The Development of Blended Learning Model with Flipped Classroom Based on MOOC to Enhance Academic Performance and Attitude in "Basics of Computer Application" Course in Guangxi Normal University for Nationalities

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A Thesis Submitted in Partial Fulfillment of Requirements for

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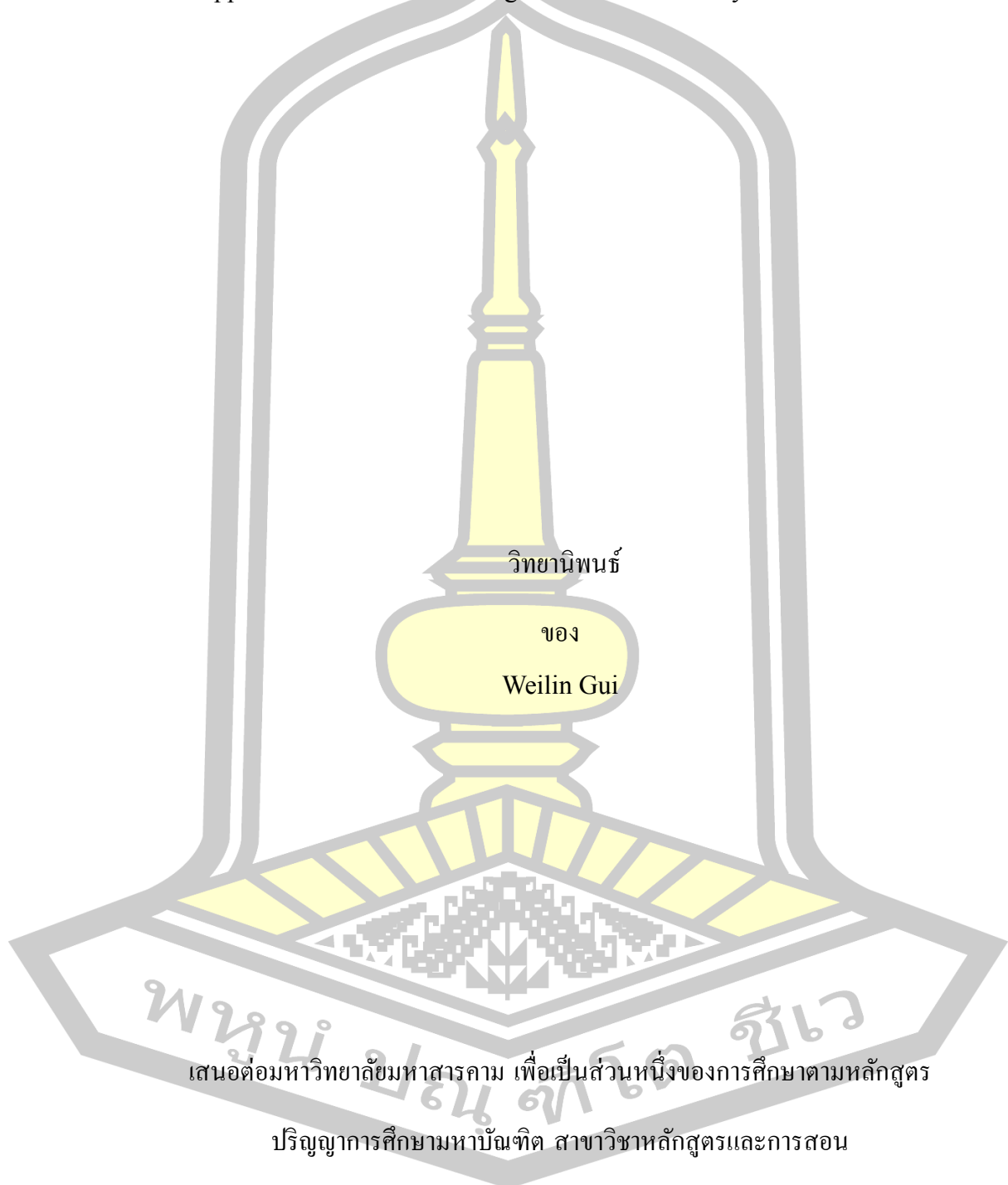
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The examining committee has unanimously approved this Thesis, submitted by Mr. Weilin Gui , as a partial fulfillment of the requirements for the Master of Education Curriculum and Instruction at Mahasarakham University

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ABSTRACT

The traditional teaching mode can't meet the teaching demand of "Basics of Computer Application" course, and the blended learning model is more suitable for the development of education informatization. This study aims to study the development of students' academic performance and learning attitude by the flipped classroom teaching mode based on MOOC. The research sample is a total of 60 students in two classes of the first grade of preschool education in Guangxi Normal University for Nationalities，there are 30 students in both classes, and they are divided into two groups based on the class: Class 1 is used as the control group to teach in the traditional classroom teaching mode, and class 2 as the experimental group is taught in the flipped classroom teaching mode based on MOOC. The research results are as follows: (1) The academic performance after learning with flipped classroom teaching model based on MOOC was higher than the tradition teaching model(P<0.01). (2) The attitude after learning with flipped classroom teaching model based on MOOC was higher than the tradition teaching model(P<0.01).

Keyword : Blended learning, Flipped Classroom, MOOC, Academic Performance, Learning Attitude

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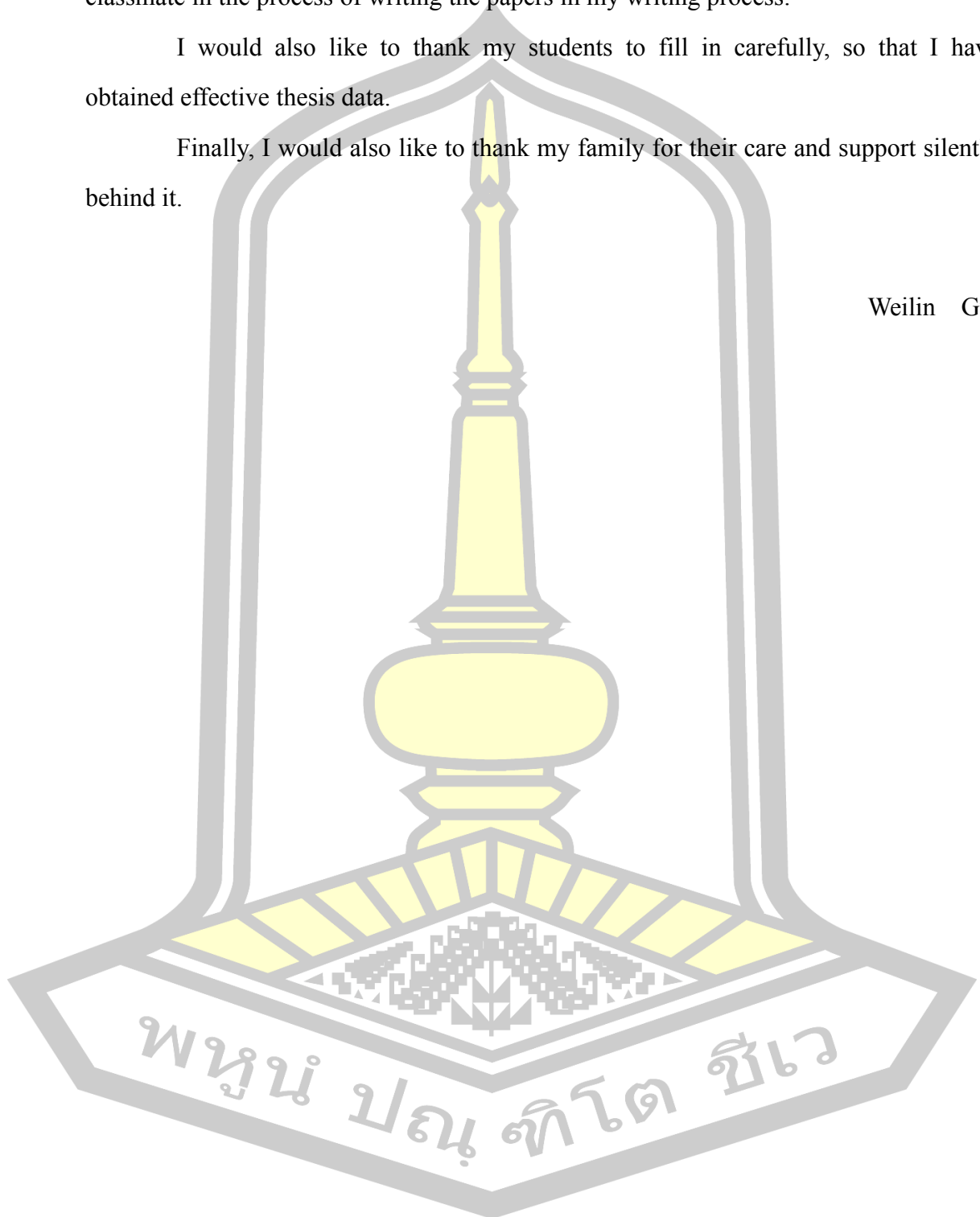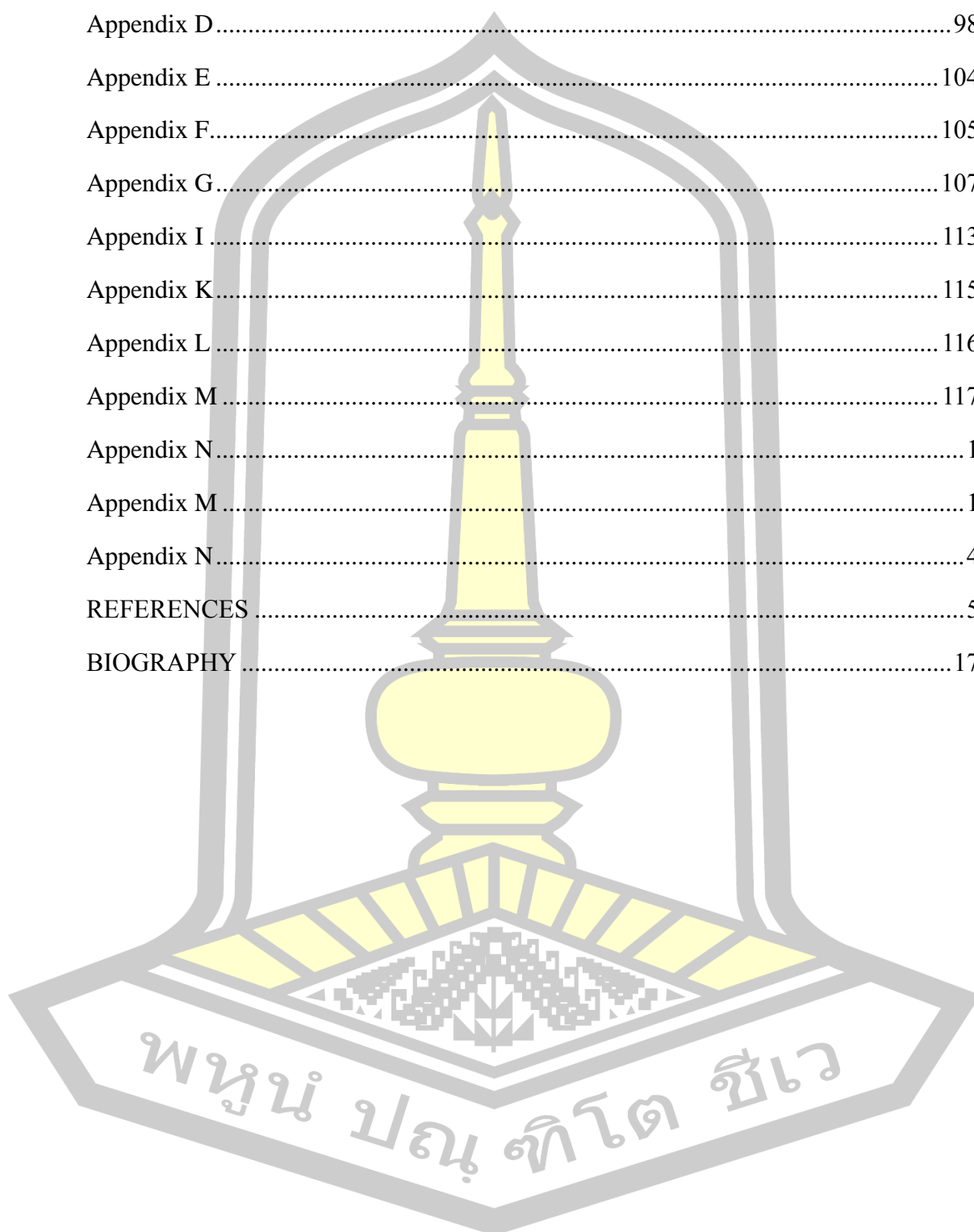# TABLE OF CONTENTS

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CHAPTER I

Introduction

1.1 Background

In today's highly competitive and evolving academic environment, academic performance and learning attitude are considered two crucial aspects that shape students' academic performance and personal development. Academic performance not only reflects a person's learning outcomes in a specific subject area, but is also closely related to his or her learning attitude. Marzano et al., (2001) pointed out that the use of effective teaching methods and strategies can have a positive impact on students' academic success, this method helps to improve students' cognitive level, understanding and application ability, thereby having a positive impact on academic performance. The importance of academic performance involves all aspects of personal life and social development, including educational opportunities, career opportunities, personal development, economic impact, social recognition, research and innovation opportunities, etc. Hattie(2008)found that a positive attitude toward learning was associated with higher academic performance. There is a positive correlation between students' positive attitudes such as interest in learning, motivation, and willingness to face academic challenges and academic success. The importance of learning attitude lies in its profound impact on an individual's educational journey, personal development and overall well-being, including enhancing one's own learning experience, enhancing one's own inner driving force, improving judgment, thinking and problem-solving abilities, and enhancing one's self-confidence. Stimulate your own career development potential, etc. Improving students' academic performance and learning attitude is for the overall development of students, future career success,

social progress and the construction of a society with high-quality talents. This is why the education system has been working hard to improve students, academic performance and develop positive learning attitudes. When the traditional education model faces social, technological and cultural changes, some problems have emerged, such as outdated knowledge structures, single teaching content, neglect of individual differences among students, limited learning time and venue, lack of creativity and critical thinking, etc. Although traditional education has made remarkable achievements in cultivating students' basic knowledge, it also needs to face these problems, adapt to the needs of contemporary society through reform and innovation, and better cultivate students' comprehensive qualities. In order to better meet the needs of modern society, some education systems are already exploring innovative teaching methods, among which the blended learning model has received great popularity and application. Blended learning is an educational approach that combines traditional face-to-face classroom instruction with online and digital learning experiences. This blended learning model seeks to leverage the advantages of both face-to-face and online learning to create a more flexible and effective educational environment. Flipped Classroom Based on MOOC is a very typical and popular blended learning method. It has some advantages: support students' personalized learning, increase students' learning participation, learning is not affected by time and geography, personalized feedback and coaching, team communication and collaboration, etc. The emergence of Flipped Classroom Based on MOOC has attracted the attention of many scholars at home and abroad, and they have actively participated in research. In 2015, the "Opinions on Strengthening the Construction and Management of Online Open

Courses in Colleges and Universities" was issued. The document emphasizes the promotion of the deep integration of information technology and education, and realizes the application and sharing of courses and platforms in various forms(Shen, 2016). In the "13th Five-Year Plan" released in 2016, it was proposed to vigorously develop the education information system with Chinese characteristics and help the modernization of national education(Education, 2016). At the China MOOC Conference held in Beijing on April 9, 2019, Wu Yan, director of the Department of Higher Education of the Ministry of Education, said China's MOOC follow a development model based on independent construction, focusing on application sharing, and strengthening standardized management. All parties gather advantages and work together, and China's MOOC have achieved an astonishing Chinese speed. First, the number has doubled. Second, the MOOC structure is more reasonable and its application is more extensive. Third, MOOC have become important lifelong learning resources. Fourth, "Internet + education" and "smart + education" go hand in hand. At the China MOOC Conference held this time, Wu Yan, director of the Department of Higher Education of the Ministry of Education, talked about the faster construction, better use, more effective learning, and more orderly management of Chinese MOOC. Published the "China MOOC Action Declaration" at the congress, Contribute Chinese solutions to the development of world MOOC by building the road of fairness, the road of sharing, the road of service, the road of innovation, and the road of cooperation, these five visions draw a blueprint for the future development of MOOC in China(Zeng, 2019). Thanks to the strong support of the country, major universities actively responded to the implementation, during the implementation process, some discoveries.

（1）Traditional teaching model is difficult to meet the needs of contemporary education. Robinson, （2006） pointed out that the traditional teaching model has had a negative impact on students' creative thinking and independent thinking abilities because this model pays more attention to standardization and regulation. Willingham（2021） emphasized the problem of students' cognitive load. The traditional teaching model may cause students to face greater cognitive load because it may focus too much on pure information transmission and ignore students' cognitive processing capabilities. In the traditional teaching model, the teacher mainly speaks on the platform and the students listen to the audience. It is difficult for the teacher to determine whether the students understand and accept the knowledge. Even during the class period, the teacher needs to complete the teaching internal affairs in the limited time and has no time to take into account the problems encountered by the students, and the students' participation in the class is very low. Students preview a single material, basically only boring book knowledge; there is no feedback link for students' pre-class preview, so the teacher can't grasp the students' preview situation in time; most teachers use paper materials to record students' learning, which is difficult to combine organically. Students spend too much time using mobile phones and computers after school, but most of the time is not for studying. In class activities, students' participation and enthusiasm are not high; after class, students review the learning efficiency is low, unable to have a comprehensive and effective grasp of the course knowledge; the teacher can't understand the students' learning after class, and can't reflect on the students' summary after class. The examination form is single, and the examination of students' course learning is basically only a simple paper

examination, which fails to provide a strong guarantee for the overall development of students, Students' spare time is not fully utilized.

(2) The development of society requires students to master more computer application skills. Due to the development of the Internet, people use computers more frequently and more carefully, which requires them to master the practical computer application ability when learning how to use computers. The course "Basics of Computer Application" is a compulsory public course offered by Chinese colleges and universities. It requires students to master the basic theory of computer but also the practical operation of computer application, such as: Skills such as the use of office software, modifying IP addresses under TCP/IP protocol, assembling computers and installing computer systems need to be mastered by students after repeated practice. According to the report of the United States President's Information Technology Advisory Council (PITAC), the most scientifically important and economically promising frontier research in the 21st century is likely to be solved through advanced computing technology and computing science(Diver & Martinez, 2015). Thus, in order to adapt to the rapid development of computer, we should actively cultivate students' computer thinking and ability.

(3) The blended teaching model combining online and offline is suitable for the development of education information. Today in the 21st century, the Internet has developed into all aspects of study, life and work. We can shop, learn about current affairs and politics in real time and acquire knowledge through the Internet. In the field of education, many colleges and universities in China are actively using the

means of information technology to increase the application of education information. "The 13th Five-Year Plan for Education Information" emphasizes that "the role of information technology in education and teaching reform and development should be released through deepening application, and the construction of learner-centered teaching and learning mode should be accelerated by relying on education information"(Chen & Xu, 2019). To meet the needs of the development of educational information in this new environment, innovation is needed in the Flipped Classroom, where the student-centered classroom, which is flipped and has received widespread attention, is performing flipped. The 2017 New Media Alliance China Higher Education Technology Outlook: Horizon Project Report has classified the development of educational technology with impact potential for Chinese institutions of higher learning in the next one to five years, and the MOOC and Flipped Classroom are both projected to make significant progress within one year(Tao et al., 2021).

In response to the above problems, this study elaborates on the characteristics and advantages of MOOC and flipped classroom, closely integrates online and offline teaching, and applies the blended learning model of flipped classroom based on MOOC to the "Basics of Computer Applications" course, to improve students' academic performance and learning attitude in the course " Basics of Computer Applications". The blended learning model with flipped classroom based on MOOC requires students to actively learn before class. Therefore, how to guide students to actively learn is the key to implementing blended learning.

1.2 Purposes of the Research

This study applies the flipped classroom based on MOOC teaching mode to the course of "Basics of Computer Application" to stimulate students' enthusiasm and initiative in learning, guide students to learn independently through the MOOC platform before class, and participate in communication, interaction and cooperative exploration in class, gradually improving Students' learning effect and learning attitude. The Purposes of

(1) To study the academic performance between flipped classroom based on MOOC teaching model and tradition teaching model;

(2) To study the attitude after learning with flipped classroom based on MOOC teaching model and tradition teaching model.

1.3 Hypotheses of the Research

(1) The students' academic performance after learning with flipped classroom teaching model based on MOOC is higher than the tradition teaching model.

(2) The students' attitude after learning with flipped classroom teaching model based on MOOC is higher than the tradition teaching model.

1.4 Scope of the Research

1.4.1 Population and Sample

The population of this study is the first-year students enrolled in the "Basics of Computer Application" course at Guangxi Normal University for Nationalities in the 2022 grade. In the 2022 grade, there are 85 classes and a total of 2,572 students. Two classes were selected for the experiment through cluster random sampling. The two

selected classes are then given random assignments to determine the teaching modes of the two classes.

1.4.2 Contents

(1) Contents of Teaching Methods

Two different teaching methods are applied to two classes of the same specialty. One class is teaching the Flipped Classroom based on MOOC, and the other is teaching the traditional teaching method.

Firstly, the students' awareness of basic computer knowledge was understood. Different teaching methods were adopted in the class to understand the degree of knowledge acquisition of students in the two classes. After class, the homework and feedback information of the two classes were collected in different ways. Adopt diversified assessment methods, set reasonable scores in each process to carry out statistical analysis of students' learning in each stage.

(2) Contents of Dependent Variables

I mainly understand the students' academic performance, mastery of computer knowledge and attitude towards computer courses after learning in the two classes. Analyze and provide solutions to various problems in students' learning process, reflect on them in time, constantly improve the classroom and improve the quality of teaching

1.4.3 Variables of study

1. Independent variables: teaching method consisting of 2 methods

(1) Blended learning model with flipped classroom based on MOOC

(2) Traditional classroom teaching.

2. Dependent variables are as follows:

(1) Students' academic performance.

(2) Students' learning attitude.

1.4.4 Duration Time

The research duration is 4 weeks, and the general arrangement is as follows:

Phase 1: Students who participated in the experiment were organized to conduct a pre-test test, and the students' pre-test results were obtained, observe that two classes are learning before. After two weeks of study, students take a post-test test and get the student's post-test score, to compare the academic performance between two different teaching models;

Phase 2: After the post-test, the learning attitude adjustment questionnaire is distributed to the students and recycled, and the students' answers are collected, to compare the attitude after learning with two different teaching models.

1.5 Terminology

1.5.1 Blended learning

Blended learning means the integration of two learning modes, face-to-face teaching and online learning, to achieve a teaching method that reduces teaching costs and improves teaching effects. The learning process can be a combination of Web-based technologies to achieve teaching goals; it can be a combination of multiple teaching methods and teaching technologies to jointly achieve the most ideal teaching effect; it can be a combination of any form of teaching technology and face-to-face teacher teaching training methods; it can be the combination of teaching technology and

specific work tasks to form good learning or work results. Blended learning is not a simple stack of online and offline education, but an education plan carefully designed according to specific circumstances. It contains several key components: learning environment, media, instructional.

The importance of blended learning lies in creating a more flexible, diverse, and interactive learning environment that helps meet the needs of students and educators at different levels.

The impact of blended learning is reflected in many aspects, covering students, teachers and the entire education system. It has a positive impact on improving student learning experience, improving teaching effectiveness and promoting educational innovation.

Evaluating the effectiveness of blended learning requires comprehensive consideration of factors such as learning outcomes, student engagement, satisfaction surveys, teaching effectiveness, used of technology tools, practical learning, teacher professional development, social learning and resource utilization.

1.5.2 Teaching methods

Teaching methods means the general term for the behaviors adopted by teachers and students in teaching activities in order to achieve teaching objectives and teaching task requirements in the teaching process, consisting of two methods as follows:

1. Flipped classroom teaching based on MOOC

Flipped classroom teaching based on MOOC means students watch the teacher's teaching video through the MOOC platform before or after class to complete the imparting of knowledge, in the classroom, the teacher is the instructor, and the students are the masters of the classroom, personalize learning, the teaching process in

which teachers answer students' questions, cooperate in exploration, and complete their studies to achieve better educational effects.

The components of Flipped classroom teaching based on MOOC include MOOC, flipped classroom, preview materials, independent learning, real-time interactive tools, interaction and discussion, instant feedback, and personalized learning

The importance of flipped classroom teaching based on MOOC reflected in many aspects: Personalized learning experience, flexibility and convenience, increased student engagement, hands-on learning opportunities, teaching innovation, instant feedback, improved teaching effectiveness, promotion of distance learning, resource sharing and globalization

Flipped classroom teaching based on MOOC can Improve student participation, personalize learning experience, strengthen practical learning, improve technical literacy, change teaching roles, improve teaching effectiveness, and globalize educational resources

Evaluating flipped classroom teaching based on MOOC involves many aspects: student engagement, learning outcomes, usage of MOOC platform, pre-class preparation, teacher's perspective

2. Traditional classroom teaching

Traditional classroom teaching means teachers use systematic and detailed explanations to enable students to master a large amount of knowledge. Before the class starts, the students mainly rely on the students to take the initiative to preview through the books. In the class, the teacher will systematically and carefully explain the knowledge in the books. Students imitate the teacher to achieve the purpose of learning. After class, they complete the homework assigned by the teacher. The main

components include teacher's teaching, students' listening and classroom interaction, and traditional teaching tools such as textbooks and blackboards are often used. Traditional teaching provides a direct way to transfer knowledge, has a clear organizational structure, provides face-to-face communication opportunities, and promotes closer connections between students and teachers. The evaluation of traditional classroom teaching mainly comes from the degree of knowledge mastery, participation in classroom activities, after-school homework, and attitude towards the learning process.

1.5.3 Academic performance

Academic performance refers to the knowledge and ability learned through Bloom's six cognitive behaviors, which are remember, understand, apply, analyze, evaluate, create. Components include test scores, homework quality, participation in classroom activities, and classroom learning attitude. Academic performance is an indicator of learning success, the basis for future development, and academic competitiveness. Academic performance is directly related to whether students can achieve academic success in school. By working hard to improve academic performance, students can develop critical thinking, problem-solving abilities and independent learning skills, promote all-round personal development, and make greater contributions to society in the future. Contribute and participate in the process of solving social problems and promoting social progress. Academic performance is mainly evaluated in several aspects: acquisition of knowledge, participation in class activities, and attitude during the learning process.

1.5.4 Learning attitude

Learning attitude refers to the emotion or emotional experience of students accompanied with cognition, learning attitude is a student's attitude and mentality towards learning, involving interest in learning, motivation, self-confidence and how to deal with difficulties. Its components include learning motivation, learning goal setting, learning interest, learning persistence, etc.

Learning attitude directly affects students' learning motivation. A positive learning attitude helps to increase students' interest and investment in learning. A good learning attitude promotes cognitive development, making students more willing to actively explore and accept new knowledge, and cultivate positive learning habits. A good learning attitude has a positive impact on students' emotional health and psychological well-being, reducing academic stress and anxiety.

Learning attitude is an important predictor of academic achievement. A positive learning attitude helps overcome learning difficulties and improve learning results. A good learning attitude cultivates students' self-management abilities, allowing them to better formulate study plans, maintain learning motivation, and cope with learning challenges. A positive learning attitude helps form positive social relationships, making students more willing to cooperate with classmates and teachers to learn and share experiences together.

By understanding students' interests and motivations, teachers can adjust teaching strategies to better meet students' learning needs, personalized learning plans can better meet students' needs, and understanding students' learning attitudes can help counselors and educational institutions provide more effective Targeted academic counseling to understand students' learning attitudes can help create a positive learning environment,

encourage students to be more willing to participate in academic activities, and improve their learning motivation.

The assessment of learning attitude is to examine students' learning motivation, interest, goal setting and attitude towards learning challenges from multiple dimensions to comprehensively understand their psychological and emotional state in the academic environment.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

In this study, the researcher studied the following relevant literature and research and proposed the following topics:

2.1 "Basics of Computer Application" course

2.2 Blended learning model

2.3 Teaching and learning model

    2.3.1 Flipped classroom teaching based on MOOC

    2.3.2 Traditional classroom teaching

2.4 Academic performance

2.5 Learning attitude

2.6 Related research

2.7 Conceptual Framework

2.1 "Basics of Computer Application" course

In this study, the textbook is "Basics of Computer Application" independently compiled by Guangxi Normal University for Nationalities. This book "Basics of Computer Application" is the "Thirteenth Five-Year Plan" textbook for computer basic education in ordinary colleges and universities in China, which is in line with my country's educational textbook standards. This book is in line with the teaching purpose of cultivating "applied talents" in ordinary colleges and universities, rich in content, advancing with the times and practical. It can be used as a teaching material

for colleges and universities and higher vocational technical colleges, and can also be used as a training material or study guide for short-term computer office training courses. This textbook not only has an electronic version that can be directly uploaded to the MOOC platform, but also has a QR code attached to each chapter in the book. Students can obtain the teaching video of this chapter by scanning the QR code, which is very convenient for students to use on PC and mobile terminals learn anytime anywhere.

The "Basics of Computer Application" course of Guangxi Normal University for Nationalities is aimed at first-year freshmen. It generally adopts the traditional teaching mode, listening to the teacher's explanation and demonstration in class, students learning by imitating the teacher's operation, and completing homework after class. However, there are many disadvantages in this teaching method, such as single learning method, lack of interaction in class, which leads to low enthusiasm of students, lack of direct communication with teachers for a long time, and they will not take the initiative to find teachers to solve problems after class. The problems encountered by students are solved, which slowly affects students' attitude in learning. I have been a teacher of the "Basics of Computer Application" course for five years. In the past five years, "Basics of Computer Application" course has been reduced from 60 class hours to the current 30 class hours, 3 lessons per week for a total of 10 weeks. Class hours are reduced but there are many knowledge points. In order to complete the teaching tasks, teachers can only give lectures in a hurry. Students have few opportunities to practice. They often do not consider whether students can accept it, and cannot judge the quality and effect of

students' learning. The main content of each chapter of the "Basics of Computer Application" course is shown in Table 1.

Table　1 Course Teaching Content Table

Weeks	teaching content	main difficulty
2	Chapter 1 Basic Computer Knowledge; Chapter 2 Computer System	Computer development, computer information representation and conversion between digital systems, computer virus and its prevention and control. Computer hardware system, computer software system, operating system.
2	Chapter 3 Word Processing Software Word2010	Interface composition of Word2010, search and replace of documents, copy and paste, formatting of documents and paragraphs, setting of bullets and numbering, shading and border formatting, use of styles, etc. Insert text boxes, pictures, shapes, SmartArt diagrams, formulas, WordArt and hyperlinks into Word2010 documents. Create and adjust tables, edit and format tables, exchange tables and text, etc. Editing of Word2010 long documents, application of document themes, page settings, separators, page numbers, headers and footers, footnotes, endnotes, table of contents and indexes, settings of revisions and comments, etc.
2	Chapter 4 Spreadsheet Processing Software Excel2010	The window composition of Excel2010; basic operation, cell format, style setting, data input, data filling, moving and copying, etc. The input of formulas and functions, the reference of cells, and the usage of several common functions. Use of professional functions, creation, editing and formatting of charts, creation of sparklines, application and analysis of Excel data, data sorting, filtering, subtotaling, creation of perspective charts,etc.
2	Chapter 5 Presentation Making Software PowerPoint	Creation and editing of presentations. Application of various objects of presentations, presentation and printing of presentations, advanced techniques of slide production.
1	Chapter 6 Network Foundation and Internet Application; Chapter 7 Multimedia Technology	Basic knowledge of computer network, Internet basics.

1	Review at the end of the semester

2.2 Blended learning model

2.2.1 Meaning

The term blended learning is frequently used among both researchers and practitioners. However, what do we mean by blended learning? What, how and why are we blending? Oliver & Trigwell, (2005) said that Even though the term blended learning is frequently used, there is ambiguity about what is actually meant. Driscoll(2002)also argued that blended learning model has taken on several means, such as combining modes of web-based technology, pedagogical approaches, instructional technologies and actual job tasks. However, she argued that the point of blended learning model is that it means different things to different people which "illustrate the untapped potential of blended learning model". While much of the debate and theoretical development on what blended learning actually is peaked more than a decade ago, the interest in blended learning among researchers and practitioners has remained high. To understand the practice and effects of blended learning model, there is a need for established and clear definitions, models and conceptualizations. Kane & Alavi, (2007) said blended learning makes it achievable to validate previous research in new settings, contribute to developing a cumulative tradition, and enable deeper exploration of foundational ideas. Graham(2006) defines blended learning model as follows: "Blended learning systems combine face-to-face instruction with computer-mediated instruction". Garrison & Kanuka(2004) define blended learning

model as "the thoughtful integration of classroom face-to-face learning experiences with online learning experiences". Allen & Seaman (2010) define a blended learning course as follows: "Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings". The term blended learning is widely used among researchers and practitioners, but there is some ambiguity and controversy over the definition and model of blended learning.

2.2.2 Components

A model can be a description of a system or phenomenon that accounts for its known or inferred properties and can be used for further study of its characteristics. Therefore, a blended learning model can be used as a guide in evaluating and integrating separate components that would result in instructionally-sound learning situation(Kaur, 2013). The components are as shown in Figure 1:

Figure   1 Components of blended learning
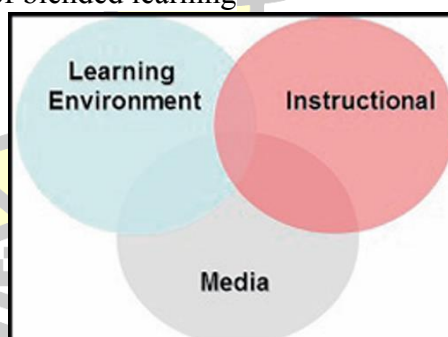
(1) Learning environment component. A learning environment can either be synchronous or asynchronous. Each learning environment has a distinct set of advantages and disadvantages. The goal of blended learning is to leverage the specific positive attributes of each environment to ensure the optimum use of resources to attain the instructional goal and learning objectives (Holden & Westfall, 2006).

(2) Media component. Media refers to vehicles that simply deliver content. Some instructional media, however, may be more appropriate than others in supporting either a synchronous or asynchronous learning environment, but no single medium is inherently better or worse than any other. Whereas a given delivery medium might not alter the desired content, the selection of a particular medium may affect how you design the content to take advantage of unique attributes of that specific medium. Nevertheless, when the most appropriate media are selected, learning outcomes will not be affected--it is the instructional strategies employed that do s (Holden & Westfall, 2006).

(3) Instructional component. This component is used to select the most appropriate instructional strategies that support the learning objectives. Such strategies are the products of learning objectives and serve to ensure the learning objectives and facilitate the transfer of learning. When developing blended learning, maintaining instructional quality is paramount. Consequently, learning objectives need not be compromised when developing a blended learning solution(Holden & Westfall, 2006).

2.2.3. Importance

Blended learning model is a new form that combines online learning and traditional learning. It provides learners with more learning resources and can also improve learning efficiency. Blended learning provides more time for creative and cooperative exercises in the classroom, enhances the quality of education (Dangwal, 2017). Typically learning initiatives include some combination of live learning and self-directed learning, supported by resources like infographics, videos, and e-learning. But modern blended learning is more than sequencing different media and activities

that happen to be related by topic. It is about aligning learning objects with the most appropriate instructional strategies, techniques, and technologies, while meeting the needs of the organization and modern learners(Hofmann, 2018). Blended learning has been understood as a combination of face-to-face and technology mediated instructional forms and practices. At the same time, the phrases "face-to-face" and "technological mediation" themselves may generally benefit from further definition and contextualization. The major advantage that blended learning offers is scale, where one instructor can only teach many people(Nuruzzaman, 2016).

2.2.4 Implication

A survey of more than 1,000 teachers confirms that digital and print teaching has the potential to transform teaching and learning, and shows that digital teaching can lead to even greater changes in the teaching field(Savvidou & Häggström, 2019). Batista-Toledo & Gavilan(2022) combines face-to-face activities in the classroom with extracurricular activities by introducing technologies such as computer-based, remote, or mobile learning. The evolution of blended learning at the University of Central Florida is used as a model and research collected over sixteen years illustrates that with proper support and planning, blended learning can result in positive institutional transformation(Moskal et al., 2013).

2.2.5 Evaluation

Öncü(2022)The authors describe various aspects of blended learning to provide a perspective on the potential use of blended learning as a solution to the limitations of traditional and online educational efforts, as well as the possible drawbacks of utilizing blended learning. Blended learning requires rigorous effort, the right attitude, budget,

and motivated teachers and students to implement successfully. Blended learning is an approach that needs to be adopted(Dangwal, 2017). As technology develops and digitization increases, blended learning is accepted globally, with learners becoming prosumers, coordinating their own learning in terms of time, space, setting, path and speed(Ossiannilsson, 2018).

Blended learning is a comprehensive education model that combines elements of traditional face-to-face teaching and online learning, aiming to give full play to the advantages of both to improve learning results. Its components include Learning environment component, Media component, and Instructional component. The importance of this education model is that it creates a more flexible and personalized learning experience, allowing students to develop critical thinking and collaboration skills through diverse teaching methods. When educators use blended learning, they can combine face-to-face teaching and online learning resources to provide a wider range of learning opportunities to meet the diverse learning needs of students. Evaluating the effectiveness of blended learning usually involves assessing students' academic performance, engagement, and online interactions in order to continuously optimize teaching strategies and create a more productive learning environment. This educational model adapts to the diversity of modern learners and provides a more innovative and adaptive approach to education.

2.3 Teaching and learning model

The teaching and learning model refers to the theoretical framework of how teachers and students interact and how information is transmitted and absorbed in the educational process. These models reflect an understanding of key elements of the

educational process and guide instructional design and implementation. This study tells

flipped classroom teaching based on MOOC and traditional classroom teaching.

2.3.1 Flipped classroom teaching based on MOOC

Flipped classroom teaching based on MOOC refers to the integration of Massive

Open Online Courses (MOOCs) with the flipped classroom model in traditional

education settings. This approach aims to enhance teaching effectiveness and student

learning outcomes. Several studies have explored the implementation and impact of

this model in different educational contexts. Pertuz et al., (2023) advocate for the

MOOC-based flipped (MBF) classroom as a strategy with high potential for blending

MOOCs with traditional engineering courses.

MOOC is the abbreviation of Massive (large-scale), Open (open), Online (online)

and Course (curriculum), which refers to large-scale open online courses. MOOC was

created by Dave Cormier of the University of Prince Edward Island and Senior

Research Fellow Bryan Alexander of the National Institute for Technology in Liberal

Education in 2008 for a course named as Connectivism and Connective Knowledge

(also known as CCK08).This course，taught by George Siemens of Athabasca

University and Stephen Downes of the National Research Council, having

25tuition-paying students as well as over 2200 online students from the general public

who paid nothing. All course content was available through RSS feeds and online

students could participate through collaborative tools，including blog posts, threaded

discussions in Moodle and Second Life meetings. In 2012, the OER developed into a

new level. Many Internet companies provided many courses with high quality,

including Coursera, EdX as well as Udacity, and that is the reason why the year of

2012 is considered as "the year of the MOOC". MOOC is warmly welcomed by the learners for its many advantages such as free of charge, peer-assessing, sharing ideas, participating in the final exam and get the certificate at last. All of these attracted by numerous learners and promote the development of MOOC(Guo, 2015).MOOC has brought unprecedented impact on traditional education model, and is favored by a large number of educators and learners around the world. MOOC Provide theoretical knowledge and teacher's explanation to students to watch and study in advance. Students can study without limitation of time and space, as long as they can connect to the network. Reduces the time for explaining theoretical knowledge in the classroom, saves time for teachers to answer questions for students, interacts in the classroom and carries out various activities in the class. Each section of MOOC provides a bench test and an after-class test, which can be used by selecting questions, filling empty questions, judging questions, subjective questions, etc. MOOC provides online interaction, allowing students to ask questions or communicate with other students when learning online. MOOC also provides teachers 'management authority to help teachers analyze students' learning efficiency, monitor students 'learning situation in real time and urge students to do correct learning. Novel learning method, online interactive learning, convenient and quick way to acquire knowledge, arouse students' attitude in learning, cultivate students' ability of active learning and innovation, and improve the quality and efficiency of learning as much as possible.

Flipped Classroom is a teaching mode which reverses the process of knowledge imparting and internalization, which is essentially different from the traditional teaching mode. The Flipped Classroom pays more attention to the cultivation of

students 'independent learning ability, and advocates that students should be the main guide, teachers should be the guide, and use information technology to complete the teaching content. Many scholars at home and abroad summarize the concept of Flipped Classroom as follows: "The learning process usually includes two stages-imparting knowledge and internalizing knowledge. The Flipped Classroom is the two stages of time and space flipping, the students watch video before class to complete the learning of classroom knowledge, and the students internalize knowledge through various effective learning forms, such as team collaboration and discussion, assignment submission, individual tutoring, etc. From this definition, Flipped Classroom is characterized by traditional teaching mode of teaching in the traditional teaching in time and space and learning. The teaching mode of flipped classroom is no longer the teacher preparing the class unilaterally, but the teacher team is organized and targeted to make teaching plan, make teaching video and instructional document carefully, let students learn with questions, and stimulate students' attitude in acquiring knowledge. The main position of Flipped Classroom is in class, but the students need to have more knowledge to master the role. Students are self-taught by MOOC platform before class, taking notes by repeatedly watching teaching video, and completing the instructional learning requirements given by teachers through group discussion and on-line interaction. In class, teachers share the lectern to students through the interaction of students' prepare lessons before class learning and students, and fully mobilize students' self-study ability, organization ability and language communication ability. Students should be absorbed and absorbed in the class after learning, interactive communication and cooperative discussion. Through the summary of students 'learning experience and the analysis of

the students' learning situation, the classroom activities and teaching methods are improved continuously. The implementation of the turnover class is not a one-off, it is necessary to try and improve continuously through the precipitation of time. The key to turnover class should pay attention to making reasonable prepare lessons before class learning plan, trying flexible in-class teaching plan and methods, and summarizing and reflecting in time after class.

After continuous trials and innovations, some MOOC platforms already have an educational system structure similar to that of colleges and universities, but the status of traditional colleges and universities is still unshakable. Learners need to set their own learning goals and participation on the MOOC platform, but self-directed learning requires learners to have a high degree of self-control and patience. When they encounter learning difficulties or loss of interest in the online learning process, they will weaken their willingness to learn or even give up of studies, which is also a significant factor in the lower completion rates on MOOC platforms. The MOOC platform also has imperfect teaching management systems, insufficient collaboration and communication among learners, and information overload that makes learners feel difficult to choose. In the specific practice process of learners, it is impossible to supervise, guide, and supervise online examination systems and measures imperfect and other shortcomings. Coincidentally, the combination of flipped classroom and MOOC can make up for the shortcomings of MOOC to the greatest extent.

The flipped classroom is to reverse the traditional teaching mode, and transfer the process of teaching knowledge to students in the traditional classroom to the time outside the classroom. When students are learning independently outside of class, they often face the search, selection and independent exploration of learning materials. At

this time, the MOOC platform provides convenient conditions for students studying in the flipped classroom teaching mode. The MOOC platform contains a large number of open learning resources. Students can learn teaching videos and materials arranged by teachers, or they can learn according to their own learning requirements. Choose the study material that suits you.

2.3.2 Traditional classroom teaching

Traditional classroom teaching is a teacher-centered, book-centered and classroom-centered teaching model. It usually adopts the "five-stage teaching method": organizing teaching, reviewing old lessons, explaining new lessons, consolidating new lessons, and assigning homework. The characteristics of this teaching model are that the teacher dictates and writes on the blackboard, and the students listen and take notes. The teacher can flexibly adjust the teaching content and methods according to the students' response and progress. The advantage of traditional classroom teaching is that it can ensure the basic quality and efficiency of teaching and cultivate students' basic knowledge and skills. However, it also has some shortcomings, such as ignoring students' initiative and creativity and instilling knowledge into students as dead things, resulting in students' lack of interest and motivation in learning. Regarding traditional classroom teaching, many scholars have given their views:

Traditional classroom teaching refers to a teacher-centered approach where the teacher gives lectures and students take notes without much expression and communication in classroom interactions(Bhavsar et al., 2022). Jiugen et al.,(2014) consider traditional classroom teaching refers to the traditional method of instruction where the teacher delivers the content in the classroom and students learn through

lectures and class activities. Zhou (2020) consider traditional classroom teaching refers to the traditional method of teaching where students and teachers interact face-to-face in a physical classroom setting.

Overall, traditional classroom teaching focuses on the teacher as the primary source of knowledge and relies on structured curriculum and assessment to promote learning. The advantage of traditional classroom teaching is that it can ensure the standardization, systematicness and efficiency of teaching, and it can also enhance the emotional communication between teachers and students. The shortcomings of traditional classroom teaching are that it ignores students' personality, creativity and initiative, and does not make full use of information technology to expand teaching resources and means.

2.4 Academic performance

2.4.1 Meaning

Regarding academic performance, many scholars have given their opinions: Mason (2017) consider the meaning of academic performance refers to the recognition of order, coherence, and purpose in one's academic pursuits. Molina Estévez (2015) consider Academic performance refers to the combination of social and educational factors that influence the development of knowledge, skills, attitudes, and motivation of students. Abba(2018) consider Performance is defined as the effective accomplishment of tasks leading to the achievement of specified standards and organizational goals. Rogaten et al., (2013) consider Academic performance refers to a student's grades and overall achievement in their academic studies. The insights of these scholars cover multiple aspects of academic performance, including cognition, social

factors, task completion, and achievement, reflecting the diversity and complexity of academic performance at different levels.

2.4.2 Components

Academic performance involves multiple components that together make up a student's overall academic performance. Here are some of the major components of academic performance:

Exam scores: The scores students receive on midterm exams, final exams, and other forms of assessment. Test scores are often one of the main indicators of students' subject knowledge.

Assignment and Project Grades: The quality and timeliness of assignments, projects, and classwork completed by students. This includes written assignments, lab reports, research projects, etc.

Participation and classroom performance: The extent to which students actively participate in class, including answering questions, giving opinions, participating in group discussions, etc. This reflects the degree of initiative students take in classroom learning.

Group work and team projects: Student participation and contribution in group work and team projects. This reflects students' abilities in a collaborative environment.

Practical and Internship Performance: Student performance in actual practical and internship situations. This can include lab work, field research, internship experience, etc.

Academic skills and methods: The development of students' subject-related academic skills and methods, such as research ability, writing ability, problem-solving ability, etc.

Extracurricular academic activities: additional subject-related academic activities that students participate in, such as scientific research projects, academic competitions, etc.

Feedback and Improvement: The extent to which students receive and utilize feedback provided by instructors and peers. Whether students are making academic progress based on feedback.

Extracurricular independent learning: academic learning activities that students conduct voluntarily outside of class, including reading additional subject materials, participating in academic forums, etc.

Comprehensive evaluation and grade points: A comprehensive evaluation of the overall academic performance, usually expressed in the form of grade points (GPA). Grade points take into account a student's performance in different subjects.

These components are intertwined to create a picture of student academic performance. By focusing on these components, educators and students can develop targeted learning plans to increase academic achievement levels.

2.4.3 Importance

Ulfaika & Firdausya(2023) consider Online learning was found to have a positive impact on students' literacy skills, which in turn can contribute to their academic performance. Pedraza & Beruvides(2016) analyzes different models for predicting

success in an undergraduate education course as well as identifies factors that affect success or failure, and evaluates the current state of the art to determine what critical performance measures might lead to accurate student success. Molina Estévez(2015) evaluated academic performance as the bond of social, psychological and educational factors influencing the development of the students' knowledge, attitudes, habits, skills, capacities, concerns, motivation and expectations for the individual development and the development in the settings where they perform. Sun et al., (2020) used a quasi-experimental design with pre-test and post-test of unequal experimental group and control group to explore the impact of flipped teaching method on the academic performance of high school students in the context of flipped classroom. The results found that flipped teaching method can effectively improve academic performance and learning efficiency;

2.4.4 Implication

Mohamad et al.,(2020)descriptive statistics is being utilized as the main tool of data analysis, involving 17 respondents of organizing committee, finding that the student involvement in GOP had significantly improved their leadership skill (in terms of communication, problem-solving and teamwork), entrepreneurship skill as well as maintained their excellence academic performance. Ponce & Pazmiño(2019) consider the influence of the factors of student behavior on academic performance was determined from data obtained in a school in Guayaquil, Ecuador, from primary and secondary information sources, based on scientific research methods and techniques. Yang & Zhao(2021) found a positive correlation between creative thinking and academic performance based on data collected from 2,355 students in a high school in China, and they found that convergent thinking was more important in students'

academic performance than divergent thinking. The implications of academic performance are significant and multifaceted, influencing various aspects of an individual's life and contributing to broader societal outcomes. Achieving academic success boosts self-esteem and confidence. Academic performance can influence social dynamics and peer interactions. It's important to note that academic performance is just one aspect of a person's overall development, and various factors contribute to a well-rounded and successful life.

2.4.5 Evaluation

Assessment for learning is a measurement of student ability, progress and academic performance. Assessment of learning is important because both students and teachers have a clear understanding of what a student can do academically, rather than what he or she cannot do. When assessing learning, tutors take into account past and future performance, current learning performance and the student's values, behaviors and attitudes towards learning(Website, 2018).

Education(2019) Common types of academic performance assessment tests include the following:

Ability test: Test students' intelligence, reaction ability, etc.

Achievement Test: Tests a student's knowledge of a course or subject

Personality test: Test students' personality traits, mental health status, etc.

Program for International Student Assessment (PISA): tests the abilities of 15-year-old students in reading, mathematics, science, etc.

There are 6 types of common academic performance assessment tests:

Subjective questions: ask students to freely write answers based on their own ideas.

True or false: questions with two options, the two options have opposite meanings, such as correct-wrong, yes-no, same-not the same.

Fill in the blanks: the question will have a sentence, and some words in it will be left blank. Respondents need to fill in the appropriate text or punctuation marks.

Multiple choice questions: multiple choice questions refer to selecting one as the correct answer from a set of options.

Multiple choices: multiple choice questions are also called multiple choice questions. The description usually given on the test paper is: Choose the correct answer according to your consideration. There are multiple answers. No points will be given for multiple choices, no choices, or wrong choices. Partial points will be given for choosing less.

Short answer questions: short answer questions are a type of question in which you answer concisely and concisely based on your own understanding of the requirements of the question stem, based on the answer angle, content, expression format and word count requirements specified by the questioner.

Academic performance is a comprehensive evaluation of a student's achievements and capabilities in an educational setting. It encompasses various components that together paint a picture of the student's engagement, understanding, and mastery of academic content. The significance of academic performance lies in its role as a measure of a student's understanding, application of knowledge, and overall commitment to the learning process. It influences future academic and career

opportunities, and a positive academic performance can contribute to the development of a student's confidence and self-esteem. Continuous assessment and improvement in these various components are essential for a well-rounded academic journey.

The assessment of academic performance evaluates students' knowledge, practice and attitude through test papers and student learning quality evaluation form (see Appendix N).test papers based on syllabus and teaching objectives, A total of 100 points in the test paper, single choice questions (there are 20 sub-questions in this major topic, each with 2 point, 40 points in total), word topic (this major topic has 1 sub-question, 60 points in total). The Student Learning Quality Evaluation Form (see Appendix N) has 10 scoring items, each scoring item is scored from 1 to 10, for a total of 100 points.

2.5 Learning attitude

2.5.1 Meaning

CHRISHILDREW(2021) consider Learning Attitude is a way of assessing and monitoring students' learning styles. It includes descriptions that reflect students' attitudes towards learning, such as engagement, effort, cooperation, initiative, independence and enthusiasm. Psychologists define attitudes as a learned tendency to evaluate things in a certain way. Kendra Cherry, (2023) said learning attitude include evaluations of people, issues, objects, or events. Such evaluations are often positive or negative, but they can also be uncertain at times. Learning attitude refers to an individual's disposition or mindset towards the process of learning. It encompasses their beliefs, emotions, and behaviors related to acquiring knowledge and skills. Corneille &

Stahl, (2019) said Attitude formation in learning can be influenced by various factors such as the validity and relational meaning of stimuli, efficiency, goal independence, and uncontrollability. Learning attitudes are described as a way of assessing and monitoring student learning styles, including attitudes towards learning such as engagement, effort, cooperation, initiative, independence and enthusiasm.

2.5.2 Components

Ghulami et al., (2015) investigated the students' attitude towards learning statistics and identified six variables or constructs such as affect, cognitive competence, value, difficulty, attitude, and effort.

Lizawati(2019) consider attitudes to learning to be broken down into three components: cognitive, behavioral and affective aspects.

Developing a good learning attitude is a process that requires long-term persistence, and there is no shortcut. Regarding how to cultivate a good learning attitude, researchers have summarized the following suggestions:

Arrange study time reasonably to improve efficiency. You should allocate your daily study time reasonably according to your own learning goals and plans to avoid procrastination and waste. Pay attention to the balance between work and rest, take appropriate rest and entertainment, and release stress.

Sincerely respect the person you are learning from and ask "why" more often. You must respect teachers, classmates, books and other learning objects, actively participate in class discussions and exchanges, and actively seek help and feedback. You must have

a spirit of exploration, ask questions and doubts about the knowledge you have learned, and understand and think deeply.

Trust your ability to learn and do not rush for success. You must have self-confidence and believe that you can achieve your learning goals through hard work and persistence. Be patient and perseverant, and don't give up or be discouraged because of temporary difficulties or failures. Be enterprising and constantly pursue higher levels and quality.

2.5.3 Importance

Vyas(2022) studied the attitudes of urban and rural student teachers towards the challenges of e-learning, the benefits of e-learning, attitudes towards using computer systems, and attitude in e-learning and computer systems through descriptive survey methods. Learning attitude usually refers to an individual's mentality and behavior toward learning. Learning attitude has a very important impact on learning results and personal growth. The following are some manifestations of the importance of learning attitude: stimulating learning motivation, improving learning efficiency, enhancing the ability to overcome difficulties, and promoting personal growth and development. Learning attitude plays a vital role in our life-long development. A positive learning attitude can not only improve our knowledge level, but also help us shape a positive outlook on life, enhance self-worth, cultivate strong learning abilities, and promote our all-round development.

2.5.4 Implication

Methods of change: Students᾽ attitudes toward learning can be changed or improved through different educational activities or interventions. For example, the following

Cognitive dissonance: A feeling of discomfort that occurs when people find their attitudes and behaviors inconsistent, prompting them to change their attitudes or behaviors to restore balance

Self-persuasion: People are more likely to change their attitudes when they actively engage in some form of persuasion, such as expressing their views in writing, debating, or speaking

Social influence: People are more likely to change their attitudes when they are influenced by others (especially authority or the like), such as interacting with others through imitation, cooperation, or competition(Preston & Feinstein, 2012)

Cothern & Collins(1991) provide a theoretical description of attitude acquisition, an overview of the nature of attitude, including factors influencing attitude development, and suggestions for addressing attitude in designing reading instruction.

Lizawati(2019) employed survey research specifically in junior high school X with 158 students as research participants and collected the data by using Behavior Cognitive Emotional Attitude (BCEA) questionnaire consisting 45 items with five point-likert scale from level 1 to 5.

2.5.5 Evaluation

Learning attitude evaluation is an important aspect of education that is often overlooked in e-learning systems. However, several studies have focused on assessing

the attitudes of students towards e-learning. Ozturk et al., (2022) developed a valid and reliable scale, called the NSA-E-learning scale, to assess the attitudes of nursing students towards e-learning. Li et al., (2019) designed a learning attitude evaluation method called PKULAE, which analyzes students' learning behavior and determines their attitude based on regression analysis and GBDT regression tree.

Mullis & Martin(2017) different schools or institutions may have different assessment methods, but some scales or questionnaires are generally used to collect students' attitudes and views on learning. For example, TIMSS 2019 (Trends in International Mathematics and Science Education Study) used the following four scales to assess students' attitudes towards learning mathematics and science：

Like Math/Science: Measures students' attitude in and enjoyment of math/science

Math/Science Confidence: Measures how confident students are in their abilities and achievements in math/science

Math/Science Importance: Measures students' awareness of the importance of math/science on a personal and societal level

Math/Science Teacher Support: Measures the extent to which student feel teachers support and encourage them when teaching math/science

Learning attitude refers to an individual's disposition, mindset, and approach towards the process of learning. It encompasses one's beliefs, feelings, and behaviors related to acquiring knowledge and skills. Cultivating a good learning attitude requires continuous investment and efforts. It is necessary to formulate scientific and reasonable phased plans, and gradually improve one's learning ability, expand one's learning areas,

and turn learning into a habit. Attitudes toward learning are important for goal setting, problem-solving skills, and academic performance.

2.6 Related research

2.6.1 Domestic research

1. Research on blended learning model

After Professor He Kekang introduced the concept of blended learning to China in 2003, blended learning attracted the attention of many domestic scholars and developed greatly. Scholars mainly conduct research through several different aspects.

(1) Research based on online learning platforms.

Yin（2015）based on the Fanya SPOC platform, the blended learning model was explored and its core process was analyzed in detail; Liang(2016) designed a blended learning model based on MOOC and conducted practical research to improve the learning effect of MOOC courses; Wang & Yang(2017) designed a blended learning model based on "Huashi" Cloud Classroom, which effectively made up for the shortcomings of traditional learning methods; Cao(2019) constructed a blended learning model based on the "Yuketang" platform and conducted application research; Ge & Wang(2020) based on the smart teaching platform, a blended learning model in colleges and universities was constructed and applied research was conducted.

（2）Research on applying blended learning models to certain types of courses. Lv(2017) introduced the blended learning model into ideological and political theory courses in colleges and universities and conducted empirical research; D. Wang(2018) apply the blended learning model to public physical education courses in colleges and

universities; He et al., (2019) applied the blended learning model based on the online teaching platform to the course "Community Nursing"; Qi(2019) conducted research on college English classroom design cases under the blended learning model. In addition, many scholars are constantly trying to apply blended learning models to different courses.

(3) Discussion on reform strategies and ability cultivation based on the blended learning model. Ren(2017) conducted research on the reform of blended learning models in colleges and universities and proposed strategies to promote the reform; Sun(2018) conducted empirical research on the cultivation of information-based teaching abilities of normal college students based on the blended teaching model; Chen(2018) conducted research and practice on cultivating college students' engineering abilities under the project-task-driven blended teaching model.

2. Research on flipped classroom teaching based on MOOC

Bai(2016) applied flipped classroom teaching based on MOOC to computer network courses. Through research, he found that the flipped classroom teaching based on MOOC has a positive role in improving students' learning attitude, cooperation awareness, independent learning ability and practical ability. Pang(2019) applied the flipped classroom teaching model based on MOOC to basic computer courses in universities, taking full advantage of the organic combination of MOOC and flipped classroom to skillfully combine basic knowledge and practical skills learning. There are two research tools: questionnaires and interview surveys, it was concluded that flipped classroom teaching model based on MOOC has the effect of improving students' academic performance and independent learning ability. Gong & Zhou(2022) use data

mining and few-shot learning technology to investigate the impact of MOOC and flipped classroom task-based college English teaching modes. This work provides a data mining-based decision tree algorithm and examines the enhanced decision tree method. The experimental results of this study demonstrate that two students in each of the two groups believe that the English teaching mode, which is mostly taught by traditional teachers, is very favorable to a thorough understanding of basic knowledge, accounting for 4% of the total. There are 17 students that believe the new teaching methodology is really beneficial, accounting for 34% of the total. This mode was determined to be effective for in-depth knowledge of the basics by a total of 25 students. It can be seen that the flipped classroom model is more popular with students.

3. Research on academic performance

Deng et al., (2020) using a unique panel dataset to thoroughly explore this effect and achieve the following findings. First, the ordinary least squares and fixed-effects estimates, as well as propensity-score matching analyses, suggest that being a leader can enhance academic performance in both the short and long run. Second, student leadership experience in primary school most effectively improves contemporary academic achievement. Third, compared with class commissaries and delegates, the position of class monitor is usually more conducive for promoting academic performance. Fourth, holding a leader position reduces study time but improves learning autonomy; the latter outweighs the former, thereby enhancing academic performance.

Yang et al., (2016)analyzes students' online learning behavior in flipped classrooms and predicts their learning performance. It provides insights on how to perform better in a flipped classroom.

4. Research on learning attitude

Chao et al., (2015) integrated collaborative problem-based learning (CPBL) supported by flipped learning into a high school bridge computer-aided design course. Ninety‐one 17‐year‐old students from two K11 classes were assigned randomly to an experimental group and a control group for the study, respectively. To assess the students' achievements and learning attitudes in the different groups, an 8‐week (16 h in total) pre‐ and post‐test quasi‐experimental study was designed. The results confirmed the effectiveness of the flipped learning approach. Significant differences were found between the experimental and control group in terms of students' achievements. In the experimental group, students' learning attitudes, motivation and self‐evaluation were enhanced.

2.6.2 Foreign research

1. Research on blended learning model

The blended learning model was first used in the field of corporate training. With the continuous development of educational informatization, blended learning has gradually been applied to the field of education, mainly through several aspects.

(1) In terms of theoretical research. Barker(2006) pointed out that the theory of blended learning model is based on the effective integration of constructivism, cognitivism and performance support. Barnum & Paarmann(2002) believes that the

blended learning model is a teaching model that combines traditional teaching models with network, offline, online and on-site teaching methods. In addition, foreign theoretical research on it also includes interaction theory, community theory, connectionism theory, etc.

⑵ In terms of application models, Purnima Valiathan divides blended learning model into three types, namely skill-driven, attitude-driven and ability-driven models Sun(2018). Barnum & Paarmann(2002) proposed a blended learning model based on four stages: web transmission, face-to-face learning, solutions and collaborative extended learning; Brian Beatty proposed the HyFlex model in which learners can independently choose online learning or face-to-face classroom teaching(Tan, 2019).

⑶ In terms of learning effects, the U.S. Department of Education's "Effective Learning" project survey results pointed out that the learning effects of blended learning are higher than traditional face-to-face classroom teaching and online learning(Tan, 2019). After one semester of blended learning, the experimental group showed significant improvement compared to the control group. The blended learning model of college English based on virtual reality technology can help improve students' English proficiency(Peng, 2022).

2. Research on flipped classroom teaching based on MOOC

Mellati & Khademi (2020) invite 38 tertiary learners have participated in the study. Among them 20 learners participated in the MOOC-based educational program and 18 learners participated in a conventional English language class. Pretest, posttest and interview were employed to reach comprehensive data. The findings indicated that

MOOC-based educational programs provide remarkable opportunities for language learners. Along with such opportunities, these new technology-based educational apparatuses provide challenges for stakeholders, policy makers, teachers, and learners that might constraint learners' development in the course of their actions. Discussions and implementations are discussed.

3. Research on academic performance

Razak et al., (2021) studies the role of various factors in order to understand their role in the student's academic performance. Furthermore, various machine learning algorithms are implemented for the prediction process for a student's performance range. The results present that various internal and external pressure on a student is a major contributor to the state of academic performance among other factors discussed in this paper. Light Gradient Boosting Machine performs the best compared to other algorithms in the multi-class classification problem with an overall accuracy and F1-score of 0.87 and 0.86, respectively.

Topor et al., (2010) study examines two potential mechanisms of this association: the child's perception of cognitive competence and the quality of the student-teacher relationship. This study used a sample of 158 seven-year-old participants, their mothers, and their teachers. Results indicated a statistically significant association between parent involvement and a child's academic performance, over and above the impact of the child's intelligence. A multiple mediation model indicated that the child's perception of cognitive competence fully mediated the relation between parent involvement and the child's performance on a standardized achievement test. The quality of the student-

teacher relationship fully mediated the relation between parent involvement and teacher ratings of the child's classroom academic performance. Limitations, future research directions, and implications for public policy initiatives are discussed.

4. Research on learning attitude

Ibrahim et al., (2019) study the learning attitude in physics and challenges towards learning force and motion among Form Four students in Klang. A total of 200 secondary schools students who are taking physics subject from six schools participated in the study. A descriptive research design was employed using survey method to analyse the students' attitude towards learning physics. The findings on the learning attitudes test showed majority of the students have favourable attitudes in learning physics. Another finding from the data revealed that the nature of topic was found to be the most predominance challenge in learning force and motion among the participants. The findings are beneficial as they can serve as a stepping stone in overcoming the underlying sources of difficulty that impede quality learning of physics. More in depth study is needed to look into this matter with more number of participants including teachers who are teaching physics.

Wijaya & Indrasari, (2022) attempts to investigate the English language learners' attitude on the online learning of receptive skills, namely listening and reading skills, conducted in English Language Education Department of UIN Raden Intan Lampung. One hundred and twenty-four students of the first year of English Education Department participated in this descriptive quantitative research with online survey design. The data were collected by using a close-ended questionnaire of the ABC model of attitude proposed by Jain which revealed three elements; affective, behavior, and

cognition. The questionnaire was administered online to the students who had experienced the process of teaching and learning online in listening and reading courses. The result showed that students' attitude towards online learning of receptive skills indicated as positive attitude on affective aspect (x̄= 3.04), behavioral aspect (x̄= 3.01) and cognitive aspect (x̄= 3.01) which concerned on the online learning platforms, task completion, lecturers' strategies in delivering online materials, online group discussion, and receptive skills improvement.

2.7 Conceptual Framework

In the study, Independent variable is two teaching methods, namely blended learning model with flipped classroom model based on MOOC and traditional teaching model. The blended learning model with flipped classroom model based on MOOC combines elements of traditional face-to-face instruction, online learning, and the flipped classroom approach. The traditional teaching model has been a longstanding and widely used approach in education. Dependent variable includes Students' academic performance, Students' learning attitude. Academic performance refers to an individual's achievements, accomplishments, and success in an educational setting. It is often measured through various indicators, assessments, and evaluations that gauge a person's knowledge, skills, and understanding of academic subjects. Learning attitude refers to an individual's approach, mindset, and disposition towards the process of learning. It encompasses a set of beliefs, emotions, and behaviors that influence how a person engages with new information, skills, and experiences.

In this study, the two teaching models were applied to two classes respectively. One class used the blended learning model with flipped classroom model based on MOOC as the experimental group, and the other class used the traditional teaching model as the control group. Observe the learning situation of the two classes and analyze the results of the questionnaire on academic performance and learning attitude.

Figure   2 Conceptual Framework

Independent variable

Dependent variable

Teaching methods:

1. Blended Learning Model with Flipped Classroom Based on MOOC
2. Traditional teaching and learning model

1. Students, academic performance

1.1 Knowledge

1.2 Skills/Practice
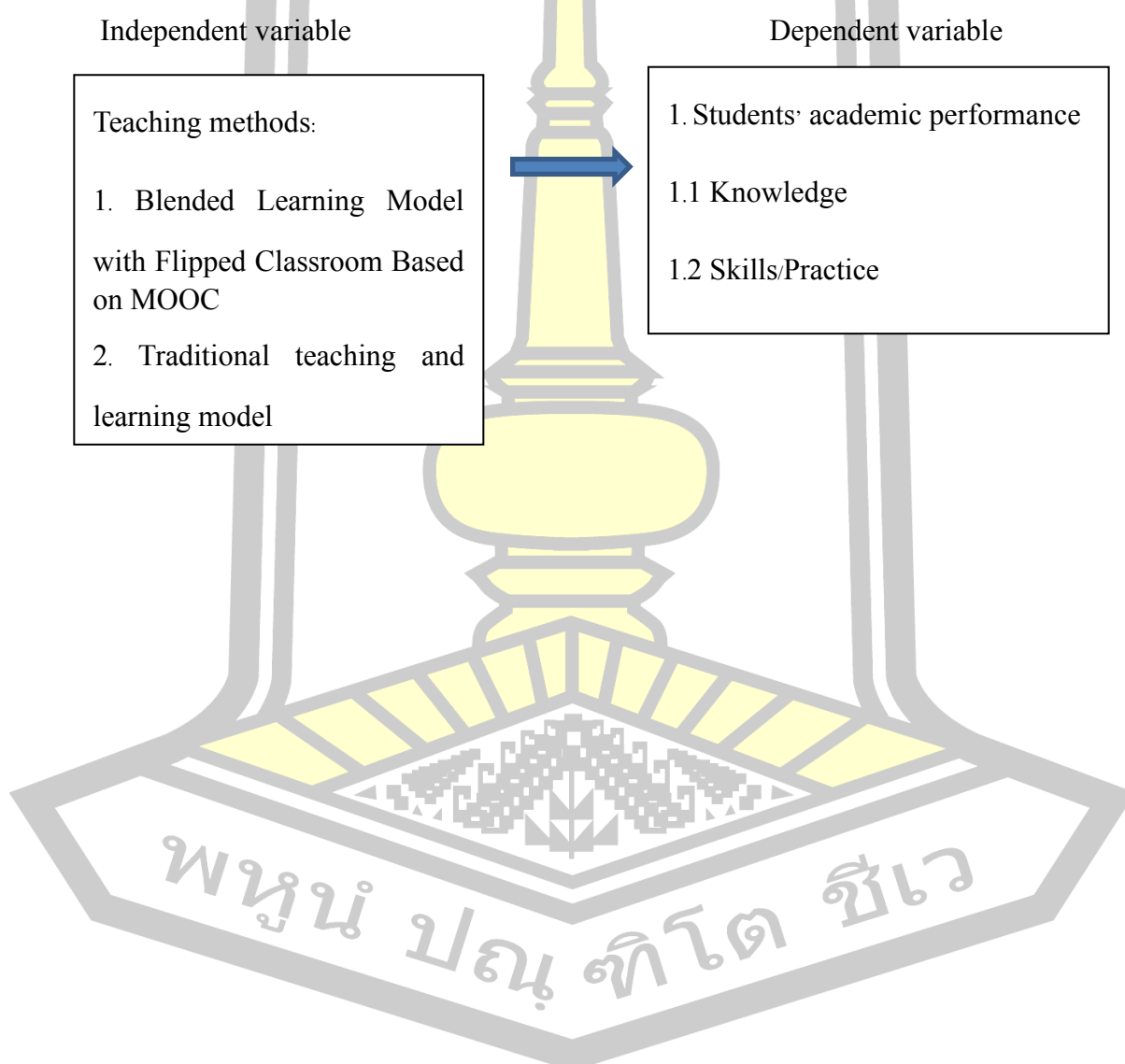
CHAPTER III

RESEARCH METHODS

This study aims to compare students' academic performance and learning attitude when learning the "Basic of Computer Application" course in flipped classroom teaching based on MOOC and traditional classroom teaching. The following research was conducted:

3.1 Population and Sample

3.2 Research Design

3.3 Instruments

3.4 Construction and Quality of Instrument

3.5 Measurement and Data Collection

3.6 Statistic for Data Analysis

3.1 Population and Samples

The population of this study is the first-year students enrolled in the "Basics of Computer Application" course at Guangxi Normal University for Nationalities in the 2022 grade. In the 2022 grade, there are 85 classes and a total of 2,572 students. Two classes were selected for the experiment through cluster random sampling. The two selected classes are then given random assignments to determine the teaching modes of the two classes.

Figure 3 Population and Samples
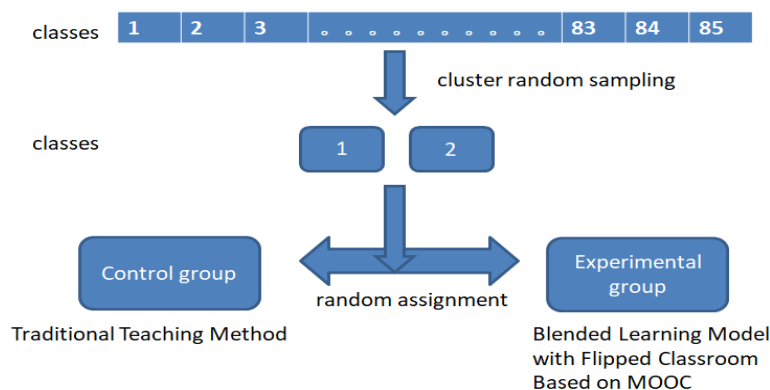
For the experiment, two classes were chosen through cluster random sampling. All students from Class 1 and Class 2 in the preschool education majors of the 2022 grade were selected. Using random assignment, class 1 followed the Traditional Teaching Method, with 30 students, while class 2 served as the experimental group using Blended Learning Model with Flipped Classroom Based on MOOC, consisting of 30 students. A total of 60 students participated in the experiment, comprising 28 boys and 32 girls.

Table   2   sample and sample size

Sample in teach of two classes	Sample size	Rework
Group 1（traditional classroom teaching）	30	Control group
Group 2（flipped classroom teaching based on MOOC）	30	Experimental group
Total	60	

3.2 Research Design

1. Preparation before teaching experiment:

Table   3 List of Preparation before teaching experiment

traditional teaching model	Flipped Classroom teaching model based on MOOC
1. Search for relevant information on traditional teaching model,	1. Search for relevant information on the blended learning, MOOC, flipped classroom

Teacher-Centered	
2.Clarify key points	2.Clarify key points
3. Make courseware PPT	3. Processing videos and information
4. Formulate teaching design	4. Formulate teaching design
5. Formulate Teaching classes and schedule	5. Formulate Teaching classes and schedule
6. Formulate test paper	6. Formulate test paper
7. Formulate questionnaire	7. Formulate questionnaire

(1) Search for relevant information on the blended learning, MOOC, flipped classroom, traditional teaching model, "Basics of Computer Application" course as keywords. According to the requirements of the syllabus, clarify the key points and difficulties of the teaching content, and prepare for resource preparation and in-class discussions; Conduct secondary processing of MOOC resources, text materials, courseware materials, etc. After expert review and suggestions, 2 teaching designs for the "Basic Computer Application" course were finally formulated, teaching design of traditional teaching model, Teaching design of Flipped Classroom teaching model based on MOOC。

(2) Look up the relevant materials of the test papers of the course "Basics of Computer Application". Ensure that the test questions cover the key knowledge points and core concepts of the course to test students, understanding of basic concepts; Make sure each question is clear and avoid vague descriptions or puns; set reasonable time limits for exam papers to ensure students have enough time to complete them while encouraging them to manage their time effectively; questions on each

knowledge point and level of difficulty should be reasonably distributed to ensure that the test paper comprehensively assesses students' mastery of the entire course. After expert review and suggestions, test papers for the "Basics of Computer Application" course were formulated.

(3) Look up the relevant information about the questionnaire on learning attitude, consider the breadth and depth of the questions to ensure a comprehensive understanding of respondent attitudes, beliefs and behaviors. Ensure questions are clearly phrased and avoid vague or pun-intended language. After reviewing and recommending by experts, formulate the questionnaire on learning attitude of students.

Preparations before teaching experiments for the two teaching modes are mostly the same. Clarify key points, formulate teaching design, formulate teaching classes and schedule, formulate test paper, formulate questionnaire. There are also differences that Flipped classroom teaching model based on MOOC search for relevant information on the blended learning, MOOC, flipped classroom; traditional classroom teaching model search for relevant information on traditional teaching model, Teacher-Centered. Flipped Classroom teaching model based on MOOC Processing videos and information, traditional teaching model Make courseware PPT.

2. Teaching experiment process:

This teaching experiment is planned to be completed in four weeks, with three classes per week, each class is 40 minutes, and there is a 10-minute break between each class. The two groups studied the same teaching content and adopted different teaching models. The experimental group adopted the Blended Learning Model with

Flipped Classroom Based on MOOC, and the control group adopted the traditional classroom teaching model.

Table 4 Teaching classes and schedule

Weekly class schedule	Time /hours	Study chapters	Group	Date	Time
1	3	Pre-test	Group1（traditional teaching model）	2023.11.7	8:00am -10：20
			Group 2（Blended learning model）	2023.11.18	8:00am -10：20
2	3	Word basic operation; Word layout operation; Form making and editing; Table calculation	Group1（traditional teaching model）	2023.11.14	8:00am -10：20
			Group 2（Blended learning model）	2023.11.15	8:00am -10：20
3	3	Insert objects into the document; long document editing	Group1（traditional teaching model）	2023.11.21	8:00am -10：20
			Group 2（Blended learning model）	2023.11.22	8:00am -10：20
4	3	Pos-test	Group1（traditional teaching model）	2023.11.28	8:00am -10：20
			Group 2（Blended learning model）	2023.11.29	8:00am -10：20

In the first week of the experiment, the pre-test papers were distributed to two classes for testing, and the pre-test papers were collected after completing the test. Inform the experimental group of the teaching mode and steps to prepare them, including communication and mutual assistance, group collaboration, group reporting, etc. Send the prepared learning materials and videos to the experimental group, and require the students in the experimental group to complete the online learning tasks and complete the test of the MOOC platform before the start of the next week's course. Inform the control group of the learning content for the next week and remind students to preview independently.

In the second week of the experiment, the experimental group conducted classroom teaching according to the in-class teaching activity design of the lesson plan (see Appendix D). Teachers and students complete 8 steps together: review, examine, raise questions, investigative learning, collaborative learning, draw conclusions and share, teacher supplement, evaluation and feedback. After the course, the learning materials and videos related to the next week's learning content were given to the experimental group. Students in the experimental group were required to complete the viewing task and complete the test of the MOOC platform before the start of the next week's course. The control group used a teaching model that combined lecture and practice to complete classroom activities (see Appendix C). After the course, homework will be assigned, the control group will be informed of the learning content of the next class, and students will be reminded to preview.

In the third week of the experiment, the experimental group conducted classroom teaching according to the in-class teaching activity design of the lesson plan (see

Appendix D). Teachers and students complete 8 steps together: review, examine, raise questions, investigative learning, collaborative learning, draw conclusions and share, teacher supplement, evaluation and feedback. The control group used a teaching model that combined lecture and practice to complete classroom activities (see Appendix C).

In the fourth week of the experiment, the post-test papers were distributed to the experimental group and the control group for testing. The experimental group and the control group were required to complete the post-test papers within the specified time and collect the post-test papers. Distribute the learning attitude questionnaire to the experimental group and the control group, require the experimental group and the control group to complete it within the specified time, and collect the learning attitude questionnaire

Table   5 Teaching schedule

Weekly class schedule	Time/hours	Teaching content	Key points of teaching content
1	3	Pre-test	
		Word basic operation	1) Text entry
			2) Text formatting
			3）paragraph formatting
2	3	Word layout operation	1) Find and replace
			2) Borders and shading
			3) headers and footers
		Form making and editing	1) Generate form
			2) Adjust the table

3） Edit form

4） Form formatting

Table calculation

1） Insert formula

2） Using functions

3　　　　3　　　Insert objects into the document

1） Insert graphics

2） Insert picture

3） Insert WordArt

4） Insert text box

5） Insert SmartArt

Long document editing

1）Document application theme effect

2） Separators and page breaks

3） Generate directory

4） Generate index

5）Revision and comment

4　　　　3　　　Pre-test

3. After the teaching experiment

Collected academic performance and Learning attitude questionnaire of the experimental group and the control group, conduct data sorting and analysis, comparing the differences in academic performance and learning attitude between the experimental group and the control group, after SPSS analysis, the experimental results were recorded and finally summarized.

3.3 research Instruments

The following 3 tools were used in this study:

1. Two teaching designs, including teaching design of Flipped classroom model based on MOOC, teaching design of traditional teaching model.

1.1 Teaching design of flipped classroom model based on MOOC concluding 4 components as follow:

(1) Objective: Master the process of word processing and the basic knowledge of word processing software, and learn to use MS Word 2010 for text processing, text typesetting, editing tables and printing. Observe students' performance and attitude during the learning process.

(2) Activities: Teachers and students complete 8 steps together: review, examine, raise questions, investigative learning, collaborative learning, draw conclusions and share, teacher supplement, evaluation and feedback. See table 6.

Table   6 In-class teaching activity design

activities	details	Estimated time
review	The teacher leads the students to recall the previous class knowledge	2 minutes
inspection	Teacher checks student learning status	8 minutes
raise question	Teacher summarizes the problems encountered by the students in the pre-class study and raises them in the classroom	2 minutes
research study	Students take the questions given by the teacher and explore one by one	5 minutes

collaborativ e learning	Collaborative learning will be carried out on problems that cannot be solved by inquiry learning through group cooperation.	8 minutes
draw conclusions and share	Through collaborative learning, each group explains the problems they are responsible for to other students.	40 minutes
teacher supplement	Teacher explain and supplement the questions and knowledge points that students cannot answer	15 minutes
Reviews and Feedback	Inter-student assessments; Mutual evaluation between teachers and students	

(3) Flipped classroom model based on MOOC may use multiple media to support learning. Here are some media types that may be used: online videos, online texts, online discussions, digital teaching materials, real-time interactive tools.

(4) Students' knowledge and practice are assessed through test papers. There are 20 sub-questions in this major topic, each with 2 point, 40 points in total that related to knowledge; there is an operational question related to Practice, 60 points in total. For attitude-related information (see Appendix N), There are 10 scoring items, each scoring item is 1-10 points, a total of 100 points.

1.2 Traditional Design

(1) Objective: Master the process of word processing and the basic knowledge of word processing software, and learn to use MS Word 2010 for text processing, text

typesetting, editing tables and printing. Observe students' performance and attitude during the learning process.

（2）Activities: The traditional teaching model adopts a teaching method that combines lecture and practice. Transfer knowledge in the classroom and reasonably arrange time for students to practice operations. The specific arrangements are as shown in the table

Table　7 Teaching content and time arrangement

teaching content	Key points of teaching content	Study style and duration
Word basic operation	1）Text entry 2）Text formatting 3）paragraph formatting	The teacher imparts knowledge and explains for 10 minutes, and the students practice for 5 minutes; the two times are 15 minutes in total, and the time is used alternately
Word layout operation	1）Find and replace 2）Borders and shading 3）headers and footers	The teacher imparts knowledge and explains for 14 minutes, and the students practice for 9 minutes; the two times are 25 minutes in total, and the time is used alternately
Form making and editing	1）Generate form 2）Adjust the table 3）Edit form 4）Form formatting	The teacher imparts knowledge and explains for 25 minutes, and the students practice for 15 minutes; the two times are 40 minutes in total, and the time is used alternately
table calculation	1）Insert formula 2）Using functions	The teacher imparts knowledge and explains for 12 minutes, and the students practice for 8 minutes; the two times are 20 minutes in total, and the time is used alternately
Knowledge sorting and summarization		It is estimated that the remaining 10 minutes will be used to sort out and summarize the knowledge points

		of this class, and arrange homework after class
review	Review what you learned in the last lesson	2 minutes
Insert objects into the document	1) Insert graphics 2) Insert picture 3) Insert WordArt 4) Insert text box 5) Insert SmartArt	The teacher imparts knowledge and explains for 25 minutes, and the students practice for 15 minutes; the two times are 40 minutes in total, and the time is used alternately
long document editing	1) Document application theme effect 2) Separators and page breaks 3) Generate directory 4) Generate index 5) Revision and comment	The teacher imparts knowledge and explains for 35 minutes, and the students practice for 25 minutes; the two times are 60 minutes in total, and the time is used alternately
Knowledge sorting and summarization		It is estimated that the remaining 10 minutes will be used to sort out and summarize the knowledge points of this class, and arrange homework after class

（3）The media forms used in the traditional teaching model are relatively traditional, but still include some common media tools. The following are some media that may be used in the traditional teaching model: textbooks and printed materials, whiteboards and blackboards, projectors, ppt, physical displays, field trips.

(4) Students' knowledge and processes are assessed through test papers. There are 20 sub-questions in this major topic, each with 2 point, 40 points in total that related to knowledge; there is an operational question related to processes, 60 points in total. For attitude-related information (see Appendix N). There are 10 scoring items, each scoring item is 1-10 points, a total of 100 points.

2. One test paper, achievement test of "Basics of Computer Application" course

3. One gauge, questionnaire on students' learning attitude

3.4 Construction and Quality of Instrument

3.4.1 Construction and Quality of teaching designs

Teaching designs of Flipped Classroom based on MOOC, teaching design of traditional classroom, follow the steps in order as follows:

1. Conduct research and analysis on the "Basics of Computer Application" course, and understand the course study syllabus, etc.

2. Determine that the learning content is applicable to the students participating in the experiment, this research chooses the office-word module to create Flipped Classroom based on MOOC teaching design and traditional classroom teaching design, the main content of the office-word module is divided into 6 tasks, as shown in Table 8.

Table 8 Office-word skill knowledge decomposition

module	unit of study	Knowledge points to be mastered
office-word	Word basic operation	1) Text entry
		2) Text formatting

Word layout operation

3) Paragraph formatting

1) Find and replace

2) Borders and shading

3) Headers and footers

Form making and editing

1) Generate form

2) Adjust the table

3) Edit form

4) Form formatting

table calculation

1) Insert formula

2) Using functions

Insert objects into the document

1) Insert graphics

2) Insert picture

3) Insert WordArt

4) Insert text box

5) Insert SmartArt

long document editing

1) Document application theme effect

2) Separators and page breaks

3) Generate directory

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	4) Generate index
	5) Revision and
	comment

3. Develop two teaching designs, teaching designs of Flipped Classroom based on MOOC, teaching design of traditional classroom

4. Submit the teaching design developed by the two teaching methods to the "Basics of Computer Application" course experts, 3 experts check the effectiveness of the teaching design content according to the requirements of the teaching syllabus, and revise according to the experts' suggestions.

5. Submit the revised teaching design to experts to evaluate the correctness and applicability of the content, the list of experts is as follows:

(1) Mr.Yi Qishun, professor, has been engaged in education work in colleges and universities for 26 years, and is currently the dean of the School of Mathematics, Physics and Electronics of Guangxi Normal University for Nationalities;

(2) Mr.Jiang Zhinian, professor, has been engaged in education work in colleges and universities for 31 years, and is currently the director of the Network Information Center of Guangxi Normal University for Nationalities;

(3) Ms.Yu Jianfang, associate professor, has been engaged in education work in colleges and universities for 15 years, and is currently the director of the computer application teaching and research section of Guangxi Normal University for Nationalities.

6. Obtain the teaching design evaluation form of three experts for inspection, Measured with IOC, Rating scale: 1, 0, -1. 1 means agree, 0 means pending, -1 means

disagree. IOC index must be between -1~1, The range of the IOC index should be greater than 0.5 to prove correctness and applicability, If the ICO index is less than 0.5, it needs to continue to be revised. The result of teaching designs of Flipped Classroom based on MOOC IOC is between 0.67 to 1(see appendix E); the result of teaching designs of traditional classroom IOC is between 0.67 to 1. Which can be applied to practical teaching using instructional design.

7. Apply the two teaching designs to actual classroom teaching, and continuously improve and perfect the teaching content in the application.

3.4.2 Construction and Quality of academic performance test

1. Study the theories and concepts of students' test scores, create test papers, and use the same set of test papers for pre-test paper and post-test paper to judge the difference in students' performance before and after learning

2. The test paper mainly examines students' understanding of the office-word module and the basic knowledge they have mastered before learning. There are 6 learning units, namely Word basic operation, Word layout operation, Form making and editing, table calculation, Insert objects into the document, long document editing, with a total score of 100 points. It mainly assesses the theoretical knowledge and word operation of the office-word module.

3. Develop test papers based on syllabus and teaching objectives, a total of 100 points in the test paper, single choice questions (there are 20 sub-questions in this major topic, each with 2 point, 40 points in total),

4. Subjective topic (this major topic has 1 sub-question, 60 points in total).

5. Test Attributes: For attributes -related information (see Appendix N), there are 10 scoring items, each scoring item is 1-10 points, a total of 100 points.
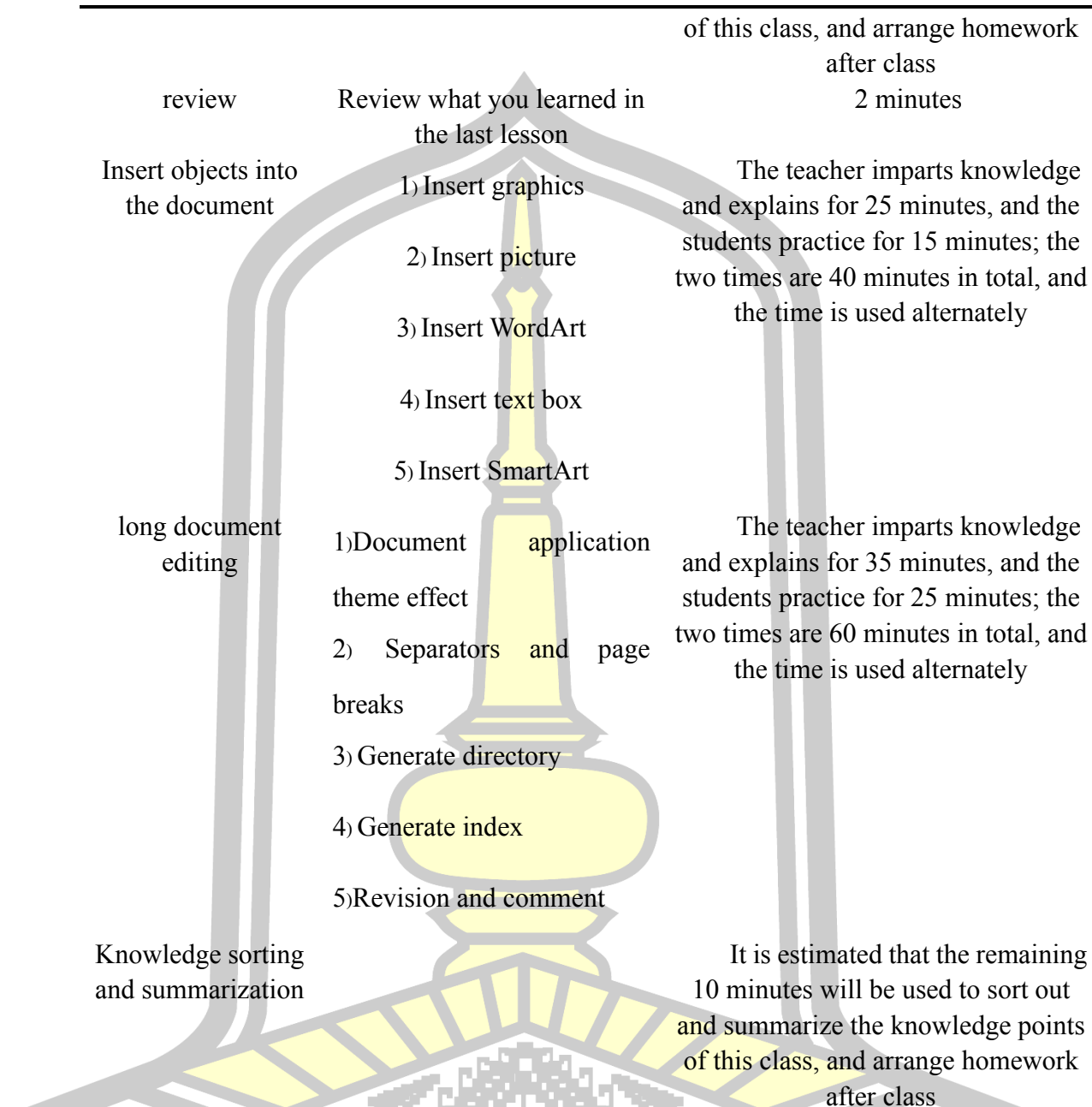
6. Submit the evaluation tools to three experts to verify the correctness of the content. The list of experts is as follows:

(1) Mr.Yi Qishun, professor, has been engaged in education work in colleges and universities for 26 years, and is currently the dean of the School of Mathematics, Physics and Electronics of Guangxi Normal University for Nationalities;

(2) Mr.Jiang Zhinian, professor, has been engaged in education work in colleges and universities for 31 years, and is currently the director of the Network Information Center of Guangxi Normal University for Nationalities;

(3) Ms.Yu Jianfang, associate professor, has been engaged in education work in colleges and universities for 15 years, and is currently the director of the computer application teaching and research section of Guangxi Normal University for Nationalities.

7. Obtain the test paper evaluation form of three experts for inspection, Measured with IOC, Rating scale: 1, 0, -1. 1 means agree, 0 means pending, -1 means disagree. IOC index must be between -1~1, The range of the IOC index should be greater than 0.5 to prove correctness and applicability, If the ICO index is less than 0.5, it needs to continue to be revised. The result of the test paper IOC was between 0.67 to 1(see appendix B) test papers can be used in practical teaching. After constructing evaluation tools, the researcher couldn,t tryout, because Due to the school's teaching management, the achievement test papers were not tryout. Although the trial was not possible, the

importance of tryout was still recognized. Students' performance will be closely monitored and prepared to respond flexibly to issues that may arise. The content of the test paper is mainly extracted from the test papers and question banks of previous years. The three experts are experts in the computer course of Guangxi Normal University for Nationalities. In view of this, this test paper is used without tryout.

3.4.3 Construction and Quality of Student Learning Attitude Questionnaire

1. Review theories and concepts and related research on measuring learning attitudes, Construct student learning attitude questionnaire, according to the Likert scale, the questionnaire is divided into 5 levels.

2. There are 20 questions in the questionnaire, which are: strongly agree = 5 points, agree = 4 points, not sure = 3 points, disagree = 2 points, strongly disagree = 1 point.

3. Submit the completed questionnaire to the experts of the "Basics of Computer Application" course. Three experts will evaluate the correctness and applicability of the content. The list of experts is as follows:

(1) Mr.Yi Qishun, professor, has been engaged in education work in colleges and universities for 26 years, and is currently the dean of the School of Mathematics, Physics and Electronics of Guangxi Normal University for Nationalities;

(2) Mr.Jiang Zhinian, professor, has been engaged in education work in colleges and universities for 31 years, and is currently the director of the Network Information Center of Guangxi Normal University for Nationalities;

(3) Ms.Yu Jianfang, associate professor, has been engaged in education work in colleges and universities for 15 years, and is currently the director of the computer

application teaching and research section of Guangxi Normal University for Nationalities.

4. Obtain the questionnaire evaluation form of the student's learning attitude from three experts for inspection, Measured with IOC, Rating scale: 1, 0, -1. 1 means agree, 0 means pending, -1 means disagree. IOC index must be between -1~1, The range of the IOC index should be greater than 0.5 to prove correctness and applicability, If the ICO index is less than 0.5, it needs to continue to be revised. The IOC result of the student learning attitude questionnaire is between 0.67 to 1 (see appendix H), and the questionnaire can be used in practical teaching.

5. Regarding the content of the questionnaire, experts mainly put forward several suggestions: clarify the question, simplify the pronunciation, time of famous monuments, and avoid double negatives. Modify according to the suggestions put forward by the experts. After the modification is completed, it will be sent to the experts for review. After the experts confirm that it is correct, the content of the questionnaire will be completed.

3.5 Data Collection

To explore the influence of students using two different teaching modes to learn the same knowledge in the course "Basics of Computer Application" on students' academic performance and learning attitude. During the data collection phase of this study, each test data was collected according to the following steps.

1. Collect pre-test papers to understand the situation of students before learning. The experimental group and the control group tested the same set of test papers together

before the start of the experiment. Through the results of the previous test papers, it is known whether there is basically no difference in the mastery of computer knowledge before the students learn the "Basics of Computer Application" course. Before the end of the experiment, the teacher will not explain the test paper. In this study, 60 pre-test papers were issued, 60 valid test papers were withdrawn, and 0 invalid test papers were recovered. The recovered pre-test papers can be used for analysis in this experiment.

2. Collect post-test papers to understand students' performance after learning. After the experiment, the two classes have completed the same teaching content through two different teaching modes. The post-test papers are distributed to the students of the two classes, and the students complete them independently within the specified time. The same set of pre-test papers and post-test papers are used test paper. There are 60 test papers after distribution, and 60 test papers after withdrawal.

3. Collect questionnaires on students' learning attitudes to understand students' learning attitudes after learning. After the experiment, the experimental group and the control group filled out the same questionnaire together. Through the answers to the questionnaires and data analysis, we can understand whether there are differences in the learning attitudes of the students in the experimental group and the control group after learning in two different teaching modes. After the end of the experiment (control group at 2023.11.28 10:20, experimental group at 2023.11.29 10:20), 60 questionnaires were distributed and 60 valid questionnaires were collected, all of which were valid questionnaires.

3.6 Statistics used in data analysis

1. Statistics for checking tool quality

(1) Content effectiveness of the learning management program, use the following formula to determine (IOC)

$$IOC = \frac{\sum R}{N}$$

IOC stands for acceptance index

ΣR stands for expert summation

N stands for number of experts

(2) Determination of the quality of learning achievement tests, use the following formula to determine (IOC)

$$IOC = \frac{\sum R}{N}$$

IOC stands for acceptance index

ΣR stands for expert summation

N stands for number of experts

(3) Determination of learning attitude test quality, use the following formula to determine (IOC)

$$IOC = \frac{\sum R}{N}$$

IOC stands for acceptance index

ΣR stands for expert summation

N stands for number of experts

2. Basic statistics

(1) Average value by using the following formula

$$\bar{X} = \frac{\sum X}{N}$$

$\bar{X}$ stands for sample mean

ΣX stands for sum of the data in the sample

N stands for the sample size

(2) Standard Deviation using the following formula

$$SD = \sqrt{\frac{\sum(X-\bar{X})^2}{N-1}}$$

SD stands for the sample standard deviation

X stands for the value of each data piece

$\bar{X}$ stands for the sample mean

N stands for the sample size

(3) T-test formula

The T-test formula used in this study is 2 independent sample T-Test formula (Witte & Witte, 2017).

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)}}$$

$\overline{X_1}$和$\overline{X_2}$ stands for the mean of the two groups of samples respectively.

S_1^2和S_2^2 stands for the variance of the two groups of samples respectively

n_1和n_1 stands for the sample size

CHAPTER IV

Data Analysis Results

The purpose of this study is to study the improvement of students' academic performance and learning attitude based on the flipped classroom teaching model based on MOOC. The results of the research data analysis are presented as follows:

4.1 Sequence of steps for presenting data analysis results

4.2 Data analysis results

4.2.1 Analysis of student academic performance before learning

4.2.2 Analysis of student academic performance after learning

4.2.3 Data Analysis of Learning Attitude Survey Questionnaire

4.1 Sequence of steps for presenting data analysis results

The researchers divided the data analysis results into the following three parts, as follows:

1. Analysis of student performance before learning.

2. Analysis of student achievement after learning.

3. Data analysis of learning attitude survey questionnaire

4.2 Data analysis results

4.2.1 Analysis of student academic performance before learning

1. Normality test: It is found that the p value is greater than 0.05, indicating that the student scores are consistent with the normal distribution, and the next step of the T-test can be carried out.

Table   9 Normality test: The results of normal distribution testing of academic

performance from Method 1(traditional teaching model) and Method 2(Flipped

classroom model based on MOOC) by using the Shapiro-Wilk test

Before experiment	statistic	df	Sig.
	0.966	60	0.094

2. T-test: Test whether there is a significant difference between two groups

(independent samples)

Table   10 The Result of comparison academic performance between Flipped
classroom model based on MOOC and traditional teaching model before learning

Teaching Method Groups	n	$\bar{X}$	SD	t	df	p-value (2-tailed test)
Control group	30	57.120	0.928		58	
				0.108		0.914>0.05
Experimental group	30	56.947	0.968		55.656	

To judge whether there is not much difference in the mastery of computer

knowledge between the two classes before the experiment, a pre-test was conducted for

the two classes before the experiment started. The test content was the same and the test

time was the same. After the pre-test, compare the pre-test results of the collected

experimental group and the control group to get some relevant data: Both classes have

30 students, the average score of the experimental group is 56.947 points, and the

average score of the control group is 57.120 points, the difference between the average

score of the experimental group and the control group is only 0.173 point; the standard

deviation of the experimental group is 0.968, and the standard deviation of the control

group is 0.928; From table 6 we have seen the P-Value (2-talied test) =

0.914>0.05.Therefore,there is no significant difference between the experimental group and the control group before the experiment begins.

4.2.2 Analysis of student academic performance after learning

　　1. First, conduct a normality test on the students' academic performance after the experiment that the p value is greater than 0.05. The student performance in both classes conforms to the normal distribution, and an independent sample T-test can be conducted.

Table　11 Normality test: The results of normal distribution testing of academic performance from Method 1(traditional teaching model) and Method 2(Flipped classroom model based on MOOC) by using the Shapiro-Wilk test

Groups	statistic	df	Sig.
control group	0.958	30	0.280
experimental group	0.979	30	0.796

　　2. T-test: Test whether there is a significant difference between two groups (independent samples), the results of the independent sample T-test showed that the p value was less than 0.05, indicating that there was a significant difference in the scores of the two classes after the experiment.

Table　12 The Result of comparison academic performance between Flipped classroom model based on MOOC and traditional teaching model after learning

Group	N	$\bar{X}$	SD	df	t	p-value (1-tailed

						test)
Control group	30	78.103	7.996	58		
					-5.520	0.000
Experimental group	30	87.963	5.638	52.119		

To judge that the use of the flipped classroom teaching mode Based on MOOC in the experimental class can significantly improve academic performance, the results of the experimental group before and after learning were compared and analyzed. The average score of academic performance before learning is 56.947 points. After passing the flipped classroom teaching mode based on MOOC, the average score of academic performance is 87.963 points, the average score has increased by 9.752 points, and the grades have improved significantly; p-value (1-tailed test) =0.000< 0.05, therefore, there is a significant difference between pre-test and post-test scores.

4.2.3 Data Analysis of Learning Attitude Survey Questionnaire

The experimental group and the control group used the same set of questionnaires, which were distributed to the students and recovered after the experiment, and some relevant data were obtained:

(1) In terms of students' attitude towards the existing teaching mode and their own learning, the scores of the experimental group were significantly higher than those of the control group. The significant difference between the experimental group and the control group Sig.(2-tailed)=0.000, which is less than the requirement of 0.05, so there is a significant difference in the attitude between the experimental group and the control group.

The average scores of the control group for most of the questions are above the middle value of 3 points, but T15(I can establish good classroom interaction with teachers and classmates) the average is only 2.57 less than 3, indicates that the student has failed to develop good classroom interactions with the teacher and classmates; T17(I like the way the teacher is teaching now) the average is only 2.47 less than 3, Indicate that the student does not like the way the class is being taught; T7(I think the current classroom discipline and learning atmosphere of the "Basics of Computer Application" course is very good) The average value is slightly higher than the median value of 3, indicating that students have considerable doubts about the existing classroom atmosphere, and the classroom atmosphere needs to be improved; T8(If I encounter some knowledge that I don't understand, I will seek help from my teachers and classmates.) average score is only 3.03, which is almost equal to the median value, indicating that not only a small number of students do not seek help from teachers and classmates when encountering knowledge they do not understand; T14(I feel happy while studying) average value is 3.07, which is slightly greater than the median value of 3, indicating that students do not feel much happiness during the learning process and do not experience the joy of learning; T18(Satisfied with my academic performance) average value is 3.07, slightly larger than the median value of 3, indicating that many students are dissatisfied with their achievements; T19(I am satisfied with the learning activities of the "Basics of Computer Application" course organized by the teacher.) average value is only 0.03 larger than the median value, indicating that students are not very satisfied with the existing traditional classroom activities; However, T20(Hope to

try more teaching modes) average is 4.90, which is far higher than the average and even close to the full score of 5.0, which shows that students are eager to change the existing traditional teaching and try more teaching models.

The average value of each question (T1-T20) in the experimental group is greater than the middle number 3, even greater than 4, indicating that the learning attitude of the students in the experimental group is at a middle-to-high level. Comparing the experimental group with the control group, there were no obvious fluctuations in the experimental group for the questions that the control group had greater doubts about. It shows that the experimental group is relatively satisfied in dealing with classroom activities, classroom learning atmosphere, seeking help, the flipped classroom teaching mode based on MOOC is generally affirmed by the students in the experimental group.

Table 13 Normality test: Normality test: The results of normal distribution testing of learning attitude from Method 1(traditional teaching model) and Method 2(Flipped classroom model based on MOOC) by using the Shapiro-Wilk test

Groups	statistic	df	Sig.
control group	0.944	20	0.281
experimental group	0.961	20	0.570

Figure 4 experimental group and control group compared the average score of each machine from learning attitude survey questionnaire

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
experiment group	4.47	4.53	4.60	4.37	4.47	4.40	4.43	4.40	4.57	4.40	4.17	4.60	4.80	4.27	4.20	4.40	4.60	4.50	4.43	4.53
control group	4.40	3.70	3.30	4.20	4.47	4.30	3.17	3.03	3.40	3.30	4.03	4.13	4.80	3.07	2.57	3.37	2.47	3.07	3.03	4.90

We can intuitively see the average answer scores of the experimental group and the control group for each question. The average score of each question is not very different, and most of the scores of the experimental group are slightly higher than those of the control group. But there are exceptions, such as T15 (I can establish good classroom interaction with teachers and classmates), the score of the control group was 2.57, below the median value of 3, while the score of the experimental class was 4.2, the difference is 1.63; T17 (I like the way the teacher is teaching now) the score of the control group is 2.47, the score of the experimental group is 4.60, a difference of 2.13 points, It shows that the experimental group and the control group have great differences on this issue. The experimental group is satisfied with the flipped classroom based on MOOC, while the control group is not satisfied with the existing traditional teaching methods; T20 (Hope to try more teaching modes) the score of the experimental group was 4.53, and that of the control group was 4.90, which indicated the urgent desire of the control group to change the existing teaching model.

Table   14 The Result of comparison learning attitude from Method 1(traditional teaching model) and Method 2(Flipped classroom model based on MOOC)

Group	N	$\overline{X}$	SD	df	t	p-value (1-tailed test)
Control group	20	3.6355	0.71946	38		
					-5.003	0.000<0.05
Experimental group	20	4.4570	0.14690	20.582		

It can be concluded from table 14 that the p-value (1-tailed test) of the experimental group and control group is 0.000, less than 0.05.It can be concluded that the learning attitude of the experimental group is significantly higher than that of the control group. So there is a significant difference in the attitude between the experimental group and the control group.

CHAPTER V

CONCLUSION, DISCUSSION AND SUGGESTION

This chapter will carry out the conclusion and discussion of the article through several steps:

5.1 Conclusion

5.2 Discussion

5.3 Suggestion for Implication

5.1 Conclusion

The purpose of this research was to study the academic performance between flipped classroom based on MOOC teaching model and tradition teaching model, to study the attitude after learning with flipped classroom based on MOOC teaching model and tradition teaching model. According to the data analysis results, the following conclusions were drawn:

1. Compared with traditional teaching model, flipped classroom teaching based on MOOC can significantly improve students' academic performance.

After the test, the average posttest score of the experimental group was 87.963 points, and the average posttest score of the control group was 78.103 points, difference of 9.86 points. The significant difference between the experimental group and the control group is P=0.000<0.05, so there is a significant difference in the post-test scores between the experimental group and the control group. The academic performance of the experimental group was significantly higher than that of the control group.

2. Compared with traditional teaching model, blended learning model with flipped classroom based on MOOC can improve students' learning attitude.

The average value of students' attitude towards using blended learning model with flipped classroom based on MOOC is 4.457, and the average value of learning attitude towards traditional learning is 3.635. The students' attitude towards blended learning is higher than that of traditional learning in the "Basics of Computer Application" Course, which is at a relatively high level.

From the students' answers to the open questions, it can be concluded that the students in the control group were not satisfied with the existing traditional teaching model, the boring learning style and almost no interactive classroom activities in the classroom make their learning feel less fun; When they encounter difficulties in their studies, they often dare not seek help from teachers and classmates because of their timidity and lack of the habit of interacting with each other. The previous knowledge learning will not affect the acquisition of subsequent knowledge, causing students to easily enter an endless loop of learning, and students' learning attitudes will gradually deviate; They hope to change the existing traditional teaching model, and hope that there will be more classroom interactions and learning activities that can create a good atmosphere in the classroom, so as to cultivate their interactive communication skills with their classmates, improve their academic performance, and correct their learning attitudes .

5.2 Discussion

In this study, two different teaching modes, flipped classroom teaching based model on MOOC and traditional classroom teaching, are applied to the course of "Basics of Computer Application" for first-year university students. Two classes of the

same major learn the same content through these two different methods. Teaching mode, the experiment proves that the academic performance and learning attitude of students based on flipped classroom teaching based on MOOC are better than those of traditional classroom teaching.

1. After the experiment, the average post-test score of the experimental group's academic performance was 87.963 points, and the average post-test score of the control group's academic performance was 78.103 points, with a difference of 9.86 points. An independent sample T test was conducted on the post-test scores of the experimental group and the control group. The significant difference between the experimental group and the control group was P=0.000<0.05. There was a significant difference in the academic performance of the experimental group and the control group. It also proves that the learning effect of flipped classroom teaching model based on MOOC is significantly better than traditional classroom teaching model. This result is consistent with the research results of Strelan, Ran Xiang (2023), and Zhong Lina (2020). They also believe that the flipped classroom teaching model based on MOOC plays an important role in improving students' academic performance and is effective. Research by Strelan et al., (2020) indicated that as long as it is used properly, even a classroom with a limited degree of flipping will have a significantly better effect teaching in traditional classroom. The flipped classroom teaching based on MOOC emphasizes the combination of online and offline, allowing students to have enough time to learn independently before class, and to internalize knowledge during class. Ran(2023)Taking 100 students from two classes of Kinesiology major in Mudanjiang College in 2022 as the experimental subjects, online and offline combined teaching methods are used for

teaching, pre-class preview and after-class review are completed online, face-to-face learning is completed in offline classrooms, and students' grades have been greatly improved; Zhong (2021)taking 61 students from 2 classes of L University as the research object, one class adopts the flipped classroom teaching method based on MOOC, and the other class as the control group adopts the traditional classroom teaching mode, after 16 weeks of study, the final academic performance of the experimental class was higher than that of the control class, and the students' autonomous learning ability was also improved.

2. The average value of students' attitude towards using blended learning is 4.457, and the average value of learning attitude towards traditional learning is 3.635. The students' attitude towards blended learning is higher than that of traditional learning in the Computer Application Fundamentals Course, which is at a relatively high level. The learning attitude of students in flipped classroom teaching model based on MOOC is more positive than that in traditional classroom teaching model. The flipped classroom model based on MOOC makes the classroom atmosphere more active, the relationship between teachers and students is more harmonious, learning problems can be answered in time, students are more willing to discuss with their classmates, and students' learning attitude is more positive. This is consistent with the research results of Gonzalez(2014), Shen(2016), and Cao(2020). Gonzalez(2014) Modifying the Flipped Classroom: The "In-Class" Version Teachers who used the flipped classroom saw "higher student achievement, greater student engagement, and better attitudes toward learning and school". Shen(2016)said that the flipped classroom based on MOOC makes the classroom more active, students are more attitude in learning, teaching happiness is enhanced, and teaching enthusiasm is improved; Cao(2020)said that the flipped

classroom based on MOOC can be flexibly adjusted according to the differences between students and the learning progress during the teaching process, which can meet the individual needs of students to the greatest extent, stimulate students' enthusiasm for learning, and make the whole teaching process more reasonable. , Scientific, improve the teaching efficiency.

In the flipped classroom teaching based on MOOC, teachers must consider the school's hardware and software support, whether students can use the network and network equipment smoothly, and whether the difficulty of teaching video content is appropriate. Flipped classroom teaching based on MOOC can organize more learning activities in the classroom, so that students have more opportunities to master deep knowledge and realize knowledge internalization. Search for more relevant knowledge on MOOC platform and expand your cognitive field.

5.3 Suggestion

This research aims to study the academic performance and learning attitude between blended learning model with flipped classroom based on MOOC teaching model and tradition teaching model. Experiments have proven that Flipped classroom teaching model based on MOOC has better students' academic performance and learning attitude than the traditional teaching model. Therefore, according to the experimental results, several suggestions are made:

1. Suggestions for practice

(1) Before class, teachers should make teaching videos and teaching materials in line with students' learning level, supervise students' learning, and communicate with students in a timely manner.

⑵ In the classroom, teachers play a leading role, take students as the center, organize classroom activities reasonably, encourage students to participate in them, speak actively, and give full play to the advantages of collaborative learning

⑶ After class, teachers should urge students to do a good job in knowledge management, teaching reflection, continuous improvement and optimization of classroom teaching, and preparation for the next class.

2. Suggestion for further research

⑴ The flipped classroom based on MOOC can cultivate students' abilities in other fields, such as hands-on ability, language expression ability and communication ability

⑵ The flipped classroom based on MOOC can be applied to primary and secondary school teaching.

⑶ The flipped classroom based on MOOC can try to combine more types of educational technologies, give full play to the advantages of MOOC and flipped classrooms, and continuously optimize teaching methods.
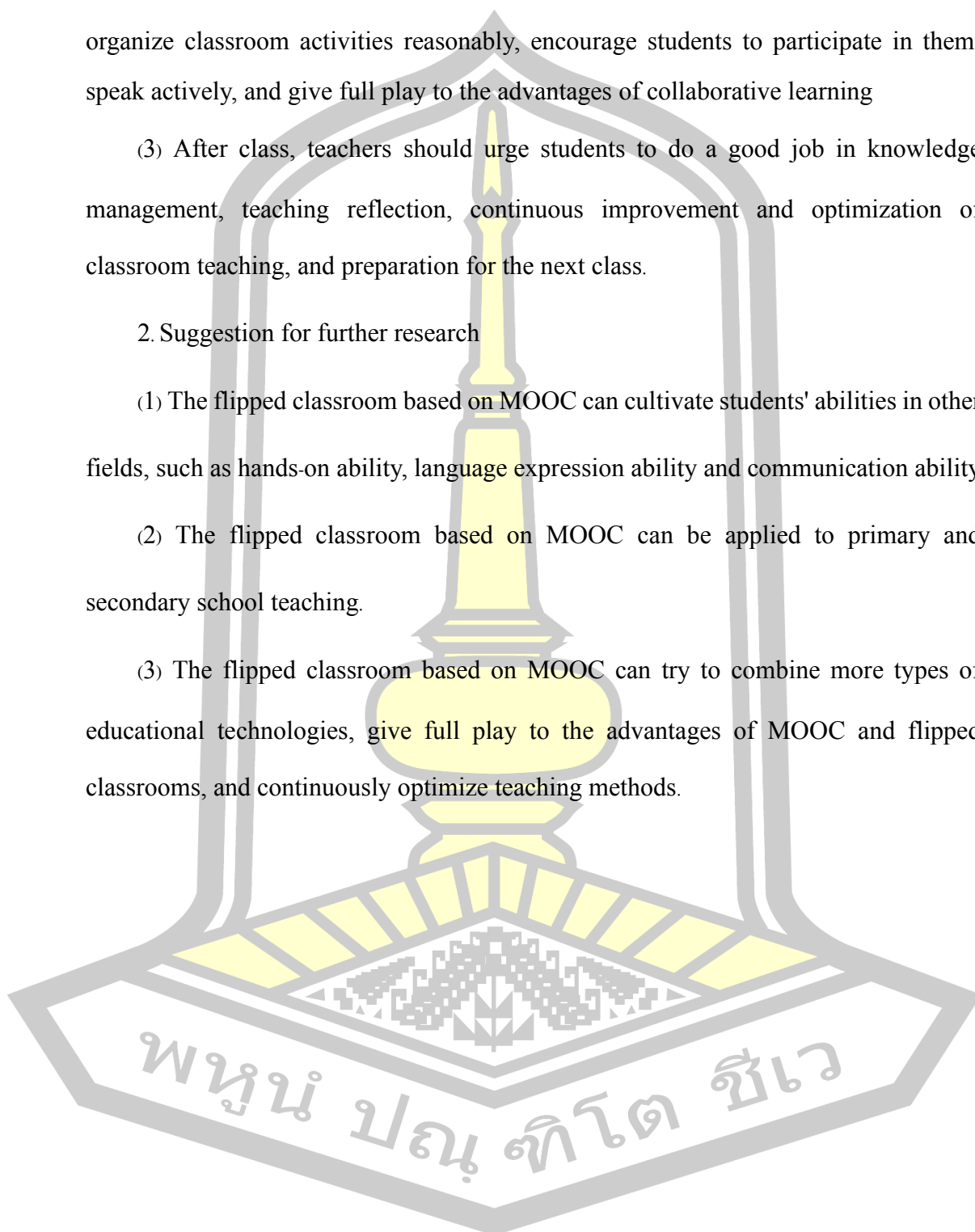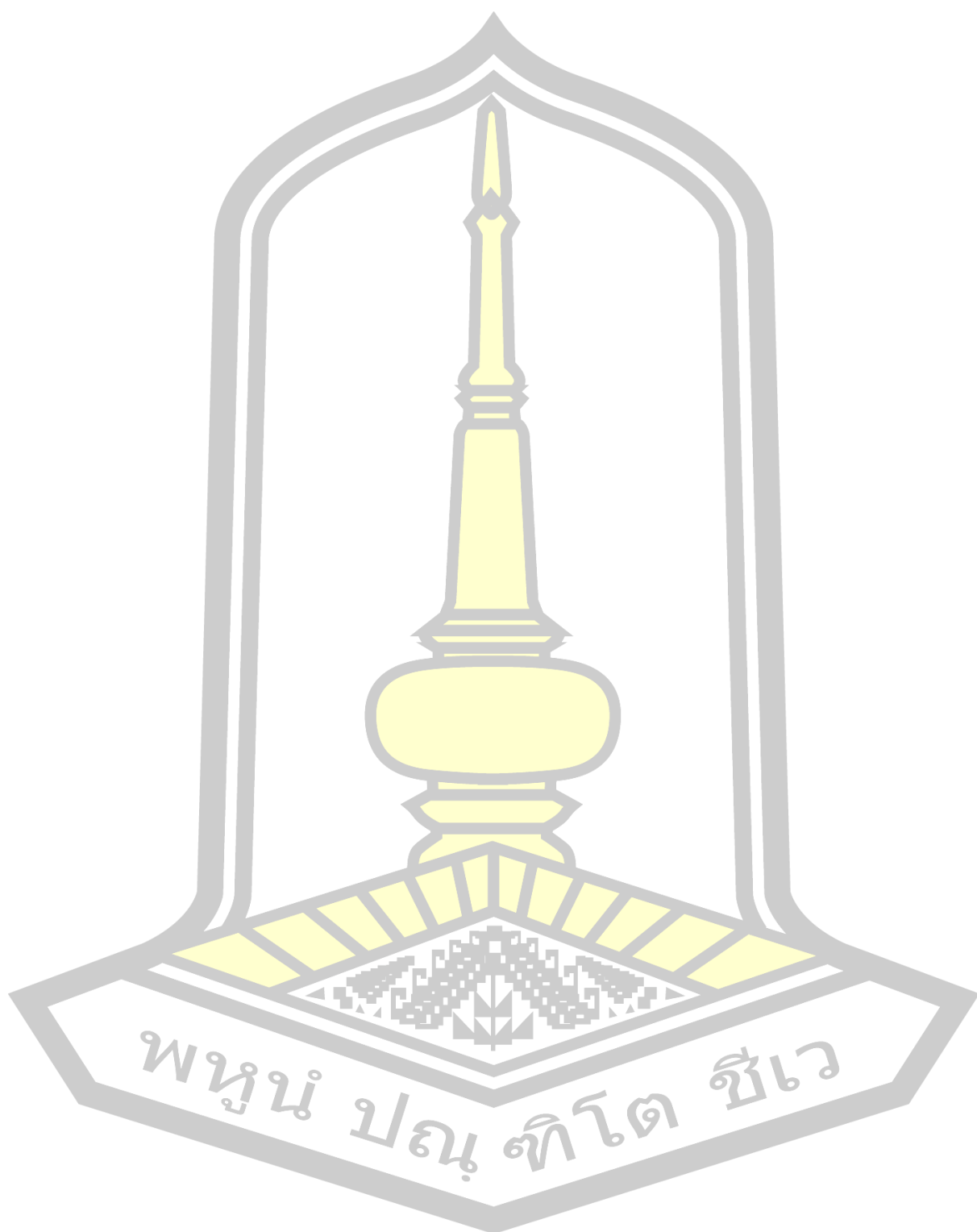
Appendix A

Academic performance test paper

I. Single choice questions (this major question has 20 sub-questions, each with 2 point, 40 points in total)

1 Among the following 4 functions, the one that does not belong to the function of Word is ().

A: compile

B: typesetting

C: edit

D: print

2. The default document extension of Word is ().

A : dosx

B : docx

C : word

D :txt

3. If multiple documents are currently open, click the "Close" button of the current document window, then ().

A: Close the Word window

B: Close the current document

C: close all documents

D: Close the non-current document

4. In Word, the reason why the document cannot be printed cannot be ().

A: No printer connected

B: No printer is set

C: Not checked by print preview

D: No print driver installed

5. In the print settings, select the "Current Page" in the "Print Current Page" item ().

A: The page where the cursor is located in the document

B: The page displayed in the current window

C: last opened page

D: the earliest page opened

6. When printing a document, setting the page number range as "2-5, 9, 11" means that it will be printed ().

A: Page 2, Page 5, Page 9, Page 11

B: Page 2 to 5, Page 9 to 11

C: Page 2 to 5, Page 9, Page 11

D: Page 2, Page 5, Page 9 to Page 11

7. The default English font of Word is ().

A :Calibri

B : Arial Unicode MS

C :Batang

D : Batang Che

8. The keyboard input technology puts forward correct fingering requirements for the input user, that is, the 8 fingers except the thumb should be placed on the positions of the reference keys, and the 8 reference keys are ().

A :SDFG HJKL

B : QWER UIOP

C :ASDF JKLM

D :ASDF JKL;

9. In Word, the first step in copying or moving must be ().

A: Click the "Paste" button

B: Place the insertion point at the target to be operated

C: Click the "Cut" or "Copy" button

D: Select the object to be operated

10. Select the "Paragraph" command, which of the following operations can be performed ().

A: Change the width of the page

B: Change the width of the page break

C: Change the width of the paragraph

D: change the width of the separator

11. The function of item number is ().

A: Number each title

B: Number each natural segment

C: number each line

D: All of the above are correct

12. Regarding the style, which of the following statements is correct ().

A: A style is a series of layout formats defined by the user

B: A paragraph style is simply a collection of paragraph formatting commands

C: Before using the style, you should select the paragraph or character to apply the style in advance

D: The character style works on all characters in the document

13. In the Word form, the information filled in the cell ().

A: only text

B: can only be text or symbols

C: can only be an image

D: Text, symbols, and images are all acceptable

14. The largest table that can be created by using the method of quickly creating a table is ().

A: 8 columns and 10 rows

B: 10 columns and 8 rows

C: 11 columns and 9 rows

D: 10 rows and 9 columns

15. In the table of Word, after merging two cells, the contents of the original two cells ().

A: Merge into one paragraph, but save the original format of each

B: Merge into one paragraph, the format is based on the first cell

C: Divided into two paragraphs, but each preserves the original format

D: Divided into two paragraphs, the format is based on the first cell

16. The statistical function that can be used to calculate the total value of a column in a Word table is ().

A : SUM

B : ABS

C : AVERAGE

D : COUNT

17. Which of the following is not a main layout type in SmartArt graphics ().

A: Ray diagram

B: cycle diagram

C: matrix diagram

D: Hierarchy diagram

18. The WordArt object is actually ().

A: graphic object

B: text object

C: link object

D: Both a text object and a graphic object

19. To access the hyperlink inserted in Word, you need to cooperate with the () key.

A : CTRL

B :SHIFT

C : ENTER

D :ALT

20. The default format for inserting pictures in Word is $_0$.

A: Embedded type

B: compact

C: float above the text

D: Around type

II. Word questions (this major question has 1 sub-question, 60 points in total)

-- -----------------

Please perform the following operations in the opened WORD document. When you're done, save the document,

And close WORD.

-- -----------------

Complete the following operations with reference to the sample sheet.

1. Set the page as: A4 paper, the top and bottom margins are 3 cm, the left and right margins are 2.5 cm, 39 lines per page, 40 characters per line;

2. Set the first line of all paragraphs in the text to be indented by 2 characters, with 1.5 times the line spacing;

3. Referring to the sample sheet, insert a vertical text box "Sunshine City Lhasa" at an appropriate position, set its font format to Chinese Xinwei, small size, red, and set the text box wrapping method to four-sided, and fill it with light blue;

4. In the text, set the sentence "The most prosperous city in Lhasa is Bajiao Street." in bold, blue, and double strikethrough;

5. Set the page border to the artistic border shown in the proof;

6. Add a footer to the article: the footer of the odd-numbered pages is "Lhasa", the footer of the even-numbered pages is "Sunshine City", and the alignment is centered;

7. Referring to the sample sheet, insert the picture "Sunshine City Lhasa.jpg" in the test question folder in a surrounding manner at an appropriate position in the text, and set the height and width of the picture to scale to 200%.
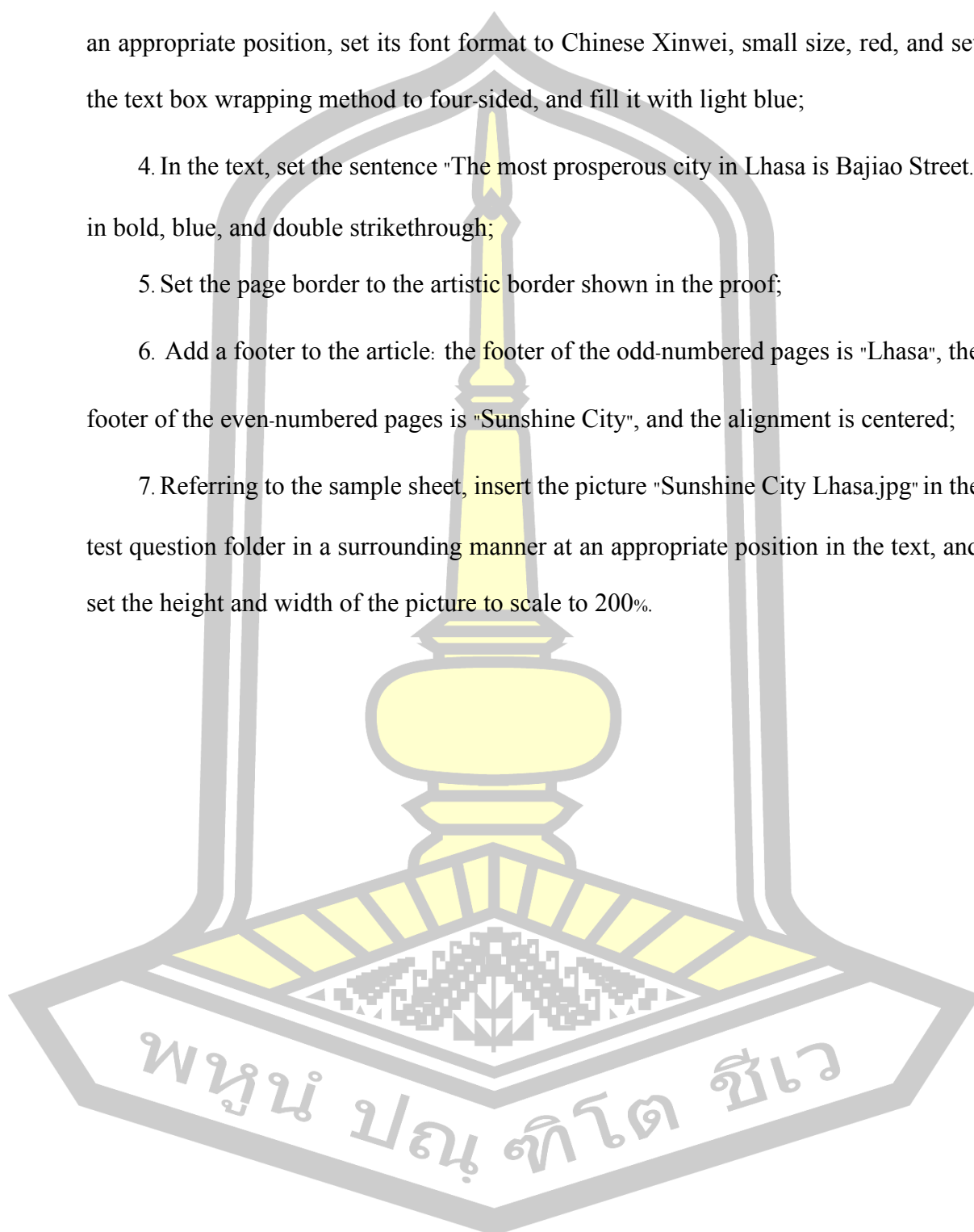
Appendix B

Academic Performance test paper Evaluation Form

Teaching design content	Expert 1	Expert 2	Expert 3	total	IOC
multiple choice questions					0.90
1. Among the following 4 functions, the one that does not belong to the function of Word is ().	1	0	1	2	0.67
2. The default document extension of Word is ().	1	1	1	3	1.00
3. If multiple documents are currently open, click the "Close" button of the current document window, then ()	1	1	1	3	1.00
4. In Word, the reason why the document cannot be printed cannot be ().	1	1	1	3	1.00
5. In the print settings, select the "Current Page" in the "Print Current Page" item ().	1	0	1	2	0.67
6. When printing a document, setting the page number range as "2-5, 9, 11" means that it will be	1	1	1	3	1.00

Teaching design content	Expert 1	Expert 2	Expert 3	total	IOC
printed ().					
7. The default English font of Word is ().	1	1	1	3	1.00
8. In Word, the first step in copying or moving must be ().	1	1	1	3	1.00
9. The keyboard input technology puts forward correct fingering requirements for the input user, that is, the 8 fingers except the thumb should be placed on the positions of the reference keys, and the 8 reference keys are ().	1	1	0	2	0.67
10. Select the "Paragraph" command, which of the following operations can be performed ().	1	1	0	2	0.67
11. The function of item number is ().	1	1	1	3	1.00
12. Regarding the style, which of the following statements is correct ().	1	1	1	3	1.00
13. In the Word form, the information filled in the cell ().	1	1	1	3	1.00

Teaching design content	Expert 1	Expert 2	Expert 3	total	IOC
14. The largest table that can be created by using the method of quickly creating a table is ().	1	1	1	3	1.00
15. In the table of Word, after merging two cells, the contents of the original two cells ().	1	0	1	2	0.67
16. The statistical function that can be used to calculate the total value of a column in a Word table is ().	1	1	1	3	1.00
17. Which of the following is not a main layout type in SmartArt graphics ().	1	1	1	3	1.00
18. The WordArt object is actually ()	1	1	1	3	1.00
19. To access the hyperlink inserted in Word, you need to cooperate with the () key.	1	1	1	3	1.00
20. The default format for inserting pictures in Word is ().	1	0	1	2	0.67
word topic	1	1	1	3	1.00

Appendix C

Teaching design of traditional teaching model

⑴ Teaching purpose:

Master the process of word processing and the basic knowledge of word processing software, and learn to use MS Word 2010 for text processing, text typesetting, editing tables and printing.

⑵ Important and difficult points in teaching:

①Some basic operations of Word 2010 on documents; Operation of document typesetting;

② styles and templates;

③Some basic operations of the form;

④ Some basic processing operations of graphics.

⑤ Graphic and text mixed layout technology

⑶ Teaching methods and means:

The teacher lectures and the students practice on the computer.

⑷ Teaching hours:

3 class hours per week, 12 class hours in 4 weeks, 40 minutes per class, 480 minutes in total.

⑸ Teaching content and time arrangement

module	teaching content	Key points of teaching content	Study style and duration
	review	Review what you learned in the last lesson	2 minutes
office-wor	Word basic	1⟩ Text entry	The teacher imparts

d	operation	2）Text formatting 3）paragraph formatting	knowledge and explains for 10 minutes, and the students practice for 5 minutes; the two times are 15 minutes in total, and the time is used alternately
	Word layout operation	1）Find and replace 2）Borders and shading 3）headers and footers	The teacher imparts knowledge and explains for 14 minutes, and the students practice for 9 minutes; the two times are 25 minutes in total, and the time is used alternately
	Form making and editing	1）Generate form 2）Adjust the table 3）Edit form 4）Form formatting	The teacher imparts knowledge and explains for 25 minutes, and the students practice for 15 minutes; the two times are 40 minutes in total, and the time is used alternately
	table calculation	1）Insert formula 2）Using functions	The teacher imparts knowledge and explains for 12 minutes, and the students practice for 8 minutes; the two times are 20 minutes in total, and the time is used alternately
	Knowledge sorting and summarization		It is estimated that the remaining 10 minutes will be used to sort out and summarize the knowledge points of this class, and arrange homework

			after class
	review	Review what you learned in the last lesson	2 minutes
	Insert objects into the document	1) Insert graphics 2) Insert picture 3) Insert WordArt 4) Insert text box 5) Insert SmartArt	The teacher imparts knowledge and explains for 25 minutes, and the students practice for 15 minutes; the two times are 40 minutes in total, and the time is used alternately
	long document editing	1) Document application theme effect 2) Separators and page breaks 3) Generate directory 4) Generate index 5) Revision and comment	The teacher imparts knowledge and explains for 35 minutes, and the students practice for 25 minutes; the two times are 60 minutes in total, and the time is used alternately
	Knowledge sorting and summarization		It is estimated that the remaining 10 minutes will be used to sort out and summarize the knowledge points of this class, and arrange homework after class

Appendix D

Teaching design of Flipped Classroom teaching based on MOOC for

The content of this lesson takes the office-word module as an example.

⑴ Teaching purpose:

Master the process of word processing and the basic knowledge of word processing software, and learn to use MS Word 2010 for text processing, text typesetting, editing tables and printing.

⑵ Important and difficult points in teaching:

①Some basic operations of Word 2010 on documents; Operation of document typesetting;

② styles and templates;

③ Some basic operations of the form;

④ Some basic processing operations of graphics.

⑤ Graphic and text mixed layout technology.

⑶ Teaching methods and means:

Students learn independently through the MOOC platform before class, and intensive lectures and interactive discussions between teachers and students in class.

⑷ Teaching hours:

3 class hours per week, 6 class hours in two weeks, 40 minutes per class, 240 minutes in total.

⑸ Teaching content and schedule:

It is divided into three stages: before class, during class, after class, as follows:

① Design of pre-class teaching activities

Pre-class teacher activities mainly include the following four aspects:

serial number	teacher activity	Details
1	Clarify key points	List the important and difficult points in teaching according to the syllabus, and prepare for resource preparation and in-class discussion
2	resource preparation	Secondary processing of MOOC resources, text materials, courseware materials.
3	Assign a task	Grouping: Divide a class of 30 into 5 groups to prepare for in-class group collaborative learning
		Learning: students are required to complete the independent learning of MOOC resources in combination with the courseware provided by the teacher, and complete the self-learning test questions to record learning difficulties: students are required to record the problems encountered in the learning process
4	organize discussion	During independent learning, students are organized to discuss learning issues on the platform, and teachers give replies irregularly. Discover students' learning difficulties from discussions, and prepare for discussions

		and explanations in class

Pre-class student activities include three contents

serial number	Student Activities	details
1	Complete the two tasks assigned by the teacher	Grouping: in charge of the study committee
		Learning: Choose the type of learning resources to learn according to their respective situations, and record the problems encountered in the learning process
2	complete detection	Complete self-directed study test questions:
3	join or start a discussion	Discuss the problems in the learning process in the forum or QQ group, and other students actively answer

② In-class teaching activity design

In the class, teachers and students complete the 8 steps of teaching together for teaching

serial number	teacher student activities	details	Estimated time allocation
1	review	The teacher leads the students to	2 minutes

		recall the previous class knowledge	
2	study	The knowledge points of self-study before class, the purpose is to further test that students have completed self-study. Difficulties encountered in the learning process, the purpose is to quickly supplement and determine the issues to be discussed next.	8 minutes
3	raise question	The teacher summarizes the problems encountered by the students in the pre-class study and raises them in the classroom	2 minutes
4	research study	Students take the questions given by the teacher and explore one by one	5 minutes
5	collaborative learning	Collaborative learning will be carried out on problems that cannot be solved by inquiry learning. Divide the class into groups, and the members of the groups play different roles, namely spokesperson, recorder, reviewer, and timer. The speaker represents the entire group to explain the method and process of problem	8 minutes

		solving. The recorder of this group records the speech content of the speaker of this group, and the timekeeper records the time, and the commentators of other groups make comments. There is both division of labor and cooperation among the team members.	
6	draw conclusions and share	Through collaborative learning, each group explains the problems they are responsible for to other students, mainly sharing the application of the knowledge points and principles learned before class, in the form of explaining examples	40
7	teacher supplement	Explain and supplement the questions and knowledge points that students cannot answer	15
8	Reviews and Feedback	Inter-student assessments: conduct group assessments and ask questions Mutual evaluation between teachers and students: Teachers conduct scientific evaluation and feedback to correct misunderstandings	

③ Design of after-school teaching activities

After class, the teacher mainly completes the teaching summary and teaching reflection, and prepares for the next class; the students should manage the knowledge they have learned, complete the chapter test, internalize the knowledge again, form their own knowledge network, and actively prepare for the next class.
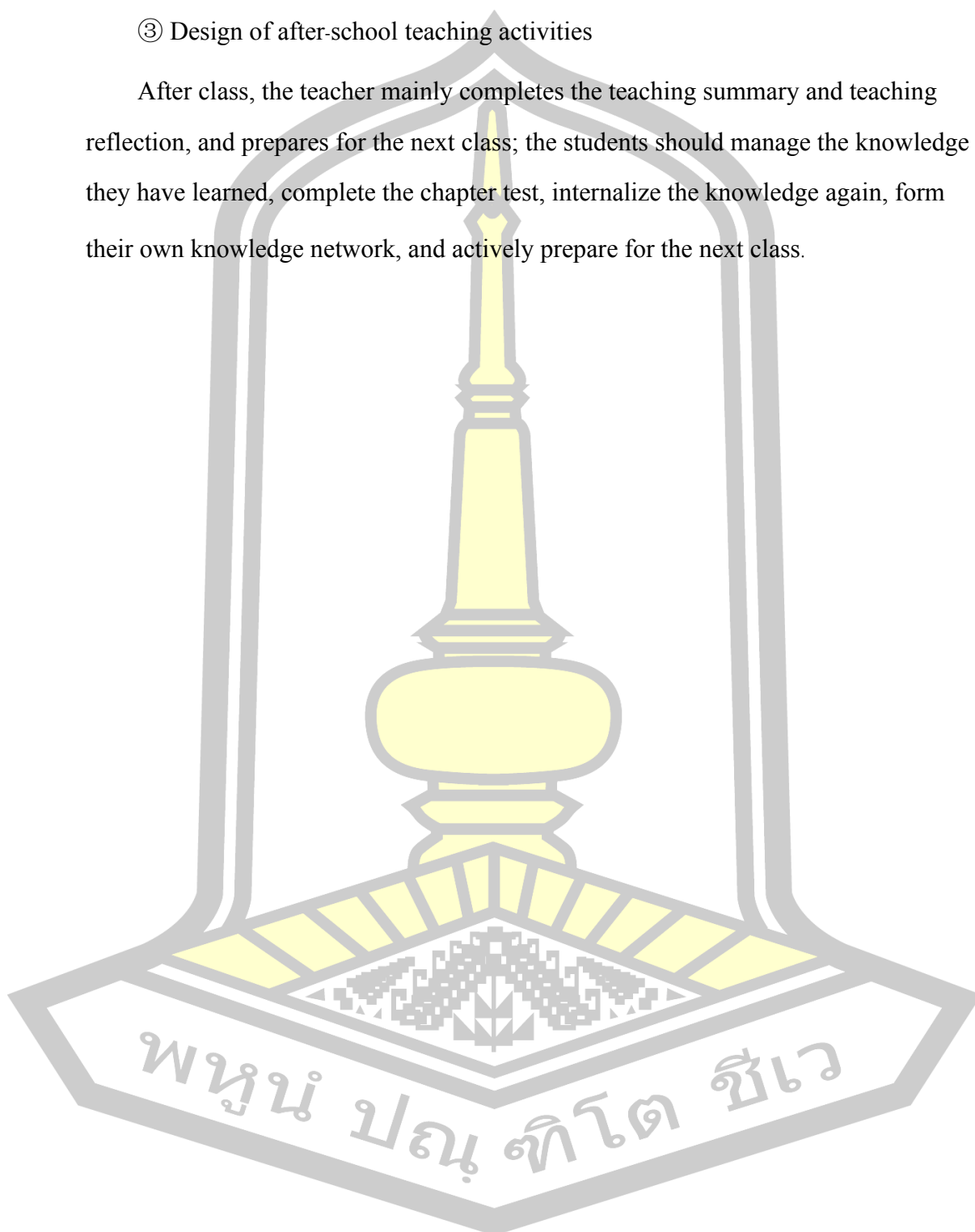
Appendix E

Teaching design of traditional teaching mode Evaluation Form

evaluation items	Expert 1	Expert 2	Expert 3	total	IOC
clear learning objectives	1	1	1	3	1.00
Align learning objectives with content	0	1	1	2	0.67
Learning content is correct	1	1	1	3	1.00
Key points and difficulties are clear	1	1	1	3	1.00
Meet the syllabus requirements	1	1	1	3	1.00
Class schedule is appropriate	1	0	1	2	0.67
Classroom activities are reasonable	1	1	1	3	1.00
Reasonable schedule of classroom activities	1	1	1	3	1.00
Able to encourage students to participate in classroom activities	1	1	1	3	1.00
Reasonable basis for measurement and evaluation	1	1	1	3	1.00
There are reasonable evaluation methods	1	0	1	2	0.67

Appendix F

Teaching design of Blended Learning Model with Flipped Classroom Based on

MOOC Evaluation Form

evaluation items	Expert 1	Expert 2	Expert 3	total	IOC
clear learning objectives	1	1	1	3	1.00
Align learning objectives with content	0	1	1	2	0.67
Learning content is correct	1	1	1	3	1.00
Key points and difficulties are clear	1	1	1	3	1.00
Meet the syllabus requirements	1	1	1	3	1.00
Class schedule is appropriate	1	0	1	2	0.67
Classroom activities are reasonable	1	1	1	3	1.00
Reasonable schedule of classroom activities	1	1	1	3	1.00
Able to encourage students to participate in classroom activities	1	1	1	3	1.00
Pre-class teaching videos and materials meet the teaching indicators	1	1	1	3	1.00
Pre-class teaching videos and materials are suitable for students to learn	1	1	1	3	1.00
Pre-class teaching videos and	1	1	1	3	1.00

materials can arouse students' interest in learning					
Reasonable basis for measurement and evaluation	1	1	1	3	1.00
Students can learn knowledge through independent learning before class	1	1	1	3	1.00
There are reasonable evaluation methods	1	0	1	2	0.67
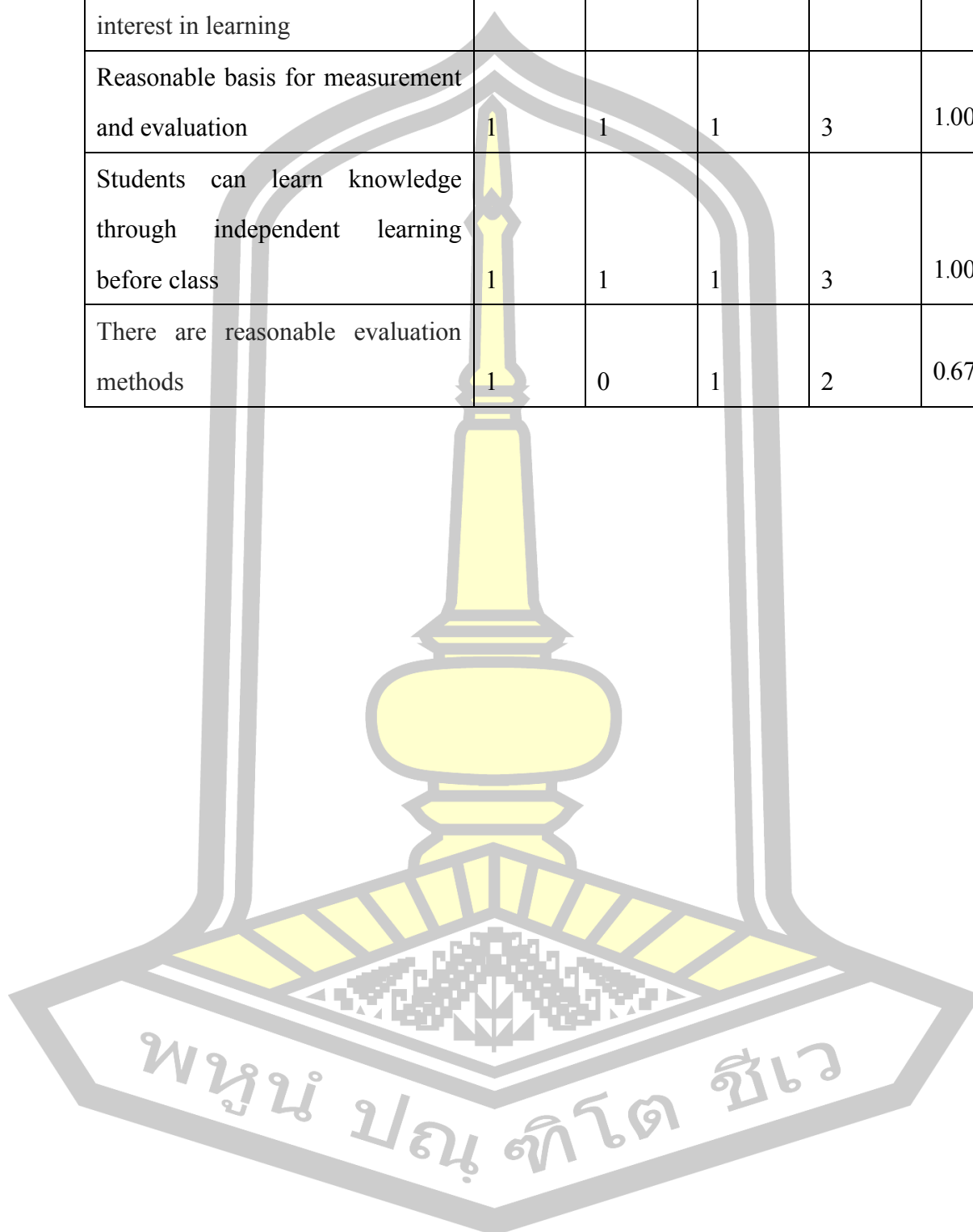
Appendix G

Student Learning Attitude Questionnaire

Dear students:

In order to understand the students' attitudes towards classroom teaching and promote the pilot and promotion of classroom teaching reform in our school, an anonymous questionnaire survey is now being conducted. We will keep any of your answers strictly confidential and will not disclose them to others, so you can answer with confidence. Please proceed from the attitude of yourself and the majority of students, and fill out this questionnaire carefully and in detail. Thank you for your cooperation!

Very much agree= 5 points

Agree=4 points

Uncertain=3 points

Disagree=2 points

Strongly disagree=1 points

Evaluation items	view				
	Very much agree	Agree	Uncertain	Disagree	Strongly disagree
1. Learning computer courses is applicable and can solve problems in daily life					
2. Able to learn independently through online teaching					
3. I take the initiative to learn the					

knowledge of the "Computer Application" course					
4. I think the course "Basics of Computer Application" is very important to me.					
5. Firmly believe that you can realize your wish through your own hard work					
6. I will come to the classroom on time even if the teacher does not call the roll					
7. I think the current classroom discipline and learning atmosphere of the "Basics of Computer Application" course is very good.					
8. If I encounter some knowledge that I don't understand, I will seek help from my teachers and classmates.					
9. When encountering a problem, I can think positively based on the knowledge I already have in my head					
10. When solving problems, I will actively raise my doubts					
11. Through study, I know more about computers.					

12. I am willing to do the hands-on tasks assigned by the teacher in the classroom.					
13. I can actively contact relevant computer knowledge according to my life situation					
14. I feel happy while studying.					
15. I can establish good classroom interaction with teachers and classmates					
16. I can apply the knowledge of this course well to the study of other subjects.					
17. I like the way the teacher is teaching now					
18. Satisfied with my academic performance					
19. I am satisfied with the learning activities of the "Basics of Computer Application" course organized by the teacher.					
20. Hope to try more teaching modes					

Appendix H

Student Learning Attitude Questionnaire Evaluation Form

evaluation items	Expert 1	Expert 2	Expert3	total	IOC
1. Learning computer courses is applicable and can solve problems in daily life	1	1	1	3	1.00
2. Able to learn independently through online teaching	1	1	0	2	0.67
3. I take the initiative to learn the knowledge of the "Computer Application" course	1	1	1	3	1.00
4. I think the course "Basics of Computer Application" is very important to me.	1	1	1	3	1.00
5. Firmly believe that you can realize your wish through your own hard work	1	0	1	2	0.67
6. I will come to the classroom on time even if the teacher does not call the roll	1	1	1	3	1.00
7. I think the current classroom discipline and learning atmosphere of the "Basics of Computer Application" course is very good.	0	1	1	2	0.67
8. If I encounter some knowledge that	1	1	1	3	1.00

I don't understand, I will seek help from my teachers and classmates.					
9. When encountering a problem, I can think positively based on the knowledge I already have in my head	1	1	1	3	1.00
10. When solving problems, I will actively raise my doubts	1	1	1	3	1.00
11. Through study, I know more about computers.	1	1	1	3	1.00
12. I am willing to do the hands-on tasks assigned by the teacher in the classroom.	1	1	1	3	1.00
13. I can actively contact relevant computer knowledge according to my life situation	1	1	1	3	1.00
14. I feel happy while studying.	1	1	0	2	0.67
15. I can establish good classroom interaction with teachers and classmates	1	1	1	3	1.00
16. I can apply the knowledge of this course well to the study of other subjects.	1	1	1	3	1.00
17. I like the way the teacher is teaching now	1	1	1	3	1.00
18. Satisfied with my academic performance	1	1	1	3	1.00

19. I am satisfied with the learning activities of the "Basics of Computer Application" course organized by the teacher.	1	1	0	2	0.67
20. Hope to try more teaching modes	1	1	1	3	1.00
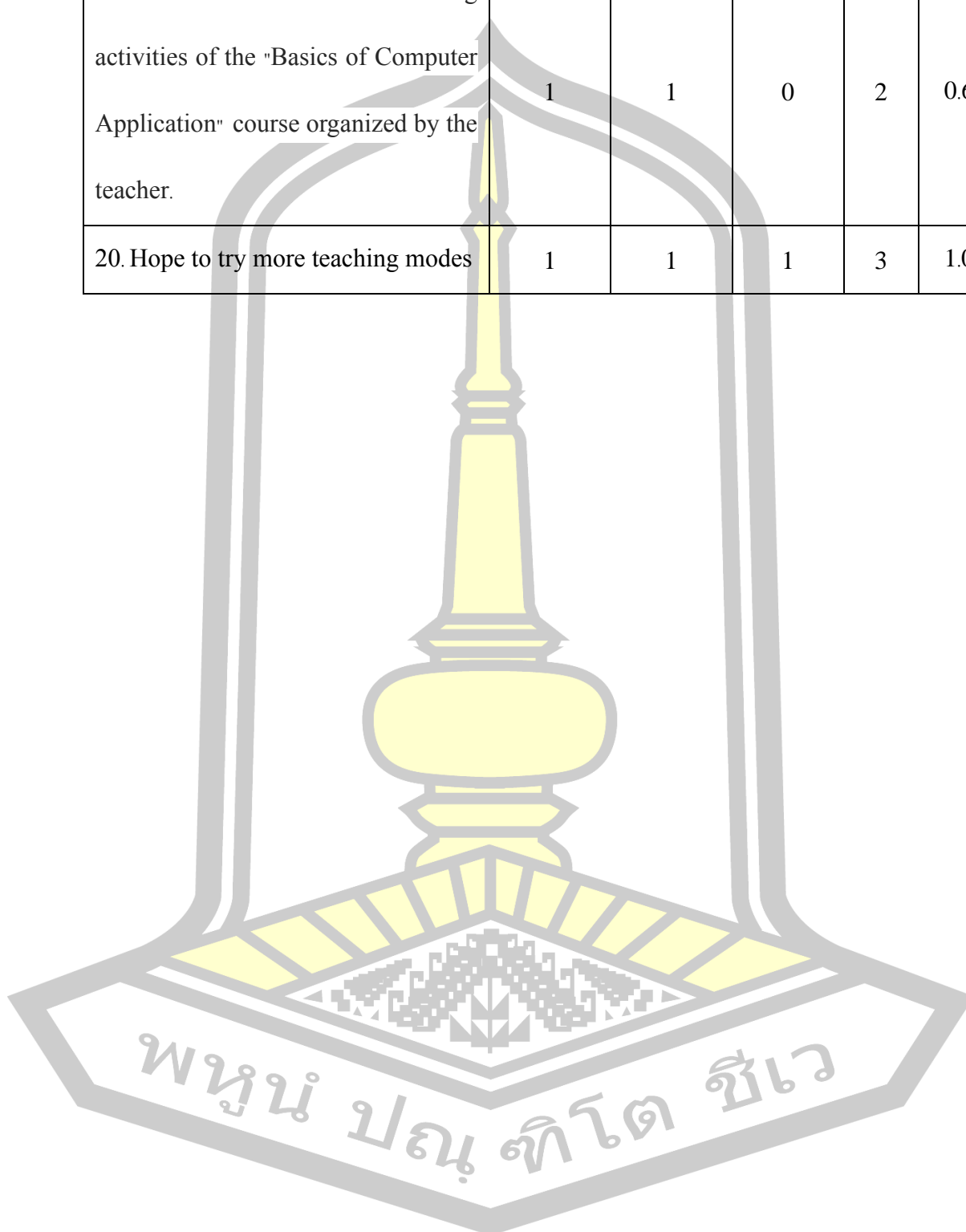
Appendix I

Experimental group pre-test academic performance

number	Name	student ID	Pre-test scores
1	B01	221031060201	61.5
2	B02	221031060202	60.6
3	B03	221031060203	60.2
4	B04	221031060204	49.9
5	B05	221031060205	58.4
6	B06	221031060206	51.8
7	B07	221031060207	51.9
8	B08	221031060208	54.7
9	B09	221031060209	53.8
10	B10	221031060210	66.3
11	B11	221031060211	58.2
12	B12	221031060212	51.4
13	B13	221031060213	63.4
14	B14	221031060214	54.1
15	B15	221031060215	61.4
16	B16	221031060216	62
17	B17	221031060217	57.3
18	B18	221031060218	54.4
19	B19	221031060219	48.7
20	B20	221031060220	43.4
21	B21	221031060221	52.8
22	B22	221031060222	52.7
23	B23	221031060223	59.6
24	B24	221031060224	66.8
25	B25	221031060225	62.8
26	B26	221031060226	62.5
27	B27	221031060227	54.5
28	B28	221031060228	59.7
29	B29	221031060229	52.4
30	B30	221031060230	61.2

Appendix J

Experimental group post-test academic performance

number	Name	student ID	Post-test scores
1	B01	221031060201	90.1
2	B02	221031060202	79.4
3	B03	221031060203	90.5
4	B04	221031060204	94.2
5	B05	221031060205	87.7
6	B06	221031060206	83.3
7	B07	221031060207	85.3
8	B08	221031060208	97.1
9	B09	221031060209	76.2
10	B10	221031060210	93.2
11	B11	221031060211	85.5
12	B12	221031060212	85.3
13	B13	221031060213	95.2
14	B14	221031060214	95.8
15	B15	221031060215	90.8
16	B16	221031060216	91.2
17	B17	221031060217	81.8
18	B18	221031060218	87.8
19	B19	221031060219	81.6
20	B20	221031060220	90.8
21	B21	221031060221	89.1
22	B22	221031060222	87.4
23	B23	221031060223	97.7
24	B24	221031060224	82.6
25	B25	221031060225	77.2
26	B26	221031060226	92.7
27	B27	221031060227	83.2
28	B28	221031060228	89.2
29	B29	221031060229	88.6
30	B30	221031060230	88.4

Appendix K

Control group pre-test academic performance

number	Name	student ID	Pre-test scores
1	A01	221031060101	58.2
2	A02	221031060102	67.3
3	A03	221031060103	45.9
4	A04	221031060104	49.5
5	A05	221031060105	60.6
6	A06	221031060106	51.8
7	A07	221031060107	67.2
8	A08	221031060108	49.2
9	A09	221031060109	50.7
10	A10	221031060110	53.3
11	A11	221031060111	58.5
12	A12	221031060112	49.1
13	A13	221031060113	61.3
14	A14	221031060114	69.3
15	A15	221031060115	51.3
16	A16	221031060116	54.3
17	A17	221031060117	64.4
18	A18	221031060118	60.4
19	A19	221031060119	52.9
20	A20	221031060120	58.9
21	A21	221031060121	62
22	A22	221031060122	51.1
23	A23	221031060123	50.3
24	A24	221031060124	51.7
25	A25	221031060125	66
26	A26	221031060126	67.3
27	A27	221031060127	52.9
28	A28	221031060128	67.3
29	A29	221031060129	54.7
30	A30	221031060130	56.2

Appendix L

Control group post-test academic performance

number	Name	student ID	Post-test scores
1	A01	221031060101	83.6
2	A02	221031060102	91.1
3	A03	221031060103	68.2
4	A04	221031060104	63.8
5	A05	221031060105	82.3
6	A06	221031060106	74.4
7	A07	221031060107	92.4
8	A08	221031060108	66
9	A09	221031060109	73.4
10	A10	221031060110	79.3
11	A11	221031060111	80.1
12	A12	221031060112	68.4
13	A13	221031060113	76.4
14	A14	221031060114	90.7
15	A15	221031060115	74.6
16	A16	221031060116	67.9
17	A17	221031060117	80.6
18	A18	221031060118	88.3
19	A19	221031060119	74.3
20	A20	221031060120	87.6
21	A21	221031060121	77.4
22	A22	221031060122	92.7
23	A23	221031060123	73.9
24	A24	221031060124	77.2
25	A25	221031060125	77.2
26	A26	221031060126	73.9
27	A27	221031060127	72.5
28	A28	221031060128	84.6
29	A29	221031060129	72.5
30	A30	221031060130	77.8

Appendix M

Experiment group Learning Attitude Collection Form

number	Name	Student ID	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
1	B01	221031060201	5	5	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5
2	B02	221031060202	5	5	5	3	3	4	3	4	5	3	4	4	4	4	3	4	4	4	4	4
3	B03	221031060203	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5
4	B04	221031060204	4	4	5	4	5	5	3	4	5	4	5	5	5	4	4	4	4	4	3	5
5	B05	221031060205	5	5	5	5	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
6	B06	221031060206	3	4	4	3	4	5	5	5	5	4	4	4	5	4	4	4	4	5	5	3
7	B07	221031060207	5	5	5	5	4	5	5	4	5	4	5	5	5	5	4	5	5	5	5	5
8	B08	221031060208	5	5	5	4	4	4	4	4	5	4	4	4	5	2	4	3	5	5	5	5
9	B09	221031060209	4	4	4	4	4	4	4	4	5	4	3	4	4	4	4	4	4	4	4	5
10	B10	221031060210	5	5	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5
11	B11	221031060211	4	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4
12	B12	221031060212	4	5	5	5	5	4	4	4	5	5	3	5	5	4	4	3	5	3	5	4
13	B13	221031060213	4	5	5	4	5	4	5	5	5	5	3	5	5	4	4	4	5	3	4	4
14	B14	221031060214	4	4	4	4	5	4	4	4	4	5	4	5	5	5	4	4	4	5	4	4
15	B15	221031060215	4	4	4	4	5	4	4	4	4	4	3	5	4	4	5	5	5	4	4	4
16	B16	221031060216	4	4	4	4	4	4	4	4	5	3	5	5	5	5	4	3	5	5	5	5
17	B17	221031060217	4	4	4	4	4	4	4	4	4	3	4	5	5	4	4	4	4	4	4	4
18	B18	221031060218	4	5	3	5	4	4	4	5	4	4	5	5	5	5	5	5	5	5	5	5
19	B19	221031060219	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	4
20	B20	221031060220	5	5	5	5	5	5	5	5	5	5	3	4	5	3	3	3	4	4	3	4
21	B21	221031060221	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5

22	B22	221031060222	5	4	4	4	4	4	5	4	5	5	3	4	5	4	4	3	5	4	4	5
23	B23	221031060223	4	5	5	4	5	3	5	5	4	5	5	5	5	3	5	5	5	5	4	5
24	B24	221031060224	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	4	5	5	5	5
25	B25	221031060225	4	4	4	4	4	4	4	4	4	5	3	4	5	3	4	4	4	4	3	4
26	B26	221031060226	4	4	4	4	4	4	4	4	4	4	3	4	4	4	5	4	4	4	4	4
27	B27	221031060227	4	4	5	3	5	4	4	4	5	4	4	4	4	3	3	3	3	4	4	4
28	B28	221031060228	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5
29	B29	221031060229	5	4	5	5	4	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5
30	B30	221031060230	5	4	5	5	4	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5

Appendix N

Control group Learning Attitude Collection Form

number	Name	Student ID	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
1	A01	221031060101	3	4	4	3	5	3	3	4	3	4	3	5	5	4	3	5	3	3	3	5
2	A02	221031060102	5	5	5	5	5	5	2	3	5	5	5	5	5	4	1	4	3	4	4	4
3	A03	221031060103	5	5	5	4	5	3	3	3	5	5	5	5	5	3	3	5	2	3	3	5
4	A04	221031060104	4	4	4	4	4	4	4	3	5	4	3	4	4	4	4	4	1	4	3	5
5	A05	221031060105	5	5	5	5	5	5	3	4	5	5	5	5	5	3	2	5	3	3	3	5
6	A06	221031060106	4	4	4	4	4	4	4	3	4	5	4	4	4	4	4	4	3	3	2	3
7	A07	221031060107	4	5	5	5	5	4	4	2	5	5	3	5	5	3	1	5	3	3	3	5
8	A08	221031060108	4	5	5	4	5	4	3	3	5	5	3	5	5	2	3	3	2	2	3	5
9	A09	221031060109	4	4	4	4	5	4	3	3	4	5	4	5	5	4	4	4	3	4	4	5
10	A10	221031060110	4	4	4	4	5	4	4	4	4	4	3	5	4	3	1	5	4	2	4	5
11	A11	221031060111	5	5	5	5	5	5	4	4	5	5	5	5	5	4	2	4	3	4	4	4
12	A12	221031060112	4	4	4	3	5	4	3	3	4	4	4	5	5	4	4	3	3	3	3	4
13	A13	221031060113	5	5	5	5	5	5	4	3	5	5	3	5	5	4	4	4	4	3	4	4
14	A14	221031060114	4	4	4	4	5	5	2	4	4	5	4	5	5	5	2	4	3	2	4	4
15	A15	221031060115	5	5	5	5	5	5	3	3	4	4	3	5	4	4	2	5	2	4	4	4
16	A16	221031060116	5	5	5	5	5	5	4	4	5	5	5	5	5	3	1	3	3	3	3	5
17	A17	221031060117	3	3	4	3	4	5	3	3	4	4	4	5	5	4	4	4	2	4	4	4
18	A18	221031060118	5	5	5	5	5	5	3	4	5	5	5	5	5	3	1	5	3	2	3	5
19	A19	221031060119	4	5	5	3	4	5	2	3	5	5	5	5	5	3	4	5	2	3	2	4
20	A20	221031060120	5	4	4	5	5	5	3	4	3	4	3	4	5	3	3	3	3	4	3	4
21	A21	221031060121	4	4	5	4	5	5	4	2	5	5	5	5	5	3	3	3	3	3	3	5

22	A22	221031060122	4	4	4	3	5	4	3	3	5	5	3	4	5	4	3	3	3	4	4	5
23	A23	221031060123	5	5	5	5	5	5	2	4	4	5	5	5	5	3	2	5	3	3	4	5
24	A24	221031060124	4	4	4	4	5	5	3	5	5	5	4	4	5	2	2	4	4	3	3	5
25	A25	221031060125	5	5	5	3	5	5	3	3	4	5	3	4	5	3	4	4	4	4	3	4
26	A26	221031060126	4	4	5	4	5	5	2	4	4	4	3	4	4	4	2	4	4	4	4	4
27	A27	221031060127	4	4	4	3	5	4	3	3	5	4	4	4	4	3	3	3	2	4	4	4
28	A28	221031060128	5	5	5	5	5	5	4	3	5	5	5	5	5	3	3	5	4	3	3	5
29	A29	221031060129	5	5	5	5	5	5	4	2	5	5	5	5	5	3	3	5	5	3	2	5
30	A30	221031060130	5	5	5	5	5	5	3	3	5	5	5	5	5	3	2	5	2	4	3	5

Appendix M

Activity of Blended Learning Model with Flipped Classroom Based on MOOC

Group discussion

Group report

Extracurricular independent learning

Appendix N

Learning quality evaluation form

Evaluation items	Evaluation index	Score
learning attitude	1. Respect teachers, be open-minded and eager to learn, listen carefully to lectures, and be full of emotions in class.	
	2. Comply with the teaching management system, have high attendance rate and good classroom order.	
learning process	3. Good self-study ability, able to preview before class and review after class.	
	4. Follow the teacher's ideas, understand the teaching content and take notes carefully.	
	5. The classroom learning atmosphere is active, thinking is active, and students speak enthusiastically.	
	6. Have high learning consciousness and often read relevant reference materials.	
	7. Always communicate with teachers after class, take the initiative to ask questions, and actively participate in tutoring and answering questions.	
learning result	8. Students are very interested in the course and highly motivated to learn.	
	9. Be able to better master the basic knowledge, basic theories and basic skills of this course.	
	10. Learn and apply flexibly. Students can use the knowledge in this course to raise, analyze and solve practical problems.	
total		

There are 10 scoring items, each scoring item is 1-10 points, a total of 100 points.

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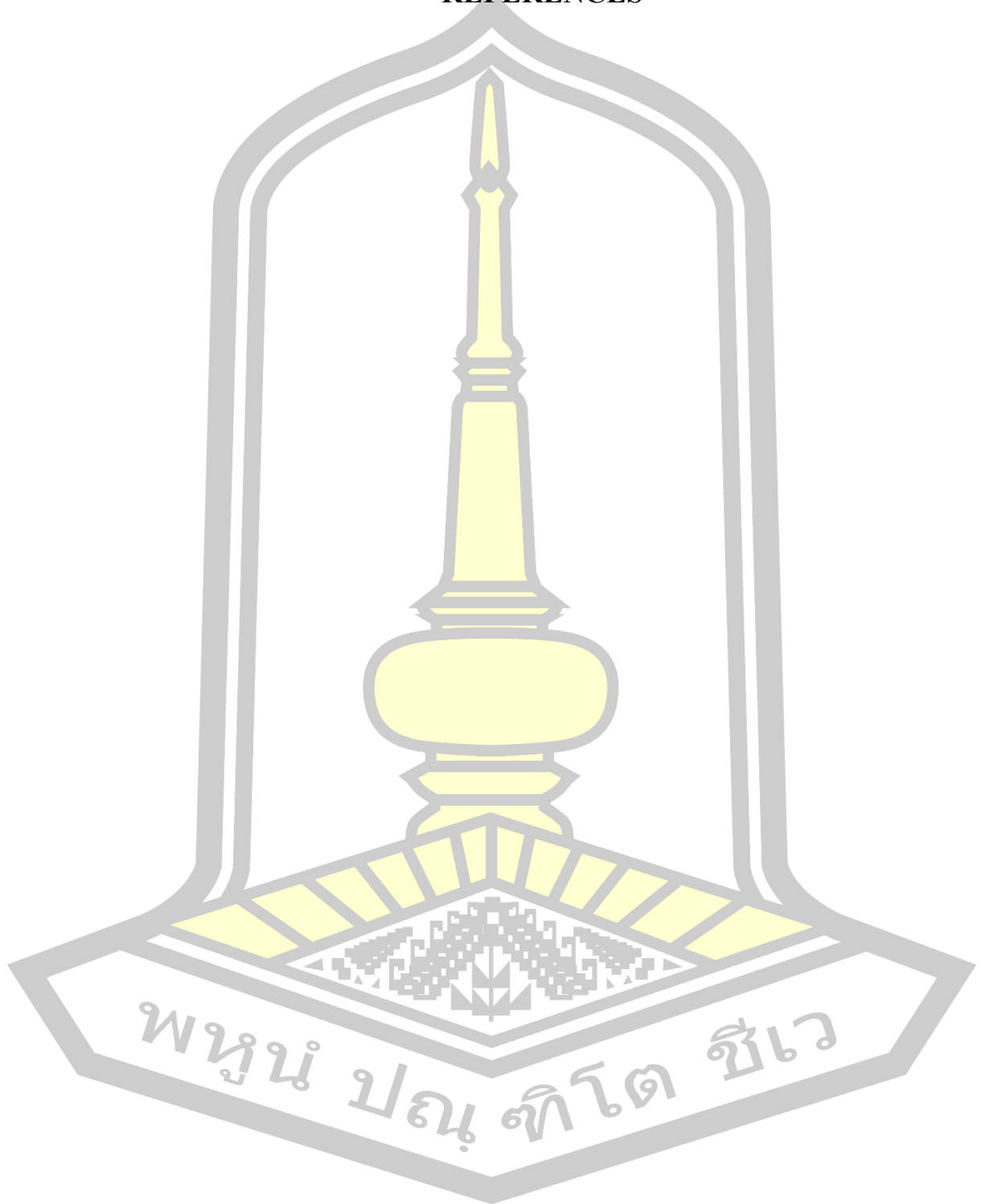
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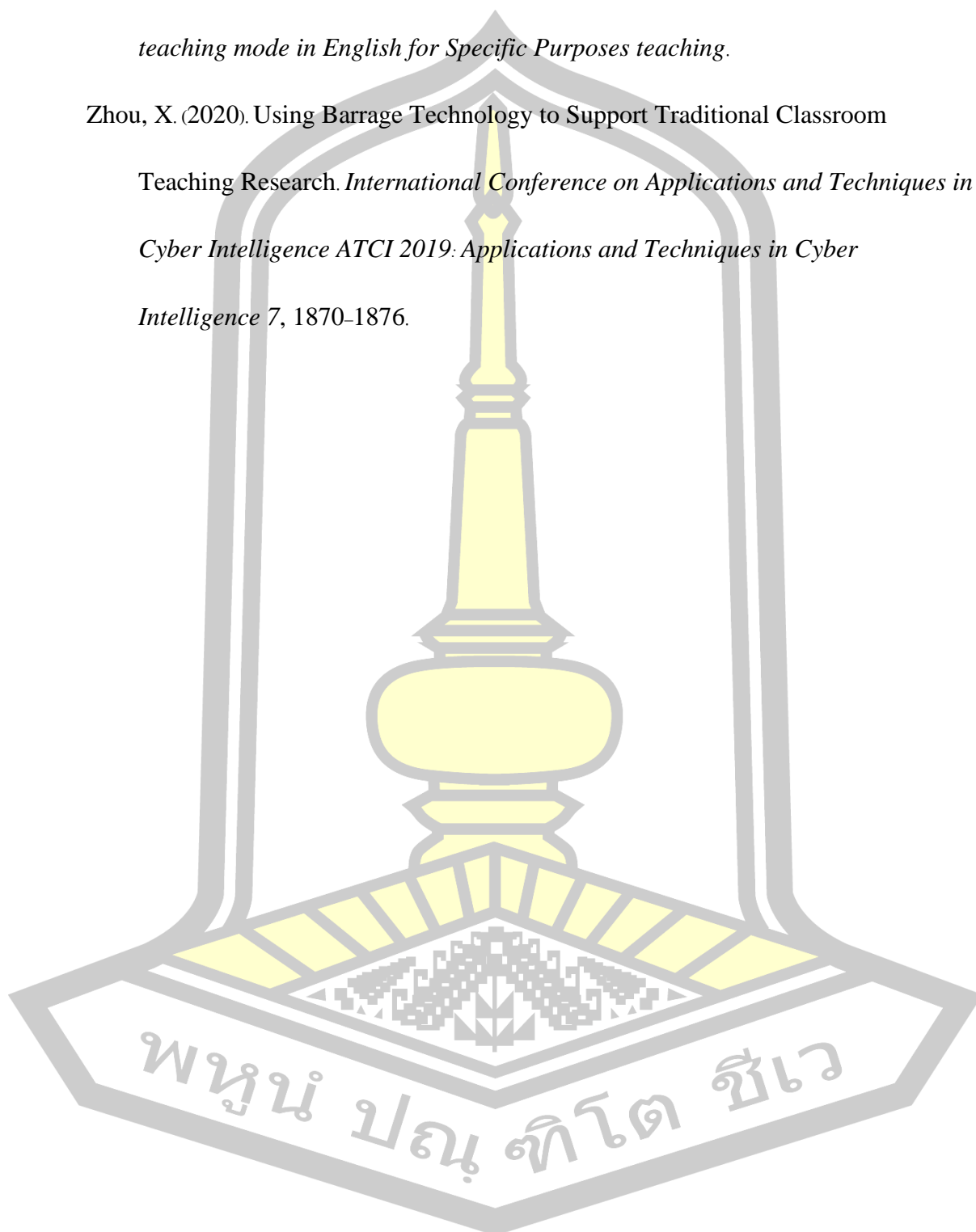
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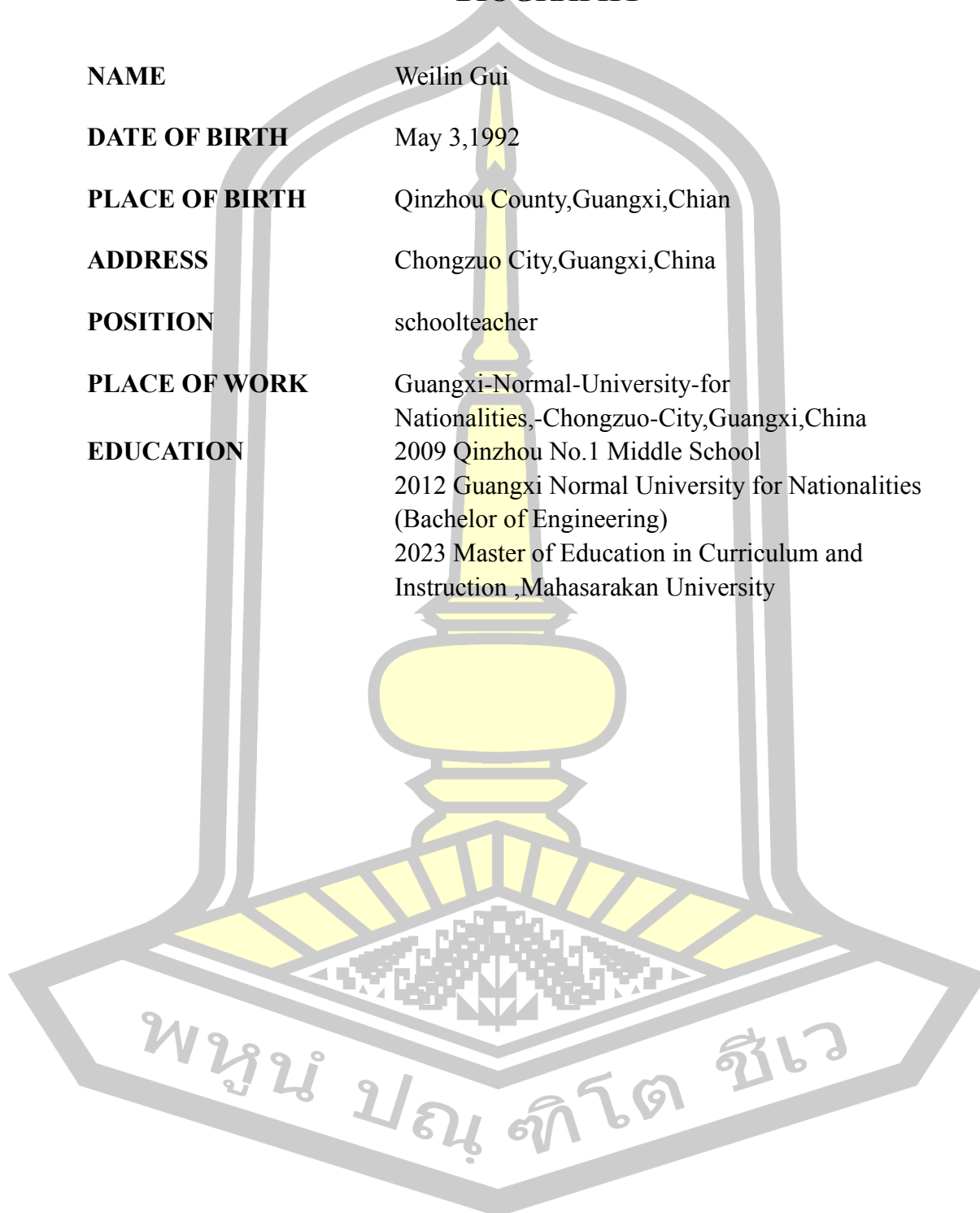
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