mode. *Journal of Liaoning University of Traditional Chinese Medicine*, 13(10), 26-28.

Hu, S. L., Xu, J. Y., Li, J., Ma, J.L., & Liu, S. S. (2023). Application effect of problem-based teaching method combined with clinical pathway teaching mode in tumor teaching. *China Medical Herald*, 20(1), 77-80.

Hu, X. X. (2021). *Practical Exploration of PBL-Based Mixed Teaching Mode in Junior Middle School Mathematics Teaching* (Master's thesis, Kashi University).

Huang, R. H., Martin, Zheng, L. Q., & Zhang, H. S. (2009). Curriculum Design Theory Based on Blended Learning. *Audiovisual Education Research*, (1), 9-14.

Hui, X. (2022). *Problems and countermeasures in college English blended teaching mode. Advances in Education*, 12(05), 1619–1624. https://doi.org/10.12677/ae.2022.125250

Jin, W. (2016). Research on the application of micro-course teaching in the "Sports Injury Rescue" course in higher vocational sports. *Contemporary Sports Science and Technology*, 2016, 6(27): 120-121. DOI: 10.16655/j.cnki.2095-2813.2016 .27.120.

Kong, Y., & Zhang, X. S. (2005). Discussion on internal and external factors and their dialectical relationship in improving teaching quality. *Journal of Guangxi Commercial College*, 22(4), 64-66.

Le, G. L., & Tian, J. F. (2001). Analysis of Factors Affecting Problem Solving. *Journal of Gannan Normal University*, (2), 61-64.

Li, J. H. (2003). Cultivation of Students' Advanced Thinking Ability in Educational Information Environment. *China Audio-visual Education*, (9), 59-63.

Li, J. P., Wang, R., Su, L. Q., & Chen, H. C. (2020). Research on teaching first-aid skills for sports injuries in colleges and universities. *Journal of Fujian Medical University* (Social Science Edition).

Li, K. M., Zhao, F. L., & Sun, Z. K. (2012). Analysis of PBL teaching mode. *Chinese Modern Distance Education of Traditional Chinese Medicine*, 10(1), 64-64.

Li, M. (2014). Talking about the prevention and early treatment of sports injuries in college physical education classes. *Knowledge Economy*, (6), 166-166.

Li, Q. (2004). On the Internal and External Factors Affecting Learning Motivation. *Journal of Xu Chang University*, 23(3), 127-128.

Li, R. X. (2020). *Research on the application of online learning space for college students based on the mixed teaching model* (Master's thesis, Hebei Normal University).

Li, W. L. (2012). Analysis of Influencing Factors of Teaching Method Based on Problem Learning. *Vocational Education Research*, (1), 141-143.

Li, X. (2009). Reform of the teaching model of basic computer education in universities. *Popular Science and Technology*, 2009(4):180-181. DOI:10.3969/j.issn.1008-1151.2009.04.089.

Li, Y. D. (2010). *Development and application of high school information technology subject learning system based on PBL* (Master's thesis, Shanxi Normal University).

Liang, W, N. (2005). Sports Injury Pain. *Continuing Medical Education*, 19(3), 25-27.

Liang, X. J. (2020). *Investigation and Research on the Development of College English Teachers' Teaching Ability Based on MOOC Blended Teaching* (Master's thesis, Hebei Normal University).

Lin, X. J. (2014). Investigation and analysis of several wrong behaviors among middle school students participating in physical exercise. *Sports*, (7), 63-64.

Lin, Y. Y., Wei, A. N., & Chen, Y. (2014). Construction and implementation of a blended teaching model combining traditional classroom and MOOC. *Journal of Taizhou University*, 36(6), 79-83.

Liu, B. L. (1988). Interaction is also based on--Re-understanding of the concept of "internal cause" and "external cause". *Journal of Wuhan Institute of Physical Education*, (1), 77-80.

Liu, C. (2021). *Mixed online and Offline teaching model and application research based on HoloLens*. Hubei: Central China Normal University.

Liu, K. l., Sun, L. Q., & Tian, Y. H. (2023). Research on the application of problem-based blended teaching in preventive medicine courses. *China Higher Medical Education*, 2023 (3): 60-62

Liu, M. L. (2003). Design of Problem-Based Learning (PBL). *Modern Distance Education Research*, (1), 39-43.

Liu, Y. F. (2018). Research on the cultivation of sports rehabilitation professionals in colleges and universities under the background of sports and medical integration. *Journal of Harbin Institute of Physical Education*, 36(4), 42-45.

Liu, Z. H. (2018). *Research on the Humanities and Social Sciences Research Papers Series of Academic Libraries in Colleges and Universities: Research on the Integrated Teaching Model of English Reading and Writing.* Beijing: China Books Publishing House.

Luo, H.Y. (2018). Research on the Innovation of Blended Teaching Mode in Applied Undergraduate Colleges--Taking "Sensor Principles and Applications" as an Example. *Vocational and Technical Education*,39 (17):34-36.

Ninedek, A., & Kelt, G. S. (2000). Sport Physiotherapists' Perceptions of Psychological Strategies in Sport Injury Rehabilitation. *Journal of Sport Rehabilitation*, 9(3), 191–206. https://doi.org/10.1123/jsr.9.3.191

Pan, F., & Fan, X. M. (1994). Re-understanding of Internal and External Causes. *Journal of the Party School of Shanxi Provincial Committee of the Communist Party of China*, (2), 46-49.

Pan, Z., & Yao, N. (2022). Research progress on cognition and training of cardiopulmonary resuscitation among college students. *Chinese School Medicine*, 36(7), 556-559.

Phongsri, P. (2011). *Education Research*. Bangkok: property Print.

Phongsri. P. (2011). *Creation and development research tools*. Bangkok: Tonkaew Printing.

Pian, K. (2022). *Research on the application of mixed teaching mode in the junior high school "Physical Education and Health" course*. Shandong: Shandong Institute of Physical Education.

Qi, L. (2019). *Research on teaching design of chemistry unit in ordinary high school under the teaching concept of PBL* (Master's thesis, Northwest Normal University).

Qiu, F., Qin, Z. L., & Cui, D. G. (2015). The relationship between physical activity risk perception and sports injury and exercise behavior of college students. *Journal of Wuhan University of Physical Education*, 49(6):75-81.

Rong, M. M. (2022). *Practical research on improving junior high school students' participation in physics class based on PBL teaching model - taking the teaching practice of Qingxi Middle School in Dongguan City as an example*. Guangxi: Guangxi Normal University.

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion referenced test item validity. *Dutch Journal of Educational Research*, 2, 49-60.

Schmidt, H. G. (1993). Foundations of problem-based learning: some explanatory notes. *Medical education*, 27(5), 422-432.

Sheng, Yao. (2022). *Research on the Effective Teaching Behavior Framework and Evaluation Index System of Mixed Teaching Teachers in Colleges and Universities*. Jiangxi: Jiangxi Normal University.

Shi, D. L, & Zhang, A. Z. (2004). Investigation and etiology analysis of sports injuries among college students in my country. *Journal of Wuhan Institute of Physical Education*, 38(3), 52-53.

Singh, H., & Reed, C. (2001). *Achieving success with blended learning*. American Society for Training and Development, state of the art industry reports 2001.

Song, L. M., Sun, M., & Zhang, X. (2023). Exploration and Practice of Blended Teaching Based on Chaoxing Panya Platform--Taking the Course of "Basic Electrical Technology" as an Example. *Industry and Information Technology Education*, (3): 41-44.

Song, S. P., Chen, K. Z., & Mo, Z. (2022). Analysis of Factors Affecting Students' Sports Injury Prevention and Handling Ability of Hotan Vocational and Technical College. *Stationary Goods and Technology*, (14):95-98.

State Council of China. (2016). “Healthy China 2030" Planning Outline. *The State Council Bulletin of the People's Republic of China*, 0(32): 5-20. from

https://www.gov.cn/xinwen/2016-10/25/content_5124174.htm?wm=3049_0006987801931

Stufflebeam, D. L. (2001). The Metae valuation Imperative. *American Journal of Evaluation*,22 (2),183-209. Retrieved July 24, 2022 from http://aje.sagepub.com cgi/content /abstract/22/2/183

Sun, A. D. (2004). On the role of preventive health care in colleges and universities. Chinese *Journal of School Medicine*, 18(3), 207-207.

Sun, F., Sun, J. Y., & Jia, S. (2021). *Online Open Course Construction and Management*. Beijing: Beijing Institute of Technology Press.

Tang, J. (2005). Context and English reading teaching. *Teaching and Management: Theoretical Edition*, (11), 72-73.

Tang, X. (2014). The importance of participatory teaching model in biology teaching. *Education and Teaching Forum*, 2014(37):68-68,69.

Teng, D. M., & Fan, X. F. (2007). Improving internal and external factors to improve the quality of English major teaching. *Times Education: Journal of Education and Teaching*, (09Z), 61-62.

Teng, X. Q. (2021). Research on the application of blended teaching mode in the course of "E-commerce Customer Service" in secondary vocational schools. *Guangxi Education*.

Tian, F. P, & Jiao, D, L. (2005). Practical exploration of the mixed teaching mode in colleges and universities under the information environment. *Audio-visual Education Research*, (4), 63-65.

Tian, J. (2018). *Sports Traumatology*. Beijing: Beijing Sport University Press.

Tian, S. S., & Fu, G. S. (2004). Preliminary Research on Blended Learning. *Audiovisual Education Research*, (7), 7-11.

Tian, X. J. (2021). *Practice and research of mixed teaching mode in high school history subject*. Hebei: Hebei Normal University.

Turner, R. C., & Carlson, L. (2003). “Indexes of item-objective congruence for Multiple dimension items.” *International Journal of Testing*, 3(2), 163-171.

Wan, Y. Y, & Zhu, L. (1995). The influence of knowledge experience, intelligence and learning ability on reading comprehension. *Psychological Science*, (3), 182-183.

Wang, F. (2012). A brief discussion on the causes and preventive measures of sports injuries in middle school physical education teaching. *Science Education*, (1), 22-23.

Wang, J. Z. (2018). *Integrated Research on Theme Course Development and Implementation*. Beijing: Guang Ming Daily Publishing House.

Wang, L. (2022). Research on Cognition and Prevention of Football injury among Amateur football players. *Cultural and Sports Products and Technology*, (13):131-133.

Wang, M. Y. (2022). SWOT analysis of mixed teaching mode. *Heilongjiang Science*.

Wang, Q. (2017). A brief analysis of the factors and countermeasures that restrict the effectiveness of college English teaching. *Intelligence*, (29), 108-109.

Wang, Q. (2018). *The application and research of high school mathematics under the PBL teaching mode* (Master's thesis, Liaoning Normal University).

Wang, Q. M. (2002). Factors restricting the effectiveness of college English teaching and countermeasures. *Foreign Language Circle*, (4), 27-35.

Wu, L., & Wei, X. (2008). On the importance of reform of teaching models in colleges and universities. *The Road to Talent*, (36), 23-24.

Wu, Q. D. (2011). A Brief Discussion on Teaching Mode. *Learning Theory*, (33), 220-221.

Wu, Y. Q., & Li, K. Q. (1998). *Teaching Mode*l. Beijing: China Personnel Publishing House.

Wu, Z. Y. (2011). The influence of external factors and internal factors on piano teaching. *Northern Music*, (10), 7-8.

Xiao, H. B., & Li, Y. F. (2010). Research on Project Curriculum Development and Implementation Based on Job Tasks. *Journal of HuangGang Vocational and Technical College*, (1), 59-62.

Xiao, W., & Yu, J. (2008). Research on college students' mastery of sports and health care knowledge and skills. *Journal of Jiangxi Science and Technology Normal University*, (6), 125-127.

Xiao, W., & Yu, J. (2008). Research on college students' mastery of sports and health care knowledge and skills. *Journal of Jiangxi Science and Technology Normal University*, (6), 125-127.

Xiao, Y. G. (2018). Realistic Considerations and Cultivation Strategies of College Students' Employability. *Education and Teaching Forum*, (46): 216-217

Xin, P. (2023). A Preliminary Study on Problem-Oriented Blended Teaching of College Physics. *Journal of Jilin Technology and Business University*, 39(3):126-128

Xiong, J. C. (2020). First aid and self-rescue for sports injuries in public physical education courses in colleges and universities. *Boxing and Fighting*, 2020(24):98,100.

Yang, Y. G. (2008). *Investigation on sports injury cognition of Physical education major students and training team members in colleges and universities in Shijiazhuang*. Hebei: Hebei Normal University.

Yin, Y. N. (2019). A brief discussion of the importance of digital teaching models. *Journal of Science and Education (Electronic Edition)* (29), 134.

Yu, X. J. (2020). *Exploration of EPIP Teaching Mode of Engineering Practice Innovation Project*. Tianjin: Tianjin University Press.

Zhang, C., Meng, F. B., & Zhu, F. (2014). Analysis on the popularization and education of on-site rescue skills in higher vocational colleges. *Journal of Taiyuan City Vocational and Technical College*, (9), 80-81.

Zhang, H. (2016). Internal and external factors that stimulate students' interest in English learning. *Chinese Science and Technology Journal Database (Abstract Edition) Education*, (10), 00181-00181.

Zhang, L. L. (2017). The importance of hierarchical teaching model and its practical research in high school physical education teaching. *Yangtze River Series* (18), 244.

Zhang, S. J., & Kong, X. Y. (2006). Network course development and mixed teaching mode. *Higher Science Education*, (3), 57-60.

Zhang, X. W., Ji, D. K., Zhang, H. M., Meng, Q. B., Cao, X. L., & Li, X. (2016). *Research on school-based teaching model*. Tianjin: Tianjin People's Publishing House.

Zhao, J. (2021). *Experimental research on the mixed teaching mode of body dance in colleges and universities* (Master's thesis, Guangxi Normal University).

Zhong, X. Y. (2020). Qualitative Research on the Influencing Factors of PBL Model English Reading Teaching Effect. *Journal of Huizhou University*, 4.

Zhu, B. M. (1997). *Implementation Plan for Teachers' Basic Skills Training*. Jilin: Jilin University Press.

Zhu, Q. P. (2001). On the cultivation of learning motivation and interest in English teaching. *Journal of Nantong Vocational University*, 15(1), 100-102.

Zhu, Z. T., & Meng, Q. (2003). Blended Learning in Distance Education. *China Distance Education*, (19), 30-34.

Zhuo, Y. (2012). *New Curriculum and Teaching of Information Technology*. Chongqing University Press, March p. 73.

Appendices

Appendix A

List of Specialists and Letters of Specialists Invitation for IOC Verification

List name the specialist to check research instruments for IOC

1. Assistant Professor Dr.Wapee Kong -In	English Program Bansomdejchaopraya Rajabhat University
2.Assistant Professor Dr. Saipon Sonsiengchai	Education Program of Institute of Science Innovation and Culture (ISIC) Rajamangala University of Technology Krungthep
3. Assistant Professor Dr. Prapai Sridama	Computer and Teachbnolog Program Bansomdejchaopraya Rajabhat University
4. Professor Dr. Zang liangyun	Tourism management Program Hezhou University
5. Associate Professor Dr. Liao Chen	Physical Education Program Hezhou University

List name the specialist to evaluate the Instructional Model

1. Associate Professor Jittawisut Wimutipanya	Science Program Bansomdejchaopraya Rajabhat University
2. Assistant Professor Dr.Wanida Ploysangwal	English Program University of the Thai Chamber of Commerce
3. Dr. Panas Jansritong	Admistration Program Krirk University
4. Associate Professor Li Zhiping	Physical Education Program Hezhou University
5. Associate Professor Pan YanHong	Social Sports Management Program Hezhou University

Appendix B

Official Letter

Ref. No. MHESI 0643.14/1095

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for research tool validation

Dear Assistant Professor Dr. Saipon Sonsiengchai

Attachment Validation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220, Thailand under the supervision of Associate Professor Dr.Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard. as co-advisor and Assistant Professor Dr.Sarayut Sethakhajorn. as co-advisors, the written rubric scoring and questionnaire as instruments will be used in the said research. In view with this, the researcher would like your expertise to validate the attached Rubric and questionnaires to qualify for conduction. Knowing your experience in the field of Education, I would like to ask for your help in validating the said instrument before administering it to the participants of the study.

The research objective, definitions of terms, rubric scoring, questionnaire and the validation sheets are hereby attached. I will be glad to hear your suggestions and comments for the improvement of the instrument. Your positive response is highly appreciated.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/ 1096

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for research tool validation

Dear Assistant Professor Dr.Prapai Sridama

Attachment Validation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220, Thailand under the supervision of Associate Professor Dr.Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard. as co-advisor and Assistant Professor Dr.Sarayut Sethakhajorn. as co-advisors, the written rubric scoring and questionnaire as instruments will be used in the said research. In view with this, the researcher would like your expertise to validate the attached Rubric and questionnaires to qualify for conduction. Knowing your experience in the field of Education, I would like to ask for your help in validating the said instrument before administering it to the participants of the study.

The research objective, definitions of terms, rubric scoring, questionnaire and the validation sheets are hereby attached. I will be glad to hear your suggestions and comments for the improvement of the instrument. Your positive response is highly appreciated.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/ 1097

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for research tool validation

Dear Assistant Professor Dr. Wapee Kong -In

Attachment Validation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220, Thailand under the supervision of Associate Professor Dr.Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard. as co-advisor and Assistant Professor Dr.Sarayut Sethakhajorn. as co-advisors, the written rubric scoring and questionnaire as instruments will be used in the said research. In view with this, the researcher would like your expertise to validate the attached Rubric and questionnaires to qualify for conduction. Knowing your experience in the field of Education, I would like to ask for your help in validating the said instrument before administering it to the participants of the study.

The research objective, definitions of terms, rubric scoring, questionnaire and the validation sheets are hereby attached. I will be glad to hear your suggestions and comments for the improvement of the instrument. Your positive response is highly appreciated.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/1098

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for research tool validation

Dear Associate Professor Dr.Liaochen

Attachment Validation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220, Thailand under the supervision of Associate Professor Dr.Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard. as co-advisor and Assistant Professor Dr.Sarayut Sethakhajorn. as co-advisors, the written rubric scoring and questionnaire as instruments will be used in the said research. In view with this, the researcher would like your expertise to validate the attached Rubric and questionnaires to qualify for conduction. Knowing your experience in the field of Education, I would like to ask for your help in validating the said instrument before administering it to the participants of the study.

The research objective, definitions of terms, rubric scoring, questionnaire and the validation sheets are hereby attached. I will be glad to hear your suggestions and comments for the improvement of the instrument. Your positive response is highly appreciated.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/ 1099

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for research tool validation

Dear Professor Dr.Zang Liangyun

Attachment Validation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220, Thailand under the supervision of Associate Professor Dr.Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard. as co-advisor and Assistant Professor Dr.Sarayut Sethakhajorn. as co-advisors, the written rubric scoring and questionnaire as instruments will be used in the said research. In view with this, the researcher would like your expertise to validate the attached Rubric and questionnaires to qualify for conduction. Knowing your experience in the field of Education, I would like to ask for your help in validating the said instrument before administering it to the participants of the study.

The research objective, definitions of terms, rubric scoring, questionnaire and the validation sheets are hereby attached. I will be glad to hear your suggestions and comments for the improvement of the instrument. Your positive response is highly appreciated.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/1100

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for evaluation of instructional model

Dear Assistant Professor Dr.Wanida Ploysangwal

Attachment evaluation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 63731032220, Thailand under the supervision of Associate Professor Dr. Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard as co-advisor and Assistant Professor Dr. Sarayut Sethakhajorn as co-advisors, the instructional model will be developed in the said research. In view with this, the researcher would like your expertise to evaluate the appropriateness of such a developed instructional model. Knowing your experience in the field of Education, I would like to ask for your help in evaluating the said instructional model before its implementation.

I will be glad to hear your suggestions and comments for the improvement of the instructional model. Your positive response is highly appreciated.

Sincerely,

(Assistant Professor Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya University

Tel. (662) 4737000
Fax. (662) 4737000

Ref. No. MHESI 0643.14/ 1101

Graduate School
BansomdejchaoprayaRajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for evaluation of instructional model

Dear Associate Professor Jittawisut Wimutipanya

Attachment evaluation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 63731032220, Thailand under the supervision of Associate Professor Dr. Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard as co-advisor and Assistant Professor Dr. Sarayut Sethakhajorn as co-advisors, the instructional model will be developed in the said research. In view with this, the researcher would like your expertise to evaluate the appropriateness of such a developed instructional model. Knowing your experience in the field of Education, I would like to ask for your help in evaluating the said instructional model before its implementation.

I will be glad to hear your suggestions and comments for the improvement of the instructional model. Your positive response is highly appreciated.

Sincerely,

(Assistant Professor Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
BansomdejchaoprayaRajabhat University

Tel. (662) 4737000
Fax. (662) 4737000

Ref. No. MHESI 0643.14/ 1102

Graduate School
BansomdejchaoprayaRajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for evaluation of instructional model

Dear Dr.Panas Jansritong

Attachment evaluation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 63731032220, Thailand under the supervision of Associate Professor Dr. Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard as co-advisor and Assistant Professor Dr. Sarayut Sethakhajorn as co-advisors, the instructional model will be developed in the said research. In view with this, the researcher would like your expertise to evaluate the appropriateness of such a developed instructional model. Knowing your experience in the field of Education, I would like to ask for your help in evaluating the said instructional model before its implementation.

I will be glad to hear your suggestions and comments for the improvement of the instructional model. Your positive response is highly appreciated.

Sincerely,

(Assistant Professor Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
BansomdejchaoprayaRajabhat University

Tel. (662) 4737000
Fax. (662) 4737000

Ref. No. MHESI 0643.14/ 1103

Graduate School
BansomdejchaoprayaRajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for evaluation of instructional model

Dear Associate Professor Li Zhiping

Attachment evaluation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 63731032220, Thailand under the supervision of Associate Professor Dr. Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard as co-advisor and Assistant Professor Dr. Sarayut Sethakhajorn as co-advisors, the instructional model will be developed in the said research. In view with this, the researcher would like your expertise to evaluate the appropriateness of such a developed instructional model. Knowing your experience in the field of Education, I would like to ask for your help in evaluating the said instructional model before its implementation.

I will be glad to hear your suggestions and comments for the improvement of the instructional model. Your positive response is highly appreciated.

Sincerely,

(Assistant Professor Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
BansomdejchaoprayaRajabhat University

Tel. (662) 4737000
Fax. (662) 4737000

Ref. No. MHESI 0643.14/ 1104

Graduate School
BansomdejchaoprayaRajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for evaluation of instructional model

Dear Associate Professor Pan YanHong

Attachment evaluation sheets

Regarding the thesis entitled "*Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students*" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 63731032220, Thailand under the supervision of Associate Professor Dr. Tanaput Chancharoen as major advisor, Assistant Professor Dr. Areewan Iamsa-ard as co-advisor and Assistant Professor Dr. Sarayut Sethakhajorn as co-advisors, the instructional model will be developed in the said research. In view with this, the researcher would like your expertise to evaluate the appropriateness of such a developed instructional model. Knowing your experience in the field of Education, I would like to ask for your help in evaluating the said instructional model before its implementation.

I will be glad to hear your suggestions and comments for the improvement of the instructional model. Your positive response is highly appreciated.

Sincerely,

(Assistant Professor Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
BansomdejchaoprayaRajabhat University

Tel. (662) 4737000
Fax. (662) 4737000

Ref. No. MHESI 0643.14/1105

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for permission to implement experiment

Dear President of HeZhou University

Regarding the thesis entitled "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220 Thailand under the supervision of

Major Advisor : Assistant Professor Dr.Tanaput Chancharoen
Co-advisor : Associate Professor Dr. Areewan Iamsa-ard
Co-advisor : Assistant Professor Dr.Sarayut Sethakhajorn

the researcher needs to implement an experiment in compliance with approved methodology and collect data in terms of Pretest and Posttest from 40 students of Sport Injury Course of institute of Tourism and Sports Health, HeZhou College. during the 1st semester of academic year 2023. Hence, I'm formally requesting permission to implement the experiment and access the aforementioned data.

The researcher plans to use this data for her thesis completion and further necessary publication as required by the Ph.D. course.

I am grateful for your consideration of my request. I pledge to adhere to any stipulations you deem fit. You may reach me at the phone number or email address provided below in case of any related questions. I look forward to your response.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.
Fax. +66 0204737000

Ref. No. MHESI 0643.14/ 1106

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for data collection

Dear President of HeZhou College

Attachment 1. 40 copies of questionnaire
2. 1 interview papers

Regarding the thesis entitled Regarding the thesis entitled "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220 Thailand under the supervision of

Major Advisor : Assistant Professor Dr.Tanaput Chancharoen

Co-advisor : Associate Professor Dr. Areewan Iamsa-ard

Co-advisor : Assistant Professor Dr.Sarayut Sethakhajorn

the researcher needs to collect data using questionnaire in terms of the factors for enhancing sports injury ability from one instructor teaching sports injury courses and 40 students of Sport Injury Course in semester I of academic year 2022 of institute of Tourism and Sports Health, HeZhou College. Hence, I'm formally requesting your assistance in distributing the attached questionnaire to the informants as referred above and please send the completed ones back to the researcher via e-mail (1245244813@qq.com).

The researcher plans to use this data for her thesis completion and further necessary publication as required by the Ph.D. course.

I am grateful for your consideration of my request. I pledge to adhere to any stipulations you deem fit. You may reach me at the phone number or email address provided below in case of any related questions. I look forward to your response.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.

Fax. 66 0204737000

Ref. No. MHESI 0643.14/ 1107

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for data collection

Dear President of YuLin Normal College

Attachment 1. 40 copies of questionnaire
2. 1 interview papers

Regarding the thesis entitled Regarding the thesis entitled "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220 Thailand under the supervision of

Major Advisor : Assistant Professor Dr.Tanaput Chancharoen

Co-advisor : Associate Professor Dr. Areewan Iamsa-ard

Co-advisor : Assistant Professor Dr.Sarayut Sethakhajorn

the researcher needs to collect data using questionnaire in terms of the factors for enhancing sports injury ability from one instructor teaching sports injury courses and 40 students of Sport Injury Course in semester I of academic year 2022 of institute of Physical Education and Health, YuLin Normal University. Hence, I'm formally requesting your assistance in distributing the attached questionnaire to the informants as referred above and please send the completed ones back to the researcher via e-mail (1245244813@qq.com).

The researcher plans to use this data for her thesis completion and further necessary publication as required by the Ph.D. course.

I am grateful for your consideration of my request. I pledge to adhere to any stipulations you deem fit. You may reach me at the phone number or email address provided below in case of any related questions. I look forward to your response.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.

Fax. 66 0204737000

Ref. No. MHESI 0643.14/ 1108

Graduate School
Bansomdejchaopraya Rajabhat University
1061 Itsarapap 15 Itsarapap Rd.
Thonburi Bangkok 10600

7 September 2023

Subject Request for data collection

Dear Principal Guilin College

Attachment 1. 40 copies of questionnaire
2. 1 interview papers

Regarding the thesis entitled Regarding the thesis entitled "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students" of Mr. Yu Zhengwen, a Ph.D. student majoring in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University code number 6373103220 Thailand under the supervision of

Major Advisor : Assistant Professor Dr.Tanaput Chancharoen
Co-advisor : Associate Professor Dr. Areewan Iamsa-ard
Co-advisor : Assistant Professor Dr.Sarayut Sethakhajorn

the researcher needs to collect data using questionnaire in terms of the factors for enhancing sports injury ability from one instructor teaching sports injury courses and 40 students of Sport Injury Course in semester I of academic year 2022 of institute of Physical Education and Health, Guilin College. Hence, I'm formally requesting your assistance in distributing the attached questionnaire to the informants as referred above and please send the completed ones back to the researcher via e-mail (1245244813@qq.com).

The researcher plans to use this data for her thesis completion and further necessary publication as required by the Ph.D. course.

I am grateful for your consideration of my request. I pledge to adhere to any stipulations you deem fit. You may reach me at the phone number or email address provided below in case of any related questions. I look forward to your response.

Sincerely,

(Asst.Prof.Dr.Kanakorn Sawangcharoen)
Dean of Graduate School
Bansomdejchaopraya Rajabhat University

Tel. +66 0204737000 Ext.

Fax. 66 0204737000

Appendix C

Research Instrument

Questionnaire for students (Objective 1)
Interview for lecturers (Objective 1)
Questionnaire for experts (Objective 2)
Lesson Plan 1 (Objective 3)
Pre Post Testing (Objective 3)

Questionnaire for students (Objective 1)

Directions:

These questionnaires are the instruments for collecting data in 1st phase of the research entitled "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students ",conducted by Yu Zhengwen, a Ph.D. student in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University under the supervision of under the supervision of Dr. Tanaput Chancharoen as majoring advisor, Associate Professor Dr. Areewan Iamsa-ard and Dr. Sarayut Sethakhajorn as co-advisor.

This questionnaire is divided into 3 sections i.e.

Section 1 Common data of the respondent

Section 2 Information on factors for understanding of prevention sports injury of undergraduate students.

The questionnaire type is the Closed-ended questions that can only be answered by selecting from provided number to summated rating scale, 5 scales.

The important issues of the items consist of two groups of the factors:

Internal factors (respondents) and External factors (teachers, teaching methods, teaching resources, teaching environment, reflection)

Section 3 Further suggestions

Data obtained from this questionnaire are only used for the purpose of conducting aforementioned research and remain confidential. Individual or personal data presentation will be avoided.

Answer the questionnaire:

Section 1 Common data of the respondent

***Directions**: Please put ✔into the ❑ according to your own personal data.*

1. Gender is ❑ Male ❑ Female
2. Students from

❑ Yulin Normal University

❑ Guilin University

❑ HeZhou University

3. Age ❑ A. below 17 yrs. ❑ B. 17-20 yrs.

❑ C. 21-23 yrs. ❑ D. over 23 yrs.

Section 2 Questionnaire on factors for enhancing sports injury ability of undergraduate Students.

***Directions**: Please rate the following factors affecting sports injury ability by putting ✔ into the attitude level column based on the criteria given below. Each question can select only one answer.*

5 means you STRONGLY agree with the contents.

4 means you QUITE agree with the contents.

3 means you remain NEUTRAL. with the contents

2 means you DO NOT QUITE agree with the contents

1 means you DO NOT STRONGLY agree with the contents

Contents	Answers				
	5	4	3	2	1
Internal factors (respondents)					
1. Students are very interested in sports injury course.					
2. The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.					
3. Students feel that sports injury course is the great significance to personal growth and development in future.					
4. Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.					
5. Students willingly and proactively use the abilities learned in the sports injury course to help injured individuals.					
6. Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.					
7. The students believe that I will better use the knowledge have learned to achieve my learning goals, whether it is in the					

Contents	Answers				
	5	4	3	2	1
course study of sports injuries or in practical problem solving.					
8. Students find it easy to stick to coursework and milestones.					
9.Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.					
10.Students believe that communication can improve Understanding of Prevention Sports Injury.					
11.Students know how to choose appropriate communication styles and attitudes in different situations.					
12.Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.					
13.When students deal with complex problems, they can also collect relevant information calmly and methodically.					
14.Students believe prior knowledge contributes to increased awareness of sports injury prevention.					
15.Students can quickly select the optimal solution to solve sports injury-related problems in different situations.					
External factors					
1.In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.					
2.The lecturer chooses the appropriate teaching method according to the characteristics of the sports injury course and the tasks and goals of the sports injury.					
3.The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.					
4.In the sports injury course, a series of heuristic teaching,					

Contents	Answers				
	5	4	3	2	1
situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates.					
5.The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.					
6.The lecturer will select the appropriate teaching materials and network resources according to the course.					
7.The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury.					
8.In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of the course and the objectives of each stage.					
9.In the sports injury course, the lecturers will guide the students to correctly understand the learning content.					
10.In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better.					
11.The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation.					
12.The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.					
13.The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to improve understanding of prevention sports					

Contents	Answers				
	5	4	3	2	1
injury.					
14.The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems.					
15.During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.					

Section 3 Suggestions for improving the better instruction

.....

.....

.....

Thank you for your kind cooperation for completing the questionnaire! Researcher

Yu zhengwen

Interview for Lecturers (Objective 1)

Directions:

This interview is a part of research entitled Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students·

Research Objectives: 1 To examine the factors for understanding of prevention sports injury of undergraduate students.

It is conducted by Yu Zhengwen, a Ph.D. student in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University under the supervision of

Major Advisor Assistant Professor Dr.Tanaput Chancharoen

Co-advisor Associate Professor Dr.Areewan Iamsa-ard

Co-advisor Assistant Professor Dr.Sarayut Sethakhajorn

The following open questions are the instrument for collecting data in 1st phase of the research, concerning about factors to affect Chinese culture English reading ability.

Please write down your own opinion for each questions.

Data obtained from this questionnaire are only used for the purpose of conducting aforementioned research and remain confidential. Individual or personal data presentation will be avoided.

These questions are the instrument for collecting data in 1st phase of the research.

1. Gender is ❑ A. Male ❑ B. Female

2.What university did you come to? What secondary University?

❑A. Yulin Normal University

❑B. Guilin University

❑ C. HeZhou University

3.Experience teaching

❑ A. Below 3 yrs. ❑B. 3-6 yrs. ❑C. 7- 9 yrs. ❑ D. Over 9 yrs.

4.Age

❑ A. below 25 yrs. ❑ B. 25-35yrs. ❑C.36-49 yrs. ❑ D. over 49 yrs.

5. Professional title

❑A. Professor ❑ B. Associate Professor

❑ C. Assistant Professor ❑ D. Lecturer

Section 2 Interview on factors for understanding of prevention sports injury of undergraduate students.

Directions: The type of question is open-ended questions, you can answer according to your actual situation. Your answers will only be used in this research and will not be disclosed individually.

1. Why did you accept or choose to teach this course in sports injuries?

2. What textbooks and resources are you going to choose to teach the subject?

3. In teaching, what form will you organize students to learn?

4. How can you help students achieve their goals if they are not following your teaching plan?

5. What measurement and assessment methods do you use to reflect the learning effect and knowledge level of students?

6. In the course, if there are students who are unwilling to communicate and have poor coordination, what do you think are the reasons for this situation?

7. In the course, if you find that some students cannot complete the homework or task, how do you solve it?

8. During the course, how do you help students solve difficulties if they do not understand the teaching content or are not interested in the course?

9. Are there areas in your teaching that could be improved or would you like the school to support you?

10. Previously, what problems do you meet in your teaching and how do you find the solution?

Comment and recommendation for improving the better instruction

.....

.....

.....

Thank you for your kind cooperation for completing the questions.

Researcher

Yu zhengwen

Questionnaire for experts (Objectives: 2)

Dear assessors,

The present study is conducted by Yu Zhengwen, a Ph.D. student in Curriculum and Instruction Programme at Bansomdejchaopraya Rajabhat University, Thailand, under the supervision of the following advisors.

1.Major Advisor Assistant Professor Dr.Tanaput Chancharoen

2.Co-advisor Associate Professor Dr.Areewan Iamsa-ard

3.Co-advisor Assistant Professor Dr.Sarayut Sethakhajorn

The attached open questions are the instrument for collecting data in phase 2 of the research, the objective of which is to confirm Problem Based Learning and Blended Learning Instructional Model.

Please write down your own opinion for each question. Data obtained from this questionnaire are only used for the purpose of conducting aforementioned research and remain confidential. Individual or personal data presentation will be avoided.

These questions involve 3 parts as follows.

Part 1: Assessor's information

Part 2: Assessment of the quality of instructional model on 5-point rating scale basis in 4 aspects 1) Utility Standards 2) Feasibility Standards 3) Propriety Standards and 4) Accuracy Standards.

Part 3: Suggestion

The researcher certifies that all information obtained from this questionnaire will be used for academic purposes and to generate maximum benefit meeting objectives.

Thank you very much for dedicating your valuable time and providing useful information to this research for the benefit of further research and development.

Name: Yu zhengwen Ph.D. student
Curriculum and Instruction Program
Bansomdejchaopraya Rajabhat University

Assessment of confirm the quality of Problem Based Learning and Blended Learning Instructional Model

Direction: Assessment of confirm the quality of instructional model
Please answer all questions by making ✓ in the answer box that corresponds to your opinion or the truth using the following criteria.

Assessment Items	Rating Results		
	Agree	Disagree	Remarks
Utility Standard 1. Problem based learning and blended learning instructional model is useful to lecturers to enhance learning achievement.			
2. Problem based learning and blended learning instructional model is useful to students to enhance learning achievement.			
3. Problem based learning and blended learning instructional model includes necessary and enough contents.			
4. Problem based learning and blended learning instructional model promotes to enhance learning achievement more compared to traditional teaching.			
5. Problem based learning and blended learning instructional model increases the learning achievement of students.			
Feasibility Standard 1.The lecturer can apply problem based learning and blended learning instructional model to enhance learning achievement to their work and it is worth the time for actual use.			
2. The lecturer can develop the students to Problem Based Learning and Blended Learning Instructional Model			
3. Problem based learning and blended learning instructional model to understanding of prevention			

Assessment Items	Rating Results		
	Agree	Disagree	Remarks
sports injury is easy to use.			
4.the students always develop their learning all time by problem based learning and blended learning instructional model to understanding of prevention sports injury.			
5. The students are comfortable in learning by themselves problem based learning and blended learning instructional model to understanding of prevention sports injury.			
Propriety Standard 1. Problem based learning and blended learning instructional model to enhance learning achievement is appropriate for lecturers to use assessment results to improve the students.			
2. Problem based learning and blended learning instructional model to enhance learning achievement is appropriateness for students to create knowledge by themselves.			
3. Problem based learning and blended learning instructional model to enhance learning achievement is convenient to use.			
4. Problem based learning and blended learning instructional model to enhance learning achievement is a systematic process to use.			
5. Problem based learning and blended learning instructional model to enhance learning achievement is clear and suitable for use in learning and students development.			
Accuracy Standard 1. Problem based learning and blended learning instructional model to enhance learning achievement is comprehensively analyzed from different contexts and sufficient for the synthesis of patterns.			

Assessment Items	Rating Results		
	Agree	Disagree	Remarks
2. Problem based learning and blended learning instructional model to enhance learning achievement has a clear process.			
3. Problem based learning and blended learning instructional model to enhance learning achievement are described and the acquisition is clear.			
4. Problem based learning and blended learning instructional model to enhance learning achievement use techniques and tools which acquires accurate information and communication.			
5. Problem based learning and blended learning instructional model to enhance learning achievement is a correct and comprehensive learning system.			

Suggestion

.....

.....

.....

Lesson plan 1 (Objective 3)

I chose Lesson 1 as an example to introduce my experimental implementation process. The course lasted 6 hours. The focus of this part is to evaluate whether problem-based learning and blended learning teaching models have increased students' knowledge of the classification and occurrence patterns of sports injuries; whether they have increased students' analysis of the causes of sports injuries, thereby improving students' understanding of preventive sports injuries.

1.1 Classification and causes of sports injuries (6 hours)

Objectives

Dimension 1: Sports injury prevention

Mean the Students can understand the classification and incidence of sports injuries; The causes of sports injuries can be analyzed, so as to prevent sports injuries.

Contents

Classification and causes of sports injuries

Instructional

Problem based learning and blended learning instructional model

Teaching:

The teaching model of problem-based learning and blended learning refers to a comprehensive teaching model that is carried out in four steps in the classroom. This lesson plan uses the classification and causes of sports injuries as the teaching content, aiming to improve students' understanding of the classification and occurrence of sports injuries, and improve students' ability to analyze the causes of sports injuries, thereby preventing sports injuries.

Step 1: Preparing Course Guide (30 minutes)

(1) Teachers analyze students' grades, majors, teaching materials, academic status, etc. to design courses.

(2) Teacher determines the overall goal of this course and the goal of this teaching plan, with the purpose of improving students' awareness of sports injury prevention. The lecturer then introduced the learning pass and invited students to log in through a browser or download the Chao Xing APP.

(3) Familiarize students with the curriculum, chapter content, teaching resources, teaching time allocation, teaching methods and performance assessment, thereby attracting students' interest in learning and improving students' learning autonomy.

Introduction to Chao Xing APP

Xue Xitong is an online learning software owned by Chaoxing, also called Chaoxing Erya. We can choose to log in in the browser or download the corresponding software. Part of the study of our sports trauma course will be conducted in the study channel. Please download and familiarize yourself with the course content.

Course Introduction

In the teaching portal for this course, you can see the course introduction to sports trauma. "Sports Injury" or "Sports Injury" is a professional course for physical education students. In this course, we will learn the classification, causes, first aid treatment techniques of sports injuries, as well as the diagnosis, treatment, and rehabilitation of common sports injuries. We must pay attention to the prevention of sports injuries in our studies, understand the occurrence patterns of sports injuries, and take effective safety measures to avoid the occurrence of sports injuries to the greatest extent. This course also includes content, resources, discussions, assignments, and more for each chapter. Please explore and understand.

Step 2: Pre-class preparation and introduction stage (30 minutes)

(1) The instructor provides resources such as literature, courseware, sports injury videos, and pre-class tests based on the classification and causes of sports injuries.

(2) Students preview literature, courseware, and sports injury videos on their own and complete pre-class tests.

(3) Based on students' tests and discussions, the lecturer will sort out and summarize common problems encountered by learners in independent learning before class, adjust the course content, and explain it in class.

Classification and causes of sports injuries

Classifying sports injuries is helpful to analyze, summarize and propose effective prevention and treatment measures, and to systematically grasp the basic situation of sports injuries as a whole, which is of great significance to the prevention and treatment of sports injuries.

Sports injuries are classified according to the degree of injury: According to the degree of post-traumatic tissue and organ damage, as well as the impact on sports ability and systemic function, they are divided into mild, moderate and severe injuries.

Mild injuries are allowed to train as planned, or games can continue after emergency treatment, sometimes with protection. Moderate injury, unable to work for more than 24 hours, daily life activities are affected to a certain extent, partial sports ability is lost, and most training content cannot be completed. Serious injury: Interference with daily life, loss of movement ability, they will not be able to return to training or competition for a long period of time (more than 4 weeks).

According to the time of injury, it can be divided into acute injury and chronic injury. Injuries such as fractures and dislocations that usually occur within two weeks are called acute injuries. For soft tissue injuries, the acute phase is within 3 days, the subacute phase (functional recovery phase) is from 3 days to 2 weeks, and the chronic phase (elderly phase) is usually after 2 weeks.

Classification according to the relationship with sports training technology: sports technical injuries and non-sports technical injuries.

Classified according to the integrity of the injured skin and mucous membrane: the skin or mucous membrane at the injured area remains intact and the deep tissue is not exposed, which is called closed injury; the skin or mucous membrane at the injured area is damaged, and even the deep tissue is damaged, making it impossible to communicate with the outside world, called an open injury; this type of injury is prone to infection.

Classification according to the nature of injury: The cause of injury is closely related to the pathological changes of sports trauma, so this classification method is more commonly used.

In order to effectively prevent and promptly treat sports injuries, one of the most basic perspectives in sports traumatology is to pay equal attention to the etiology, pathogenesis and early appropriate treatment of sports injuries. Sports injuries, especially chronic injuries, are often caused by multiple factors, and these injury factors are not isolated from each other. The occurrence of sports trauma is the result of the comprehensive influence of internal and external factors such as athletes' physical condition, psychological quality, training methods, environmental factors, etc.

Step 3: Problem-based classroom and offline teaching stage (240 minutes)

(1) Lecturers conduct classroom lectures based on self-evaluation data and combined with teaching content and key points such as the classification of sports injuries. Lead students to study the resources in the video again, so that students can further understand the knowledge and key points related to sports injury prevention.

(2) The teacher designs the following problems through pictures or videos and guides students to solve them in groups.

(3) Students find problems, The teacher guides students to think about the problem from several aspects such as the classification and causes of sports injuries.

(4) The group selects the problem, discusses the main work to achieve the goal, arranges the progress and planning of the entire problem research work, and conducts a reasonable division of labor.

(5) Use PPT form to display or state the ideas, reasoning, etc. involved in the group's problem-solving process, and prepare complete relevant materials used to solve the problem to support your own understanding or plan.

(6) The research results of each group are communicated among the groups, the research results are reasonably evaluated, and the behavior of the group members in completing the tasks is evaluated.

Questions for Group

(1) Which part and to what extent was the athlete injured?

(2) What are the possible causes of athletes' injuries?

(3) Are these reasons internal or external?

(4) How to prevent athletes from getting injured in life?

(5) What other sports injuries do you know?

(6) What can we do for athletes in life?

Step 4: Post-class feedback improvement stage (60 minutes)

(1) Teachers will supplement learning resources based on the implementation of the first two stages to help students with strong independent learning ability expand their learning. Students can also share their learning resources to the online learning space during the after-class learning process.

(2) After each chapter, students are required to use learning tools or conduct practical summary and reflection in the course circle. Teachers also conduct teaching reflection to improve their teaching plans. Teachers upload excellent works to the resource library for other learners to learn from.

(3) Students complete the post-class test

Evaluation

Before class——For Pretest questions (Dimension1: Sports injury prevention)

The total score of the test is 20 points, and there are 20 multiple-choice questions, each worth 1 point.

After class——For Posttest questions (Dimension1: Sports injury prevention)

The total score of the test is 20 points, and there are 20 multiple-choice questions, each worth 1 point.

Pre – Post Test

Dimension 1: Sports injury prevention

Mean the Students can understand the classification and incidence of sports injuries; The causes of sports injuries can be analyzed, so as to prevent sports injuries.

1: Which of the following is classified according to the degree of injury? ()

A. Mild, moderate, severe

B. Openness, closure

C. Acute injury, chronic injury

D. Not sure

Correct answer: A

2: An athlete cannot train for more than 24 hours, has a certain impact on daily life activities, loses part of his athletic ability, and cannot complete most training content. What level of injury is this? ()

A. Mild

B. Moderate

C. Severe

D. Not sure

Correct answer: B

3: Which of the following times is called the acute phase of soft tissue sports injuries? ()

A. Within 24 hours

B. Within 48 hours

C. Within 72 hours

D. Not sure

Correct answer: C

4: Which of the following periods of time is known as the functional recovery period from soft tissue sports injuries? ()

A. 2 days to 3 weeks

B. 2 days to 2 weeks

C. 3 days to 2 weeks

D. Not sure

Correct answer: C

5: Which of the following injuries is most likely to occur in sports? ()

A. Sprain

B. Strain

C. Abrasions

D. Not sure

Correct answer: A

6: Which of the following principles should be followed to prevent sports injuries? ()

A. Based on fruit prevention

B. Based on prevention

C. According to cause and effect prevention

D. Not sure

Correct answer: B

7: Which of the following are causes of sports injuries? ()

A. Warm-up activities

B. Without protective gear

C. All of the above

D. Not sure

Correct answer: C

8: What is the proportion of anterior cruciate ligament injuries in the knee joints of female football players and male football players? ()

A. Women are taller than men

B. Men are taller than women

C. same height

D. Not sure

Correct answer: A

9: What are the factors for sports injuries caused by venue conditions? ()

A. Internal cause

B. Iatrogenic factors

C. Environmental factors

D. Not sure

Correct answer: B

10: Which part of volleyball has the highest injury rate? ()

A. Waist

B. Shoulder joint

C. Elbow joint

D. Not sure

Correct answer: B

11: Sprains are classified in which of the following ways? ()

A. The extent of the damage

B. According to the nature of the injury

C. According to the damaged tissue structure

D. Not sure

Correct answer: B

12: How long does it take to be unable to train, is it considered a serious injury? ()

A. 24 hours

B. 48 hours

C. 4 weeks

D. Not sure

Correct answer: B

13: Which of the following times is called the acute phase of fractures and sprains? ()

A. Within 1 week

B. Within 2 weeks

C. Within 3 weeks

D. Not sure

Correct answer: B

14: Which of the following types of injuries is most likely to cause infection? ()

A. Chronic injury

B. Acute injury

C. Open injury

D. Not sure

Correct answer: C

15: Which of the following is superficial soft tissue trauma? ()

A. Sprain

B. Strain

C. Laceration

D. Not sure

Correct answer: C

16: Which of the following injuries is the most common among adolescents? ()

A. Sprain

B. Fracture

C. Laceration

D. Not sure

Correct answer: B

17: Gender, body shape, age, and anatomical and physiological characteristics are which factors that cause sports injuries? ()

A. Physical factors

B. Psychological factors

C. Technical factors

D. Not sure

Correct answer: A

18: Accidental injury is caused by which of the following reasons? ()

A. Technical damage

B. Non-technical damage

C. Physical factors

D. Not sure

Correct answer: B

19: Which part of the throwing event has the highest injury rate? ()

A. Waist

B. Shoulder joint

C. Elbow joint

D. Not sure

Correct answer: C

20: Which of the following are internal causes of sports injuries? ()

A. Gender

B. Sports equipment

C. Medical supervision

D. Not sure

Correct answer: A

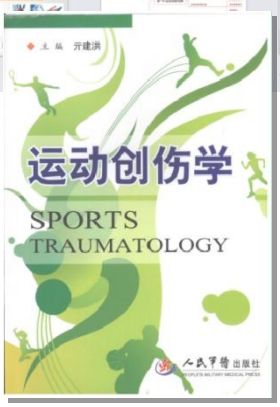
Materials

1) PPT presentation

2) Sports injury textbooks and related documents

University sports injury course PPT picture

Sports injury textbook



Xuetong login platform

Group discussion pictures

Learning Resources

1) Videos related to sports injury diagnosis and evaluation

2)Related academic papers.

Clip Video

1.http://newes.chaoxing.com/zhjwmicroservice/login?fid=3437

2.https://tv.sohu.com/v/dXMvMTE0Nzc2Njc3LzgyNzA3OTQxLnNodG1s.html

3.https://open.163.com/newview/movie/free?pid=HHGP5TNKL&mid=GHGP5UFTA

4.https://open.163.com/newview/movie/free?pid=HHGP5TNKL&mid=THGP5UF7G

Pre Post Testing (Objective 3)

Directions: Choose the best answer

Unit 1. Prevention and diagnosis of sports injuries (12 hrs.)

1.1 Classification and causes of sports injuries

Dimension 1: Sports injury prevention

Mean the Students can understand the classification and incidence of sports injuries; The causes of sports injuries can be analyzed, so as to prevent sports injuries.

1: Which of the following is classified according to the degree of injury? ()

A. Mild, moderate, severe

B. Openness, closure

C. Acute injury, chronic injury

D. Not sure

Correct answer: A

2: An athlete cannot train for more than 24 hours, has a certain impact on daily life activities, loses part of his athletic ability, and cannot complete most training content. What level of injury is this? ()

A. Mild

B. Moderate

C. Severe

D. Not sure

Correct answer: B

3: Which of the following times is called the acute phase of soft tissue sports injuries? ()

A. Within 24 hours

B. Within 48 hours

C. Within 72 hours

D. Not sure

Correct answer: C

4: Which of the following periods of time is known as the functional recovery period from soft tissue sports injuries? ()

A. 2 days to 3 weeks

B. 2 days to 2 weeks

C. 3 days to 2 weeks

D. Not sure

Correct answer: C

5: Which of the following injuries is most likely to occur in sports? ()

A. Sprain

B. Strain

C. Abrasions

D. Not sure

Correct answer: A

6: Which of the following principles should be followed to prevent sports injuries? ()

A. Based on fruit prevention

B. Based on prevention

C. According to cause and effect prevention

D. Not sure

Correct answer: B

7: Which of the following are causes of sports injuries? ()

A. Warm-up activities

B. Without protective gear

C. All of the above

D. Not sure

Correct answer: C

8: What is the proportion of anterior cruciate ligament injuries in the knee joints of female football players and male football players? ()

A. Women are taller than men

B. Men are taller than women

C. same height

D. Not sure

Correct answer: A

9: What are the factors for sports injuries caused by venue conditions? ()

A. Internal cause

B. Iatrogenic factors

C. Environmental factors

D. Not sure

Correct answer: B

10: Which part of volleyball has the highest injury rate? ()

A. Waist

B. Shoulder joint

C. Elbow joint

D. Not sure

Correct answer: B

11: Sprains are classified in which of the following ways? ()

A. The extent of the damage

B. According to the nature of the injury

C. According to the damaged tissue structure

D. Not sure

Correct answer: B

12: How long does it take to be unable to train, is it considered a serious injury? ()

A. 24 hours

B. 48 hours

C. 4 weeks

D. Not sure

Correct answer: B

13: Which of the following times is called the acute phase of fractures and sprains? ()

A. Within 1 week

B. Within 2 weeks

C. Within 3 weeks

D. Not sure

Correct answer: B

14: Which of the following types of injuries is most likely to cause infection? ()

A. Chronic injury

B. Acute injury

C. Open injury

D. Not sure

Correct answer: C

15: Which of the following is superficial soft tissue trauma? ()

A. Sprain

B. Strain

C. Laceration

D. Not sure

Correct answer: C

16: Which of the following injuries is the most common among adolescents? ()

A. Sprain

B. Fracture

C. Laceration

D. Not sure

Correct answer: B

17: Gender, body shape, age, and anatomical and physiological characteristics are which factors that cause sports injuries? ()

A. Physical factors

B. Psychological factors

C. Technical factors

D. Not sure

Correct answer: A

18: Accidental injury is caused by which of the following reasons? ()

A. Technical damage

B. Non-technical damage

C. Physical factors

D. Not sure

Correct answer: B

19: Which part of the throwing event has the highest injury rate? ()

A. Waist

B. Shoulder joint

C. Elbow joint

D. Not sure

Correct answer: C

20: Which of the following are internal causes of sports injuries? ()

A. Gender

B. Sports equipment

C. Medical supervision

D. Not sure

Correct answer: A

Unit 1. Prevention and diagnosis of sports injuries (12 hrs.)

1.2 Examination and diagnosis of sports injuries

Dimension 2: Diagnosis and assessment of sports injuries

Mean the Students can understand the basic knowledge of clinical examination and diagnosis; complete clinical examination according to the athlete's injury condition, inquire and record the medical history, analyze the situation and make a reasonable diagnosis.

1: If an athlete suffers shock during exercise, what problem should be diagnosed first? ()

A. Is there a conscious

B. Whether you are breathing or whether your respiratory tract is clear

C. Is there a heartbeat?

D. Not sure

Correct answer: A

2: What is the first step in diagnosis and the prerequisite for correct diagnosis. ()

A. History of special training

B. Medical history

C. Physical examination

D. Not sure

Correct answer: B

3: Which of the following is an essential examination tool when joint movement is limited? ()

A. Fascia gun

B. Scale

C. Protractor

D. Not sure

Correct answer: C

4: What problem is the straight leg raise test used to check? ()

A. Tibial nerve

B. Cervical nerve

C. Sciatic nerve

D. Not sure

Correct answer: C

5: Which of the following is incorrect in X-ray examination of bones and joints? ()

A. Be careful to remove metal jewelry

B. Hold your breath during the process

C. Fast for at least 4 hours before the examination

D. Not sure

Correct answer: C

6: After being diagnosed by a doctor, a patient needs to use enhanced CT technology to examine the abdomen. Which of the following is correct ()

A. No need to remove metal jewelry

B. Hold your breath during the process

C. Fast for at least 4 hours before the examination

D. Not sure

Correct answer: C

7: Which part of the body is the "4" experiment used to check? ()

A. Shoulder joint

B. Knee joint

C. Hip joint

D. Not sure

Correct answer: C

8: Which of the following examinations has no radiation and can be continuously scanned dynamically and repeatedly, so it is easy to promote and apply? ()

A. Magnetic resonance imaging (MRI)

B. Ultrasound Imaging (USI)

C. Electromyography (EMC)

D. Not sure

Correct answer: B

9: Injury to the lateral ligaments of the ankle joint belongs to which of the following types of injuries? ()

A. Soft tissue injury

B. Closed injury

C. Acute closed soft tissue injury

D. Not sure

Correct answer: C

10: Which of the following injuries is usually called an acute injury if it occurs within 1 week? ()

A. Fracture

B. Dislocation

C. Soft tissue injury

D. Not sure

Correct answer: C

11: Which item in the general physical examination is not included in the clinical physical examination? ()

A. History of special training

B. Vital signs

C. Head, face and facial features

D. Not sure

Correct answer: A

12: Which of the following is not a clinical examination in traditional Chinese medicine? ()

A. Inspection

B. Palpation

C. Diagnosis

D. Not sure

Correct answer: C

13: What problem is the neck-pressure test used to detect? ()

A. Brachial plexus

B. Cervical nerve

C. Sciatic nerve

D. Not sure

Correct answer: B

14: What problem is the neck flexion test used to check? ()

A. Tibial nerve

B. Cervical nerve

C. Sciatic nerve

D. Not sure

Correct answer: C

15: Which of the following examinations requires the injection of contrast media and may cause allergic reactions in the human body? ()

A. X-ray examination

B. X-ray computed tomography (CT)

C. Magnetic Resonance Imaging (MRI)

D. Not sure

Correct answer: B

16: What problem is the floating patella test used to check for the knee joint? ()

A. Effusion

B. Meniscus

C. Ligaments

D. Not sure

Correct answer: A

17: An athlete has a spinal injury and is suspected of having a thoracic spine fracture. Which of the following examinations is most suitable for diagnosis ()

A. X-ray examination

B. X-ray computed tomography (CT)

C. Magnetic Resonance Imaging (MRI)

D. Not sure

Correct answer: B

18: In boxing, what level of neurological damage is short-term unconscious loss lasting more than 10 seconds? ()

A. Level 1

B. Level 2

C. Level 3

D. Not sure

Correct answer: B

19: What is the simplest index to evaluate exercise-induced fatigue? ()

A. Heart rate

B. blood pressure

C. Respiratory rate

D. Not sure

Correct answer: A

20: What is the earliest subjective indicator for judging exercise-induced dehydration? ()

A. Thirst

B. Pale

C. Feeling weak

D. Not sure

Correct answer: A

Unit 2. Sports injury treatment and rehabilitation (10 hrs.)

2.1 Treatment of acute sports injuries

Dimension 3: First Aid Treatment for Sports Injuries

Mean the Students can understand the basics of first aid; be able to apply cardiopulmonary resuscitation, bandaging and triangular bandaging techniques.

1: At the scene of a sports injury, which of the following is incorrect regarding the principles of first aid? ()

A. Ensure the safety of the environment first, then carry out rescue operations

B. Rescue serious injuries first, then treat minor injuries; stop bleeding first and then bandage

C. Give first aid first and then call for help

D. Not sure

Correct answer: C

2: When performing adult cardiopulmonary resuscitation, the ratio of compression to blowing should be? ()

A. 15:1

B. 30:2

C. 15:2

D. Don't know

Correct answer: C

3: An athlete fell from a height, suffered a head injury, and bleeding from the nose and ear canal. What is the correct treatment method? ()

A. Stuff it with cotton balls

B. Rinse with cold water

C. Not blocked

D. Not sure

Correct answer: C

4. In case of abdominal trauma and intestinal extravasation, what is the on-site bandaging method? ()

A. Triangular scarf abdominal bandaging

B. Cover the wound with the dressing and make a circle, use a bowl to hold the wound, and then wrap it with a triangle towel

C. Return the prolapsed intestine to the abdominal cavity and cover the wound with dressing

D. Not sure

Correct answer: B

5: What is the correct way to use a tourniquet? ()

A Every 40-50 minutes, relax for 2-3 minutes

B The tightness should be moderate

C All of the above are correct

D Not sure

Correct answer: C

6: What is the wrong way to carry a wounded person with a cervical vertebra fracture? ()

A. Pull-car transport

B. Transportation using a spine board

C. Four ambulancemen lifted and laid them flat

D. Not sure

Correct answer: A

7: When there is massive bleeding from an open injury to the forearm, where should the tourniquet be placed? ()

A. 1/3 of the upper arm

B. Middle and lower 1/3 of upper arm

C. 1/3 of the upper arm

D. Not sure

Correct answer: C

8: An athlete accidentally twists his foot and the outside of the ankle joint becomes congested and swollen. What would you do first? ()

A. Gently relieve swelling on the injured area

B. Rest immediately, apply cold compress and apply pressure bandage

C. No bleeding and no treatment required

D. Not sure

Correct answer: B

9: Athletes experience severe abdominal pain during running. What is the best way to deal with it? ()

A. Slow down appropriately

B. Press the painful area and bend over to walk or jog

C. Adjust breathing and running rhythm

D. Not sure

Correct answer: B

10: If a student sprains the lateral ankle ligament during sports, will you fix his ankle? ()

A. Valgus position

B. Varus position

C. Function bit

D. Not sure

Correct answer: C

11: A student has a sprained right ankle joint. When bandaging it, which bandaging method would you choose? ()

A. Circular bandaging method

B. Spiral bandaging method

C. “8” shaped bandaging method

D. Not sure

Correct answer: C

12: A student accidentally bruises his finger while passing the ball. How would you deal with it? ()

A. Minor injuries can be left alone

B. Massage the student’s fingers to relieve pain

C. Have the student immediately stop practicing, apply ice, and use a support band to fix the affected limb to the healthy side.

D. Not sure

Correct answer: C

13: How will you deal with a student who develops blisters due to ill-fitting sneakers? ()

A. Squeeze the liquid out of the blister and cut off the foreskin of the blister.

B. Clean the blister with warm water, squeeze out the liquid in the blister, disinfect it, cover it with sterile gauze and bandage it

C. Rinse the blisters with cold water, treat them, and wait until they get better naturally.

D. Not sure

Correct answer: C

14: What is the most important, simplest and most effective temporary method to stop bleeding? ()

A. Indirect finger pressure hemostasis method

B. Tourniquet method to stop bleeding

C. Flexion of limbs and padding to stop bleeding

D. Not sure

Correct answer: A

15: When a student has a minor scratch, which of the following methods should be used to clean the wound? ()

A. Rinse with soda water

B. Use physiological saline for cleaning

C. Clean with soapy water

D. Not sure

Correct answer: B

16: How would you deal with someone suffering from heatstroke while exercising outdoors in the hot summer weather? ()

A. Rinse with cold water

B. Go to a cool place and drink hot water

C. Rest in a cool place and drink cold water

D. Not sure

Answer: C

17: How do you deal with muscle spasms? ()

A. Use even force and slow reverse traction on the spastic area

B. Timely and rapid traction of spastic muscles

C. Massage

D. Not sure

Correct answer: A

18: During class or training, a student suddenly faints. Which of the following is incorrect? ()

A. Lie flat and raise your head and lower limbs

B. Ensure normal breathing and heartbeat, maintain adequate breathing, and keep warm

C. Pinch the Renzhong and Hegu acupoints

D. Not sure

Correct answer: A

19: What are the four major vital signs of the human body that are used to evaluate whether the injured person has a life-threatening situation? ()

A. Respiration, body temperature, pulse, blood pressure

B. Consciousness, heartbeat, pupils, breathing

C. Heartbeat, movement, respiration, blood pressure

D. Not sure

Correct answer: A

20: What do the “four techniques” of trauma first aid refer to? ()

A. Hemostasis, bandaging, fixation, and transportation

B. Protect, elevate, bandage, and fix

C. Resuscitation, hemostasis, bandaging, and fixation

D. Not sure

Correct answer: A

Unit 2. Sports injury treatment and rehabilitation (10hrs.)

2.2 Rehabilitation training for sports injuries

Dimension 4: Rehabilitation after Sports Injury

Mean the Students can understand the knowledge of rehabilitation assessment of sports injuries; and master sports therapy and physical therapy.

1: Which of the following does not conform to the basic principles of sports injury rehabilitation training? ( )

A. Principle of special adaptation

B. The principle of never stopping training

C. Principle of suitable large amount of exercise

D. Not sure

Correct answer: C

2: If a person is confirmed to have a moderate injury, for how long should the specific training of the injured part be suspended or reduced and active treatment be given? ()

A. Within 1 week

B. Within 2 weeks

C. Within 4 weeks

D. Not sure

Correct answer: C

3: In the rehabilitation assessment, what is the basis for understanding the scope and degree of motor function impairment as the basis for formulating a rehabilitation plan? ()

A. Initial assessment

B. Mid-term evaluation

C. Final evaluation

D. Not sure

Correct answer: A

4: After a sports injury occurs, what are the early symptoms of muscle injury? ()

A. Redness, swelling, heat and pain

B. Has limited functions

C. Shrink

D. Not sure

Correct answer: A

5: What is the first step in the basic procedure of sports injury rehabilitation training? ()

A. Restore joint range of motion

B. Emergency treatment

C. Restoration of strength

D. Not sure

Correct answer: B

6: Which level of muscle injury will have obvious local symptoms and signs, as well as muscle dysfunction? ()

A. Mild injury or first degree injury

B. Moderate injury or secondary injury

C. Severe injury or third-level injury

D. Not sure

Correct answer: A

7: Which level of injury means the injury is ≥ half of the cartilage thickness but does not reach the subchondral bone, and you cannot continue to exercise. ()

A. 1st degree injury

B. 2nd degree injury

C. 3rd degree injury

D. Not sure

Correct answer: C

8: Which of the following are chronic recovery training exercises? ()

A. Correct wrong movement exercises

B. Rapid development of compensatory function exercises

C. Strengthen the strength training of the injured area

D. Not sure

Correct answer: A

9: After the fracture, that period belongs to the second stage, and you cannot train yet. ()

A. 2 weeks~5 weeks

B. 3 weeks~6 weeks

C. 6 weeks~8 weeks

D. Not sure

Correct answer: B

10: Which of the following are the basic conditions for functional recovery? ()

A. No pain in movable areas

B. Muscles do not have normal strength and explosion

C. Overstressed mental state

D. Not sure

Correct answer: A

11: Rehabilitation training after ankle and foot sports injuries can be roughly divided into the following five phases. What period is 5-10 days after the injury? ()

A. The first issue

B. The second period

C. The third issue

D. Not sure

Correct answer: B

12: What rehabilitation training cannot be performed 5-10 days after ankle and foot sports injuries? ()

A. Do Achilles tendon stretching exercises in cold water

B. Practice walking and standing on the front of the foot (double or single foot)

C. Do training to strengthen ankle muscles on the isotonic exercise machine

D. Not sure

Correct answer: B

13: In the late stage of sports injury, what is the commonly used closed treatment method? ()

A. Massage treatment

B. Acupuncture treatment

C. Acupotomy treatment

D. Not sure

Correct answer: A

14: In the process of rehabilitation treatment, what is used to evaluate the treatment effect and judge the recovery progress? ()

A. Initial assessment

B. Mid-term evaluation

C. Final evaluation

D. Not sure

Correct answer: B

15: In the process of rehabilitation treatment, it is used as the basis for determining the curative effect, arranging daily training, and determining whether formal training or participation in competitions can be resumed? ()

A. Initial assessment

B. Mid-term evaluation

C. Final evaluation

D. Not sure

Correct answer: C

16: Which level of muscle injury will cause muscle fiber rupture, obvious local symptoms and signs, and muscle dysfunction? ()

A. Mild injury or first degree injury

B. Moderate injury or secondary injury

C. Severe injury or third-level injury

D. Not sure

Correct answer: B

17: Which of the following are the basic principles of sports injury rehabilitation training? ( )

A. The principle of never stopping training

B. Principles of restoring muscle function as early as possible

C All of the above

D. Not sure

Correct answer: C

18: What is the first step in the basic procedure of sports injury rehabilitation training? ()

A. Emergency treatment

B. Restore joint range of motion

C. Restoration of strength

D. Not sure

Correct answer: A

19: What is the third step in the basic procedure of sports injury rehabilitation training? ()

A. Emergency treatment

B. Restore joint range of motion

C. Restoration of strength

D. Not sure

Correct answer: A

20: What is the therapy that uses natural and artificial physical factors for rehabilitation training? ()

A. Exercise therapy

B. Physical therapy

C. Traditional Chinese Medicine

D. Not sure

Correct answer: B

Appendix D

The Results of the Quality Analysis of Research Instruments

IOC- Questionnaire for students

IOC- Questionnaire for lecturers

IOC- Validity of instructional model for lecturers

IOC- Lesson Plans

IOC- Pre Post Testing

Table Appendix 1: Evaluation Results of IOC for Factor Analysis (For Students)

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Section 1 Common data of the respondent									
1	**Gender** ❑ A. Male ❑ B. Female	+1	+1	+1	+1	+1	5	1.00	Valid
2	**University in Guangxi Zhuang Autonomous Region.** ❑ A. Yulin Normal University ❑ B. Guilin University ❑ C. HeZhou University	+1	+1	+1	+1	+1	5	1.00	Valid
3	**Age** ❑ A. below 18 yrs. ❑ B. 18-20 yrs. ❑ C. 21-23 yrs. ❑ D. over 23 yrs.	+1	+1	+1	+1	+1	5	1.00	Valid
Section 2 Factors									
Internal factors (respondents)									
1	Students are very interested in sports injury course.	+1	+1	+1	+1	+1	5	1.00	Valid
2	The students are willing to improve their understanding of prevention sports injury, take the initiative to study diligently, and exert their greatest potential.	+1	+1	+1	+1	+1	5	1.00	Valid
3	Students feel that sports injury course is the great significance to personal growth and development in future.	+1	+1	+1	+1	+1	5	1.00	Valid
4	Using Problem Based Learning and Blended Learning Instructional Model in the sports injury course, students have a clearer understanding and understanding of sports injury related knowledge.	+1	+1	+1	+1	+1	5	1.00	Valid
5	Students willingly and proactively use the abilities learned in the	+1	+1	+1	+1	+1	5	1.00	Valid

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
	sports injury course to help injured individuals.								
6	Based on the relevant knowledge in the sports injury course, students will actively analyze and try to solve the injuries they have not learned, and can extend to solve other problems.	+1	+1	+1	+1	+1	5	1.00	Valid
7	The students believe that I will better use the knowledge I have learned to achieve my learning goals, whether it is in the course study of sports injuries or in practical problem solving.	+1	+1	+1	+1	+1	5	1.00	Valid
8	Students find it easy to stick to coursework and milestones.	+1	+1	+1	+1	+1	5	1.00	Valid
9	Students think that they can actively and actively complete the homework and tasks assigned online and now, so as to help them better learn and apply the knowledge and skills they have learned.	+1	+1	+1	+1	+1	5	1.00	Valid
10	Students believe that communication can improve Understanding of Prevention Sports Injury.	+1	+1	+1	+1	+1	5	1.00	Valid
11	Students know how to choose appropriate communication styles and attitudes in different situations.	+1	+1	+1	+1	+1	5	1.00	Valid
12	Students can think from the perspective of others, understand the reasons for other people's thoughts and emotions, and have friendly exchanges.	+1	+1	+1	+1	+1	5	1.00	Valid
13	When students deal with complex problems, they can also collect relevant information calmly and methodically.	+1	+1	+1	+1	+1	5	1.00	Valid
14	Students believe prior knowledge	+1	+1	+1	+1	+1	5	1.00	Valid

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
	contributes to increased awareness of sports injury prevention.								
15	Students can quickly select the optimal solution to solve sports injury-related problems in different situations.	+1	+1	+1	+1	+1	5	1.00	Valid
External factors									
1	In the sports injury course, the lecturer will guide students according to their spare time to help students better understand the prevention of sports injuries.	+1	+1	+1	+1	+1	5	1.00	Valid
2	The lecturer chooses the appropriate teaching method according to the characteristics of the sports injury course and the tasks and goals of the sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
3	The lecturer combines the teaching methods he teaches with the goals and knowledge abilities in the sports injury course to improve the understanding of prevention sports injury of undergraduates.	+1	+1	+1	+1	+1	5	1.00	Valid
4	In the sports injury course, a series of heuristic teaching, situational teaching and simulation teaching will be carried out, which can stimulate students' thirst for knowledge and effectively cultivate understanding of prevention sports injury of undergraduates.	+1	+1	+1	+1	+1	5	1.00	Valid
5	The online and offline hybrid teaching mode can combine the advantages of traditional teaching and digital teaching to better improve students' understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
6	The lecturer will select the appropriate teaching materials and	+1	+1	+1	+1	+1	5	1.00	Valid

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
	network resources according to the course.								
7	The teaching materials selected by lecturers and the network resources provided can fully support students' learning of sports injury courses and understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
8	In the sports injury course, lecturers use various methods to help students clearly understand the teaching objectives of the course and the objectives of each stage.	+1	+1	+1	+1	+1	5	1.00	Valid
9	In the sports injury course, the lecturers will guide the students to correctly understand the learning content.	+1	+1	+1	+1	+1	5	1.00	Valid
10	In the teaching process, the lecturers will use teaching platforms, interactive teaching spaces, live broadcast software, etc. to share teaching resources, so as to help students learn better.	+1	+1	+1	+1	+1	5	1.00	Valid
11	The campus has a stable high-speed network for teaching guarantee, and supports the understanding of prevention sports injury majoring in sports rehabilitation.	+1	+1	+1	+1	+1	5	1.00	Valid
12	The classroom environment of the school is clean and bright, equipped with tables and chairs, blackboards, podiums, computers, projectors, large screens, loudspeakers and other multimedia facilities to facilitate teaching.	+1	+1	+1	+1	+1	5	1.00	Valid
13	The school has special classrooms and laboratories to meet the needs of sports rehabilitation majors to learn sports injury courses to	+1	+1	+1	+1	+1	5	1.00	Valid

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
	improve understanding of prevention sports injury.								
14	The lecturers combine traditional classroom evaluation methods with various modern intelligent online evaluation systems.	+1	+1	+1	+1	+1	5	1.00	Valid
15	During teaching, teachers will lead students to discuss and evaluate the problems and deficiencies encountered in sports injury courses.	+1	+1	+1	+1	+1	5	1.00	Valid
Total (In Overview)							165	33.00	Valid

Table Appendix 2: Evaluation Results of IOC for Factor Analysis (For lecturers)

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Section 1 Common data of the respondent									
1	**Gender** ❑ A. Male ❑ B. Female	+1	+1	+1	+1	+1	5	1.00	Valid
2	**3 lecturers teaching sports injury courses in Guangxi Autonomous Region** ❑ A. Yulin Normal University ❑ B. Guilin University ❑ C. HeZhou University	+1	+1	+1	+1	+1	5	1.00	Valid
3	**Teaching experience** ❑ A. Below 3 yrs. ❑ B. 4-6 yrs. ❑ C. 7- 9 yrs. ❑ D. Over 9 yrs.	+1	+1	+1	+1	+1	5	1.00	Valid
4	**Age** ❑ A. below 18 yrs. ❑ B. 18-20 yrs. ❑ C. 21-23 yrs. ❑ D. over 23 yrs.	+1	+1	+1	+1	+1	5	1.00	Valid
5	**Professional title** ❑ A. Professor ❑ B. Associate Professor ❑ C. Assistant Professor ❑ D. Lecturer	+1	+1	+1	+1	+1	5	1.00	Valid
Section 2 Questions									
1	Why did you accept or choose to teach this course in sports injuries?	+1	+1	+1	+1	+1	5	1.00	Valid
2	What textbooks and resources are you going to choose to teach the subject?	+1	+1	+1	+1	+1	5	1.00	Valid
3	In teaching, what form will you organize students to learn?	+1	+1	+1	+1	+1	5	1.00	Valid
4	How can you help students achieve their goals if they are not following your teaching plan?	+1	+1	+1	+1	+1	5	1.00	Valid

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
5	What measurement and assessment methods do you use to reflect the learning effect and knowledge level of students?	+1	+1	+1	+1	+1	5	1.00	Valid
6	In the course, if there are students who are unwilling to communicate and have poor coordination, what do you think are the reasons for this situation?	+1	+1	+1	+1	+1	5	1.00	Valid
7	In the course, if you find that some students cannot complete the homework or task, how do you solve it?	+1	+1	+1	+1	+1	5	1.00	Valid
8	During the course, how do you help students solve difficulties if they do not understand the teaching content or are not interested in the course?	+1	+1	+1	+1	+1	5	1.00	Valid
9	Are there areas in your teaching that could be improved or would you like the school to support you?	+1	+1	+1	+1	+1	5	1.00	Valid
10	Previously, what problems do you meet in your teaching and how do you find the solution?	+1	+1	+1	+1	+1	5	1.00	Valid
Total (In Overview)							75	15.00	Valid

Table Appendix 3: Evaluation Results of IOC for instructional model

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Utility Standard								
1. Problem based learning and blended learning instructional model is useful to lecturers to enhance learning achievement.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model is useful to students to enhance learning achievement.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model includes necessary and enough contents.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model promotes to enhance learning achievement more compared to traditional teaching.	+1	+1	+1	+1	+1	5	1.00	Valid
5. Problem based learning and blended learning instructional model increases the learning achievement of students.	+1	+1	+1	+1	+1	5	1.00	Valid
Feasibility Standard								
1.The lecturer can apply problem based learning and blended learning instructional model to enhance learning achievement to their work and it is worth the time for actual use.	+1	+1	+1	+1	+1	5	1.00	Valid
2. The lecturer can develop the students to Problem Based Learning and Blended Learning Instructional Model	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
model to understanding of prevention sports injury is easy to use.								
4.the students always develop their learning all time by problem based learning and blended learning instructional model to understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
5. The students are comfortable in learning by themselves problem based learning and blended learning instructional model to understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
Propriety Standard								
1. Problem based learning and blended learning instructional model to enhance learning achievement is appropriate for lecturers to use assessment results to improve the students.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model to enhance learning achievement is appropriateness for students to create knowledge by themselves.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model to enhance learning achievement is convenient to use.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model to enhance learning achievement is a systematic	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
process to use.								
5. Problem based learning and blended learning instructional model to enhance learning achievement is clear and suitable for use in learning and students development.	+1	+1	+1	+1	+1	5	1.00	Valid
Accuracy Standard								
1. Problem based learning and blended learning instructional model to enhance learning achievement is comprehensively analyzed from different contexts and sufficient for the synthesis of patterns.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model to enhance learning achievement has a clear process.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model to enhance learning achievement are described and the acquisition is clear.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model to enhance learning achievement use techniques and tools which acquires accurate information and communication.	+1	+1	+1	+1	+1	5	1.00	Valid
5. Problem based learning and blended learning instructional model to enhance learning achievement is a correct and comprehensive learning system.	+1	+1	+1	+1	+1	5	1.00	Valid

Table Appendix 4: Evaluation Results of IOC for handout

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Utility Standard								
1. Problem based learning and blended learning instructional model is useful to lecturers to enhance learning achievement.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model is useful to students to enhance learning achievement.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model includes necessary and enough contents.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model promotes to enhance learning achievement more compared to traditional teaching.	+1	+1	+1	+1	+1	5	1.00	Valid
5. Problem based learning and blended learning instructional model increases the learning achievement of students.	+1	+1	+1	+1	+1	5	1.00	Valid
Feasibility Standard								
1.The lecturer can apply problem based learning and blended learning instructional model to enhance learning achievement to their work and it is worth the time for actual use.	+1	+1	+1	+1	+1	5	1.00	Valid
2. The lecturer can develop the students to Problem Based Learning and Blended Learning Instructional Model	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
model to understanding of prevention sports injury is easy to use.								
4.the students always develop their learning all time by problem based learning and blended learning instructional model to understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
5. The students are comfortable in learning by themselves problem based learning and blended learning instructional model to understanding of prevention sports injury.	+1	+1	+1	+1	+1	5	1.00	Valid
Propriety Standard								
1. Problem based learning and blended learning instructional model to enhance learning achievement is appropriate for lecturers to use assessment results to improve the students.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model to enhance learning achievement is appropriateness for students to create knowledge by themselves.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model to enhance learning achievement is convenient to use.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model to enhance learning achievement is a systematic	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
process to use.								
5. Problem based learning and blended learning instructional model to enhance learning achievement is clear and suitable for use in learning and students development.	+1	+1	+1	+1	+1	5	1.00	Valid
Accuracy Standard								
1. Problem based learning and blended learning instructional model to enhance learning achievement is comprehensively analyzed from different contexts and sufficient for the synthesis of patterns.	+1	+1	+1	+1	+1	5	1.00	Valid
2. Problem based learning and blended learning instructional model to enhance learning achievement has a clear process.	+1	+1	+1	+1	+1	5	1.00	Valid
3. Problem based learning and blended learning instructional model to enhance learning achievement are described and the acquisition is clear.	+1	+1	+1	+1	+1	5	1.00	Valid
4. Problem based learning and blended learning instructional model to enhance learning achievement use techniques and tools which acquires accurate information and communication.	+1	+1	+1	+1	+1	5	1.00	Valid
5. Problem based learning and blended learning instructional model to enhance learning achievement is a correct and comprehensive learning system.	+1	+1	+1	+1	+1	5	1.00	Valid

Table Appendix 5: Evaluation Results of IOC for Lesson Plan

No.	Item	Specialists' rating					Total	Mean	Results
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Learning Objective									
1	Complying with content of the course	+1	+1	+1	+1	+1	5	1.00	Valid
2	Covering knowledge, process, and attitude	+1	+1	+1	+1	+1	5	1.00	Valid
3	Being measurable in knowledge, process, and attitude	+1	+1	+1	+1	+1	5	1.00	Valid
Contents									
4	Complying with learning objective	+1	+1	+1	+1	+1	5	1.00	Valid
5	Being appropriate in terms of time management	+1	+1	+1	+1	+1	5	1.00	Valid
6	Problem based learning and blended learning instructional model Complying with the designed instructional model	+1	+1	+1	+1	+1	5	1.00	Valid
7	Supporting students' learning	+1	+1	+1	+1	+1	5	1.00	Valid
8	Including various activities	+1	+1	+1	+1	+1	5	1.00	Valid
Learning materials									
9	Complying with the learning objectives	+1	+1	+1	+1	+1	5	1.00	Valid
10	Complying with the contents	+1	+1	+1	+1	+1	5	1.00	Valid
Evaluation and Assessment									
11	Complying with the learning objectives	+1	+1	+1	+1	+1	5	1.00	Valid
12	Including various methods and instruments	+1	+1	+1	+1	+1	5	1.00	Valid

Table Appendix 6: Evaluation Results of IOC for Pre Post Testing

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Dimension 1: Sports injury prevention								
1: Which of the following is classified according to the degree of injury? () A. Mild, moderate, severe B. Openness, closure C. Acute injury, chronic injury D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
2: An athlete cannot train for more than 24 hours, has a certain impact on daily life activities, loses part of his athletic ability, and cannot complete most training content. What level of injury is this? () A. Mild B. Moderate C. Severe D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
3: Which of the following times is called the acute phase of soft tissue sports injuries? () A. Within 24 hours B. Within 48 hours C. Within 72 hours D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
4: Which of the following periods of time is known as the functional recovery period from soft tissue sports injuries? () A. 2 days to 3 weeks	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
B. 2 days to 2 weeks C. 3 days to 2 weeks D. Not sure Correct answer: C								
5: Which of the following injuries is most likely to occur in sports? () A. Sprain B. Strain C. Abrasions D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
6: Which of the following principles should be followed to prevent sports injuries? () A. Based on fruit prevention B. Based on prevention C. According to cause and effect prevention D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
7: Which of the following are causes of sports injuries? () A. Warm-up activities B. Without protective gear C. All of the above D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
8: What is the proportion of anterior cruciate ligament injuries in the knee joints of female football players and male football players? () A. Women are taller than men B. Men are taller than women C. same height D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
9: What are the factors for sports injuries caused by venue conditions? () A. Internal cause B. Iatrogenic factors C. Environmental factors D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
10: Which part of volleyball has the highest injury rate? () A. Waist B. Shoulder joint C. Elbow joint D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
11: Sprains are classified in which of the following ways? () A. The extent of the damage B. According to the nature of the injury C. According to the damaged tissue structure D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
12: How long does it take to be unable to train, is it considered a serious injury? () A. 24 hours B. 48 hours C. 4 weeks D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
13: Which of the following times is called the acute phase of fractures and sprains? () A. Within 1 week B. Within 2 weeks C. Within 3 weeks D. Not sure	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
Correct answer: B								
14: Which of the following types of injuries is most likely to cause infection? () A. Chronic injury B. Acute injury C. Open injury D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
15: Which of the following is superficial soft tissue trauma? () A. Sprain B. Strain C. Laceration D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
16: Which of the following injuries is the most common among adolescents? () A. Sprain B. Fracture C. Laceration D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
17: Gender, body shape, age, and anatomical and physiological characteristics are which factors that cause sports injuries? () A. Physical factors B. Psychological factors C. Technical factors D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
18: Accidental injury is caused by which of the following reasons? () A. Technical damage B. Non-technical damage	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
C. Physical factors D. Not sure Correct answer: B								
19: Which part of the throwing event has the highest injury rate? () A. Waist B. Shoulder joint C. Elbow joint D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
20: Which of the following are internal causes of sports injuries? () A. Gender B. Sports equipment C. Medical supervision D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
21: Who needs to determine the degree of sports injury? () A. Coach B. Athletes C. Doctor D. All of the above Correct answer: D	+1	+1	+1	0	0	3	0.60	Invalid
22: Which of the following are serious injuries () A. Breath B. Loop C. Consciousness D. All of the above Correct answer: D	0	+1	+1	+1	0	3	0.60	Invalid
23: Which of the following are internal causes of sports injuries? () A. Fatigue B. Disease C. Fear	0	0	+1	+1	+1	3	0.60	Invalid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
D. All of the above Correct answer: D								
24: Which of the following is physical fitness training? () A. Strength B. Speed C. Endurance D. All of the above Correct answer: D	+1	+1	0	0	0	2	0.40	Invalid
25: What is the protective device that effectively protects the human body? A. Helmet B. Shoulder pads C. Knee pads D. All of the above Correct answer: D	0	+1	+1	+1	0	3	0.60	Invalid
Feasibility Standard								
1: If an athlete suffers shock during exercise, what problem should be diagnosed first? () A. Is there a conscious B. Whether you are breathing or whether your respiratory tract is clear C. Is there a heartbeat? D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
2: What is the first step in diagnosis and the prerequisite for correct diagnosis. () A. History of special training B. Medical history C. Physical examination D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
3: Which of the following is an essential examination tool when joint movement is	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
limited? () A. Fascia gun B. Scale C. Protractor D. Not sure Correct answer: C								
4: What problem is the straight leg raise test used to check? () A. Tibial nerve B. Cervical nerve C. Sciatic nerve D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
5: Which of the following is incorrect in X-ray examination of bones and joints? () A. Be careful to remove metal jewelry B. Hold your breath during the process C. Fast for at least 4 hours before the examination D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
6: After being diagnosed by a doctor, a patient needs to use enhanced CT technology to examine the abdomen. Which of the following is correct () A. No need to remove metal jewelry B. Hold your breath during the process C. Fast for at least 4 hours before the examination D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
7: Which part of the body is the "4" experiment used to	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
check? () A. Shoulder joint B. Knee joint C. Hip joint D. Not sure Correct answer: C								
8: Which of the following examinations has no radiation and can be continuously scanned dynamically and repeatedly, so it is easy to promote and apply? () A. Magnetic resonance imaging (MRI) B. Ultrasound Imaging (USI) C. Electromyography (EMC) D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
9: Injury to the lateral ligaments of the ankle joint belongs to which of the following types of injuries? () A. Soft tissue injury B. Closed injury C. Acute closed soft tissue injury D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
10: Which of the following injuries is usually called an acute injury if it occurs within 1 week? () A. Fracture B. Dislocation C. Soft tissue injury D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
11:Which item in the general physical examination is not	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
included in the clinical physical examination? () A. History of special training B. Vital signs C. Head, face and facial features D. Not sure Correct answer: A								
12: Which of the following is not a clinical examination in traditional Chinese medicine? () A. Inspection B. Palpation C. Diagnosis D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
13: What problem is the neck-pressure test used to detect? () A. Brachial plexus B. Cervical nerve C. Sciatic nerve D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
14: What problem is the neck flexion test used to check? () A. Tibial nerve B. Cervical nerve C. Sciatic nerve D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
15: Which of the following examinations requires the injection of contrast media and may cause allergic reactions in the human body? () A. X-ray examination B. X-ray computed tomography (CT) C. Magnetic Resonance Imaging	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
(MRI) D. Not sure Correct answer: B								
16: What problem is the floating patella test used to check for the knee joint? () A. Effusion B. Meniscus C. Ligaments D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
17: An athlete has a spinal injury and is suspected of having a thoracic spine fracture. Which of the following examinations is most suitable for diagnosis () A. X-ray examination B. X-ray computed tomography (CT) C. Magnetic Resonance Imaging (MRI) D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
18: In boxing, what level of neurological damage is short-term unconscious loss lasting more than 10 seconds? () A. Level 1 B. Level 2 C. Level 3 D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
19: What is the simplest index to evaluate exercise-induced fatigue? () A. Heart rate B. blood pressure C. Respiratory rate	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
D. Not sure Correct answer: A								
20: What is the earliest subjective indicator for judging exercise-induced dehydration? () A. Thirst B. Pale C. Feeling weak D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
21: Which tender point is located in front of the shoulder joint? () A. Lateral epicondyle of humerus B. Medial epicondyle of humerus C. Long head of brachialis tendon D. Not sure Correct answer: C	0	+1	+1	+1	0	3	0.60	Invalid
22: Which tender point is located on the outside of the elbow joint? () A. Lateral epicondyle of humerus B. Medial epicondyle of humerus C. Long head of brachialis tendon D. Not sure Correct answer: A	0	0	+1	+1	+1	3	0.60	Invalid
23: Which tender point is located on the inside of the shoulder joint? () A. Lateral epicondyle of humerus B. Medial epicondyle of	+1	+1	0	0	0	2	0.40	Invalid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
humerus C. Long head of brachialis tendon D. Not sure Correct answer: B								
24: What does straight leg raising check? () A. Brachial plexus B. Sciatic nerve C. Ulnar nerve D. Not sure Correct answer: B	0	+1	+1	+1	0	3	0.60	Invalid
25: What does the neck flexion test check? () A. Brachial plexus B. Sciatic nerve C. Ulnar nerve D. Not sure Correct answer: B	0	0	+1	+1	+1	3	0.60	Invalid
Dimension 3: First Aid Treatment for Sports Injuries								
1: At the scene of a sports injury, which of the following is incorrect regarding the principles of first aid? () A. Ensure the safety of the environment first, then carry out rescue operations B. Rescue serious injuries first, then treat minor injuries; stop bleeding first and then bandage C. Give first aid first and then call for help D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
2: When performing adult cardiopulmonary resuscitation, the ratio of compression to	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
blowing should be? () A. 15:1 B. 30:2 C. 15:2 D. Don't know Correct answer: C								
3: An athlete fell from a height, suffered a head injury, and bleeding from the nose and ear canal. What is the correct treatment method? () A. Stuff it with cotton balls B. Rinse with cold water C. Not blocked D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
4: In case of abdominal trauma and intestinal extravasation, what is the on-site bandaging method? () A. Triangular scarf abdominal bandaging B. Cover the wound with the dressing and make a circle, use a bowl to hold the wound, and then wrap it with a triangle towel C. Return the prolapsed intestine to the abdominal cavity and cover the wound with dressing D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
5: What is the correct way to use a tourniquet? () A. Every 40-50 minutes, relax for 2-3 minutes B. The tightness should be moderate	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
C. All of the above are correct D. Not sure Correct answer: C								
6: What is the wrong way to carry a wounded person with a cervical vertebra fracture? () A. Pull-car transport B. Transportation using a spine board C. Four ambulancemen lifted and laid them flat D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
7: When there is massive bleeding from an open injury to the forearm, where should the tourniquet be placed? () A. 1/3 of the upper arm B. Middle and lower 1/3 of upper arm C. 1/3 of the upper arm D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
8: An athlete accidentally twists his foot and the outside of the ankle joint becomes congested and swollen. What would you do first? () A. Gently relieve swelling on the injured area B. Rest immediately, apply cold compress and apply pressure bandage C. No bleeding and no treatment required D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
9: Athletes experience severe abdominal pain during running.	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
What is the best way to deal with it? () A. Slow down appropriately B. Press the painful area and bend over to walk or jog C. Adjust breathing and running rhythm D. Not sure Correct answer: B								
10: If a student sprains the lateral ankle ligament during sports, will you fix his ankle? () A. Valgus position B. Varus position C. Function bit D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
11: A student has a sprained right ankle joint. When bandaging it, which bandaging method would you choose? () A. Circular bandaging method B. Spiral bandaging method C. "8" shaped bandaging method D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
12: A student accidentally bruises his finger while passing the ball. How would you deal with it? () A. Minor injuries can be left alone B. Massage the student's fingers to relieve pain C. Have the student immediately stop practicing, apply ice, and use a support band to fix the affected limb	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
to the healthy side. D. Not sure Correct answer: C								
13: How will you deal with a student who develops blisters due to ill-fitting sneakers? () A. Squeeze the liquid out of the blister and cut off the foreskin of the blister. B. Clean the blister with warm water, squeeze out the liquid in the blister, disinfect it, cover it with sterile gauze and bandage it C. Rinse the blisters with cold water, treat them, and wait until they get better naturally. D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
14: What is the most important, simplest and most effective temporary method to stop bleeding? () A. Indirect finger pressure hemostasis method B. Tourniquet method to stop bleeding C. Flexion of limbs and padding to stop bleeding D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
15: When a student has a minor scratch, which of the following methods should be used to clean the wound? () A. Rinse with soda water B. Use physiological saline for cleaning C. Clean with soapy water	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
D. Not sure Correct answer: B								
16: How would you deal with someone suffering from heatstroke while exercising outdoors in the hot summer weather? () A. Rinse with cold water B. Go to a cool place and drink hot water C. Rest in a cool place and drink cold water D. Not sure Answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
17: How do you deal with muscle spasms? () A. Use even force and slow reverse traction on the spastic area B. Timely and rapid traction of spastic muscles C. Massage D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
18: During class or training, a student suddenly faints. Which of the following is incorrect? () A. Lie flat and raise your head and lower limbs B. Ensure normal breathing and heartbeat, maintain adequate breathing, and keep warm C. Pinch the Renzhong and Hegu acupoints D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
19: What are the four major vital signs of the human body that are used to evaluate	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
whether the injured person has a life-threatening situation? () A. Respiration, body temperature, pulse, blood pressure B. Consciousness, heartbeat, pupils, breathing C. Heartbeat, movement, respiration, blood pressure D. Not sure Correct answer: A								
20: What do the "four techniques" of trauma first aid refer to? () A. Hemostasis, bandaging, fixation, and transportation B. Protect, elevate, bandage, and fix C. Resuscitation, hemostasis, bandaging, and fixation D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
21: What is the first step of initial emergency diagnosis? () A. Head B. Chest C. Abdomen D. Brain Correct answer: C	0	0	+1	+1	+1	3	0.60	Invalid
22: What is the first step in on-site early support? () A. Airway B. Breathe C. Cycle D. Rest Correct answer: A	+1	+1	0	0	0	2	0.40	Invalid
23: What does R mean in "RICE" in on-site first aid? () A. Rest	0	+1	+1	+1	0	3	0.60	Invalid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
B. Brake C. Apply ice D. Bandage Correct answer: A								
24: What does I mean in "RICE" in on-site first aid? () A. Rest B. Brake C. Apply ice D. Bandage Correct answer: C	0	0	+1	+1	+1	3	0.60	Invalid
25: What does the E in "RICE" in on-site first aid refer to? () A. Rest B. Elevate and pressurize C. Apply ice D. Bandage Correct answer: B	0	0	+1	+1	+1	3	0.60	Invalid
Dimension 4: Rehabilitation after Sports Injury								
1: Which of the following does not conform to the basic principles of sports injury rehabilitation training? ( ) A. Principle of special adaptation B. The principle of never stopping training C. Principle of suitable large amount of exercise D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
2: If a person is confirmed to have a moderate injury, for how long should the specific training of the injured part be suspended or reduced and active treatment be given? () A. Within 1 week	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
B. Within 2 weeks C. Within 4 weeks D. Not sure Correct answer: C								
3: In the rehabilitation assessment, what is the basis for understanding the scope and degree of motor function impairment as the basis for formulating a rehabilitation plan? () A. Initial assessment B. Mid-term evaluation C. Final evaluation D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
4: After a sports injury occurs, what are the early symptoms of muscle injury? () A. Redness, swelling, heat and pain B. Has limited functions C. Shrink D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
5: What is the first step in the basic procedure of sports injury rehabilitation training? () A. Restore joint range of motion B. Emergency treatment C. Restoration of strength D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
6: Which level of muscle injury will have obvious local symptoms and signs, as well as muscle dysfunction? () A. Mild injury or first degree	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
injury B. Moderate injury or secondary injury C. Severe injury or third-level injury D. Not sure Correct answer: A								
7: Which level of injury means the injury is ≥ half of the cartilage thickness but does not reach the subchondral bone, and you cannot continue to exercise. () A. 1st degree injury B. 2nd degree injury C. 3rd degree injury D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
8: Which of the following are chronic recovery training exercises? () A. Correct wrong movement exercises B. Rapid development of compensatory function exercises C. Strengthen the strength training of the injured area D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
9: After the fracture, that period belongs to the second stage, and you cannot train yet. () A. 2 weeks~5 weeks B. 3 weeks~6 weeks C. 6 weeks~8 weeks D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
10: Which of the following are the basic conditions for functional recovery? () A. No pain in movable areas B. Muscles do not have normal strength and explosion C. Overstressed mental state D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
11: Rehabilitation training after ankle and foot sports injuries can be roughly divided into the following five phases. What period is 5-10 days after the injury? () A. The first issue B. The second period C. The third issue D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
12: What rehabilitation training cannot be performed 5-10 days after ankle and foot sports injuries? () A. Do Achilles tendon stretching exercises in cold water B. Practice walking and standing on the front of the foot (double or single foot) C. Do training to strengthen ankle muscles on the isotonic exercise machine D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
13: In the late stage of sports injury, what is the commonly used closed treatment method? ()	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
A. Massage treatment B. Acupuncture treatment C. Acupotomy treatment D. Not sure Correct answer: A								
14: In the process of rehabilitation treatment, what is used to evaluate the treatment effect and judge the recovery progress? () A. Initial assessment B. Mid-term evaluation C. Final evaluation D. Not sure Correct answer: B	+1	+1	+1	+1	+1	5	1.00	Valid
15: In the process of rehabilitation treatment, it is used as the basis for determining the curative effect, arranging daily training, and determining whether formal training or participation in competitions can be resumed? () A. Initial assessment B. Mid-term evaluation C. Final evaluation D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
16: Which level of muscle injury will cause muscle fiber rupture, obvious local symptoms and signs, and muscle dysfunction? () A. Mild injury or first degree injury B. Moderate injury or secondary injury C. Severe injury or third-level	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
injury D. Not sure Correct answer: B								
17: Which of the following are the basic principles of sports injury rehabilitation training? ( ) A. The principle of never stopping training B. Principles of restoring muscle function as early as possible C All of the above D. Not sure Correct answer: C	+1	+1	+1	+1	+1	5	1.00	Valid
18: What is the first step in the basic procedure of sports injury rehabilitation training? () A. Emergency treatment B. Restore joint range of motion C. Restoration of strength D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
19: What is the third step in the basic procedure of sports injury rehabilitation training? () A. Emergency treatment B. Restore joint range of motion C. Restoration of strength D. Not sure Correct answer: A	+1	+1	+1	+1	+1	5	1.00	Valid
20: What is the therapy that uses natural and artificial physical factors for rehabilitation training? () A. Exercise therapy B. Physical therapy C. Traditional Chinese Medicine	+1	+1	+1	+1	+1	5	1.00	Valid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
D. Not sure Correct answer: B								
21: What are the training principles from worry-free training to ball training? () A. Principle of coordination B. Principle of comprehensiveness C. The principle of gradual and orderly progress D. Security Principles Correct answer: C	0	0	+1	+1	+1	3	0.60	Invalid
22: Which of the following is an active movement? () A. Static exercises B. Passive practice C. Collaborative practice D. Practice together Correct answer: A	+1	+1	0	0	0	2	0.40	Invalid
23: What promotes capillary contraction in physical therapy? () A. Cold therapy B. Hyperthermia C. Magnetic therapy D. Ultrasound Correct answer: A	0	+1	+1	+1	0	3	0.60	Invalid
24: What in physical therapy promotes faster blood flow? () A. Cold therapy B. Hyperthermia C. Magnetic therapy D. Ultrasound Correct answer: B	0	0	+1	+1	+1	3	0.60	Invalid
25: Which of the following belong to traditional Chinese medicine? () A. Cold therapy B. Cupping	+1	+1	0	0	0	2	0.40	Invalid

Item	Specialists' rating					Total	Mean	Results
	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5			
C. Magnetic therapy D. Ultrasound Correct answer: B								

Appendix E

Certificate of English

BANSOMDEJCHAOPRAYA
RAJABHAT UNIVERSITY

This is to certify that

Mr. Yu Zhengwen

Achieved BSRU English Proficiency Test (BSRU-TEP) level

C1

Given on 25th January 2021

(Assistant Professor Dr Kulsirin Aphiratvoradej)

Director

Appendix F

The Document for Acceptance Research

ที่ อว.๖๕๐๑.๑๑/ว.๒๑๗๖

คณะศึกษาศาสตร์
มหาวิทยาลัยเกษตรศาสตร์
๕๐ ถนนงามวงศ์วาน จตุจักร
กรุงเทพมหานคร ๑๐๙๐๐

๔ ธันวาคม ๒๕๖๖

เรื่อง ยืนยันการตีพิมพ์บทความในวารสารศึกษาศาสตร์ปริทัศน์

เรียน คุณ Yu Zhengwen, Assistant Professor Dr. Tanaput Chancharoen, Associate Professor Dr.Areewan Iamsa-ard และ Assistant Professor Dr. Sarayut Sethakhajorn

ตามที่ท่านได้ส่งบทความเรื่อง "Development of Problem Based Learning and Blended Learning Instructional Model for Understanding of Prevention Sports Injury of Undergraduate Students" เพื่อลงตีพิมพ์ในวารสารศึกษาศาสตร์ปริทัศน์ กองจัดการวารสารศึกษาศาสตร์ปริทัศน์คณะศึกษาศาสตร์มหาวิทยาลัยเกษตรศาสตร์ ขอแจ้งให้ท่านทราบว่าบทความของท่านได้รับการพิจารณาให้ลงตีพิมพ์ในวารสารศึกษาศาสตร์ปริทัศน์ ปีที่ ๓๙ ฉบับที่ ๒ เดือน พฤษภาคม – สิงหาคม ๒๕๖๗

ขอแสดงความนับถือ

(รองศาสตราจารย์ ดร.จิตตินันท์ บุญสถิรสกุล)
บรรณาธิการวารสารศึกษาศาสตร์ปริทัศน์

วารสารฯ
โทร ๐๒-๕๗๙๘๔๐๓

Research Profile

Name–Surname	Yu Zhengwen
Day/Month/Year	18/March/1993
Address	No. 3261 Xiaohe Avenue, Babu District, Hezhou City, Guangxi Province, China
Education	
2012.9-2016.6	Liaocheng University, Liaocheng City, China Major: Social Sports Guidance and Management, Degree: Bachelor's Degree
2016.9-2018.6	Liaocheng University, Liaocheng City, China Major: Social Sports Guidance, Degree: Master's Degree
2021.1-Present	Bansomdejchaopraya Rajabhat University, Bangkok, Thailand. Major: Curriculum and Instruction, Degree: Ph.D.
Working experience	
2018.8- Present	School of Tourism and Sports Health, Hezhou University, Hezhou, China; Position: Lecturer