

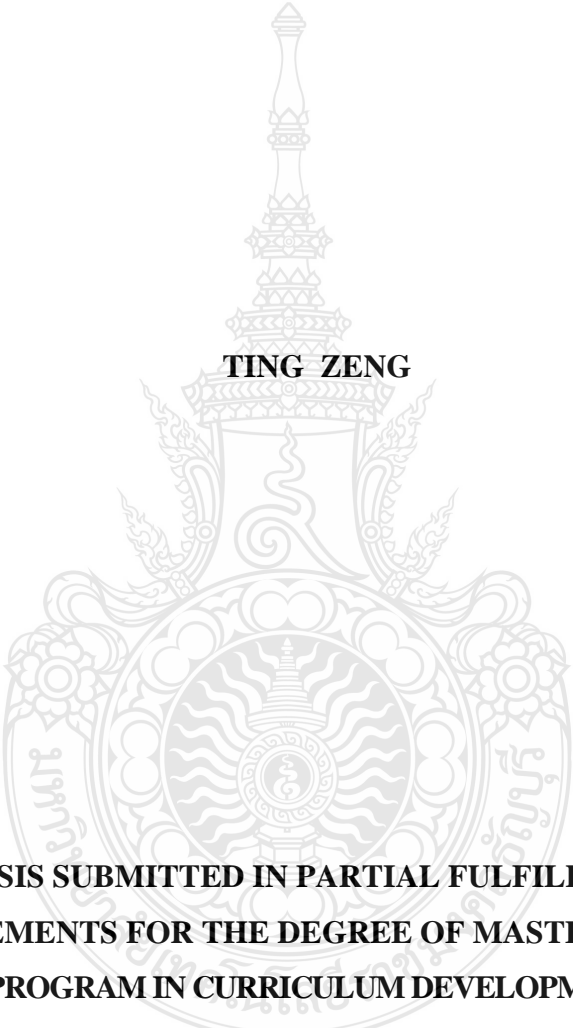
**LEARNING MANAGEMENT USING PROJECT-BASED LEARNING  
IN INNOVATION AND ENTREPRENEURSHIP COURSES TO DEVELOP  
LEARNING ACHIEVEMENT FOR UNDERGRADUATE STUDENTS**

**TING ZENG**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION  
PROGRAM IN CURRICULUM DEVELOPMENT  
AND INSTRUCTIONAL INNOVATION  
FACULTY OF TECHNICAL EDUCATION  
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI  
ACADEMIC YEAR 2022  
COPYRIGHT OF RAJAMANGALA UNIVERSITY  
OF TECHNOLOGY THANYABURI**

**LEARNING MANAGEMENT USING PROJECT-BASED LEARNING  
IN INNOVATION AND ENTREPRENEURSHIP COURSES TO DEVELOP  
LEARNING ACHIEVEMENT FOR UNDERGRADUATE STUDENTS**

**TING ZENG**



**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION  
PROGRAM IN CURRICULUM DEVELOPMENT  
AND INSTRUCTIONAL INNOVATION  
FACULTY OF TECHNICAL EDUCATION  
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI  
ACADEMIC YEAR 2022  
COPYRIGHT OF RAJAMANGALA UNIVERSITY  
OF TECHNOLOGY THANYABURI**

วิทยานิพนธ์ฉบับนี้เป็นงานวิจัยที่เกิดจากการค้นคว้าและวิจัย ขณะที่ยังศึกษาอยู่ใน คณะครุศาสตร์อุตสาหกรรม มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี ดังนั้น งานวิจัยในวิทยานิพนธ์ ฉบับนี้ถือเป็นลิขสิทธิ์ของมหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี และข้อความต่าง ๆ ในวิทยานิพนธ์ ฉบับนี้ ข้าพเจ้าขอรับรองว่าไม่มีการคัดลอกหรือนำงานวิจัยของผู้อื่นมานำเสนอในชื่อของข้าพเจ้า

This thesis consists of research materials conducted at Faculty of Technical Education, Rajamangala University of Technology Thanyaburi and hence the copyright owner. I hereby certify that the thesis does not contain any forms of plagiarism.

*Ting zeng*  
(Ms.Ting Zeng)



COPYRIGHT © 2022  
FACULTY OF TECHNICAL EDUCATIONAL  
RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI

ลิขสิทธิ์ พ.ศ. 2565  
คณะครุศาสตร์อุตสาหกรรม  
มหาวิทยาลัยเทคโนโลยีราชมงคลธัญบุรี

**Thesis Title** Learning Management Using Project-Based Learning  
in Innovation and Entrepreneurship Courses to Develop  
Learning Achievement for Undergraduate Students

**Name - Surname** Mrs. Ting Zeng


**Program** Curriculum Development and Instructional Innovation


**Thesis Advisor** Assistant Professor Saiphin Siharak, Ph.D.

**Academic Year** 2022


---

**THESIS COMMITTEE**


 ..... Chairmar  
(Associate Professor Kosol Meekun, Ed.D.)

 ..... Committee  
(Associate Professor Sutthiporn Boonsong, Ed.D.)

 ..... Committee  
(Assistant Professor Rossarin Jermtaisong, Ph.D.)

 ..... Committee  
(Assistant Professor Saiphin Siharak, Ph.D.)

Approved by the Faculty of Technical Education, Rajamangala University of  
Technology Thanyaburi in Partial Fulfillment of the Requirements for the Master's Degree

 ..... Dean of Faculty of Technical Education  
(Assistant Professor Arnon Niyomphol, M.S.Tech.Ed.)

3 April 2023

<b>Thesis Title</b>	Learning Management Using Project-Based Learning in Innovation and Entrepreneurship Courses to Develop Learning Achievement for Undergraduate Students
<b>Name - Surname</b>	Mrs. Ting Zeng
<b>Program</b>	Curriculum Development and Instructional Innovation
<b>Thesis Advisor</b>	Assistant Professor Saiphin Siharak, Ph.D.
<b>Academic Year</b>	2022

### ABSTRACT

The purposes of this research were to compare: 1) undergraduate students' learning achievement in innovation and entrepreneurship courses before and after using project-based learning instruction, 2) undergraduate students' learning achievement in innovation and entrepreneurship courses before and after using the traditional instruction, and 3) the students' learning achievement in innovation and entrepreneurship courses of the students who learned through project-based learning instruction and the students who learned through the traditional instruction. The research design was a quasi-experimental method.

The samples of the research were 60 undergraduate third-year students in the second semester of academic year 2022 at Sichuan University of Science and Engineering, China. Two classes of students were randomized using cluster sampling technique. The research instruments included project-based learning lesson plans, traditional lesson plans, and learning achievement tests. The data were analyzed using mean, standard deviation, and t-test.

The research results showed that: 1) the undergraduate students' learning achievement in innovation and entrepreneurship courses after using project-based learning instruction was higher than before at the statistically significance level of .05, 2) the undergraduate students' learning achievement in innovation and entrepreneurship courses using the traditional instruction was higher than before at the statistically significance level of .05, and 3) the students who learned through project-based learning instruction had higher learning achievement in innovation and entrepreneurship courses than those who learned through the traditional instruction at the statistically significance level of .05.

**Keywords:** project-based learning, entrepreneurship, innovation, learning achievement

## **Acknowledgments**

Between the pen, condensed blood, and sweat graduation thesis is finally completed, and the heart is full of joy. Two years of postgraduate life are coming to an end. Looking back on the fleeting two years, I am infinitely grateful to so many teachers and friends who accompanied me and gave me a lot of encouragement and help.

First of all, I would like to express my sincere gratitude to my supervisor, Assistant Professor Dr. Saiphin Siharak, for you have not only taught me knowledge but also greatly inspired my life during the two years of study. Let me learn to broaden my mind in the cultivation of knowledge, and develop a calm attitude, in the process of paper topic selection and writing, you gave me a lot of inspiration and lessons, especially by putting forward a lot of constructive revision suggestions for the paper. At the same time, I would like to thank Assistant Professor Dr. Saiphin Siharak, and Associate Professor Dr. Kosol Meekun, Associate Professor Dr. Sutthiporn Boonsong, Assistant Professor Dr. Rossarin Jermtaisong, and Dr. Pornpirom Lhongsap. I would like to thank all my teachers for giving me knowledge, giving me a different perspective to think about problems, and enlightening my wisdom.

Secondly, I would like to thank Assistant Professor Dr. Liu Xiao Li, Assistant Professor Dr. Xiong LiJuan and Associate Professor Dr. Dowroong Watcharinrat. for discussing my paper and putting forward many valuable suggestions during my writing process. In addition, I would like to express my gratitude to all the students. During the days of mutual help and communication with them, I felt deep friendships and gained a lot of happiness. In particular, I would like to thank our monitor, He Fei Chi, for giving me a lot of help.

Finally, I would like to thank my family and friends for their silent support and encouragement. Their support is my endless spiritual motivation, it is their silent support, understanding, and help, so that I will not feel helpless in the face of difficulties, but also to the writing of this article reference, reference the Learning achievement of experts at home and abroad to express heartfelt thanks! This document is for all those who have helped me.

Ting Zeng

## Table of Contents

	Page
Abstract.....	(3)
Acknowledgements.....	(4)
Table of Contents.....	(5)
List of Tables.....	(7)
List of Figures.....	(8)
CHAPTER 1 INTRODUCTION.....	9
1.1 Background and Importance of the Problems.....	9
1.2 Research Purpose.....	14
1.3 Research Hypothesis.....	14
1.4 Scopes of Research.....	14
1.5 Definition of Terms.....	15
1.6 Research Framework.....	17
1.7 Contribution to Knowledge.....	17
CHAPTER 2 REVIEW OF THE LITERATURE.....	18
2.1 Innovation and Entrepreneurship Courses.....	18
2.2 Project-Based Learning.....	22
2.3 Learning Achievement.....	32
2.4 Relevant Research.....	37
CHAPTER 3 RESEARCH METHODOLOGY.....	43
3.1 Research Design.....	43
3.2 Population and Sample of Informants.....	44
3.3 Research Instrument.....	44
3.4 Instrument Development.....	45
3.5 Data Collection.....	48
3.6 Data Analysis.....	49

## Table of Contents (Continued)

	Page
CHAPTER 4 RESEARCH RESULT.....	51
Part 1 Comparative analysis of learning achievement of undergraduate third-year students before and after learning by project-based learning.....	51
Part 2 Comparative analysis of learning achievement of undergraduate third-year students before and after learning by traditional method...	51
Part 3 Comparative analysis of learning achievement of undergraduate third-year students between the students learning by project-based learning and the students learning by the traditional method.....	53
CHAPTER 5 DISCUSSION AND RECOMMENDATION.....	55
5.1 Summary of Findings.....	55
5.2 Discussion.....	56
5.3 Recommendation.....	59
List of Bibliography.....	61
Appendices.....	71
Appendix A.....	72
- Letter to Experts and Specialists for Research Instruments Validation...	57
Appendix B.....	77
- Lesson plan.....	61
Appendix C.....	117
- Learning Achievement Test.....	118
Biography.....	122



## List of Tables

	Page
Table 3.1 Pretest-Posttest Nonequivalent-Group Design.....	43
Table 4.1 Comparative analysis of Learning achievement of undergraduate third-year students before and after learning by project-based learning....	52
Table 4.2 Comparative analysis of learning achievement of undergraduate third-year students before and after learning by traditional method.....	52
Table 4.3 Comparative analysis of learning achievement of undergraduate third-year students before learning between the students learning by the project-based learning and the students learning by the traditional method.....	53
Table 4.4 Comparative analysis of learning achievement of undergraduate third-year students after learning between the students learning by the project-based learning and the students learning by the traditional method.....	53



## List of Figures

	Page
Figure 1.1 Conceptual Research Framework.....	16



# CHAPTER 1

## INTRODUCTION

### 1.1 Background and Importance of the Problem

As higher education became more prevalent in China, university graduates faced severe employment pressure each year. Meanwhile, with the development of the economy and technology, there was an increasing demand in society for high-quality talent with innovative ideas. To promote the development of university curriculum construction and improve students' learning outcomes in employment and entrepreneurship, continuous updates were required in the research of innovation and entrepreneurship courses.

In recent years, innovation and entrepreneurship courses have become an important aspect of the development of Chinese universities. As a result, a series of policies and measures were formulated to promote the cultivation of innovative and entrepreneurial talents (Yu & Xiong, 2018, pp. 28). China's national policies have given significant attention and support to entrepreneurship education. In January 1999, The State Council approved the Action Plan for Revitalizing Education in the 21st Century, which was issued by the Ministry of Education. This plan clearly stated that "we should strengthen entrepreneurship education for teachers and students and take measures to encourage students to set up new and high-tech enterprises independently" (Zhou et al., 2019, pp.54-60). The Outline of the National Medium and Long-Term Plan for Educational Reform and Development (2010-2020) also explicitly stated that "Higher education should focus on improving students' learning, practical, and innovative abilities" and "promote entrepreneurship education" (Bai et al., 2021, p.1490). In 2010, the Ministry of Education instructed that innovation and entrepreneurship courses should be carried out in colleges and universities to encourage college students to start their own businesses. This was the official introduction of innovation and entrepreneurship courses into college campuses by the Ministry of Education, and it marked the beginning of the education system of innovation and entrepreneurship courses in colleges and universities. Innovation and entrepreneurship courses should be integrated into the overall curriculum system of higher education and become an important part of college students' education

(Hu, 2016, pp.1-4). In 2015, The General Office of the State Council issued the Implementation Opinions on Deepening the Reform of Entrepreneurship Education in Colleges and Universities, which emphasized that the comprehensive promotion of college students' entrepreneurial ability should be placed at the core of higher education reform.

The promotion of entrepreneurship education in Chinese higher education, the strengthening of the combination of higher education and industry, the promotion of college students' entrepreneurship, and the cultivation of innovative and entrepreneurial talents were all essential to adapt to the new situation of innovation-driven development and realize the national innovation-driven strategy. Innovation and entrepreneurship courses were one of the important aspects of talent training reform in colleges and universities (Yang, 2018, pp.41-42), and it was also one of the crucial means to build an innovative country (Hu & Wang, 2019, pp.29-33) on September 26, 2018, The State Council issued the Opinions on Promoting High-quality Development of innovation and entrepreneurship courses and Building an Upgraded version of Mass innovation and entrepreneurship courses. This document provided important follow-up advice for building an upgraded version of mass innovation and entrepreneurship courses in the new era and promoting high-quality development of entrepreneurship. Promoting mass innovation and entrepreneurship courses was a natural choice given rapid economic development and increasingly fierce social competition. In this context of "mass innovation and entrepreneurship courses" education, college students' "mass innovation and entrepreneurship courses" education became the focus of common concern of enterprises, universities, and society. It was also an essential aspect of talent training in colleges and universities, and the inevitable responsibility of colleges and universities to provide high-end talents to society. "Mass innovation and entrepreneurship courses" education was of far-reaching significance for improving the comprehensive ability and quality of students in higher vocational colleges and improving the quality and quantity of employment (Wu et al., 2019, pp.54-57)

Carrying out innovation and entrepreneurship courses was essential not only to improve the comprehensive quality and professional quality of students but also to meet the needs of current and future economic and social development. It played an important

role in promoting national innovation. “However, China's innovation and entrepreneurship courses still faced numerous problems. For instance, there was a gap between the desired outcome and the effectiveness of the course. Entrepreneurship education for college students aimed to foster critical and innovative thinking, improve academic performance in innovation and entrepreneurship courses, and enhance their scientific and entrepreneurial spirit (Li et al., 2020, pp.34-37). But based on the course construction and teaching outcomes at that time, the teaching process was oversimplified, and the training provided fell short of meeting the needs of schools, enterprises, society, and the country for innovative and entrepreneurial talents. The curriculum lacked balance in addressing the needs of students and lacked efficient support for cultivating high-quality entrepreneurial talents. Students aimed to master knowledge, improve academic performance, and become entrepreneurs. However, teachers needed to consider the universality of teaching; hence the teaching content was based on basic theory, supplemented by practice and actual combat. Students who had started or planned to start their own businesses could only receive one-on-one after-class tutoring, which had limited time and effect and did not provide effective support for cultivating high-quality entrepreneurial talents. Students had low acceptance of the traditional method classroom organization form, and the evaluation effect was poor. The traditional method was based on "knowledge," where teachers mainly inculcated knowledge. Outdated teaching methods and the lack of practical teaching made it challenging to stimulate students' interest in learning, leading to low expectations, low participation, poor learning outcomes, difficulty in achieving curriculum objectives, and low teaching evaluation. At the professional level, of course, teachers needed urgent improvement. Entrepreneurship courses required teachers to understand the elements and process of entrepreneurship, master multidisciplinary professional knowledge, pay attention to the real-time development of enterprises, and update the teaching content in line with economic and social development. The innovation and entrepreneurship courses belonged to the Student Affairs Department, and most teachers were staff members. At that time, the number of teachers was small, and staff not related to entrepreneurship lacked sufficient knowledge of entrepreneurship theory and practice, leading to significant teaching pressure and poor quality of curriculum construction and teaching effectiveness. Students lacked comprehensiveness

and depth, practical opportunities, enthusiasm, and initiative of teachers and students (Liu, 2020, pp.12-14).

In summary, the previous training approach did not meet the objectives of innovation and entrepreneurship courses in terms of student training, curriculum development, teaching quality, teaching staff development, and other aspects, and it failed to meet the requirements of schools and society for innovative and entrepreneurial talents. The innovation and entrepreneurship courses mode in colleges and universities was an integrated and innovative mode of education that needed to be reformed and innovated in terms of curriculum design, teaching methods, and practical links. Concerning teaching methods, it was essential to adopt diverse teaching methods to enhance students' learning interest and participation (Wei & Liu, 2020, pp.77-80).

Therefore, the study adopted Project-Based Learning as the teaching framework to develop the course and improve students' learning performance in innovation and entrepreneurship courses. Project-Based Learning is a problem-oriented, student-centered, group-based teaching method that is recognized by the global education community (Maeda et al., 2016, pp.2466-2474). Project-Based Learning can cultivate students' academic performance and improve their quality. Since the 21st century, employment pressure has rapidly increased. In order to meet the requirements of today's rapidly developing society, contemporary college students needed to have strong abilities in active and self-directed learning, while traditional method teacher-centered and passive learning methods were insufficient to cultivate students' independent learning and improve their academic performance. The Project-Based Learning principle could meet this requirement by emphasizing the cultivation of students' problem awareness, mastery of learning methods, and enthusiasm and initiative in learning so that students could develop the ability to identify, analyze and solve problems, improve their academic performance, adapt to the development trend of a knowledge-changing society, and change their fate through knowledge. Moreover, flexible and diversified learning methods were not limited by time, space, and region, making it suitable for various disciplines, meeting the needs of lifelong education, and conforming to the development of the times. Research on Project-Based Learning has shown that it could be an effective way to engage students in deeper learning, promote higher-order thinking skills, and facilitate the

development of key competencies such as teamwork, communication, and problem-solving (Thomas, 2000).

The Project-Based Learning strategy focused on encouraging learners to actively participate in classroom activities, accumulate their own learning outcomes, and develop and present them in the form of projects. Students needed a way to express, learn, and regulate their sequence of learning activities. They had the opportunity to collaborate on practices and use content knowledge to develop their own projects. Projects were based on students' interests, needs, and demands, and were related to real-life scenarios. The activities in Project-Based Learning were practical and authentic, involving structured activities of collaboration and cooperation such as group discussions, brainstorming, and group projects - communication in real-life situations. Therefore, students were encouraged to frequently communicate with their classmates and participate in group activities to complete projects (Maeda et al., 2016, pp.2466-2474)

Students were expected to possess self-management and problem-solving skills and to perform well in cooperative learning activities. Exploration, self-evaluation and reflection, team participation, and leadership; are all skills that were considered necessary for a successful life of a 21st-century learner. They developed their academic skills through practical activities (Hmelo-Silver et al., 2007, pp. 99-107).

Researchers must utilize Project-Based learning to enhance the learning outcomes of undergraduate third-year students in innovation and entrepreneurship courses. Although research on Project-Based Learning has a long history, with numerous domestic citations published in many years was studied, the application of Project-Based Learning in innovation and entrepreneurship courses, and even basic courses, was still lacking. To fill this gap, researchers aim to explore the application of student-centered Project-Based Learning in innovation and entrepreneurship courses, using "undergraduate entrepreneurship education" as an example, and develop reform and practice plans. Therefore, researchers must adopt Project-Based learning to foster Learning achievement in undergraduate third-year students' innovation and entrepreneurship courses.

## **1.2 Research Purposes**

1.2.1 To compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by project-based learning.

1.2.2 To compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by the traditional method.

1.2.3 To compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students between students who learned by project-based learning and students who learned by the traditional method.

## **1.3 Research Hypothesis**

1.3.1 Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning by project-based learning are higher than before learning.

1.3.2 Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning by the traditional method are higher than before learning.

1.3.3 Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning by project-based learning are higher than the traditional method.

## **1.4 Scope of Research**

### **1.4.1 Population and samples**

#### **1.4.1.1 Population**

The population consisted of 120 undergraduate third-year students at Sichuan University of Science and Engineering in China, who were enrolled in the second semester of the academic year 2022.

#### **1.4.1.2 Sample scope**

The sample comprised undergraduate third-year students at Sichuan University of Science and Engineering in China who were enrolled in the second



semester of the academic year 2022 and studying innovation and entrepreneurship courses. The students in the sample were selected using a cluster sampling technique, with two classes randomly chosen. Each class was then divided into random groups, with one group assigned to Project-Based Learning (Experimental group) and the other group assigned to the Traditional method (Control group). Each group consisted of 30 students.

#### 1.4.2 Variable scope

1.4.2.1 Independent variable is learning management with two values:

- 1) project-based learning and
- 2) Traditional method.

1.4.2.2 Dependent variable is learning achievement.

#### 1.4.3 Content scope

The undergraduate third-year students on innovation and entrepreneurship consist of 3 chapters

Lesson Plan 1: Are you suited to starting a business (4 hours)

Lesson Plan 2: Create your business plan (4 hours)

Lesson Plan 3: If you were starting a business today, what would you need to do? (4 hours)

#### 1.4.4 Time frame :

The teaching experiment period is from November 2022 to January 2023

### **1.5 Definition of Terms**

#### 1.5.1 Innovation and Entrepreneurship Courses

Innovation and entrepreneurship courses were designed to foster students' entrepreneurial thinking, abilities, and awareness through theoretical study and practical application. These courses equipped students with the necessary skills to innovate and establish their businesses, laying a strong foundation for future self-employment and employment opportunities. The target audience for this elective course was senior students at Sichuan University of Science and Engineering, with a total of 12 hours of class time. The objectives of the course included enhancing students' knowledge

and skills, improving their innovation and entrepreneurial abilities, nurturing innovative talents, developing career-related skills, and promoting economic and social development.

#### 1.5.2 Project-Based Learning

Project-Based Learning was a teaching and learning approach centered around the design and implementation of student-centered projects. It emphasized problem-solving and cooperative participation, allowing students to acquire knowledge and skills by exploring real and complex problems over an extended time. Steps of Project-based learning were: Step 1 identify a topic based on interests, Step 2 planning for developing the project, Step 3 finding the information, Step 4 analyze and develop the final project, and Step 5 present the results of the project.

#### 1.5.3 Traditional Method

The traditional method referred to a teaching approach where teachers aimed to impart a significant amount of knowledge to students through systematic and detailed explanations. The form of instruction was relatively straightforward, with teachers typically standing at the front of the classroom while students passively received the instruction. The teacher assumed the dominant role in the class, while students occupied a passive role, emphasizing the transfer of knowledge but often lacking the cultivation of students' creative thinking and practical abilities. In this method, teachers had more freedom in their instruction, while students were expected to listen attentively. The teaching plan of Sichuan University of Science and Engineering served as a guideline for this method.

#### 1.5.4 Learning achievement

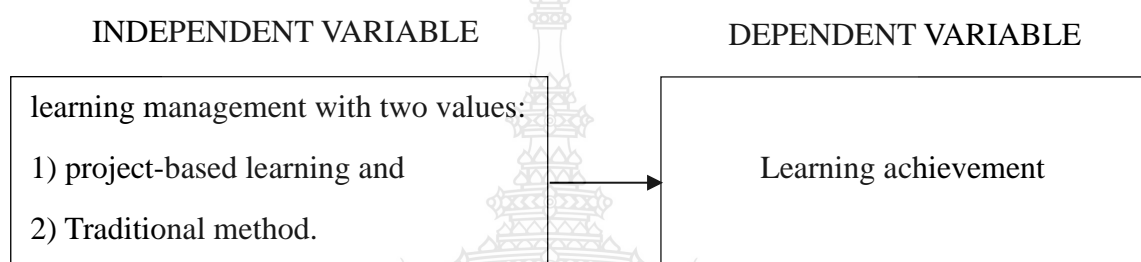
Learning achievement referred to the scores obtained by students after completing final paper exams. These scores were used by teachers to evaluate students' mastery of knowledge. The Learning achievement tests were developed by the researcher conducting the study.

#### 1.5.5 Undergraduate third-year students

The undergraduate third-year students were individuals enrolled in university-level courses as part of their basic higher education. They were typically high school graduates or possessed an equivalent level of education. The duration of undergraduate studies was usually four years for most majors, although a few majors

might have required five years of study (the length of study for part-time undergraduate education varied). Undergraduate degrees could be obtained through full-time or part-time programs. Full-time undergraduate programs typically involved national standardized entrance exams for general college admissions, while non-full-time undergraduate programs included adult education, online education, open education, and higher education through self-study examinations.

## 1.6 Research Framework



**Figure 1.1:** Conceptual Research Framework

## 1.7 Contribution to Knowledge

1.7.1 Guideline on how to learn management by using project-based learning in innovation and entrepreneurship courses to develop Learning achievement for undergraduate third-year students.

1.7.2 Guideline on how to learn management by using project-based learning can improve Learning achievement for the other courses.

## **CHAPTER 2**

### **REVIEW OF THE LITERATURE**

This chapter focused on reviewing the previous studies related to the following area relevant to this research.

- 2.1 Innovation and Entrepreneurship courses
  - 2.1.2 The background of the innovation and Entrepreneurship course
  - 2.1.3 Significance of innovation and entrepreneurship courses
  - 2.1.4 Course structure
- 2.2 Project-based learning
  - 2.2.1 Definition of Project-based learning
  - 2.2.2 Theoretical basis of Project-based learning
  - 2.2.3 Learning Management with Project-based learning
  - 2.2.4 Effective strategies for applying Project-Based Learning to college students' innovation and entrepreneurship courses
- 2.3 Learning achievement
  - 2.3.1 Definition of learning achievement
  - 2.3.2 Composition of learning achievement
  - 2.3.3 Methods to improve learning achievement
- 2.4 Related Research
  - 2.4.1 Domestic Research
  - 2.4.2 Foreign Research
  - 2.4.3 Summarize

#### **2.1 Innovation and Entrepreneurship Courses**

- 2.1.1 The background of the innovation and Entrepreneurship course

In recent years, the cultivation of innovative and entrepreneurial talents has become a crucial development strategy for higher education institutions in China, following the implementation of the national innovation-driven development strategy (Zhang et al., 2019, pp.107-127).

Innovation and entrepreneurship education has become an essential component of colleges and universities' talent training strategy, as emphasized by the guidelines and policies on innovation and entrepreneurship education issued by the Ministry of Education of China. These policies stressed the importance of integrating theory and practice and fostering students' practical skills (Song & Wang, 2015, pp.251-269).

Reforming innovation and entrepreneurship education in colleges and universities would have aided in the development of more innovative and entrepreneurial talents, driven industrial innovation and upgrading, and advanced the implementation of the national innovation-driven development strategy (Yang, 2018, pp.41-42).

Higher education institutions were supposed to play a critical role in providing educational guidance, personnel training, knowledge innovation, and social service, with a focus on innovation and entrepreneurship that catered to the needs of economic and social development. Innovation and entrepreneurship education was core aspect that led the reform and development of higher education and served as a vital link between higher education and society (Hu & Wang, 2019, pp.29-33).

Bae, Qian, Miao, and Fiet. (2014, pp.217-254) discovered that entrepreneurship education had a significant positive effect on entrepreneurial intention, meaning that individuals who underwent entrepreneurship education were more likely to plan to start a business. This effect was particularly noticeable in higher education settings, long-term courses, and courses that prioritized experiential learning. The relationship between entrepreneurship education and entrepreneurial intent was stronger for individuals with a proactive personality and a higher level of previous business experience.

As the most populous country in the world, China had an abundance of human resources. The growing demand for innovative talent to aid in the country's transformation into a human resource power made it necessary for higher education, especially innovation and entrepreneurship education, to excel in training these talents. Doing so would have assisted innovative talents in securing better employment, enhanced the level of national human resources construction and development, and satisfied the increasing demand of enterprises for high-quality, highly skilled, and technologically

innovative talents. Therefore, schools must have reinforced the cultivation of excellent and high-quality talents.

### 2.1.2 Significance of innovation and entrepreneurship courses

In the context of modern society, higher education institutions faced higher requirements in terms of talent training. Graduates faced increased employment pressure, leading colleges and universities to pay more attention to cultivating students' employment and entrepreneurial abilities to promote their all-round development (Shu et al., 2019, pp.153-154). With the comprehensive promotion of quality education, China emphasized the quality education of college students to develop their overall qualities. The spirit of innovation and the ability to create were important components of this education. However, traditional college teaching only focused on basic knowledge and neglected education on innovation and entrepreneurship. Therefore, colleges and universities needed to adjust and optimize traditional method and use innovation and entrepreneurship education as an effective means of talent training, integrating it into the entire college education process. The construction of an innovation and entrepreneurship education system should focus on cultivating students' innovative thinking, practical skills, and entrepreneurial spirit and create a favorable environment for students to start their own businesses. This would positively promote the improvement of students' comprehensive literacy (Wang et al., 2020, pp.42-49).

With the rapid development of science and technology, the teaching mode and concept of higher education also changed. Therefore, colleges and universities needed to keep pace with the times to endure in this ever-changing era (Wang, 2020, pp.140-142). The integration of big data technology and innovation and entrepreneurship education could not only help colleges and universities effectively cultivate students' innovation and entrepreneurship abilities but also promote the transformation and upgrading of traditional industries and promote the healthy development of regional economies (Li et al., 2021). The purpose of higher education was to cultivate more high-quality applied talents and provide a steady stream of power for social development (Wang & Song, 2019, pp.116-120).

Contemporary employment policies were developed to support the level of self-employment, laying a good foundation for students' employment and promoting

more diversified employment channels, making a maximum contribution to society, really solving the problem of students' employment difficulties, and creating more jobs for social employment. The implementation of innovation and entrepreneurship courses changed the educational orientation of colleges and universities from elite training to mass education training, making innovation and entrepreneurship courses the development concept of colleges and universities, promoting their innovative and sustainable development. Innovation and entrepreneurship courses would help with China's education reform, cultivate students' comprehensive qualities, promote the innovative development of colleges and universities, and promote social employment.

### 2. 1.3 Course structure

Liu, Zhang and Cai (2020, pp.92-97) suggested that colleges and universities establish a talent training system that combines theory and practice and integrates innovation and entrepreneurship education into the entire curriculum. The paper proposed strategies to promote innovation and entrepreneurship education, such as implementing innovation and entrepreneurship courses and organizing innovation and entrepreneurship competitions in colleges and universities.

Similarly Wang and Liu (2020, pp.42-49) believed that innovation and entrepreneurship education should be integrated into the entire talent training process. They put forward a framework for building an innovation and entrepreneurship education system, including establishing professional courses, building innovation and entrepreneurship practice bases, establishing a teacher training system, and cultivating an innovation and entrepreneurship culture.

Innovation and entrepreneurship education should be combined with practical activities, utilizing various platforms and resources, and providing students with a variety of innovation and entrepreneurship activities and supporting services (Li et al., 2021).

During the course structure reform process, great attention was paid to students' original innovation and entrepreneurship abilities, and efforts were made to integrate basic theory courses of innovation and entrepreneurship with professional skills courses, required courses with elective courses, and classroom teaching, online courses, and practical courses (Zhang, 2019, pp.5-6).

Chen and Wu (2021, pp.109-115) believed that the combination of industry and education was crucial in innovation and entrepreneurship education for college students. Combining production and education can create a more practical and hands-on learning environment, thereby enhancing students' innovation and entrepreneurship. Measures were proposed to promote the combination of industry and education in innovation and entrepreneurship education, such as establishing school-enterprise cooperation platforms and designing more practical and project-based courses.

The reform of the innovation and entrepreneurship curriculum was conducive to improving students' practical abilities and innovative spirit, promoting employment and economic development, and helping colleges and universities better serve society. The innovation and entrepreneurship courses at Sichuan University of Science and Engineering were based on theoretical foundations and supplemented with practical applications. The university enhanced students' interest through events like the "Innovation and Entrepreneurship Competition for College Students" and "Internet +" competitions. Additionally, a science and technology park was established to encourage entrepreneurial practice among the university students.

This paper employed the Problem-Based Learning as the framework for implementing the innovation and entrepreneurship course. It aimed to improve students' initiative and enthusiasm for learning, enhance their independent thinking and communication abilities, and ultimately enhance their academic performance. The subsequent section provided an overview of the application of Project-Based Learning in the curriculum developed within this study.

## **2.2 Project-Based Learning**

### **2.2.1 Definition of Project-Based Learning**

Project-Based Learning was a teaching method in which students learned through active participation in real-world and personally meaningful projects (Larmer et al., 2015).

Liu (2003, pp.39-43) stressed that Project-Based Learning was a teaching method that put students' learning in a meaningful and practical background situation. It enabled learners to learn the scientific knowledge behind the problems through



communication and cooperation to solve practical problems, promoting them to acquire the skills of cooperative learning and independent inquiry, efficient problem-solving ability, and development of critical thinking.

Problem-based learning is an instructional approach that involves students actively engaging in authentic, ill-structured problems to develop problem-solving skills, domain-specific knowledge, and self-directed learning abilities. (Savery, 2006, pp.9-20)

Project-Based Learning is an instructional approach that emphasizes active student engagement in authentic, complex projects to promote knowledge construction and skill development. Through Project-Based Learning, students have opportunities to develop not only subject-specific knowledge but also important transferable skills such as teamwork, independent inquiry, and efficient problem-solving abilities." (Helle; Tynjälä & Olkinuora, 2006, pp.287-314)

Project-Based Learning is an instructional approach that centers on students engaging in authentic, complex projects to actively construct their knowledge and skills. It involves students working collaboratively to investigate and solve real-world problems, applying interdisciplinary knowledge and skills while demonstrating critical thinking, creativity, and effective communication.

This article considers Project-Based learning as follows: It was an instructional approach where real-world problems were taken as the theme for projects, utilizing subject knowledge, skills, and critical thinking as tools. Participants developed project plans, collaborated, explored driving problems through various means, and presented the final results as project works. Throughout the project process, students gradually constructed a personalized knowledge network, acquired essential skills, and formed core concepts. Project-Based Learning was considered a teaching method that aimed to foster comprehensive literacy development.

### 2.2.2 Theoretical basis of Project-based learning

Project-Based Learning is founded on various theoretical frameworks, including cognitive constructivism, situated learning, learner-centered, and cooperative learning.

### 2.2.2.1 Cognitive constructivism

Cognitive constructivism is a theory of learning that underscored the active role of learners in constructing new knowledge and understanding through mental processes such as reflection, interpretation, and integration of new information with existing knowledge (Jonassen, 1991, pp.5-14).

As per cognitive constructivism, students should have engaged in inquiry learning in real problem situations to enhance their multi-ability teaching model (Zhang et al, 2016, pp.38-45).

The theory posits that individuals have a cognitive structure and can actively interact with the environment, forming a cognitive system inside the brain through proper adjustment and control of the cognitive structure (Zhong, 2009, pp.12-13).

In the cognitive constructivism approach, teachers should not indoctrinate knowledge but rather design the teaching environment, organize student learning, develop curriculum, collaborate and promote meaning construction, and serve as learning consultants to students. Students should be given timely opportunities to combine, criticize and clarify the differences between old and new knowledge questions, and then build their cognitive structure (Ji, 2016, pp.44-45).

Cognitive constructivism highlights the subject status of students and advocates for students to use their will and needs as a starting point, under the encouragement and guidance of teachers, to improve their professional knowledge, skills, quality, and overall development (Dai, 2017, pp.513-517).

Finally, cognitive constructivism highlights the construction of meaning and identity through interaction and the influence of the broader context in which they are located (Zhao, 2004, p.7).

Learning for students was a process in which they actively perceived and formed their own opinions about external objects in the context of certain knowledge, with the help of others and through corresponding real-life situations, rather than being taught by teachers. It was the students' construction of knowledge.

### 2.2.2.2 Situated learning

Situated learning was a theory put forward by Lave and Wenger (1991), which emphasized that Learning was achieved through active participation in

tasks related to the learners' lives and integration into the communities and cultures in which they lived. Situated learning took place in the context of real and meaningful activities and was influenced by the social and cultural factors of the environment. Situated learning emphasized the importance of social interaction, guidance, and the construction of knowledge through experience.

Kreijns; Kirschner and Jochems (2003, pp.335-353) emphasized the importance of effective group communication in facilitating situated learning and increasing retention.

According to Brown, Collins, and Duguid (1989, pp.32-42), situated learning was achieved through participation in a community of practice in which learners engaged in real activities with experts and other novices in a meaningful and culturally relevant way.

Greeno (1998, pp.5-26) argued that knowledge, learning, and research were all situational activities, influenced by the context in which they occurred. He saw learning as a process of developing and refining situational knowledge that was specific to the acquired environment, rather than acquiring abstract, non-situational knowledge.

Herrington and Oliver (1995, pp.1-13) believed that situated learning encompassed real tasks, multiple roles and perspectives, and social negotiation in the history of the world. In this thesis, situated learning was not only a proposal for situating teaching but also a theory on the nature of human knowledge. It studied how human knowledge developed in the course of activities. Situated learning believed that knowledge and action intersected and interacted. Knowledge was situated and constantly evolved through activities, promoting learning and understanding through participation in practice.

This paper argued that Project-Based Learning simulated real-life situations by setting specific goals and integrating the knowledge points that students needed to master with practical work and real-world problem situations. It required students to complete projects within a designated timeframe, promoting active engagement and encouraging students to develop their completion plans. Furthermore, it encouraged students to deeply contemplate the connection between the real world and

their problem-solving abilities. By learning in authentic situations, learners confronted real-world projects that demanded the application of comprehensive knowledge and the utilization of previously acquired skills to solve increasingly complex problems. This type of experiential learning, where students actively employed new skills and explored novel ideas, enhanced their ability to effectively address practical challenges.

#### 2.2.2.3 Learner-centered

Weimer (2012) believes that learner-centered teaching focuses on cultivating higher-order thinking skills, such as critical thinking, problem-solving ability, and creativity. It is a response to the personal needs and characteristics of learners, realizing that each learner has unique advantages, disadvantages, and learning methods.

Garrison (1997, pp.18-33) proposed the learner-centered approach to education. He proposed a comprehensive model of autonomous learning that placed learners at the center of the process. Garrison stressed the importance of learner motivation and self-regulation in the autonomous learning process and suggested that learners should be encouraged to reflect on their learning and conduct continuous self-assessment to ensure that they achieve learning goals.

Xu and Ding (2017, pp.6-10) proposed that the "learner-centered" classroom teaching model should center on discarding some wrong ideas. "Learner-centered" does not weaken the role of teachers; on the contrary, the role of teachers becomes more important. It is not enough for teachers to prepare lessons well. Teachers also need to consider students' actual situations and do a good job of organizing, motivating, guiding, and evaluating them.

The classroom teaching "learner-centered" emphasizes the sense of acquisition in learners' learning, which is closely related to the effectiveness of classroom teaching. The effectiveness of classroom teaching depends on two factors: one is the nature and structure of professional knowledge, and the second is the characteristics and rules of students' learning (Lin, 2017, pp.26-35).

Chickering and Gamson (1987, pp.3-7) proposed that the learner is centered, suggesting that effective learning can occur when learners actively participate in the learning process, take responsibility for their learning, and cooperate with others. This principle stresses the importance of considering learners' needs, interests, and

abilities in design and teaching. By focusing on learners, teachers can create an environment that promotes critical thinking, problem-solving, and independent learning.

Project-Based Learning provides a learner-centered participation environment, in which the responsibility for the learning process falls on the learner, who will rely on the guidance of teachers and participate in a series of tasks. Learners must learn to develop and organize project plans, study the required data, deal with possible problems, put forward their work results, and evaluate and adjust the requirements of the process.

This paper discusses the classroom teaching model of "Learning-centered", which mainly means that learners' learning is centered on the learner, and its learning effect is centered on the learner. The educational idea of "Learner-centered" is an overall surpass of the educational idea of "teacher-centered" and inspires learners' thirst for knowledge and desire to explore by creating a rich learning environment. Learners have a good sense of acquisition while cultivating good learning habits. Therefore, teachers' teaching materials, teaching design, teaching evaluation, etc. should consider the central position of the learner. When teachers are designing an effective learning environment, they not only need a good understanding of the knowledge that has been mastered before the learner enters the classroom but also need to master the nature and characteristics of the professional knowledge taught and the characteristics and rules of students to learn this knowledge.

#### 2.2.2.4 Cooperative learning

Research and experiments on cooperative learning had been conducted in China and had achieved good results since the late 1980s and early 1990s (Chen & Liu, 2007, pp.100-107).

In his article "Open the Black Box", Zhao (2017, pp.30-46) introduced cooperative learning as essentially a form of social interaction that helped students develop their ability to understand society and social interaction, thus promoting their socialization.

Johnson, Johnson, and Smith (2006) emphasized the importance of collaboration and social interaction in promoting learning and constructing cooperative learning activities to evaluate their effectiveness.

Kagan (1994) stressed the importance of establishing positive interdependence among group members and included specific techniques to promote active participation, equal participation, and individual responsibility.

Gillies (2003, pp.35-49) argued that the structure of collaborative group work in the classroom was crucial to its success. Team building activities, goal setting, and task design could help create a positive learning environment that enhanced students' academic and social outcomes.

Cooperative learning was one of the most important strategies in Project-Based Learning. It involved dividing students into groups based on their different genders, specialties, interests, and abilities. Members in the group had a clear division of labor, cooperated, and actively completed tasks assigned by the teacher. Cooperative learning allowed all students to know their learning tasks and take an active part in class communication and learning. When teachers and students cooperated, students' individuality was respected, and their learning in class became happy, relaxed, and joyful. Cooperative learning could cultivate students' cooperative spirit and strengthen their consciousness of cooperation with others. At the same time, it could develop their communication ability, language expression ability, equality consciousness, innovative spirit, and incentive spirit.

The core of Project-Based Learning was problem-solving. Students needed to conceive solutions, explore and verify them, and obtain the best solution. The thinking abilities of judgment, evaluation, analysis, and reasoning were fully exercised in the process of Project-Based Learning. In the form of cooperative learning inquiry, students could get a variety of solutions from different perspectives, so that they could develop a good thinking habit of looking at problems from multiple perspectives and could objectively consider and compare the advantages and disadvantages of various solutions

### 2.2.3 Learning Management with Project-based learning

Questions were asked and project themes were identified: The problem served as the starting point and focus of Project-Based Learning. Problems could be raised by teachers based on real-life situations, students' cognitive levels, learning content, and other relevant aspects. Alternatively, students could identify practical problems in their

own lives that needed solving, with the guidance and support of teachers. (Smith, 2015, pp.456-473)

**Group learning:** Students were divided into groups by teachers based on the class conditions, typically consisting of 3-6 students. The tasks to be undertaken by each group, along with the goals to be achieved in solving the problem, were communicated by the teacher. Specific task assignments were determined for each member of the group. Once the groups were formed, students were guided by the teacher to engage in self-directed learning by consulting relevant materials and analyzing the content and information related to the questions raised (Smith, 2018, pp.87-102).

**Problem-solving:** Building upon individual and group learning, students within the group engaged in communication, cooperation, and problem analysis to arrive at solutions. Throughout the learning process, students compiled, summarized, and organized the materials, forming a final problem-solving report plan and determining the candidate responsible for the report (Johnson, 2012, pp.245-261).

**Presenting results:** The learning outcomes were presented to both teachers and students through various mediums such as text reports, presentations (e.g., PowerPoint), videos, or scene interpretations. The reporting format followed standardized guidelines, with the presenter addressing the problems to be solved and explaining the group's learning outcomes. In the group report, students responded to questions raised by other students, providing answers or seeking assistance from the teacher if necessary (Smith, 2017, pp.75-89).

**Evaluation and reflection:** Teachers conducted comprehensive evaluations of students' learning, reporting, and task completion, aligning with the teaching objectives. The evaluation primarily focused on the process, while the outcome evaluation served as a supplementary component. It included assessments from both the teacher's perspective and student self-evaluation. The evaluation criteria encompassed information collection, students' learning ability, cooperation skills, learning attitude, and task completion. At the end of the content learning phase, teachers facilitated student reflection and encouraged them to summarize their learning experiences (Johnson, 2014, pp.154-169).

This article discusses the utilization of Project-Based Learning in Innovation and Entrepreneurship courses. The steps involved were as follows:

Step 1: Identifying a topic based on interests. Teachers explained the basic content of innovation and entrepreneurship courses, initiated exploratory questions, and selected project topics based on students' interests, cognitive level, and learning content. Students then planned and developed their final projects accordingly.

Step 2: Planning for project development. The teacher divided the class into five groups of six students each. The teacher grouped students based on their specific circumstances, but students could also form their own teams. After the groups were formed, students engaged in team-building activities under the teacher's guidance to promote team integration. Forming an effective team was crucial for subsequent entrepreneurial projects, based on previous teaching experience. Once the team was formed, the teacher shared relevant information about successful entrepreneurial projects. Project teams used independent learning, group discussions, information gathering, collaboration, and task assignment to determine their entrepreneurial projects. They then developed a reporting plan to address the identified issues.

Step 3: Finding the information. Through studying, students needed to develop a clear understanding of their own projects and the components involved. They collected corresponding information for each part of the project, determining the type and nature of the information needed. They identified key information requirements, assessed what information had already been obtained or possessed, and what was still missing and needed to be collected. They used search engines, databases, shared libraries, and physical libraries to obtain the necessary information.

Step 4: Analyzing and developing the final project. Project teams utilized the knowledge they had gained to explore the entrepreneurial elements of their projects, such as entrepreneurs, business opportunities, business models, and investment and financing models. They analyzed, negotiated, designed, and developed the final project, and presented the results through a PowerPoint (PPT) presentation in class.

Step 5: Presenting the project results. Prior to the presentation, each project team submitted a business plan that clearly defined the various components. The groups used PowerPoint to present their projects, and teachers provided fair evaluations and feedback on student reports and presentations. Group members also assessed each



other's work through questions and discussions. After the presentations, the teacher guided students in reflecting on and summarizing their learning experience.

#### 2.2.4 Effective strategies for applying Project-Based Learning to college students' innovation and entrepreneurship courses

The effective application of Project-Based Learning in college students' innovation and entrepreneurship courses required the rational formulation of training plans for innovation and entrepreneurship courses using Project-Based Learning. This guaranteed the effectiveness of innovation and entrepreneurship courses project training and achieved the overall development and training goals of students (Peng, 2019, pp.28-29).

During college education, some teachers and students believed that students only needed to learn professional knowledge to obtain better employment opportunities after graduation. As a result, teachers failed to guide students to develop innovative and entrepreneurial ideas in their teaching, which could impact the future development of students (Wang et al., 2019, pp.169-171).

In actual project planning and construction, teachers strived to understand the employment needs, interests, and preferences of students. They grasped social development dynamics and trends in real-time and designed innovative and entrepreneurial projects for students according to specific conditions. At the same time, teachers considered all aspects of students' working abilities to ensure that innovation and entrepreneurship courses training programs enhanced students' professional abilities and overall quality (Wang et al., 2021, pp.1-6).

Therefore, in the actual practice of college students' innovation and entrepreneurship courses training programs, teachers drove the project and increased project publicity. This stimulated students' awareness of innovation and entrepreneurship courses, highlighting the importance of implementing the training program to improve their employability and overall literacy. Teachers reasonably used network platforms to broaden the scope of project publicity, deepen the influence on students, and promote their rapid and comprehensive development (Liu & Zhou, 2018).

Teamwork was of great help to students' personal growth. Team spirit was the soul of team cooperation, and all team members needed to cooperate and

communicate with each other. They learned from each other and worked together to achieve the team's goals (Niu et al., 2021, pp.438-441).

The application of Project-Based learning in college students' innovation and entrepreneurship courses aimed to cultivate students' innovation and entrepreneurship courses abilities and improve their academic performance. Therefore, it was necessary to attach great importance to students' project research process. The process of project research was not only a way of project implementation but also a way of project success. During the project implementation process, college students might face mistakes and failures, such as confusion with professional knowledge, contradictions between knowledge and practical operation, and other problems. Therefore, college students should have paid attention to the experiences, lessons learned, and skills gained during the implementation of innovation and entrepreneurship courses projects. This enabled them to accumulate rich knowledge and skills of innovation and entrepreneurship courses, enhance their abilities, and improve their academic performance (Li, 2021, pp.315-320).

Hence, the reasonable formulation of training plans, strengthening of project publicity, realization of multi-disciplinary vision, and attaching importance to the project research process were all effective strategies of Project-Based Learning applied to college students' innovation and entrepreneurship courses. Teachers designed innovative and entrepreneurial projects for students to cooperate with groups, guided students to maintain and stabilize the team, and encouraged the team to give full play to their maximum strengths. The team members performed their duties, worked towards the common goal of the team, and efficiently completed the cooperation project. Students from different professional backgrounds and scientific perspectives could gather together to carry out project research and innovation. This was more conducive to realizing multiple scientific perspectives and ensuring the learning results of project research

## **2.3 Learning Achievement**

### **2.3.1 Definition of learning achievement**

Learning achievement" referred to the scores obtained by students after passing the final paper examination and Learning achievement test, which was an

indicator used by teachers to evaluate students' mastery of knowledge (Li & Chen, 2016, pp.67).

Woolfolk; Winne & Perry (2016) believed that Learning achievement was a key concept in educational psychology and that motivation, self-regulation, and metacognition all played important roles in determining Learning achievement. Additionally, factors such as socioeconomic status, cultural background, and prior knowledge also affected academic performance.

Motivation played a crucial role in the educational process, and students with greater intrinsic motivation tended to learn more and perform better academically. Improving student motivation had been shown to improve academic performance and persistence in the face of challenges (Huitt, 2011).

Zhang (2005, pp.17-27) pointed out that "Learning achievement" had three meanings: first, it meant that an individual or group could successfully achieve the desired goal after taking actions. The second was to achieve a certain level or degree of success in a certain field. The third was the score on learning achievement.

Self-regulation was an important factor in learning achievement, which involved students using their own cognitive and metacognitive strategies to manage the process of learning. Students who engaged in self-regulated learning tended to have more positive outcomes, such as higher Learning achievement, deeper understanding, and greater motivation to learning (Zimmerman & Schunk, 2011).

In short, "learning" referred to the process of lasting changes in behavior or behavioral potential of individuals through practice or experience, while "Learning achievement" referred to an individual's innate genetic basis, coupled with the outcome of the environment to study hard, resulting in the individual's actual ability to perform in a certain aspect. Learning achievement referred to the knowledge and skills a student had acquired in school through learning certain courses and textbooks. It was usually represented by school test scores or academic tests. In this article, learning achievement was defined by students' academic performance in school tests.

### 2.3.2 Composition of Learning achievement

Zhang and Liu (2017, pp.68-75) found that academic performance was influenced by various factors, such as personal characteristics, learning attitudes, family background, teaching quality, and social environment.

Wang (2019, pp.62-67) demonstrated that academic attitude, learning ability, social support, family background, and teaching quality were significant predictors of Learning achievement. Moreover, the study discovered that the impact of these factors on learning achievement varied significantly across majors and gender groups.

Attention, memory, and motivation were the primary components of learning ability. Learning motivation was a subjective mental state that drove students forward, and confidence and strong expectations were common forms of learning motivation that could encourage the use of active and participatory learning strategies (Zhang & Yang, 1999, pp.35-39).

The family was a critical part of the learning environment. Family education referred to direct education of students' knowledge and skills by the family. Parents should provide enlightening and inspiring educational activities to cultivate their children's habits, interests, and mentality (Wang et al., 2020, p.82).

Family education had a purpose, such as consciously cultivating and training children's correct behavior to encourage their interest in learning activities. These efforts could enhance their self-confidence and promote their ability to form independent thinking. Therefore, family education played an essential fundamental and directional influence on children's learning ability, such as memory ability and learning motivation (Zhang et al., 2021, p.117).

Teachers' teaching methods had a direct impact on students' learning enthusiasm. Teachers' knowledge, attitude, preference, and emotion all affected students' learning motivation (Li et al., 2021, p.68).

Teachers' means of arousing students' enthusiasm was essentially to cultivate their learning motivation (Zhang et al., 2021, p.24).

Classroom teaching that enhanced students' attention and participation could stimulate their interest in learning. Thus, facing the same teaching materials and

assessment content, there were significant differences between classes and schools. The more teachers could arouse students' learning enthusiasm, the more they could improve their Learning achievement (Liu & Zheng, 2021, p.45).

The state and society exerted direct and indirect influence on students through the education department. For example, the people and events praised by the school and society became the life goals of students, and the concept of consumption and entertainment advocated by society also prevailed among students (Guo & Zhang, 2021, p.125).

The entire learning process could not be separated from the influence of social factors. Both memory ability and learning motivation had the potential to be constructed (Zhou & Zhang, 2021, p.93).

This paper contends that Learning achievement was an exceedingly complex social phenomenon that needed to be analyzed from students' individual, family, school, and societal dimensions. The core element of students' personal dimension was learning ability, and learning motivation prompted students to overcome subjective and objective difficulties and convert various elements into resources. Family factors, such as parents' education level and family economic status, also played a role in students' Learning achievement. School factors, such as teaching quality, curriculum design, and classroom environment, also had an impact on Learning achievement. Social factors, such as peer influence, extracurricular activities, and cultural background, were also important predictors of learning achievement.

### 2.3.3 Methods to improve Learning achievement

Home-school cooperation created the most suitable growth atmosphere for students, shaping their positive and sunny attitudes. Through home-school cooperation, students' good habits were cultivated, leading to improved Learning achievement and enhanced practical abilities. Moreover, home-school cooperation effectively promoted parent-child relationships and facilitated healthy student growth (Wang & Li, 2021, p.112).

Positivity not only felt good but also had a transformative effect on our lives. Positive emotions expanded our awareness. The ability to think flexibly and

expansively in the face of challenges or difficulties was a sign of resilience and was positively nurtured (Fredrickson, 2009, pp.7-51).

Optimistic individuals tended to interpret the causes of adverse events as temporary, specific, and external, while pessimists saw these causes as permanent, universal, and personal. Optimism enabled people to persist in the face of obstacles, whereas pessimism led to passivity and avoidance (Seligman, 2006, pp.7-101).

The most successful people were those who harnessed the power of positive thinking to stay dynamic, optimistic, and positive, even in the face of challenges. When we were happy and positive, our brains became more creative, engaged, motivated, resilient, and productive. Positive thinking helped us reframe challenges as opportunities and setbacks as temporary (Achor, 2010, pp.4-26).

In regular teaching activities, students were guided to understand the importance of learning correctly, set learning objectives, stimulate their enthusiasm and sense of responsibility for learning, create situations that stimulated their sense of reasoning and pride in knowledge, and allowed them to fully demonstrate their wisdom and achieve a sense of accomplishment through problem-solving and assuming a subjective role (Ma, 2014, pp.158-159).

Learning ability was a psychological feature that improved and developed through the process of learning activities based on innate physiology. In the teaching process, students' ability for independent learning was enhanced by cultivating their observation, memory, thinking ability, self-learning ability, and innovation ability (Wang & Li, 2019, pp.53-56).

The effectiveness of learning largely depended on the way students learned. In the classroom teaching process, students were guided to develop good learning habits and form correct, Active, and independent learning behaviors and attitudes through learning links such as "preview - listen to lectures - review - practice - test". This improved learning efficiency and Learning achievement (Zhang & Yang, 2018, pp.447-452).

Therefore, enhancing the connection and cooperation between families and schools, cultivating students' positive and optimistic attitudes towards learning, guiding them to think positively, stimulating their learning potential and enthusiasm, cultivating their learning ability, and guiding them to develop good learning habits were

of great help in improving their Learning achievement. This paper utilized the Project-Based Learning teaching method to instruct senior students in innovation and entrepreneurship courses, thereby enhancing their abilities for positive and independent thinking, as well as their Learning achievement.

## **2.4 Relevant Research**

### **2.4.1 Domestic research**

Guo and Liu (2021) studied the application of Project-Based Learning in innovation and entrepreneurship courses in higher vocational colleges. The authors believed that Project-Based Learning could improve students' innovative thinking and practical ability, promote their understanding of entrepreneurship concepts and methods, and be an effective way to strengthen innovation and entrepreneurship courses in higher vocational colleges.

Chen and Xu (20217) conducted a case study at Donghua University to explore the application of Project-Based Learning in innovation and entrepreneurship courses. They found that Project-Based Learning could effectively improve students' abilities in innovation and entrepreneurship courses, as well as their comprehensive ability. Project-Based Learning could also cultivate students' teamwork and communication skills and encourage them to actively explore and solve practical problems in the field of innovation and entrepreneurship courses. They believed that the application of Project-Based Learning in innovation and entrepreneurship courses could promote students' all-around development and provide them with practical skills and abilities that are highly valued in the job market.

Zhou and Liu (2020) found that the application of Project-Based Learning in innovation and entrepreneurship courses in colleges and universities could enhance students' practical ability, cultivate their innovative thinking, improve their teamwork ability, and enhance their communication ability. Project-Based Learning provided students with the opportunity to apply theoretical knowledge to the real world, develop problem-solving skills, and gain practical experience in entrepreneurial projects.

Gao and Yuan (2019) investigated the implementation of Project-Based Learning in college English teaching in China. They found that Project-Based Learning not only helped students develop language skills but also enhanced problem-solving and critical thinking skills.

Research by Liu and Wang (2019) showed that Project-Based Learning had positive effects on students' learning outcomes, critical thinking skills, and creativity. In addition, students who participated in Project-Based Learning showed higher levels of motivation and engagement in the learning process compared to students who received traditional instructional methods. They believed that Project-Based Learning was an effective way to promote student-centered learning and improve students' learning achievements in Chinese higher education. Project-Based Learning was integrated with subject teaching, and the role of teachers was more embodied in the early stage of project learning, co-designing project plans with students, and acting as supervisors.

#### 2.4.2 Foreign research

Vargas-Hernández and Núñez-García (2021) analyzed the effectiveness of Project-Based Learning in entrepreneurship education. The authors found that Project-Based Learning significantly improved students' entrepreneurial skills, including problem-solving, critical thinking, creativity, and collaboration. They also observed an increased interest and motivation among students in entrepreneurship education, leading to greater entrepreneurial willingness and behavior.

Hennemann and Linnenberg (2018) focused on the effectiveness of Project-Based Learning in entrepreneurship education. They examined the impact of Project-Based Learning on students' entrepreneurial ability and explored the factors influencing its effectiveness. The study revealed that Project-Based Learning had a positive effect on college students' entrepreneurial ability, and its effectiveness was influenced by factors such as project design, the convenience of the learning process, and the implementation situation.

Kitzinger and Wilbers (2020) conducted research on the effectiveness of Project-Based Learning in entrepreneurship education. The study found that project-based learning had positive effects on entrepreneurial intention, self-efficacy, knowledge acquisition, and knowledge retention. The effectiveness of Project-Based Learning was



influenced by factors such as the duration and intensity of the intervention and the type of assessment used.

Maritz; Brown and Bock (2020) discovered that Project-Based Learning is an effective approach to cultivating entrepreneurial abilities. The study showed that Project-Based Learning positively affected various entrepreneurial abilities, including opportunity recognition, risk-taking, creativity, and problem-solving. The effectiveness of Project-Based Learning was influenced by factors such as the level of guidance provided, the type of assessment used, and the program's duration.

Manrique and Gutiérrez-Carrasco (2019) explored the use of Project-Based Learning in entrepreneurship education, discussing its potential benefits and challenges and suggesting areas for further research. The article highlighted the potential of Project-Based Learning as an effective and engaging method of teaching entrepreneurship.

Dabrowski and Kurczewska (2020) discussed the use of Project-Based Learning as a tool to promote entrepreneurship among students in engineering schools. The authors argued that Project-Based Learning could provide a hands-on approach to learning, improving students' innovation and problem-solving skills, while also developing important entrepreneurial abilities. The study provided examples of successful Project-Based Learning programs and outlined the benefits and challenges of using Project-Based Learning in entrepreneurship education.

Mironov; Voronin and Shershneva (2020) presented a case study of a Project-Based Learning course on entrepreneurship at a Russian university. In this course, students worked in small groups to develop business plans for real entrepreneurial ideas. The authors found that the program successfully engaged students and promoted active learning, resulting in the development of various skills and knowledge related to entrepreneurship.

Baser; Aydin, and Karaman (2017) focused on the application of Project-Based Learning in science courses. They believed that the interdisciplinary and collaborative nature of Project-Based Learning could enhance students' mastery of cutting-edge technologies and cultivate collaborative skills.

Basilotta Gomez-Pablos; Martin del Pozo and Garcia-Valcarcel Munoz-Repis (2017) applied Project-Based Learning to the Embedded System course and found that it optimized the teaching effect by improving students' interest, learning outcomes, and real-world engineering problem-solving ability.

Hoe and Tan (2006) constructed and applied Project-Based Learning in information technology courses, highlighting its ability to improve students' overall awareness and understanding of knowledge structure, as well as greatly enrich their global learning resources.

Erdogan (2014) applied Project-Based Learning in English teaching at the Middle East Technical University and observed its significant impact on students' learning achievement and self-regulation function.

Project-Based Learning is frequently employed in innovation and entrepreneurship courses due to its effectiveness and engaging nature, which prioritize the cultivation of problem-solving and critical thinking skills-both crucial for achieving success in such courses. Project-Based Learning empowers students to engage in real-world projects and challenges, granting them hands-on experience and opportunities to foster practical skills and knowledge. Through the application of Project-Based Learning in innovation and entrepreneurship courses, students can nurture entrepreneurial thinking, acquire the ability to identify and evaluate business opportunities and develop the skills and knowledge necessary to initiate and expand their enterprises.

#### 2.4.3 Summarize

The research directions of Project-Based Learning varied between China and abroad. In China, Project-Based Learning research had expanded from preschool education to all levels of higher education, encompassing a wide range of subjects. The primary focus was on basic subjects like mathematics, physics, and English in primary and secondary education, and English in higher education. On the other hand, foreign countries primarily emphasized Project-Based Learning in higher education and technical courses. This difference may be attributed to the educational environment in China, where Project-Based Learning was more readily organized and accepted in basic courses.

Over the past decade, Project-Based Learning research in China has concentrated on the "learning process", "learning activities", and "foreign language

research" aspects of Project-Based Learning. The research mainly centered on teaching reform, teaching models, teaching methods, learning theory, and information technology. While domestic researchers recognized the significant role of Project-Based Learning in cultivating students' abilities, most studies still focused on teaching models and methods, particularly in English. There were limited investigations into technical support, teacher and student evaluation, and group collaborative learning in Project-Based Learning, which had not yet gained popularity in Chinese research.

In contrast, the predominant trend in Project-Based Learning research abroad has been to focus on student learning based on original research on teaching, curriculum, and schools. This has led to the development of clusters of learning themes. Project-Based Learning applications abroad primarily took place in higher education, particularly in science and technology fields and science-related subjects such as STEM, physics, chemistry, space engineering, electronics, and computer science.

In China, Project-Based Learning was mainly employed in applications related to database technology, CNC machine tool fault diagnosis and maintenance, STEAM, commercial bank management, higher vocational chemistry, higher vocational business English, MTI vocational translation ability, college English academic writing, and even English translation majors. In the future, Project-Based Learning in China may expand to encompass a broader range of subjects such as literature and history or interdisciplinary studies across various professions. Given the global emphasis on lifelong learning and core literacy development, there is a need for more case studies on Project-Based Learning at the primary and secondary education levels. Students should have Project-Based Learning experiences before entering higher education.

Regarding the promotion of Project-Based Learning, some schools in developed countries have fully implemented it. However, China is still in the pilot period, lacking professional Project-Based Learning-trained teachers, Project-Based Learning methods suitable for China's national conditions, objective and reasonable evaluation systems for implementation, and solutions to challenges encountered during the learning process. Therefore, Project-Based Learning cannot be fully implemented in China at once. Nevertheless, a significant number of scholars in China have conducted Project-Based Learning research across various courses, although the research focuses have been

scattered. By combining the advantages of Project-Based Learning in problem-solving and the cultivation of abilities and qualities with cooperation with traditional Chinese teaching methods and curriculum design, a well-rounded Project-Based Learning system with Chinese characteristics can be developed, leading to improved learning outcomes through pilot experiences or models that can be further promoted.



## CHAPTER 3

### RESEARCH METHODOLOGY

Research on the use of project-based learning for learning management in innovation and entrepreneurship courses to develop Learning achievement of university students will include the following details or components:

- 3.1 Research Design
- 3.2 Population and Sample of Informants
- 3.3 Research Instruments
- 3.4 Instrument Development
- 3.5 Data Collection
- 3.6 Data Analysis

#### 3.1 Research Design

The design of the study was quasi-experimental research. The researcher conducted experiments based on the Pretest-Posttest Nonequivalent-Group Design (Best & Kahn, 2003, p.178).

**Table 3.1** Pretest-Posttest Nonequivalent-Group Design

The Pretest-Posttest Nonequivalent-Group Design			
O1	X		O2
O3	C		O4

Symbols used in experimental design

O1 = Pre-test of the experimental group

O3 = Pre-test of the control group

O2 = Posttest of the experimental group

O4 = Posttest of the control group

X = the learning management using project-based learning.

C = the learning management using the traditional method

## **3.2 Population and Sample of Informants**

### **3.2.1 Population**

The population consisted of 120 undergraduate third-year students at Sichuan University of Science and Engineering in China, who were enrolled in the second semester of the academic year 2022.

### **3.2.2 Sample**

The sample comprised undergraduate third-year students at Sichuan University of Science and Engineering in China who were enrolled in the second semester of the academic year 2022 and studying innovation and entrepreneurship courses. The students in the sample were selected using a cluster sampling technique, with two classes randomly chosen. Each class was then divided into random groups, with one group assigned to the Project-Based method (Experimental group) and the other group assigned to the Traditional method (Control group). Each group consisted of approximately 30 students.

## **3.3 Research Instrument**

The research instruments were classified into the types used in the experiment and the instruments used for data collection. With details as follows:

3.3.1 Learning Management plan and learning management adopt the traditional method, and the theme is innovation and entrepreneurship course:

Lesson Plan 1: Are you suited to starting a business (4 hours)

Lesson Plan 2: Create your business plan (4 hours)

Lesson Plan 3: If you were starting a business today, what would you need to do? (4 hours)

3.3.2 Learning Management plan adopts project-based learning for learning management. The theme is to apply project learning in innovation and entrepreneurship courses for learning management and cultivate college students' Learning achievement. There are ten themes:

Lesson Plan 1: Are you suited to starting a business (4 hours)

Lesson Plan 2: Create your business plan (4 hours)

Lesson Plan 3: If you were starting a business today, what would you need to do? (4 hours)

### **3.4 Instrument Development**

#### 3.4.1 Creating an Experiment Instrument

3.4.1.1 Research tools were used to develop learning management plans using traditional learning management methods for the theme of the Innovation and Entrepreneurship Course.

1) The courses, disciplines, and traditional methods of the learning management plan were studied using traditional learning management methods. The following concepts were summarized: Traditional teaching method is a kind of traditional teaching mode centered on teachers and teaching knowledge.

2) Traditional learning management methods were applied to develop and create learning management plans.

3) The study management plan proposed by the researcher was submitted to the thesis advisor to verify the validity of the content and provide suggestions for improvement and correction.

4) The study management plan was submitted to the expert for evaluation. It was verified and determined that the IOC (project objective Consistency Index) conformance index was greater than or equal to 0.05 for each element in the learning management plan. Three experts, including two for courses and one for measurement evaluation, evaluated the program and made improvements. The Lesson IOC was equal to 1.

1: It was certain that the elements in the learning management plan were congruent.

0: It was not certain that the elements in the learning management plan were congruent.

-1: It was not established that the elements in the learning management plan were congruent.

5) The modified learning management plan was tried out on students in non-one-class sample groups to improve the learning management plan.

6) A learning plan was used for a control group.

3.4.1.2 Project-based learning was used to develop research tools for learning management plans. The theme was the application of project learning in the course of innovation and entrepreneurship for learning management and the cultivation of college students' Learning achievement. There were four themes, and the creation steps were as follows:

1) The courses and topics were studied, and virtual Project-Based Learning was analyzed. The following concepts were outlined: Project-Based Learning was a dynamic classroom approach where students actively explored real-world problems and challenges to gain deeper knowledge. Problem-based learning was a student-centered approach to teaching where students learned about a subject through the experience of solving open-ended questions found in trigger materials. The Project-Based Learning process did not focus on solving problems with defined solutions, but it allowed the development of other required skills and attributes. These included knowledge acquisition, enhanced teamwork, and communication. Project-Based Learning was developed for medical education and had since been expanded for use in other learning programs. This process allowed learners to develop skills that could be used in their future practice. It improved critical evaluation, and literature search, and encouraged continuous learning in a team environment.

2) Project-based learning was used to create a learning management plan for three lesson plans.

3) The learning management plan of the innovation and entrepreneurship course with project-based learning, created by researchers, was submitted to the thesis advisor to verify the effectiveness of the content and provide suggestions for improvement and correction.

4) The learning management scheme using project-based learning was submitted to the experts. It was verified and determined that the IOC conformance index was greater than or equal to 0.05 for each element in the learning management plan. Three experts evaluated the program, including two for courses and one for measurement evaluation, and made improvements. The Lesson IOC was equal to the evaluation criteria were as follows:



1: It was certain that the elements in the learning management plan were congruent.

0: It was not certain that the elements in the learning management plan were congruent.

-1: It was not established that the elements in the learning management plan were congruent.

5) The modified learning management plan, which used project-based learning for learning management, was tried out among students in a non-one-class sample group to improve the learning management plan.

6) A learning plan was used for an experimental group.

### 3.4.2 Creating a Data Collection Tool

The Learning achievement test was used to evaluate the application of project learning in the course of innovation and entrepreneurship for learning management and to cultivate the Learning achievement of college students. The Learning achievement test consisted of 30 multiple-choice questions, with four choices for each question. Both the experimental group and the control group were tested before and after the intervention. The specific steps were as follows:

1) The course manual on learning management and research related to measurement and evaluation was referred to as a guideline for creating Learning achievement tests.

2) An academic performance test was created. It consisted of four multiple-choice questions, with 30 out of 60 items meeting the content and indicators.

3) The proposed learning outcome test, created by the researcher, was submitted to the thesis advisor for validation of the content and suggestions for improvement and correction.

4) The Learning achievement tests were submitted to experts to verify and identify elements of the Learning achievement test with an IOC (Index of Objective Congruence) compliance index greater than or equal to 0.5. Three experts, including two curriculum staff and one measurement and assessment staff, evaluated the tests and made improvements. The evaluation criteria were as follows:

1: When ensuring that the items of the Learning achievement test were congruent with the learning objectives.

0: When not certain whether the items of the Learning achievement test were congruent with the learning objectives.

-1: When being certain that the items of the Learning achievement test were congruent with the learning objectives.

The expert's scores were taken and the Conformity Index was calculated. In this research, the conformity IOC was equal to 1.

5) The modified Learning achievement test was used to improve the Learning achievement among students in a non-one classroom sample group and then put into actual data collection.

6) The test results of the academic performance test were tested and the difficulty was analyzed. The quality standard of the test was set, and each item was classified with a difficulty level ranging from 0.20 to 0.80 and a discrimination ability ranging from 0.20 to 1.00. The quality test consisted of 30 items.

7) The results were analyzed, and Cronbach's alpha coefficient was used to determine the total reliability value, which needed to be greater than 0.8.

8) The Learning achievement test that passed the quality check was published.

9) The Learning achievement test was used to collect data in the experiment.

### **3.5 Data Collection**

Data were collected for this study. The researchers collected data in the following order:

#### **3.5.1 Preparation steps**

3.5.1.1 Contact was made for official documents of the Sichuan University of Science and Engineering. Permission was requested to collect data with the sample group, and the assistance and cooperation of the head of the educational institution were sought.

3.5.1.2 The experimental group and control group were randomly selected from the undergraduate third-year students of Sichuan University of Science and Engineering from 2022 using a cluster sampling technique. They were then randomly assigned to different groups. One group was taught using Project-based learning, while the other group was taught using the Traditional method.

### 3.5.2 Experimental Steps

3.5.2.1 Through the pre-test, the experimental group and control group were assessed before receiving instruction in the innovation and entrepreneurship courses to cultivate college students' Learning achievement.

3.5.2.2 Learning management was divided into two classrooms: the experimental group adopted project-based learning for learning management, while the control group adopted the traditional method for learning management and learning.

3.5.2.3 Through the post-test, the experimental group and control group were assessed after learning management in innovation and entrepreneurship courses, aiming to evaluate the cultivated Learning achievement of college students.

### 3.5.3 Analyze steps

The scores obtained from the Learning achievement tests were statistically analyzed to test the hypotheses.

## 3.6 Data Analysis

In the data analysis, the researcher used a software program to analyze the data. The following data analysis was conducted:

### 3.6.1 Study protocol quality analysis

3.6.1.1 The IOC method was used to analyze the validity of the learning management plan content.

3.6.1.2 The IOC method was used to analyze the validity of the Learning achievement tests.

3.6.1.3 Cronbach's alpha test was used to test the reliability of the Learning achievement tests.

### 3.6.2 Analysis used in hypothesis testing.

3.6.2.1 The Learning achievement in the innovation and entrepreneurship courses was compared before and after learning management through the traditional method using a dependent t-test.

3.6.2.1 The Learning achievement in the innovation and entrepreneurship the use of project-based learning, and a dependent t-test was conducted.

3.6.2.1 The Learning achievement in the innovation and entrepreneurship courses was compared between learning management through the traditional method and learning management through project-based learning using an independent t-test.



## **CHAPTER 4**

### **RESEARCH RESULT**

This research develops the Learning achievement of undergraduate third-year students by using project-based learning. The purposes of this research were to: 1) compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by project-based learning, 2) compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by the traditional method, and 3) compare Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students between students who learned by project-based learning and students who learned by the traditional method. The researchers analyzed the data and presented the results of the data analysis in 3 parts with details as follows:

Part 1: Comparative analysis of learning achievement of undergraduate third-year students before and after learning by project-based learning.

Part 2: Comparative analysis of learning achievement of undergraduate third-year students before and after learning by traditional method.

Part 3: Comparative analysis of learning achievement of undergraduate third-year students between the students learning by project-based learning and the students learning by the traditional method.

#### **Part 1: Comparative analysis of Learning achievement of undergraduate third-year students before and after learning by project-based learning.**

Data analysis to compare the Learning achievement of undergraduate third-year students before and after learning by project-based learning, using the t-test (Dependent), the results of the analysis are shown in Table 4.1.

**Table 4.1** Comparative analysis of Learning achievement of undergraduate third-year students before and after learning by project-based learning.

learning achievement	n	$\bar{X}$	SD	$\bar{D}$	Sd	t	p
before learning	30	10.70	1.86	14.30	.75	104.47*	.000
after learning	30	25.00	2.29				

\*  $p < .05$

Analysis of data from Table 4.1 Significant differences was found in t-tests. ( $t=104.47$ ,  $p<.05$ ) When considering the learning achievement of undergraduate third-year students who were taught with project-based learning, it was found that students had a statistically significantly higher learning achievement after learning ( $\bar{X}=25.00$ ,  $SD=2.29$ ) than before learning ( $\bar{X}=10.70$ ,  $SD.=1.86$ ) at .05 level.

**Part 2: Comparative analysis of learning achievement of undergraduate third-year students before and after learning by traditional method.**

Data analysis to compare the learning achievement of undergraduate third-year students before and after learning by the traditional method, using the t-test (Dependent), the results of the analysis are shown in Table 4.2.

**Table 4.2** Comparative analysis of learning achievement of undergraduate third-year students before and after learning by traditional method.

learning achievement	n	$\bar{X}$	SD	$\bar{D}$	Sd	t	p
before learning	30	10.87	1.41	10.03	2.47	22.25*	.000
after learning	30	20.90	2.58				

\* $p<.05$

Analysis of data from Table 4.2 Significant differences was found in t-tests. ( $t=22.25$ ,  $p<.05$ ) When considering the learning achievement of undergraduate third-year students who were taught with the traditional method, it was found that students had a statistically significantly higher Learning achievement after learning ( $\bar{X}=20.90$ ,  $SD=2.58$ ) than before learning ( $\bar{X}=10.87$ ,  $SD=1.41$ ) at .05 level.

**Part 3: Comparative analysis of learning achievement of undergraduate third-year students between the students learning by the project-based learning and the students learning by the traditional method.**

Data analysis to compare the learning achievement of undergraduate third-year students between the students learning by the project-based learning and the students learning by the traditional method, using the t-test (Independent) the results of the analysis are shown in Table 4.3 - 4.4

**Table 4.3** Comparative analysis of learning achievement of undergraduate third-year students before learning between the students learning by the project-based learning and the students learning by the traditional method.

Learning Management	n	$\bar{X}$	SD	t	p
project-based learning.	30	10.70	1.86	.39	.697
Traditional method.	30	10.87	1.41		

Analysis of data from Table 4.4 The significance was found in t-tests. ( $t=.39$ ,  $p=.697$ ) When considering the average learning achievement of undergraduate third-year students before learning between the students learning by the project-based learning and the students learning by the traditional method, it was found that the students learning by project-based learning ( $\bar{X}=10.70$ ,  $SD=1.86$ ) is not different from the students learning by the traditional method. ( $\bar{X}=10.87$ ,  $SD=1.41$ ).

**Table 4.4** Comparative analysis of learning achievement of undergraduate third-year students after learning between the students learning by the project-based learning and the students learning by the traditional method.

Learning Management	n	$\bar{X}$	SD	t	p
project-based learning.	30	25.00	2.29	6.51*	.000
Traditional method.	30	20.90	2.58		

\* $p < .05$

Analysis of data from Table 4.4 The significance was found in t-tests. ( $t=6.51$ ,  $p<.05$ ) When considering the average learning achievement of undergraduate third-year students after learning between the students learning by the project-based learning and the students learning by the traditional method, it was found that the students learning by the project-based learning had a statistically significantly higher Learning achievement ( $\bar{X}=25.00$ ,  $SD=2.29$ ) than the students learning by the traditional method ( $\bar{X}=20.90$ ,  $S.D.=2.58$ ) at .05 level.





## **CHAPTER 5**

### **DISCUSSION AND RECOMMENDATION**

This research develops the learning achievement of undergraduate third-year students by using project-based learning. The purposes of this research were to 1) compare learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by project-based learning, 2) compare learning achievement in innovation and entrepreneurship courses of undergraduate third-year students before and after learning by the traditional method, and 3) compare learning achievement in innovation and entrepreneurship courses of undergraduate third-year students between students who learned by project-based learning and students who learned by the traditional method. The sample of the research was 60 undergraduate third-year students in the second semester of the 2022 academic year at Sichuan University of Science and Engineering in China. The research instruments were project-based learning, lesson plans, traditional lesson plans, and learning achievement test.

#### **5.1 Summary of Findings**

Developing the Learning achievement of innovation and entrepreneurship of undergraduate third-year students by using project-based learning cultivated. As follows:

5.1.1 Based on hypothesis 1, Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning by project-based learning was significantly higher than before learning management at the .05 level,

5.1.2 Based on hypothesis 2, Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning by the traditional method was significantly higher than before learning management at the .05 level,

5.1.3 Based on hypothesis 3, Learning achievement in innovation and entrepreneurship courses of undergraduate third-year students after learning with project-based learning was significantly higher than students learning management by traditional method at the .05 level,

## 5.2 Discussion

The development of learning achievement in innovation and entrepreneurship among undergraduate third-year students was facilitated by using project-based learning. The research findings discussed three key issues:

5.2.1 Based on the research results, it was found that learning achievement in innovation and entrepreneurship courses among undergraduate third-year students increased significantly after they engaged in project-based learning. This improvement was statistically significant at a significance level of .05. Project-based learning, being student-centered, focused on encouraging active student participation in classroom activities, allowing them to accumulate learning outcomes and present them through their projects. Students had the opportunity to express themselves, conduct research, and manage their learning. They developed their projects through collaborative exercises and the application of content knowledge. The projects were based on the student's interests and needs and were related to real-life scenarios. Classroom activities in project-based learning were practical and authentic, involving real-life communication, processing, and collaboration to complete structured activities such as group discussions, brainstorming, and group projects. Therefore, students were encouraged to engage in frequent communication with their peers and actively participate in group activities to complete their projects. Students needed to possess self-management and problem-solving skills to effectively participate in cooperative learning activities. Through inquiry, self-assessment, reflection, team involvement, and leadership, students acquired the skills necessary for success as 21st-century learners. They enhanced their Learning achievement through practical activities. Project-based learning was a method that enabled students to construct knowledge by dealing with problems through group discussions, receiving appropriate feedback, and obtaining necessary assistance from teachers. Moreover, project-based learning required students to collaborate in solving real-world problems (Chen & Yang, 2021, pp.45-61). Additionally, using project-based learning to address problems in innovation and entrepreneurship courses enabled students to recognize the connections between data and the problems at hand. Hence, project-based learning proved to be an effective approach in facilitating problem-solving skills among students. By connecting general knowledge and fostering problem-solving abilities, this

approach was suitable for university faculty and supported students in solving innovative entrepreneurial challenges, as it prepared them for entrepreneurship.

5.2.2 Based on the research results, it was found that the learning achievement in innovation and entrepreneurship courses among undergraduate third-year students increased significantly after using the traditional method of learning. This improvement was statistically significant at a significance level of .05. The traditional method of learning management involved organizing learning activities clearly and comprehensively, following standards and indicators. It began with a review of the learners' basic or prior knowledge to prepare them. Then new content was introduced, systematically and carefully explained by the teacher, enabling students to acquire a substantial amount of knowledge. The teacher provided relevant examples of problems in innovation and entrepreneurship courses, allowing students to solve these problems independently and eventually summarizing the course together in class. Students were assigned separate exercises based on the textbook or homework sheet, providing opportunities to apply what they had learned and practice their problem-solving skills. During the early days of the founding of New China, there was a strong influence of "learning from the Soviet Union fever," which deeply impacted educational and teaching practices. The traditional method, particularly the lecturing method, dominated school teaching in both the Soviet Union and China. The traditional method, being the oldest, most widespread, and fundamental teaching method, retained its significance in school teaching regardless of changes in times, technological advancements, or evolving educational ideas (Yu, 2001, pp.87-103).

5.2.3 According to the research findings, it was found that the learning achievement in innovation and entrepreneurship courses among undergraduate third-year students who adopted project-based learning for learning management was higher than that of students who adopted the traditional method. This difference was statistically significant at a significance level of .05. The traditional method predominantly relied on the teacher delivering lectures while students listened passively. Classroom instruction focused on unilaterally teaching textbook knowledge, leaving most students in a state of passive knowledge acceptance. In such a learning environment, teachers prioritized imparting known textbook knowledge but neglected to cultivate students' interest in

learning and their ability to apply knowledge to solve practical problems. Consequently, the teacher-student relationship revolved around transmission and acceptance, lacking effective communication and cooperation (Zhang & Li, 2013, pp.64-76). In such a passive learning environment, students lacked motivation and interest, failed to engage deeply with the content, and demonstrated limited participation in learning activities.

In comparison to the traditional method, project-based learning brought about significant changes in teaching elements such as the roles of teachers and students, teaching strategies, learning environments, and evaluation methods. Teachers gradually transitioned from being knowledge providers to guides and facilitators of student development. Instead of directly giving students the answers to knowledge, teachers guided them to obtain problem-solving strategies and methods through appropriate questioning during practical problem-solving. Project-based learning emphasized the central role of students, empowering them to take responsibility for their learning, explore their independent learning abilities, and apply newly constructed knowledge to solve complex problems. Teachers no longer acted as knowledge disseminators but as designers of the teaching environment, organizers of student learning, developers of the curriculum, collaborators in knowledge construction, and consultants for student learning. Teachers encouraged students to connect, criticize, and clarify differences between new and existing knowledge, fostering the development of new cognitive structures (Ji, 2016, pp.45-58). Thus, project-based learning placed significant importance on the primary role of students, advocating for their independent exploration and learning based on their own will and needs. This approach aimed to enhance students' professional knowledge, skills, qualities, and overall development, fostering their growth into ideal, cultured, disciplined, and morally upright individuals (Dai, 2017, pp.78-92).

Therefore, project-based learning can be regarded as a learning management method aimed at nurturing students' ability to solve problems in innovation and entrepreneurship courses. In the teaching activities of innovation and entrepreneurship courses, project-based learning proved to be superior to the traditional method, aligning.

## **5.3 Recommendation**

### **5.3.1 Recommendations for the Implementation of research results**

5.3.1.1 Based on the research findings, teachers who used project-based learning for learning management needed to learn the basic knowledge of project-based learning, understand its organizational form, and comprehend the role that teachers should play in the teaching process. This laid a foundation for effective learning management through project-based learning.

5.3.1.2 According to the research findings, teachers were advised to plan their learning activities in a step-by-step manner. They should closely follow the teaching syllabus and develop projects that were suitable for students with specific potential, fostering their pioneering spirit and encouraging them to explore new horizons.

5.3.1.3 According to the research results, teachers who chose project-based learning first created and experienced a real-life situation and then raised questions through the presentation of the actual situation. Next, the students were divided into groups, and the group members worked together. They consulted a lot of information, screened it, and freely discussed the problems. Each group member brought their answers to exchange ideas with other group members, and there was communication, compliments, comments, and expression of opinions among everyone. Each team member had different methods and skills to solve the problem, and they had to come up with a common solution by summarizing the opinions of each member. After several group discussions, a unified answer was finally formed through analysis, induction, re-analysis, and re-induction. The group leader wrote written materials based on the final results of the group discussion and presented them to teachers and students in the form of PowerPoint. After the presentation, the teacher and all the students could ask questions based on the student's presentation, and the students answered them seriously. The students showcased their learning achievements to each other, compensating for their lack of knowledge, enabling them to learn more, enrich their experience, and improve their ability to identify, analyze, and solve problems. After each group finished their report, the teacher provided comments, affirming the students' Learning achievement and pointing out any deficiencies, which strengthened the students' confidence and improved

their ability for independent learning. From this, it can be concluded that project-based learning teaching started with problems and eventually returned to problems.

### 5.3.2 Recommendations for next research

5.3.2.1 Apply project-based learning to different contexts and disciplines or another level of students to develop Learning achievement.

5.3.2.2 Learning Management Methods using project-based learning. Develop other abilities or processing skills, such as the ability to learn independently or communication skills.



## List of Bibliography

- Achor, S. (2010). **The happiness advantage: The seven principles of positive psychology that fuel success and performance at work.** Crown Business.
- Bae, T. J., Qian, S., Miao, C., & Fiet, J. O. (2014). The relationship between entrepreneurship education and entrepreneurial intentions: A meta-analytic review. **Entrepreneurship Theory and Practice, 38**(2): 217-254.
- Bai, X., Zhang, Q., Chen, M., & Li, W. (2021). The impact of entrepreneurship education on entrepreneurial intentions and actions: The mediating role of entrepreneurial attitudes and perceived behavioral control. **Sustainability, 13**(3): 1490.
- Baser, M., Aydin, B., & Karaman, A. (2017). The Application of Problem-Based Learning in Science Courses. **Eurasian Journal of Educational Research, 17**(70): 123-140.
- Basilotta Gomez-Pablos, R., Martin del Pozo, E., & Garcia-Valcarcel Munoz-Repis, J. (2017). Application of Project-Based Learning in the Embedded System course: An optimization of the teaching effect. **Journal of Engineering Education Research, 2**(4): 501-512.
- Best, J. W., & Kahn, J. V. (2003). **Research in education** (10<sup>th</sup> ed.). Pearson Education.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. **Educational Researcher, 18**(1): 32-42.
- Chen, J., & Liu, X. (2007). Cooperative learning in the Chinese context. **Theory into Practice, 46**(2): 100-107.
- Chen, J., & Wu, Z. (2021). Research on the Innovation and Entrepreneurship Education of College Students Based on the Integration of Production and Education. **Journal of Higher Education Management, 37**(1): 109-115.
- Chen, L., & Yang, S. (2021). Enhancing Learning achievement through project-based learning. **Journal of Educational Research and Practice, 21**(3): 45-61.
- Chen, W., & Xu, X. (2021). The Application of Project-Based Learning in Innovation and Entrepreneurship Education: Taking Donghua University as an Example. **Journal of Higher Education Research, 1**(1): 80-86.

### List of Bibliography (Continued)

- Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. **AAHE Bulletin**, **39**(7): 3-7.
- Dabrowski, A., & Kurczewska, A. (2020). Project-Based Learning as a tool for fostering entrepreneurship among students of engineering faculties. **Przegląd Elektrotechniczny**, **96**(6): 135-139.
- Dai, S. (2017). The role of project-based learning in enhancing students' professional development. **Journal of Education and Development**, **41**(3): 78-92.
- Dai, X. (2017). The Enlightenment of Cognitive Constructivism on the Teaching of Ideological and Political Theory Course in Vocational Colleges. **International Journal of Information and Education Technology**, **7**(7): 513-517.
- Erdogan, T. (2014). The Effect of Project-Based Learning on Pre-Service EFL Teachers' Learning achievement and Self-Regulation. **Educational Research and Reviews**, **9**(8): 250-257.
- Fredrickson, B. L. (2009). **Positivity: Groundbreaking research reveals how to embrace the hidden strength of positive emotions, overcome negativity, and thrive**. Crown Publishing Group.
- Gao, L., & Yuan, R. (2019). Research on the Implementation of Project-Based Learning Teaching Model in College English Teaching in China. **Journal of Language Teaching and Research**, **10**(4): 734-741.
- Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. **Adult Education Quarterly**, **48**(1): 18-33.
- Gillies, R. M. (2003). Structuring cooperative group work in classrooms. **International Journal of Educational Research**, **39**(1-2): 35-49.
- Greeno, J. G. (1998). The situativity of knowing, learning, and research. **American Psychologist**, **53**(1): 5-26.
- Guo, L., & Liu, Y. (2021). Research on the application of Project-Based Learning teaching method in innovation and entrepreneurship education in higher vocational colleges. **Journal of Shandong Youth Political College**, **33**(2): 26-32.



### List of Bibliography (Continued)

- Guo, X., & Zhang, Y. (2021). The influence of state and society on students' value orientation. **Journal of Educational Theory and Practice**, 4(2): 125.
- Helle, L., Tynjälä, P., & Olkinuora, E. (2006). Project-Based Learning in post-secondary education: Theory, practice, and rubber sling shots. **Higher Education**, 51(2), 287-314.
- Hennemann, S., & Linnenberg, A. (2018). Project-Based Learning in entrepreneurship education: A multi-level analysis. **Journal of Small Business Management**, 56(2): 253-273.
- Herrington, J., & Oliver, R. (1995). Critical characteristics of situated learning: Implications for the instructional design of multimedia. **Australian Journal of Educational Technology**, 11(1): 1-13.
- Hmelo-Silver, C. E., Duncan, R. G., & Chinn, C. A. (2007). Scaffolding and Learning achievement in problem-based and inquiry learning: A response to Kirschner, Sweller, and Clark (2006). **Educational Psychologist**, 42(2): 99-107.
- Hoe, W.-M., & Tan, I. (2006). Constructing a problem-based learning model in information technology education: A study of its effect on students' learning. **Innovations in Education and Teaching International**, 43(3): 291-301.
- Hu, W. (2016). The development of innovation and entrepreneurship education in China. **Journal of Education and Practice**, 7(7): 1-4.
- Hu, Y., & Wang, J. (2019). An empirical analysis of entrepreneurship education's effect on college students' entrepreneurial intention: A mediating role of entrepreneurial self-efficacy. **Studies in Higher Education**, 44(1): 29-33.
- Huitt, W. (2011). **Motivation to learn: An overview**. Educational Psychology Interactive. Valdosta, GA: Valdosta State University.
- Ji, Y. (2016). An analysis of cognitive constructivism theory and its application in English teaching. **US-China Education Review**, 6(11): 44-45.
- \_\_\_\_\_. (2016). The role of teachers in project-based learning. **Journal of Educational Practice and Research**, 30(2): 45-58.

### List of Bibliography (Continued)

- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2006). **Active learning: Cooperation in the college classroom**. Edina, MN: Interaction Book.
- Johnson, M. A. (2012). Cooperative learning in Project-Based Learning: Enhancing problem-solving skills. **Journal of Educational Research**, *57*(4): 245-261.
- \_\_\_\_\_. (2014). Assessment and evaluation in Project-Based Learning: A comprehensive approach. **Journal of Educational Assessment**, *61*(2): 154-169.
- Jonassen, D. H. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm?. **Educational Technology Research and Development**, *39*(3): 5-14.
- Kagan, S. (1994). **Cooperative learning**. San Juan Capistrano, CA: Kagan Cooperative Learning.
- Kitzinger, A., & Wilbers, K. (2020). Effectiveness of Project-Based Learning in entrepreneurship education: A systematic review and meta-analysis. **Entrepreneurship Education and Pedagogy**, *3*(4): 584-594.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. **Computers in Human Behavior**, *19*(3): 335-353.
- Larmer, J., Mergendoller, J. R., & Boss, S. (2015). **Setting the standard for project based learning: A proven approach to rigorous classroom instruction**. [n.p.].
- Lave, J., & Wenger, E. (1991). **Situated learning: Legitimate peripheral participation**. London: Cambridge University Press.
- Li, H., Lei, L., Wang, C., & Wang, J. (2015). The application of Project-Based Learning in translation teaching. **Theory and Practice in Language Studies**, *5*(1): 1-9.
- Li, J., & Chen, S. (2016). An analysis of the relationship between learning motivation and Learning achievement. **Journal of Education and Teaching Research**, *3*(5): 67.

### List of Bibliography (Continued)

- Li, S. L., Liu, M., & Liu, J. (2020). Research on the problem of innovation and entrepreneurship curriculum in colleges and universities. **Modern Vocational Education, 11(8):** 34-37.
- Li, X. (2021). The Implementation Process of Innovation and Entrepreneurship Projects in Higher Education: A Study on College Students. **Journal of Education and Learning, 10(3):** 315-320.
- Li, X., Li, S., & Song, J. (2021). Research on Innovation and Entrepreneurship Education in Colleges and Universities under the Background of Big Data. **Advances in Social Science, Education and Humanities Research.**
- Li, Y., Wang, J., & Wang, L. (2021). The relationship between teachers' teaching methods and students' learning motivation. **Journal of Educational Sciences, 6(1):** 68.
- Lin, J. (2017) The future of China's new engineering construction. **Education Research Of Qinghua University, 38(2):** 26-35.
- Liu, J., & Wang, X. (2019). An Investigation of the Effectiveness of Problem-Based Learning in Chinese Higher Education. **Journal of Education and Practice, 10(11):** 66-74.
- Liu, W. (2020). Analysis of problems and countermeasures in the implementation of entrepreneurship education in colleges and universities. **Journal of Continuing Education, 38(3):** 12-14.
- Liu, Y. (2003). The exploration and practice of problem-based learning (Project-Based Learning) in higher education. **Journal of Higher Education, 24(3):** 39-43.
- Liu, Y., & Zheng, X. (2021). The relationship between classroom teaching and students' academic performance. **Journal of Educational Research and Practice, 10(1):** 45.
- Liu, Y., & Zhou, J. (2018). Exploration of college students' innovation and entrepreneurship training program. **Journal of Physics: Conference Series, 1107(1),** 012141. doi:10.1088/1742-6596/1107/1/012141.

### **List of Bibliography (Continued)**

- Liu, Y., Zhang, L., & Cai, Q. (2020). Research on the Path of Innovation and Entrepreneurship Education in Higher Vocational Colleges. **Journal of Higher Education Management**, **36**(2): 92-97.
- Ma, Y. (2014). On the cultivation of student of sense responsibility in the classroom teaching of middle school Chinese. **Journal of Hubei Open Vocational College**, **29**(2): 158-159.
- Maeda, J. K., Murata, K., & Haniu, T. (2016). The Development of Problem-Based Learning in Japan: Active Learning Methods in Higher Education. **Creative Education**, **7**(16): 2466-2474.
- Manrique, J. M., & Gutiérrez-Carrasco, E. (2019). A review of Project-Based Learning in entrepreneurship education. **Journal of Entrepreneurship Education**, **22**(2): 1-14.
- Maritz, A., Brown, M., & Bock, B. (2020). The effectiveness of Project-Based Learning on the development of entrepreneurial competencies: A systematic review and meta-analysis. **Journal of Small Business Management**, **58**(2): 395-418.
- Mironov, A., Voronin, A., & Shershneva, K. (2020). Project-Based Learning as an innovative approach for teaching entrepreneurship in Russian universities. **Entrepreneurship and Sustainability Issues**, **8**(3): 1509-1521.
- Niu, L., Zhang, Y., Wang, Q., & Li, J. (2021). Exploring the influence of teamwork on college students' personal growth. **Journal of Education and Training Studies**, **9**(3): 438-441.
- Peng, L. (2019). Research on the application of problem-based learning in innovation and entrepreneurship education. **Journal of Educational Development**, **15**(5): 28-29.
- Savery, J. R. (2006). Overview of problem-based learning: Definitions and distinctions. **Interdisciplinary Journal of Problem-Based Learning**, **1**(1): 9-20.
- Seligman, M. E. P. (2006). **Learned optimism: How to change your mind and your life**. Vintage Books.

### List of Bibliography (Continued)

- Shu, J., Li, X., Lin, C., & Yu, Y. (2019). Research on the cultivation of college students' employment and entrepreneurship ability in the new era. **Journal of Shandong Youth Administrative Cadres College**, **21**(6): 153-154.
- Smith, J. R. (2015). The role of problems in Project-Based Learning: A comprehensive analysis. **Journal of Educational Psychology**, **118**(3): 456-473.
- \_\_\_\_\_. (2017). Presenting learning results in Project-Based Learning: A comprehensive guide. **Journal of Educational Practice**, **42**(1): 75-89.
- \_\_\_\_\_. (2018). Grouping and task assignment in Project-Based Learning: A teacher's guide. **Journal of Educational Practice**, **23**(2): 87-102.
- Song, Y., & Wang, Y. (2015). The development and challenges of innovation and entrepreneurship education in China's universities. **Higher Education Policy**, **28**(2): 251-269.
- Thomas, J. R. (2000). Project-Based Learning: An instructional approach for active learning. **Journal of Educational Psychology**, **92**(3): 616-625.
- Thomas, J. W. (2000). **A review of research on Project-Based Learning**. San Rafael CA: Autodesk Foundation.
- Vargas-Hernández, J. G., & Núñez-García, J. (2021). Analysis of the effectiveness of Project-Based Learning in entrepreneurship education. **Journal of Small Business Management**, **59**(1): 111-129.
- Wang, H. (2020). Exploration of the reform of entrepreneurship education in colleges and universities under the background of innovation and entrepreneurship education. **Journal of Ningxia Vocational and Technical College**, **16**(12), 140-142.
- Wang, H., Yang, X., & Liu, S. (2019). Exploration of innovative and entrepreneurial talent training model in colleges and universities. **Journal of Xihua University (Philosophy and Social Sciences)**, **40**(5): 169-171.
- Wang, J. (2019). Predictors of Learning achievement: A study across different and gender groups. **Journal of Educational Research**, **25**(4): 62-67.

### List of Bibliography (Continued)

- Wang, L., & Li, H. (2019). The cultivation of students' learning ability in the process of classroom teaching. **Journal of Shangqiu Vocational and Technical College**, **36**(3): 53-56.
- Wang, Q., Yang, H., & Liu, S. (2020). Research on the construction of innovation and entrepreneurship courses in colleges and universities under the background of quality education. **Journal of Guangdong University of Finance and Economics**, **36**(5): 42-49.
- Wang, Y., & Li, H. (2021). The impact of home-school cooperation on students' growth. **Journal of Educational Practice and Research**, **8**(2): 112.
- Wang, Y., & Song, J. (2019). Exploration and practice of the cultivation of application-oriented innovative talents in colleges and universities. **Journal of Social Science of Hunan Normal University**, **30**(6): 116-120.
- Wang, Y., Li, M., & Zhu, X. (2021). The Exploration and Practice of Innovation and Entrepreneurship Education in Higher Vocational Colleges. **Journal of Educational Innovation and Practice**, **3**(1): 1-6.
- Wang, Y., Liu, Y., & Li, J. (2020). The effect of family education on children's education. **Journal of Education and Practice**, **11**(20): 82.
- Wei, J., & Liu, Y. (2020). Research on the reform of entrepreneurship education in higher vocational colleges under the background of innovation and entrepreneurship education. **Education and Teaching Research**, **3**(3): 77-80.
- Weimer, M. (2012). **Learner-centered teaching: Five key changes to practice**. [n.p.].
- Woolfolk, A., Winne, P., & Perry, N. (2016). **Educational psychology**. Pearson.
- Wu, Y., Sun, X., & Bu, X. (2019). Analysis of the studio model of higher vocational students based on the cultivation of innovation and entrepreneurship ability. **Vocational Technology**, **18**(10): 54-57.
- Xu, L., & Ding, S. (2017). Research on the teaching mode of learner-centered classroom under the guidance of "new curriculum reform". **Journal of Hubei Open Vocational College**, **21**(3): 6-10.

### List of Bibliography (Continued)

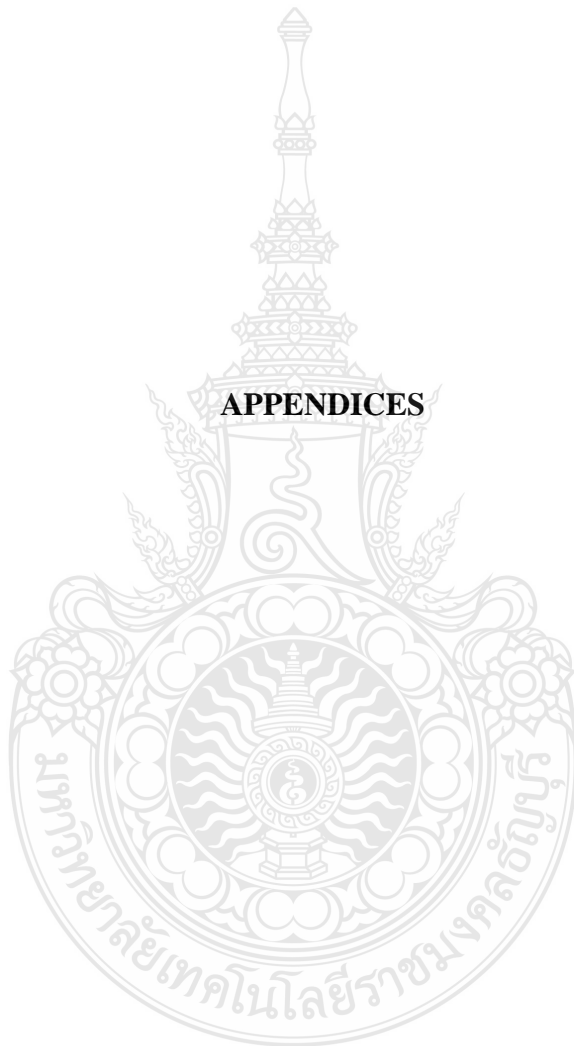
- Yang, L. (2018). An empirical study on innovation and entrepreneurship education for college students. **Journal of Higher Education Research**, **38**(3): 41-42.
- Yu, X. (2001). The impact of "learning from the Soviet Union fever" on education and teaching practices. **Journal of Educational History**, **43**(2): 87-103.
- Yu, Y., & Xiong, J. (2018). Study on the cultivation of innovative and entrepreneurial talents in China's colleges and universities. **Journal of Open Innovation: Technology, Market, and Complexity**, **4**(3): 28.
- Zhang, H., & Li, W. (2013). The drawbacks of the traditional teaching method: Lack of communication and cooperation. **Education and Teaching Research**, **26**(3): 64-76.
- Zhang, H., Li, X., & Liu, X. (2021). The cultivation of students' learning motivation through teachers' methods. **Journal of Teaching and Learning**, **17**(1): 24.
- Zhang, L. (2005). The role of student Learning achievement in educational research in China. **Educational Psychology Review**, **17**(1): 17-27.
- \_\_\_\_\_. (2019). Exploring the reform of innovation and entrepreneurship education curriculum system in colleges and universities. **Science and Technology Innovation and Application**, **17**(3): 5-6.
- Zhang, Q., Wang, S., & Wang, T. (2019). The development of innovation entrepreneurship education in China's higher education institutions. **Journal of Entrepreneurship in Emerging Economies**, **11**(1): 107-127.
- Zhang, W. L., Zhang, S. Q., Lin, J. F., Wu, Q., & Chen, S. L. (2016). Research on Project-Based Learning Design and Practice Based on the Concept of Curriculum Reconstruction in the Network Environment. **Electronic and Electronic Education Research**, **37**(2): 38-45.
- Zhang, X., & Liu, J. (2017). A Multi-Dimensional Analysis of Factors Affecting Academic Performance of College Students. **International Journal of Emerging Technologies in Learning (iJET)**, **12**(03): 68-75.

### List of Bibliography (Continued)

- Zhang, Y., & Yang, S. (2018). The effect of learning links on learning efficiency and Learning achievement. **Journal of Beijing University of Posts and Telecommunications (Social Sciences Edition)**, **20**(3): 447-452.
- Zhang, Y., Liu, Y., & Zhang, X. (2021). The impact of family education on children's learning ability. **Journal of Psychology and Behavioral Science**, **9**(2): 117.
- Zhang, Y. L., & Yang, S. L. (1999). A study on the learning motivation and learning strategies of middle school students. **Psychological Development and Education**, **15**(4): 35-39.
- Zhao, J. (2017). Open the black box. **Journal of Educational Science Research**, **23**(3): 30-46.
- Zhong, X. (2009). The cognitive structure and its adjustment control mechanism. **Journal of Psychological Science**, **32**(1): 12-13.
- Zhou, L., & Liu, X. (2020). Research on the Application of Project-Based Learning Teaching Method in Innovation and Entrepreneurship Education in Colleges and Universities. **Journal of Social Science Research**, **13**(6): 145-149.
- Zhou, L., & Zhang, J. (2021). The influence of social factors on learning memory and motivation. **Journal of Psychology and Social Behavior**, **9**(1): 93.
- Zhou, Q., Hu, Z. X., & Shi, Y. Y. (2019). The Evolution and Reflection of Innovation and Entrepreneurship Education Policy in Universities from the Perspective of Triple Helix Theory. **Journal of Zhengzhou University (Philosophy and Social Science Edition)**, **52**(6): 54-60.
- Zimmerman, B. J., & Schunk, D. H. (2011). Handbook of self-regulation of learning and performance. Routledge. [n.p.].



**APPENDICES**





**APPENDIX A**

**Letter to Experts and Specialists for Research Instruments Validation**

No. 0649.02/ 0121.2



Faculty of Technical Education  
Rajamangala University of Technology  
Thanyaburi  
39 Moo 1, Rangsit-Nakhon Nayok Road,  
Klong Hok, Khlong Luang, Pathum Thani  
Postal Code 12110, Thailand

27 January 2023

Subject Invitation letter inviting experts to validate research instruments

Dear Assoc. Prof. Dr. Dowroong Watcharinrat

Due to Mrs. Ting Zeng, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Learning Management by Using Project-Based Learning in Innovation and Entrepreneurship Courses to Develop Learning Achievement for Undergraduate Students" with Asst. Prof. Dr. Saiphin Siharak, a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs. Ting Zeng for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

Thank you for your kind consideration.

Sincerely Yours,

A handwritten signature in blue ink, appearing to be 'Arnon Niyomphol', written over a circular official stamp of the Faculty of Technical Education.

(Asst. Prof. Arnon Niyomphol)  
Dean, Faculty of Technical Education

Department of Education  
Tel: +66-2549-3207  
Fax: +66-2577-3207

No. 0649.02/ 0121. 2



Faculty of Technical Education  
Rajamangala University of Technology  
Thanyaburi  
39 Moo 1, Rangsit-Nakhon Nayok Road,  
Klong Hok, Khlong Luang, Pathum Thani  
Postal Code 12110, Thailand

27 January 2023

Subject Invitation letter inviting experts to validate research instruments

Dear Assoc. Prof. Xiong liJuan

Due to Mrs.Ting Zeng , a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Learning Management by Using Project-Based Learning in Innovation and Entrepreneurship Courses to Develop Learning Achievement for Undergraduate Students" with Asst. Prof. Dr. Saiphin Siharak , a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs.Ting Zeng for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

Thank you for your kind consideration.

Sincerely Yours,

(Asst. Prof. Arnon Niyomphol)  
Dean, Faculty of Technical Education

Department of Education  
Tel: +66-2549-3207  
Fax: +66-2577-3207

No. 0649.02/0121.2



Faculty of Technical Education  
Rajamangala University of Technology  
Thanyaburi  
39 Moo 1, Rangsit-Nakhon Nayok Road,  
Klong Hok, Khlong Luang, Pathum Thani  
Postal Code 12110, Thailand

27 January 2023

Subject Invitation letter inviting experts to validate research instruments

Dear Assoc. Prof. Liu Xiaoli

Due to Mrs. Ting Zeng, a student who is taking up Master of Education Program in Curriculum Development and Instructional Innovation, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi (RMUTT), is currently processing a thesis for this semester entitled "Learning Management by Using Project-Based Learning in Innovation and Entrepreneurship Courses to Develop Learning Achievement for Undergraduate Students" with Asst. Prof. Dr. Saiphin Siharak, a research advisor.

In relation to this, the researcher has a strong desire to be assisted with regard to the validation of the instruments required studies. The curriculum administration committee consider that you are the most qualified professional with knowledge and capabilities to provide such, the researcher has chosen and would like to ask approval from your good office to be the evaluator. I would like to invite you to be an expert to the validation research instruments for Mrs. Ting Zeng for the benefit of further education. I am highly anticipating your kind approval regarding this matter.

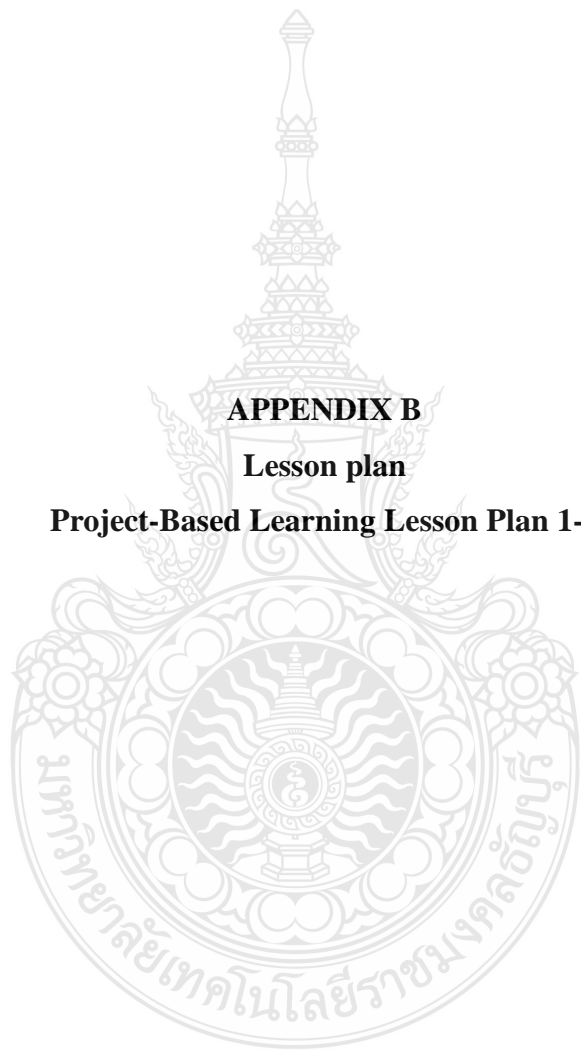
Thank you for your kind consideration.

Sincerely Yours,

(Asst. Prof. Arnon Niyomphol)  
Dean, Faculty of Technical Education

Department of Education  
Tel: +66-2549-3207  
Fax: +66-2577-3207





**APPENDIX B**

**Lesson plan**

**Project-Based Learning Lesson Plan 1-3**

## Lesson Plan 1

Lesson Plans No.1 Name: Are you suited to starting a business

Class Level: undergraduate third-year students

Time: 4 hours.

### 1. Learning Standards / Indicators / Learning Outcomes

Standard: Ability to communicate data, information, concepts and ideas needed to start a business orally and in writing.

Indicator: Understand the main ideas of starting a business

### 2. Learning Objectives (KPA)

1. Students can explain the main ideas of starting a business. (K)
2. Students can discuss entrepreneurship in the group. (P)
3. Students accept the value of the opportunity for entrepreneurship. (A)

### 3. Content

1. starting a business
2. makerspace

In 2015, Premier Li KeQiang of The State Council held an executive meeting of The State Council and pointed out the policy on "Makerspace". The meeting pointed out that conforming to the situation of promoting mass entrepreneurship and innovation in the network era, building an entrepreneurial service platform such as a "makerspace" for everyone, which would stimulate the creative vitality of hundreds of millions of people and cultivate various young innovative talents and teams, including college students. It is of great significance to create more jobs and create new engines for economic development. This meeting has a profound impact on college students' innovation and entrepreneurship, which brings a new turning point for college students' innovation and entrepreneurship education. It is no longer an armchair strategy. For most college students, learning knowledge is for their life after graduation, and employment is closely related to life. Let college students realize that better employment is to start a business, at the same times, college students themselves also enhance the social practice and communication ability, give full play to what they have learned and thought to achieve the goal of entrepreneurship. Innovation and entrepreneurship courses guide college students to transition from campus to society, and lay the groundwork for students' future life in terms of thought and experience. Contemporary college students participate in innovation and entrepreneurship precisely because they are at the forefront of new technologies and new ideas in society, and they have received good social education as a common result.



#### 4. Learning Activity/ Learning Management Process

##### **Introduction stage**

1. Teacher introduces a project-based learning method.
2. Teacher tells the learning objectives of this lesson plan.

##### **Teaching Stages**

1. Teacher explain the enterprise is an economic organization established according to law and engaged in the production, exchange or provision of services for the purpose of profit. Enterprises have three characteristics: market-oriented, independent management, self-responsibility for profit and loss, independent accounting, legally established, and legal operation.

2. Teacher asks the question for students to discuss, the question is:
  - The advantages of starting their own business?
  - What troubles and difficulties you will encounter when you start your own business?
  - why startups might fail?
  - How do you analyze yourself from the perspective of an entrepreneur?
  - How did you increase your entrepreneurial skills?
3. Let students discuss the question step by step, and students help to conclude each question.
4. Let students assess their finances for entrepreneurs, and let students show the idea.
5. Teacher explains that it takes at least three months for a new business to generate enough profit to cover your and your family's daily expenses. Rational entrepreneurs should have a strong sense of risk prevention. After assessing your financial situation, no matter how much money you have left, you should always have enough risk prevention funds in case of emergency.

##### **Project-Based Learning teaching:**

##### **Step 1 Identify a topic based on interests.**

1. Teacher asked: What is the reason for Jack Ma's success in establishing Alibaba Group?
2. Teacher divided 30 students into two groups. One group analyzed the reasons for Jack Ma's success and the other group analyzed the reasons for Alibaba Group's success.
3. Students in each group brainstorm the problems, and then divide the tasks after collective discussion. Students start to collect relevant information in a targeted way, and then organize, screen, and summarize the collected information.
4. Students in each group present the conclusion from the discussion.
5. Homework: according to their actual situation, evaluate whether they are suitable for entrepreneurship, yes or no, why?

## 5. Materials & Resources

- Textbooks
- PPT
- computers
- Test 1
- Homework
- Teacher log

## 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can explain the main ideas of starting a business. (K)	Testing	Test 1	The minimum threshold of 60% must be met
2. Students can discuss entrepreneurship in the group. (P)	Observing that students could discuss in their group	-Teacher log	Students could discuss this in their group at least 70% of activities.
3. Students accept the value of the opportunity for entrepreneurship. (A)	Observing students' reflections on discussions, and in Homework.	-Homework -Teacher log	Students have positive thinking in discussions, and in Homework.

Test 1

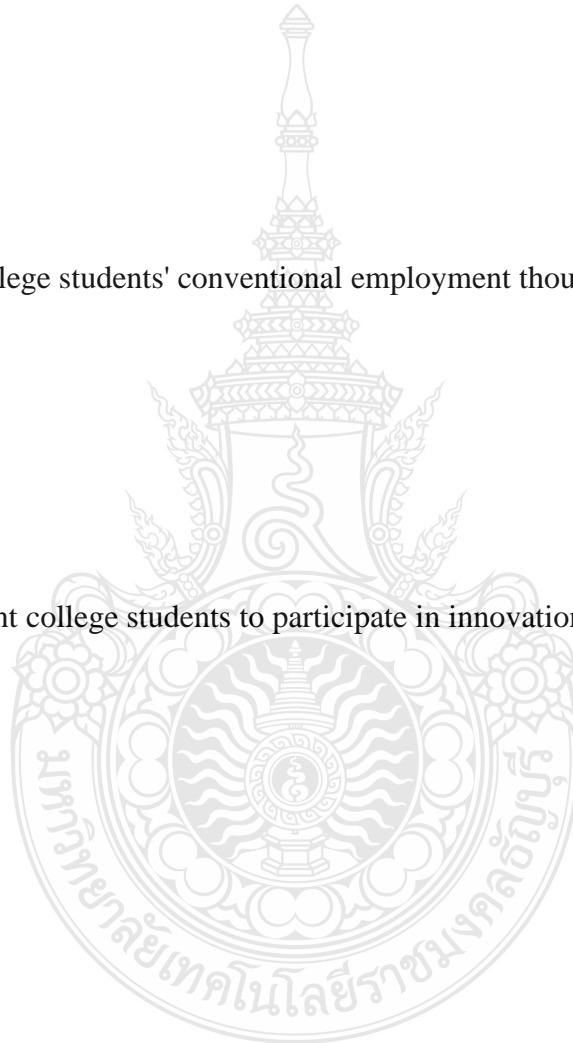
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer the questions with your opinion.**

1. Who pointed out the policy on "maker Spaces", and How do you think about this?

2. What breaks college students' conventional employment thoughts?

3. Why do you want college students to participate in innovation and entrepreneurship?



## Homework

Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer the questions with your opinion.**

According to your actual situation, evaluate whether you are suitable for entrepreneurship, yes or no, why?



### Teacher log for undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

## Lesson Plans 2

Lesson Plans No.2 Name: Create your business plan

Class Level: undergraduate third-year students      Time: 4hours.

### 1. Learning Standards / Indicators

Standard: Understand relevant knowledge in making business plans, and how to make a business plan

Indicator: Master. Create a business plan

### 2. Learning Objectives (KPA)

1. Students can conclude relevant knowledge in making business plans, and how to make a business plan. (K)

2. Students can create a business plan. (P)

3. Students accept the value of making business plans. (A)

### 3. Content

Business plan

### 4. Learning Activity/ Learning Management Process

#### **Introduction stage**

1. Teacher tells the learning objectives of this lesson plan.

2. Teacher asks about homework, and lets students told about their opinion.

#### **Teaching Stages**

1. Teacher explains a successful enterprise starts with the right idea and a good idea, and a good business plan is expressed in words. A reasonable and thorough business plan can avoid disappointment and loss in the future. If it is not reasonable, no matter how much time and money is invested, the enterprise is doomed to fail

2. Teacher asks the question for students to discuss, the question is:

- What kind of enterprises are only suitable for small businesses to operate?

- What kind of business do you want to run?

3. Let students discuss the question, and share the idea.

4. Teacher explains what makes a small business successful, and the principles of small and micro enterprises.

5. Teacher asks the question for students to discuss, the question is: How to start a low-cost business?

6. Let students discuss the question, and share the idea.

7. Teacher explains the method of exploring the enterprise idea: 1) Brainstorm  
2) Use the Internet : B2B; B2C; O2O; Network instant messaging software exchange

platform 3) Use questions 4) Research businesses in startup areas and 5) Investigate the business environment in start-up areas

8. Let students filter their business ideas with the main component

1) Customer: Who is your customer? What is the number of customers? What is the purchasing power of consumers? Are customers willing to buy from your business?

2) Competitors: 1. Are your business the only one of its kind in the area? How do you succeed in competing with similar companies?

3) Resources and demands: How to ensure that products and services can meet the needs of customers? Where do you get the resources to start a business? Where to get advice and information? Will equipment, premises, and qualified staff be required? Can you raise money?

4) Skills, knowledge, and experience: understanding of products or services; What skills, knowledge, and experience will help you run your business? Why are businesses profitable? Are your personality and abilities a good fit for the business?

9. Let students analyze their business idea: First, conduct field research on students' customers, competitors, wholesalers and suppliers, and other key information providers; then analyze your strengths, weaknesses, opportunities, and threats; Finally decided to implement, adjust, or abandon.

#### **Project-Based Learning teaching:**

##### **Step 1 Identify a topic based on interests.**

1. Teacher gave a questionnaire to the students, "Are you ready to start a business?", and the students filled it out according to their actual situation. If there is no question, they can start to make their business plan. If students have a problem, the student should talk with the teacher, or solve the problem through other means, and then make their business plan.

2. Teacher divides students into three groups, each group of 10 people, they will share their resources, and then through discussion, freely choose the type of business to be founded. Then, analyze the strengths of each student, the task in the business plan is assigned to collect and sort out the data. Finally, the collected data is sorted and summarized.

##### **Step 2 Planning for developing the project**

3. Let each group present their business plan, and student share, and exchange ideas together, and the teacher help to advise the business plan.

#### **5. Materials & Resources**

- Textbooks,
- PPT,
- computers
- Test 1
- Survey document
- Teacher log

## 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can conclude relevant knowledge in making business plans, and how to make a business plan. (K)	Testing Observing the answer of students	Test 2 Teacher log	The minimum threshold of 60% must be met
2. Students can create a business plan. (P)	Observing that students could create a business plan in their group	-Teacher log	Students could create a business plan for at least 70% of activities.
3. Students accept the value of making business plans. (A)	Observing students' reflections on discussions.	-Teacher log	Students have positive thinking in discussions.





## Text

A business plan is a feasibility business report in which an entrepreneur lobbies potential investors, venture capital companies, and partners for cooperation support or venture capital on a new product or service with market prospects before the establishment of a new enterprise. It describes all the internal and external elements in the establishment of a new enterprise. The business plan is usually an integration of functions such as a marketing plan, production and sales plan, financial plan, human resources plan, etc. It is also the guideline for proposing all the medium and short-term decision-making systems in the first three years of the business.

The preparation of business plan is generally carried out in a relatively standard text format. It is a written material that comprehensively introduces the development prospect of the company or project, and expounds the product, market, competition, risks, investment returns and financing requirements. A detailed business plan is just like a business development instruction chart. It will always remind the entrepreneur what problems to pay attention to and what risks to avoid, and help the entrepreneur to get outside help to the greatest extent.

As for the promotion of business plan, a standard business plan should contain at least three aspects of promotion:

1. Help entrepreneurs evaluate themselves and clarify their thinking.

A business plan must first be presented to the entrepreneur before it can be funded. Starting a business is not "playing house". Entrepreneurs must analyze all their resources, unknown market conditions and preliminary competitive strategies in as much detail as possible with a thorough and detailed attitude, and put forward a preliminary action plan clearly. They should strive to do it through the business plan and make themselves aware of it. In addition, the business plan is also a necessary means of capital preparation and risk analysis. For start-up venture enterprises, business plan plays a particularly important role in promoting a project in the planning process, which is often very vague. By making a business plan, writing down both the two reasons, and then considering each one, entrepreneurs can have a more accurate understanding of the project.

2. Help entrepreneurs gather people and manage effectively.

A relaxed business plan can further boost the entrepreneur's confidence and make him or her feel more in control and in control of the business. Because the entrepreneurial plan provides more current situation and future development direction of the enterprise, it also provides more good benefit evaluation system and management monitoring indicators for the enterprise. The business plan gives the entrepreneur rules to follow in the business practice.

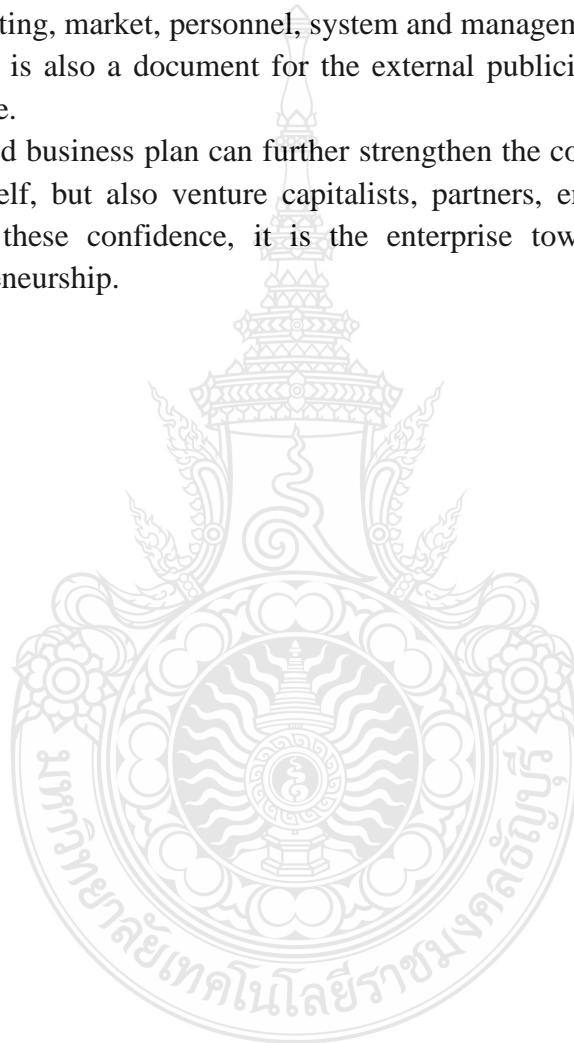
By describing the development prospect and growth potential of the new enterprise, the business plan makes the management and employees full of confidence in

the future of the enterprise and individuals, and makes it clear what projects and activities to engage in, so that everyone can know what role they will play, what work they will complete, and whether they are qualified for these jobs. Therefore, business plan plays an important role in attracting human resources needed by entrepreneurs and uniting people.

3. Assist entrepreneurs to publicize and win financing.

As a comprehensive project plan, the business plan carries out feasibility analysis on the upcoming business project, and also publicizes the proposed enterprise and its operation mode to venture investors, banks, customers and suppliers, including the product, marketing, market, personnel, system and management of the enterprise. To a certain extent, it is also a document for the external publicity and packaging of the proposed enterprise.

A relaxed business plan can further strengthen the confidence of not only the entrepreneur himself, but also venture capitalists, partners, employees, suppliers and distributors. And these confidence, it is the enterprise towards the foundation of successful entrepreneurship.



Test 2

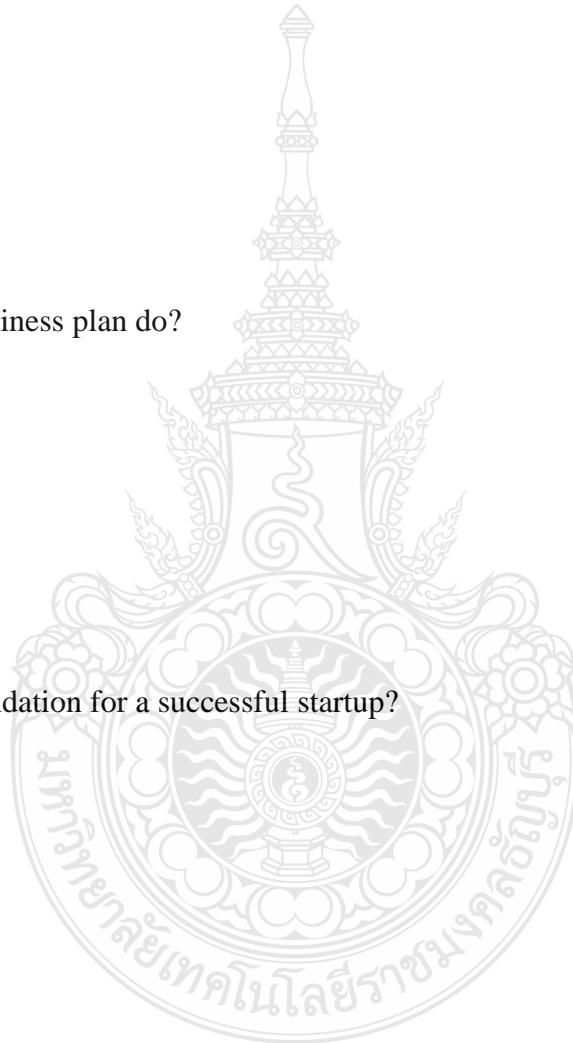
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer completely the questions.**

1. What is a business plan?

2. What does a business plan do?

3. What is the foundation for a successful startup?



### Are you ready to start a business?

	yes	no
1. Do you know that running a business involves commitment, long-term commitment, and hard work?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are you sure you know why you want to start a business?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you know why businesses usually fail?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you think you're really the type of person to start a business?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you know what you need to improve on to become a successful entrepreneur?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you know how much money you have available to start your business?	<input type="checkbox"/>	<input type="checkbox"/>
7. Have you calculated that this is enough money to start the business you intend to start?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you have a clear idea for your business?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have you done a SWOT analysis of your business idea?	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you know who will be your customers? Why would they buy a product or service from you?	<input type="checkbox"/>	<input type="checkbox"/>
How many "yes" s and how many "no" s do you have?	<input type="checkbox"/>	<input type="checkbox"/>



### Teacher log for Undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

### Lesson Plan 3

Lesson Plans No.3 name: If you were starting a business today, what would you need to do?

Class Level: undergraduate third-year students      Time: 4 hours.

#### 1. Learning Standards / Indicators / Learning Outcomes

Standard: Be able to understand what it takes to start a business

Indicator: Interest and Start a business

#### 2. Learning Objectives (KPA)

1. Students can conclude what it takes to start a business. (K)

2. Students can start a business. (P)

3. Students accept the value of doing business. (A)

#### 3. Content

Influential of Young entrepreneurs

#### 4. Learning Activity/ Learning Management Process

##### **Introduction to lessons Steps**

1. Teacher tells the learning objectives of this lesson plan.

2. Teacher asks the student, How a good business owner handles the day-to-day management of a business. Let student share their opinion.

3. Teacher explains, once the business is up and running, the daily work can be patient, Good business owners learn something new every day.

##### **Teaching Steps**

1. let students evaluate whether they are suitable for entrepreneurship and what kind of business are they suitable for

2. let students assess their market, know where their business is going, know who their customers are, and why they buy your products and services.

3. Teacher explains the personnel organization of the enterprise, know what needs to be done in an enterprise, what jobs need to be set up, what departments they have, what kind of people they need, and how to find excellent and suitable employees.

4. Teacher explains how to choose a corporate legal form, understand what legal form is, compare different legal forms, how to choose the appropriate corporate legal form.

5. Teacher explains the legal environment and responsibilities of enterprises and knows that small and micro enterprises should understand the law, what legal responsibilities enterprises should undertake, and how to buy insurance for enterprises.

6. let students predict a start-up capital. Know how much money that business needs to start and how to predict a start-up capital.

7. Teacher explains how to develop a profit plan. Know if a cash flow is normal and when your business is making money. And when will get the investment back?

8. Teacher explains how to judge whether a business can survive, before starting a business, it needs to collect and use a lot of information to make a comprehensive analysis of all the information, complete a business plan, and then judge how much chance your business project has to succeed, so as to decide whether to start this business.

9. let students create a business plan

10. And start your business with:

Understand the daily activities of the enterprise:

Trade enterprise: sales, purchase inventory, bookkeeping, managing shop assistants;

Manufacturing enterprises: receive orders, verify their production capacity and arrange the production. Procurement of raw materials, deployment of equipment, monitoring staff production quality, cost control, and product sales.....

Service enterprises: to solicit business and complete service tasks;

Management should; Purchase materials, cost control, pricing.....

Agriculture, forestry, husbandry, and fishery enterprises: purchasing raw materials, controlling costs, pricing products, and doing a good job in disease prevention and control.

Daily work management involved in all enterprises: Staff management, purchasing and inventory management, production management, promotion, cost control, price setting, business records, and office organization.

### **Project-Based Learning teaching**

#### **Step 1 Identify a topic based on interests**

1. Teacher requires the students to start the business practice and submit the practice report to the teacher one month later.

2. Students have a group discussion and decide what kind of enterprise to start according to their interests, resources, funds, etc. Then they are divided into three groups freely.

#### **Step 2 Planning for developing the project**

3. Let each group create a business plan. The duration for business was one month.

#### **Step 3 Finding the information.**

4. Let each group find information to develop their business.

#### **Step 4 Analyze and develop the final project**

5. Let each group analyze their business plan again to develop the final project, and start a business, for one month.

### Step 5 Presents the results of the project

6. After one month, students have to present the results of the project, share their entrepreneurial experience, summarize their successes and shortcomings, and finally choose to continue, adjust or abandon the enterprise after discussion.

#### 5. Materials & Resources

- Market survey form.
- PPT,
- computers
- Test 3
- Teacher log

#### 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can conclude what it takes to start a business. (K)	Testing Observing the answer of students	Test 3 Teacher log	The minimum threshold of 60% must be met
2. Students can start a business. (P)	Observing that students could start a business	-Teacher log	Students could start a business for at least 70% of activities.
3. Students accept the value of doing business. (A)	Observing students' reflections on doing business.	-Teacher log	Students have positive thinking in doing business



Test 3

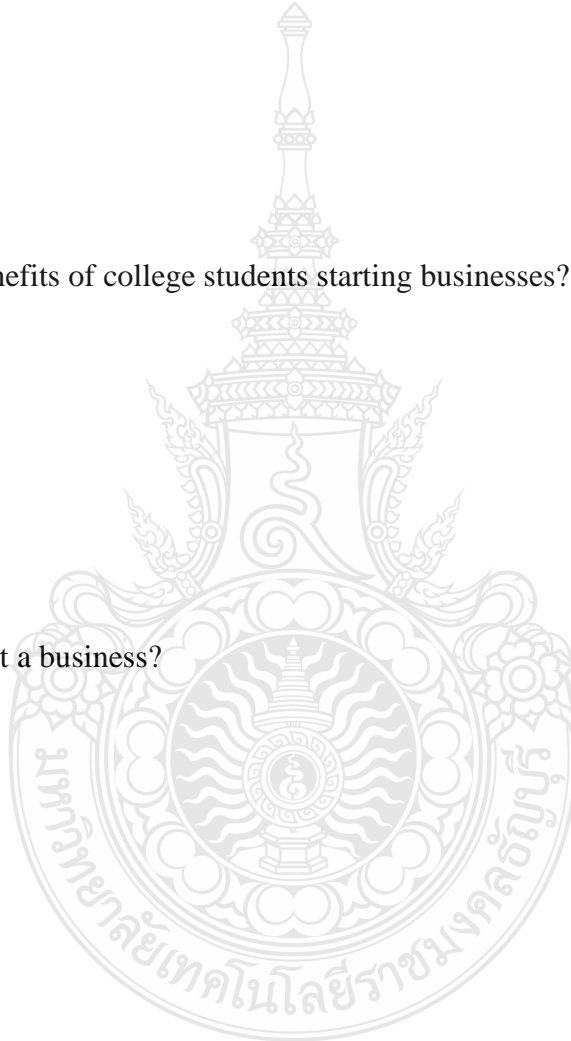
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer completely the questions.**

1. Who conducts research on start-ups with a market value of more than \$500 million?

2. What are the benefits of college students starting businesses?

3. How do you start a business?



### Teacher log for Undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Market survey form			
Survey area			
Survey time			
Enterprise type segmentation	Manufacturing industry	Trade industry	Service industry
Type of enterprise Distribution ratio	%	%	%
Analysis of the characteristics of enterprises in this region			
Existing enterprise data analysis			
Potential enterprise analysis			
Three potential business opportunities or projects			
Members of the investigation team sign :			
Advisor's signature:			

## Traditional lesson plans 1-3

### Lesson Plan 1

Lesson Plans No.1 Name: Are you suited to starting a business

Class Level: undergraduate third-year students

Time: 4 hours.

#### 1. Learning Standards / Indicators / Learning Outcomes

Standard: Ability to communicate data, information, concepts and ideas needed to start a business orally and in writing.

Indicator: Understand the main ideas of starting a business

#### 2. Learning Objectives (KPA)

1. Students can explain the main ideas of starting a business. (K)
2. Students can discuss entrepreneurship in the group. (P)
3. Students accept the value of the opportunity for entrepreneurship. (A)

#### 3. Content

1. The current employment situation in our country and its characteristics. The annual increase in the urban labor force was 9.7 million in 2005, 11.84 million in 2006, and 12 million in 2007. The number of college graduates was 4.13 million in 2006 and 4.95 million in 2007. 130 million to 150 million surplus rural workers are in urgent need of resettlement.

State-owned enterprises are declining, and private smes account for more than 99 percent of all registered enterprises and provide 75 percent of urban employment opportunities. The contradiction between supply and demand is prominent, the structural ratio is out of balance, and flexible and informal employment is prominent

#### 2. How to Start a Business?

A common question entrepreneurs face is: Do I want to start a business, but don't know where to start? I have money, but I don't know what project to do?

#### 4. Learning Activity/ Learning Management Process

##### **Introduction stage**

1. The teacher introduced a traditional learning method of teaching.
2. The teacher informs us of the learning objectives of the lesson plan.

##### **Teaching Stages**

1. What is an enterprise?  
Enterprise and its cycle process;  
Challenges for starting a business:  
Reasons for starting a business

The challenges of starting a business

Recognize some of the reasons that can get you into trouble in starting a business.

2. The teacher tells about the characteristics of a business founder Understand the characteristics of successful and unsuccessful business founders;

Understand the importance of entrepreneurship training in developing these characteristics.

3. the teacher said how to evaluate you as an entrepreneur

Advantages and disadvantages of oneself as an entrepreneur

How can I develop my ability as an entrepreneur?

4. How do you estimate how much money you can use to start a business

5. The teacher tells about the financing channels and characteristics

### Summary stage

Entrepreneurs have to face all kinds of worries and problems. However, as a person starting a business for the first time, entrepreneurship is a kind of "want to say love you is not very easy" wealth game, successful entrepreneurs are the same, it needs you to have a strong desire, a healthy body, more energy and money, have the courage to take risks and responsibilities, have the ability to seize opportunities and bold, and so on.

### 5. Materials & Resources

-Textbooks

-PPT

-computers

-Test 1

-Homework

-Teacher log

### 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can explain the main ideas of starting a business. (K)	Testing	Test 1	The minimum threshold of 60% must be met
2. Students can discuss entrepreneurship in the group. (P)	Observing that students could discuss in their group	-Teacher log	Students could discuss this in their group at least 70% of activities.
3. Students accept the value of the opportunity for entrepreneurship. (A)	Observing students' reflections on discussions, and in Homework.	-Homework -Teacher log	Students have positive thinking in discussions, and in Homework.

Test 1

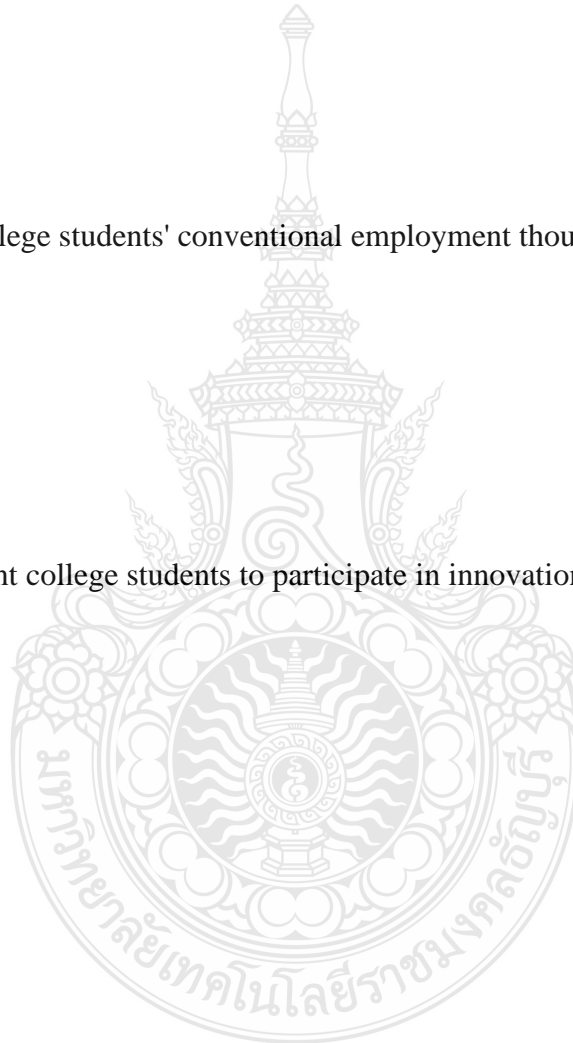
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer the questions with your opinion.**

1. Who pointed out the policy on "maker Spaces", and How do you think about this?

2. What breaks college students' conventional employment thoughts?

3. Why do you want college students to participate in innovation and entrepreneurship?



## Homework

Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer the questions with your opinion.**

According to your actual situation, evaluate whether you are suitable for entrepreneurship, yes or no, why?



### Teacher log for Undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		



## Lesson Plans 2

Lesson Plans No.2 Name: Create your business plan

Class Level: undergraduate third-year students      Time: 4hours.

### 1. Learning Standards / Indicators

Standard: Understand relevant knowledge in making business plans, and how to make a business plan

Indicator: Master. Create a business plan

### 2. Learning Objectives (KPA)

1. Students can conclude relevant knowledge in making business plans, and how to make a business plan. (K)

2. Students can create a business plan. (P)

3. Students accept the value of making business plans. (A)

### 2. Content

Business plan

### 4. Learning Activity/ Learning Management Process

#### **Introduction stage**

1. The teacher informs us of the learning objectives of the lesson plan.

2. The teacher asks about the homework and asks the students to give their opinions.

#### **Teaching Stages**

1. The teacher explains how to find ideas for starting a business

Search: market research, newspapers and magazines, radio and television, online inquiry.

Mining: discover the unknown needs of consumers and create new businesses by themselves.

Integration: Creative combination of businesses.

2. What does the teacher tell you about finding entrepreneurial opportunities?

A problem is a business opportunity! Be good at finding business opportunities. Who wants to become rich, who to find, study, solve other people's problems.

Nearly 90% of the most successful businessmen come from humble beginnings, but they all know that "attention is a business."

3. The teacher tells about the common market research methods to the street walk more, see more, listen more, ask more, take a look at what kind of facade, what kind of industry is the most prosperous

You can go to a higher city to have a look, change your environment and thinking, and see which projects have market potential.

Find information in networking, and seek out business opportunities from successful entrepreneurs.

4. What did the teacher say about developing your business plan

- 1) Choose the right place of business.
- 2) Raising and implementing start-up funds.
- 3) Go through registration procedures.
- 4) Connect the electricity and phone.
- 5) Purchase or rent equipment and machinery.
- 6) Buy inventory.
- 7) Hire staff.
- 8) Get insurance.
- 9) Advertise your business.

**Summary stage**

A business plan is a very important document that summarizes all the information entrepreneurs need; Weighing the information provided by the business plan and ultimately deciding whether to take action; If you do decide to go ahead, the best thing to do is to create an action plan to ensure that all tasks are completed on time and in an orderly manner.

5. Materials & Resources

- Textbooks,
- PPT,
- computers
- Test 1
- Survey document
- Teacher log

## 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can conclude relevant knowledge in making business plans, and how to make a business plan. (K)	Testing Observing the answer of students	Test 2 Teacher log	The minimum threshold of 60% must be met
2. Students can create a business plan. (P)	Observing that students could create a business plan in their group	-Teacher log	Students could create a business plan for at least 70% of activities.
3. Students accept the value of making business plans. (A)	Observing students' reflections on discussions.	-Teacher log	Students have positive thinking in discussions.



## Text

A business plan is a feasibility business report in which an entrepreneur lobbies potential investors, venture capital companies and partners for cooperation support or venture capital on a new product or service with market prospects before the establishment of a new enterprise. It describes all the internal and external elements in the establishment of a new enterprise. The business plan is usually an integration of functions such as marketing plan, production and sales plan, financial plan, human resources plan, etc. It is also the guideline for proposing all the medium and short-term decision-making systems in the first three years of the business.

The preparation of business plan is generally carried out in a relatively standard text format. It is a written material that comprehensively introduces the development prospect of the company or project, and expounds the product, market, competition, risks, investment returns and financing requirements. A detailed business plan is just like a business development instruction chart. It will always remind the entrepreneur what problems to pay attention to and what risks to avoid, and help the entrepreneur to get outside help to the greatest extent.

As for the promotion of business plan, a standard business plan should contain at least three aspects of promotion:

1. Help entrepreneurs evaluate themselves and clarify their thinking. A business plan must first be presented to the entrepreneur before it can be funded. Starting a business is not "playing house". Entrepreneurs must analyze all their resources, unknown market conditions and preliminary competitive strategies in as much detail as possible with a thorough and detailed attitude, and put forward a preliminary action plan clearly. They should strive to do it through the business plan and make themselves aware of it. In addition, the business plan is also a necessary means of capital preparation and risk analysis. For start-up venture enterprises, business plan plays a particularly important role in promoting a project in the planning process, which is often very vague. By making a business plan, writing down both the two reasons, and then considering each one, entrepreneurs can have a more accurate understanding of the project.

2. Help entrepreneurs gather people and manage effectively.

A relaxed business plan can further boost the entrepreneur's confidence and make him or her feel more in control and in control of the business. Because the entrepreneurial plan provides more current situation and future development direction of the enterprise, it also provides more good benefit evaluation system and management monitoring indicators for the enterprise. The business plan gives the entrepreneur rules to follow in the business practice.

By describing the development prospect and growth potential of the new enterprise, the business plan makes the management and employees full of confidence in the future of the enterprise and individuals, and makes it clear what projects and activities

to engage in, so that everyone can know what role they will play, what work they will complete, and whether they are qualified for these jobs. Therefore, business plan plays an important role in attracting human resources needed by entrepreneurs and uniting people.

3. Assist entrepreneurs to publicize and win financing.

As a comprehensive project plan, the business plan carries out feasibility analysis on the upcoming business project, and also publicizes the proposed enterprise and its operation mode to venture investors, banks, customers and suppliers, including the product, marketing, market, personnel, system and management of the enterprise. To a certain extent, it is also a document for the external publicity and packaging of the proposed enterprise.

A relaxed business plan can further strengthen the confidence of not only the entrepreneur himself, but also venture capitalists, partners, employees, suppliers and distributors. And these confidence, it is the enterprise towards the foundation of successful entrepreneurship.



Test 2

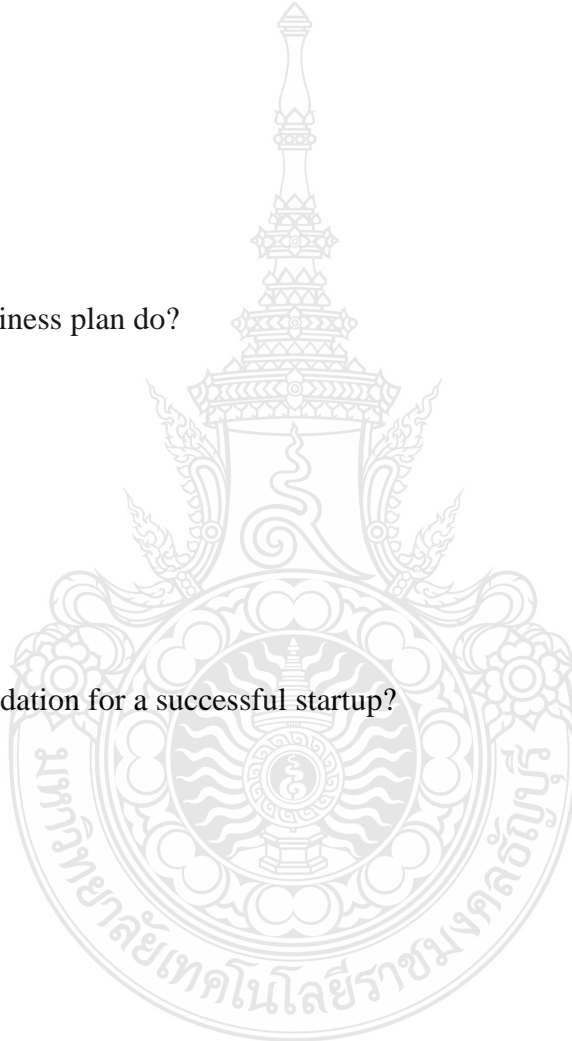
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer completely the questions.**

1. What is a business plan?

2. What does a business plan do?

3. What is the foundation for a successful startup?



### Are you ready to start a business?

	yes	no
1. Do you know that running a business involves commitment, long-term commitment, and hard work?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are you sure you know why you want to start a business?	<input type="checkbox"/>	<input type="checkbox"/>
3. Do you know why businesses usually fail?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you think you're really the type of person to start a business?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you know what you need to improve on to become a successful entrepreneur?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do you know how much money you have available to start your business?	<input type="checkbox"/>	<input type="checkbox"/>
7. Have you calculated that this is enough money to start the business you intend to start?	<input type="checkbox"/>	<input type="checkbox"/>
8. Do you have a clear idea for your business?	<input type="checkbox"/>	<input type="checkbox"/>
9. Have you done a SWOT analysis of your business idea?	<input type="checkbox"/>	<input type="checkbox"/>
10. Do you know who will be your customers? Why would they buy a product or service from you?	<input type="checkbox"/>	<input type="checkbox"/>
How many "yes" s and how many "no" s do you have?	<input type="checkbox"/>	<input type="checkbox"/>



### Teacher log for Undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		



### Lesson Plan 3

Lesson Plans No.3 name: If you were starting a business today, what would you need to do?

Class Level: undergraduate third-year students

Time: 4 hours.

#### 1. Learning Standards / Indicators / Learning Outcomes

Standard: Be able to understand what it takes to start a business

Indicator: Interest and Start a business

#### 2. Learning Objectives (KPA)

1. Students can conclude what it takes to start a business. (K)

2. Students can start a business. (P)

3. Students accept the value of doing business. (A)

#### 3. Content

Influential of Young entrepreneurs

#### 4. Learning Activity/ Learning Management Process

##### **Introduction to lessons Steps**

1. The teacher informs us of the learning objectives of the lesson plan.

2. The enterprise teacher tells about the daily activities of the enterprise: Assign and manage the work of employees; Purchase of raw materials/services; Control production; Control production cost; The formulation case; Provide services to customers; Keep business records; Organize office work and so on.

##### **Teaching Steps**

1. What does the teacher say about how to supervise the staff

Build a sense of teamwork; Pay attention to staff training; Linking performance to benefits; Pay attention to labor security; Set an example for your employees

2. How to buy inventory and raw materials

All the companies, including wholesalers, manufacturers and service companies, are buying and selling.

Careful sourcing of raw materials and selection of services can: reduce costs, increase profits.

Don't rely on a buyer; Analyze price, reputation and quality information to buyers.

3. How to control production

Production management decisions in manufacturing and service industries include: What to produce? Where is it produced? When will it be produced? How to produce? Quantity of production? Production quality?

The purpose is to reasonably organize enterprise production, to provide customers with quality and quantity of products.

4. What does the teacher say about how to provide service for customers

Communication with customers, reception methods, negotiation skills, cargo transport etiquette norms, after-sales service quality commitment.

5. How did the teacher talk about promotion management

Advertising: TV, magazines, newspapers, Windows, billboards, flyers to introduce products.

Public relations: introduce, report and publicize the company and its products through government agencies, social organizations, celebrities, experts and scholars;

6. What does the teacher say about cost control

Keep the account:

First, to meet the requirements of the tax department, the second can timely understand their own business conditions.

Control content:

Review budget, analyze cash flow variance and pay attention to it; Revise forecasts and break-even points according to actual conditions; Choose the most suitable employees to stay in the company; Analyze corporate overhead, such as employee phone calls, transportation costs, bank interest and fees; Procurement cost analysis, etc.

7. What does the teacher say about how to set the price

Adjust the selling price according to the new break-even point, taking into account the market price and demand.

Many owners do not understand the relationship between cost and price, before setting the price must first find out the cost, otherwise there is no way to know whether the enterprise is profit or loss.

8. What did the teacher say about how to keep good business records

The purpose is to master the law of business change, control management.

9. What does the teacher say about organizing office work

The office includes the special work of each department in the process of business operation. At this time, there must be various post responsibilities and assessment standards. The goal is to ensure the normal operation and sustainable development of the enterprise.

**Summary stage**

From "want to be the boss" to "want to be the boss", need to learn a lot of things, after learning to think that they "can be the boss", on the "good boss" goal step by step forward!

## 5. Materials & Resources

- Market survey form.
- PPT,
- computers
- Test 3
- Teacher log

## 6. Measurement and Evaluation

Learning Objectives	How to measure	Measuring Instruments/ Tools	Measurement and Evaluation Criteria
1. Students can conclude what it takes to start a business. (K)	Testing Observing the answer of students	Test 3 Teacher log	The minimum threshold of 60% must be met
2. Students can start a business. (P)	Observing that students cloud start a business	-Teacher log	Students could cloud start a business for at least 70% of activities.
3. Students accept the value of doing business. (A)	Observing students' reflections on doing business.	-Teacher log	Students have positive thinking in doing business

Test 3

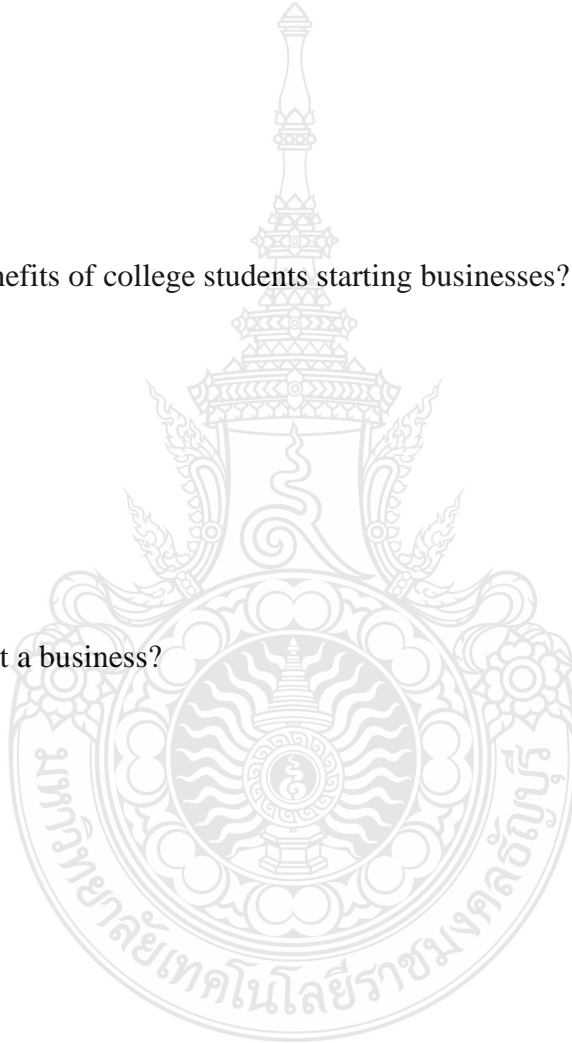
Name: \_\_\_\_\_ Number \_\_\_\_\_

**Please answer completely the questions.**

1. Who conducts research on start-ups with a market value of more than \$500 million?

2. What are the benefits of college students starting businesses?

3. How do you start a business?



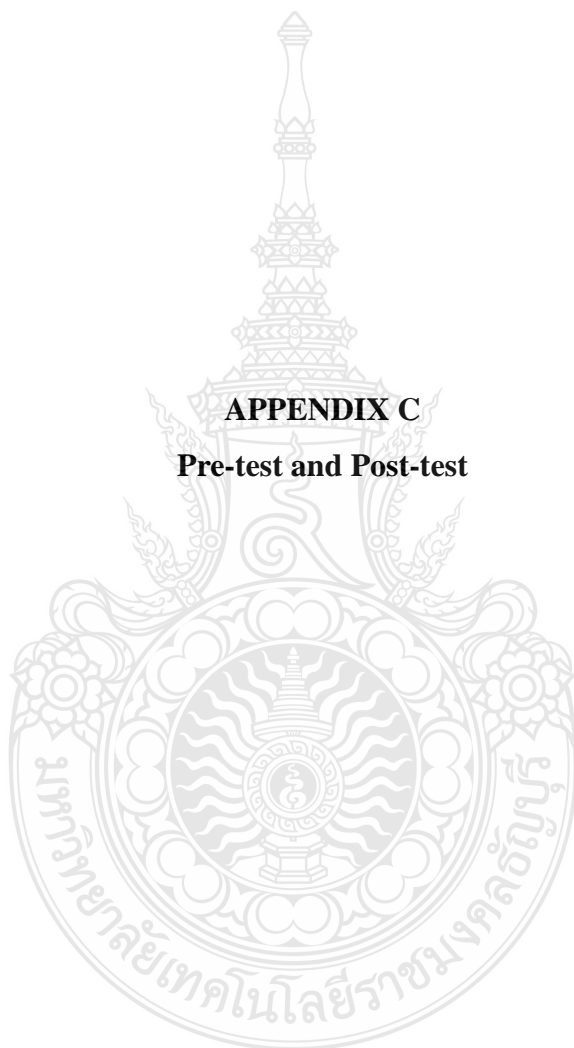
### Teacher log for Undergraduate third-year students

Activity Details: \_\_\_\_\_ Date: \_\_\_\_\_

Student's no./name	Comments	
	(Knowledge, Process, or Practice)	Attitude
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

Market survey form			
Survey area			
Survey time			
Enterprise type segmentation	Manufacturing industry	Trade industry	Service industry
Type of enterprise Distribution ratio	%	%	%
Analysis of the characteristics of enterprises in this region			
Existing enterprise data analysis			
Potential enterprise analysis			
Three potential business opportunities or projects			
Members of the investigation team sign :			
Advisor's signature:			

**APPENDIX C**  
**Pre-test and Post-test**



## Learning achievement In the Innovation and Entrepreneurship course

### Pre-test and Post-test

Read the following sentences and choose the best option from A, B, C, and D, and choose the correct answer and write the symbol on the answer sheet.

1. The purpose of establishing a business is ( )
  - A. profit
  - B. meet customer needs
  - C. produce products
  - D. product
2. there are many types of enterprises, mainly divided into four types, which of the following is not one of the four main types ( )
  - A. manufacturing enterprise
  - B. service enterprise
  - C. Trading enterprise
  - D. wholesale enterprise
3. SWOT analysis means ( )
  - A. Strengths, weaknesses, opportunities and threats
  - B. Strengths, weaknesses, opportunities and threats
  - C. Advantages, disadvantages, opportunities and dangers
  - D. External, internal, opportunities and threats
4. In SWOT analysis, ( ) refers to the unfavorable things existing in the surrounding area for your enterprise.
  - A. advantages
  - B. disadvantages
  - C. opportunities
  - D. threats
5. The results of SWOT analysis are as follows. What is incorrect is ( ).
  - A. adhere to their own business idea and conduct a comprehensive feasibility study
  - B. modify the original business idea
  - C. Abandon the business idea altogether
  - D. Let the teacher or expert make the final judgment.
6. how to dig out a good enterprise idea, the following statement is the most complete is ( )
  - A. Start with your ideas
  - B. Start from customer needs
  - C. Start from production expertise
  - D. Start from production expertise and customer needs
7. ( ) Buy from the manufacturer (the person who makes the product), buy a large quantity of the product, and then resell it in small pieces to the retailer.
  - A. retail
  - B. manufacturing
  - C. service
  - D. wholesale



8. You can start with a word or a topic and write down all the ideas that come into your mind. This way of opening your mind is called ( )
- A. Brainstorm                      B. Research businesses in your area  
C. Research your environment   D. Use experience
9. Which of the following enterprises are service enterprises ( )
- A. furniture factory, cannery, clothing factory, shoe factory  
B. Legal consulting, technical training, moving company, housekeeping services
10. Test the four aspects of enterprise conception: ( )
- A. place, price, opportunity, threat  
B. Advantage, disadvantage, price, opportunity  
C. Strengths, weaknesses, opportunities, threats  
D. Advantage, disadvantages, price, threats
11. Tencent's "Five Tigers" include ( ), Zhang Zhidong, Xu Chenye, Zeng Liqing and Chen Yidan.
- A. Li Shufu                      B. Ma Huateng  
C. Jack Ma                      D. Wang Sicong
12. In 1994, Jack Ma went to the United States as ( ) and came into contact with the Internet.
- A. Leader                      B. Translator  
C. Entrepreneur              D. Think tank
13. The business proposal of ( ) requires the feasibility of the technology, the marketability of the technology, and the originality of the patented technology
- A. Education service industry      B. High-tech industry  
C. Cultural tourism              D. Traditional industries
14. In industry-university-research cooperation, what are the forms of tangible assets based on contracts? ( )
- A. Cultivate talents together      B. Informal communication  
C. Sharing equipment              D. Co-build the enterprise
15. What is the last step in an effective business plan process? ( )
- A. Check and adjust plan      B. Market research and analysis  
C. "Defense" of the plan          D. Writing the plan
16. Who is one of the inventors of the integrated circuit and the co-founder of Intel and Fairchild Semiconductors? ( )
- A. Bell                      B. Locke  
C. Robert Noyes              D. Shockley
17. Which of the following is part of a business's responsibility to gain social acceptance? ( )
- A. Economic responsibility      B. Legal Liability  
C. Ethical responsibility          D. Charitable responsibility

18. What is the largest manufacturing base in the world? ( )  
A. The United States                      B. Germany  
C. Russia                                      D. China
19. Financial viability relates to sources of income and ( )  
A. Prepare funds                              B. Amount of investment  
C. Cost composition                              D. The above is true
20. For the entrepreneurial team, what is the most important task in the entrepreneurial stage? ( )  
A. Firm will                                      B. Build sufficient commitment  
C. Reasonable division of labor                              D. Grasp the market
21. Brainstorming exercises are ways to open your mind and help you come up with lots of different ideas. To do brainstorming exercises, follow the following principles ( ).  
A. quantity for quality  
B. Don't judge other people's ideas  
C. Not evaluating the feasibility of an idea  
D. The more participants, the better. There are more people and more ideas!
22. A product is something you plan to sell to whom, The product and kimono you plan to offer to your target customers Combination of services: ( )  
A. Wholesalers                              B. Retailers  
C. Customers                                      D. Individual
23. If you are a retailer and wholesaler, what is offered ( ) is your product  
A. Goodwill                                      B. Physical Objects  
C. Trademarks                                      D. Service
24. The American Institute for Quality considers characteristics to be those provided by the characteristics of a product or service that enable it to satisfy customers' current or potential ( ) performance  
A. Desire    B. Need  
C. Demand    D. Presentation
25. ( ) Has a variety of functions such as product composition proportion, brand, pattern, the manufacturing time, location, Content, purpose, safe use tips, etc  
A. Labels    B. Brand  
C. Packaging    D. Products
26. ( ) It refers to the set of activities that the subject provides to the object to participate in and consume experiences and share  
A. Desire    B. Need  
C. Service    D. Experience

27. Enterprises () occupy an important position in the business decision-making system and are the core of the business decision-making heart
- A. Product decision
  - B. Product forecast
  - C. Product management
  - D. Product strategy
28. ( )The concept is gradually forming a trend, the marketing personnel should try to make the product packaging in line with the requirements of an ecological environment
- A. Luxury
  - B. Economy
  - C. Waste
  - D. Green environmental protection
29. A man in our city who has difficulty in finding a job wants to start a business and wants to reduce fees and taxes as much as possible. The operation is not big enough to require many hands. As far as the current the preferential policy is concerned, it is better to register the enterprise as ().
- A. partnership
  - B. Limited liability company
  - C. Sole proprietorship enterprise
  - D. Individual industrial and commercial enterprises
30. A plan that can help you prevent a cash crunch is ( )
- A. Profit plan
  - B. Cash flow plan
  - C. Loan program
  - D. Sales and cost planning
- C. grocery store, hardware store, stationery store, fruit store
- D. pearl farm, apple orchard, dairy farm, nursery planting