DEVELOPMENT OF FLIPPED CLASSROOM TEACHING MODEL TO IMPROVE RESEARCH ABILITY OF UNDERGRADUATE STUDENTS

[1]Qin Jianrong, [2]Areewan Iamsa-ard, [3]Wapee Kong – In And [4] Sarayuth Sethakajorn

Bansomdejchaophaya Rajabhat University, Bangkok, Thailand

[1]qinjianrong.bsru@hotmail.com

Received : February 2, 2023; **Revised** : March 29, 2024; **Accepted** :April 30, 2024

Abstract

The objectives of this research were 1) to examine the factors to improve research ability of undergraduate students, 2) to develop flipped classroom teaching model to improve research ability of undergraduate students and 3) to examine the results of flipped classroom teaching model to improve research ability of undergraduate students. The methodology was divided into 3 phases. A total of 150 students and 5 lecturers of educational research methods course in semester 1 academic year 2023 from Yulin Normal University who' majoring in primary education were obtained as population for eliciting factors affecting research ability. Phase 2 required the target group of 3 experts to confirm of developed instructional model within 4 standards i.e., 1) utility 2) feasibility 3) propriety and 4) accuracy. The final phase was for examining the results of implementing the developed instructional model, the data of which were collecting from 46 students who enrolled in educational research methods course of Yulin Normal University. The research tools were 1) a set of questionnaires for students, and lecturers' interview, 2) a set of questionnaires for flipped classroom teaching model, 3) lesson plans using flipped classroom teaching model, and 4) Scoring rubrics form for research ability of Yulin Normal University undergraduate students. Data were analyzed by frequency, percentage, mean score and standard deviation. Scoring rubrics were employed to assess sample group's research ability.

The results revealed the following 1) The findings from the study highlight two key factors influencing research ability in educational research methods courses: internal and external factors. Internal factors include interest, motivation, and physical health, while external factors encompass teaching methods, time management, and environmental factors. These factors synergistically impact students' research skills., 2) A flipped classroom teaching model was developed and evaluated by specialists, meeting utility, feasibility, propriety, and accuracy standards. The model comprises five components: principle and rationale, objectives, contents, teaching methods and materials, and evaluation. This model aims to enhance vocational undergraduate students' research ability effectively and ,3) The effectiveness of the flipped classroom teaching model in improving undergraduate students' research ability is underscored by the influence of internal and external factors. Teachers play a crucial role in

[1]Student in Curriculum and Instruction Program, Bansomdejchaophaya Rajabhat University, Bangkok, Thailand

[2]Associate Professor, Dr., in Curriculum and Instruction Program, Bansomdejchaophaya Rajabhat University, Bangkok, Thailand

[3]Assistance Professor, Dr., in Curriculum and Instruction Program, Bansomdejchaophaya Rajabhat University, Bangkok, Thailand

[4]Assistance Professor, Dr., in Curriculum and Instruction Program, Bansomdejchaophaya Rajabhat University, Bangkok, Thailand

fostering students' research skills by addressing these factors and emphasizing practical evaluation methods.

Keywords: Flipped Classroom Model, Research Ability; Undergraduate Students

Introduction

The course "Educational Research Methods" is a required course for students majoring in elementary education at Yulin Normal College. The Educational Research Methods course is usually offered in the second year of university or the third year of university, and the course is a 2-credit course with a total of 32 hours. The educational research methods course is one of the main courses to improve the research ability of college students. The objectives of this course are formulated as follows: 1) understanding the general principles of scientific research in education; basic mastery of the general steps of educational research methods and the main scientific research methods, basic knowledge. 2) learn to scientifically pose questions, find, read and analyze literature, design research programs, analyze data in a scientific way to master the scientific research results in the form of expression, writing standard scientific research papers or laboratory reports. 3) to consciously use scientific research methods to carry out research to the best of their ability, have a good ability to reflect on teaching and improve teaching, have a sense of the problem and a sense of research, and be able to skillfully choose the appropriate resources and modern information technology to carry out innovative educational research work. (Yulin Normal University, 2020). The researcher found that most students had the lowest in research ability, could not conduct scientific research. Scientific research ability includes such constituent elements as observation, attention, memory, language expression, comprehension and thinking ability. The research ability of college students was specifically expressed in four items: 1) the ability to analyze the research dynamics and development trend in the scientific field and to determine the research direction and topic. 2) the ability to collect literature and data to process the literature and data. 3) the ability to design the research plan and to carry out the research experiments. 4) the ability to summarize the research results and to write the experimental report and thesis. Research ability can be understood as consisting of four parts. (Wang .1985; Qiu,2019; Zhang,2015; Tai.et al,2002; Jia, 2022;)

So the researcher studied from the text, books and another researches and found that flipped classroom teaching model can improve research ability of undergraduate students for the advantages of flipped classroom, the following experts have done corresponding research, for example: Zhang, et al, (2013) believe that the flipped classroom fully respects the students' subjective position, mobilizes students' autonomy and enthusiasm, greatly improves students' learning efficiency, and promotes students' all-round development. Ye (2014) pointed out that, firstly, firstly, the concept of flipped classroom "learning before teaching and teaching by learning" allows students to learn to learn independently, which really promotes students' development. Secondly, the exploration activities centered on certain problematic situations" improve students' learning engagement. Wen (2015) argues that the flipped classroom "attaches importance to the development and utilization of digital teaching resources, the cultivation and promotion of a culture of independent learning, and the generation and construction of a symbiotic teaching system". Dai (2016) argues that the flipped classroom constructs a learner-centered learning model, reshaping the way in which the learner's knowledge system construction method, which is conducive to the implementation of quality education. Chang (2021) argues that the adoption of the flipped classroom teaching mode in colleges and universities is conducive to the cultivation of innovative and lifelong learning talents, to the independent construction of knowledge by college students, to the cultivation of the spirit of cooperation and innovation, to the enhancement of college students' subjective initiative in learning, and that the flipped classroom promotes the personalized development of students.

As mentioned above, based on the importance of research capacity development of university students, the importance of research capacity of teachers is also self-evident. Advantages of using the flipped classroom teaching model. The author recognizes the importance of studying the flipped classroom teaching model to improve undergraduate research ability. This is a highly significant study.

Objectives

1. To examine the factors to improve research ability of undergraduate students.
2. To develop flipped classroom teaching model to improve research ability of undergraduate students.
3. To examine the results of flipped classroom teaching model to improve research ability of undergraduate students.

Material and Method

Development of Instructional Model

Definition of Instructional Model

There are many academics defined about definition of instructional model as follows: Regarding the meaning of teaching mode, researchers in different countries have different views. The more representative one is the American scholars Joyce & Weil (2004). They state that a model of teaching is a pattern or plan which can be taken up with a view to shape a curriculum or course to select appropriate instructional material and to guide the teacher's action. They put forward the classification system of teaching mode, which divided the teaching modes into four categories: cognitive development-centered teaching mode, social-centered teaching mode, activity-centered teaching mode and personality development-centered teaching mode. Li (1994) refers to definition by a comprehensive report on the third Annual Conference of National Teaching Theory on Instructional Model. (A comprehensive report on the third Annual Conference of National Teaching Theory, as cited in Li, 1994). There are roughly three definitions of teaching mode, the first one is that the mode belongs to the category of methods. Some think that the pattern is the method, and some think that the pattern is the synthesis of many methods. The second one holds that there are both connections and differences between modes and methods. Each method shows different spatial structures and time series under specific time, place and conditions, thus forming different modes. The third one is that the model is closely related to the category of "teaching structure-function". The teaching model is the subjective choice of teaching structure made by people under the guidance of certain teaching ideas.

With the development of teaching mode, the definition of "teaching mode as a plan" has been basically eliminated. Xu (2021) define the teaching mode as: under the guidance of certain teaching theories, to achieve specific teaching objectives, appropriate teaching means and strategies are arranged in each teaching program. The sum of the teaching framework with flexibility and stability and its related teaching evaluation. Through the research of teaching mode, the pressure of preparing lessons for teachers can be reduced, and the purpose of improving the learning effect of students can be achieved. These views reveal the connotation of teaching mode from different aspects and provide useful reference for us to further explore.

From the definition above, it can be concluded that instructional model refers to a teaching structure, which is simply a typical and stable teaching procedure or stage established under the guidance of certain teaching ideas. It is gradually formed by people constantly summarizing and improving teaching in long-term teaching practice. It comes from teaching practice and guides teaching practice in turn. It is an important factor affecting teaching. Tang (2015) defined instructional model as: mathematical mode refers to a relatively stable, systematic and theoretical model of teaching activities formed based on certain teaching ideas

and theories. Instructional model is the concretization of teaching theory with practice and a systematic generalization of teaching experience. It can be formed either directly from the rich teaching practice experience through theoretical generalization, or it can be formed after several experiments by putting forward a hypothesis under the guidance of certain theories.

Components of Instructional Model

Li (1994)) & Qu (2005) have been identified the complete structure of modern classroom teaching model generally includes five factors: theme, objective, condition, procedure and evaluation, which are interdependent and interact with each other to form a complete teaching model.

1) Theme. The thematic factor of the teaching mode refers to the teaching thought or theory on which the teaching mode is based. In the structure of teaching mode, the theme factor is not only an independent factor, but also permeates or contains in other factors, and other factors are established according to the theme factor. For example, the thematic factor contained in the structure of foreign information processing teaching mode is the theory of information processing, and the thematic factor contained in the structure of non-director teaching mode is the humanistic teaching thought.

2) Goals. Any teaching model points to a certain teaching goal and is created to accomplish a certain teaching goal. Objective is the core factor of the structure of teaching mode, and it has a restricting effect on other factors. For example, the goal factor of foreign social exploration teaching mode structure is to cultivate the ability to solve social problems through scientific exploration and logical analysis, while the goal factor of undirected teaching mode structure is to cultivate the ability of self-knowledge, self-realization and self-education.

3) Conditions (or means). The conditional factors refer to the various conditions for achieving certain teaching objectives and making the teaching mode effective. Any teaching mode can only be effective under specific conditions. There are many conditions, including teachers, students, teaching materials, teaching tools, teaching time and space.

4) Procedures. Any teaching mode has a unique set of operating procedures, which specify the logical steps of teaching and the tasks completed in each step. For example, the operation procedure of Herbart's teaching model is divided into four stages or steps: understanding, association, system and method, while the operation procedure of Dewey's pragmatic teaching model structure is divided into five stages or steps: situation, problem, hypothesis, solution and verification.

5) Evaluation. Evaluation is an important factor in teaching mode, which includes evaluation methods, standards and so on. Because different teaching modes accomplish different teaching objectives, procedures and conditions, so the evaluation methods and standards are different. Therefore, a teaching model should generally specify its own evaluation methods and standards. For example, the evaluation factors of Broome's mastery teaching model structure are different from standardized evaluation, and its standards are criterial based.

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

Confirmatory of model

To ensure the appropriateness of developed instructional model before implementation, the developed instructional model is confirmed depending on program evaluation standards in 4 aspects: 1) Utility standards, 2) Feasibility standards, 3) Propriety standards and ,4) Accuracy standards. (Stufflebeam, 2012).

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

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

Propriety standards were intended to ensure that the developed instructional model will be conducted in conformity to teaching principles and provide positive results.
Accuracy standards were intended to ensure that the developed instructional model shows a measure of closeness to a true value.

Flipped Classroom Teaching Model

The traditional teaching mode is that the teacher lectures in the classroom and assigns homework for students to practice at home. However, under the "flipped classroom teaching mode", students are free to complete their knowledge before class without any time and space constraints. The classroom becomes a place for interaction between teachers and students, including answering questions and solving puzzles, applying knowledge, etc. Flipped classroom is more advantageous than traditional classroom in cultivating students' learning autonomy, teamwork, innovation, classroom atmosphere and internalization of knowledge.
Li, Xin. (2015) Flipped classrooms have been around since 2007, have rapidly expanded globally since 2011, and have been recognized by the Globe and Mail as an important technological change affecting classroom teaching and learning.

Zhang, Wang & Zhang (2012) argued that the flipped classroom has revolutionized the traditional teaching mode by reversing the process of knowledge transfer and internalization, changing the roles of teachers and students in traditional teaching, and rearranging the use of classroom time. In the flipped classroom, information technology and activity-based learning build a personalized and collaborative learning environment for learners, which helps to form a new learning culture.

He & Ou & Gao (2014) argued that many students in flipped classrooms sub the value of collaborative learning, students in flipped classrooms are more concerned with the process of learning, and students in flipped classrooms are more willing to participate in classroom activities.

Song & Yu (2014) believe that the flipped classroom teaching mode requires advanced information technology support, which can be student-centered, fully mobilize cooperation among students, and increase teacher-student interactions in the classroom, so that the role of the teacher from the traditional knowledge transmitter, changed into a learning. The role of the teacher is changed from the traditional knowledge transmitter to the facilitator and guide of learning.

Li & Liu (2013) recognized that flipped classroom is a teaching mode that can enhance learning interaction, stimulate learning interest, strengthen students' independent learning, and realize the sharing of teaching resources.

Wang (2013) believes that the flipped classroom model changes the time and space of learning, which can transform classroom teaching into out-of-class or out-of-school and turn classroom pre-study into pre-course project-based exploratory learning. A teaching model that emphasizes student-centeredness, tailoring teaching to students' needs, students are active and independent learners, and guiding students to learn how to learn.

Han (2013) believes that the flipped classroom is a reversed arrangement of knowledge transfer and knowledge internalization, in which the knowledge transfer is placed outside the classroom and completed by students independently, and the knowledge internalization is realized in the classroom. Before class, teachers provide students with some rich teaching resources, including multimedia resources in addition to paper textbooks, and students learn independently with the help of information technology; in the classroom, they use what they have learned to solve problems, communicate and dialogue with teachers, and collaborate with classmates, to cultivate higher order thinking among students.

Huang (2013). Argues that the flipped classroom enhances learning autonomy and strengthens interaction in learning.
Chen & Zhao (2014). Considering Flipped Classroom (FCL) as a new teaching mode, Flipped Classroom teaching mode has different characteristics from traditional teaching mode. First, it reverses the traditional teaching concept. Flipped classroom emphasizes students' collaborative

learning and teachers' targeted guidance in class, so it provides an implementable way for "student-centered", and truly achieves "teaching according to the student's ability"; secondly, it reverses the traditional teaching process. The model puts the learning of new knowledge in the pre-course, and in the class, group collaborative learning and teachers' Q&A are the focus to help students master the knowledge they have learned in the pre-course: at the same time, it reverses the roles of teachers and students. In the flipped classroom, unlike the traditional classroom, students are independent learners who actively internalize knowledge, and the teacher is the guide, resource provider, and organizer of classroom activities, responsible for individualized guidance and Q&A.

Xue, Yun & Zheng, Li. (2016) "Flipped Classroom" (Flipped Classroom) teaching mode originated from two chemistry teachers, Jonathan Berman and Aaron Sams, in the United States in 2007, refers to flipping the traditional teaching mode, i.e., students attend classes in the classroom and complete the homework assigned by the teacher after class. Teachers assign homework after class to flip over the teaching mode, students watch teaching videos or PPT before class, independent learning of new knowledge, and in the classroom discussion and in-depth scientific experiments to complete the internalization of knowledge, the real realization of student-led independent learning mode of teaching.

Chang, (2016) Flipped classroom is a kind of different traditional classroom teaching method, students can watch the video at home to replace the teacher's classroom explanation, and then in the classroom, they focus on completing the exercises and interacting with the teacher and peers. This practice subverts the traditional school teaching arrangement of "teacher teaching in class and students completing homework after class", which has received very good teaching results and has attracted widespread attention at home and abroad. With the in-depth development of the research and practice of the flipped classroom teaching mode, we find that the flipped classroom is not only a change in teaching time and space, but also an innovation of its teaching content, teaching methods and teaching process to adapt to the requirements of deep learning.

From the above, the flipped classroom teaching mode is a new type of teaching mode, which benefits from the development of information technology and the application of information technology in education. The flipped classroom model emphasizes the subjectivity of students' learning, highlights the student-centeredness, focuses on cultivating students' independent learning ability, and focuses on cultivating students' teamwork spirit and innovation spirit. Flipped classroom can improve the interactivity of the classroom, classroom participation, flipped classroom teaching mode in line with the needs of the current era of development.

Theory

1. Constructivism learning theory

Constructivism learning theory is based on the academic research of Its main point of view is that "learners determine what kind of knowledge they are going to acquire by harmonizing the input information from the external world and by actively constructing knowledge. Learning is active mental work, not passive teaching." (Dewey,2002; Piaget,1972; Vygotsky,1978, etc.)

Flipped classroom is in line with the theory of constructivism, in the traditional teaching mode, the teacher instills knowledge to students in the classroom, the teacher is the center of the whole teaching behavior, is the transmitter of knowledge and the dominator of teaching, and the students are the passive receivers of external stimuli. Constructivist theory advocates learner-centered learning under the guidance of the teacher and believes that the acquisition of knowledge is not a simple "stimulus-response" process from the teacher to the student as described by behaviorism, but a process of independent discovery by the student. Students are not passive recipients of information, but actively select, process external information, and with the existing information in the brain connection, and constantly construct, adjust and improve the knowledge system. Therefore, constructivism emphasizes students' subjectivity and initiative in the acquisition process.

2. Bloom's Theory of Mastery Learning

Bloom's mastery learning theory was developed based on Carroll's learning theory. He incorporated five variables from Carroll's learning theory to further model mastery learning theory,

which he corroborated in his own teaching practice. These five variables include: learning time, learning perseverance, quality of instruction, ability to understand instruction, and aptitude. These five variables interact with each other and ultimately affect the effectiveness of students' learning. Based on summarizing the previous studies and based on his own educational theories, Bloom put forward the idea of teaching for mastery, and then put forward the theory of mastery learning. He believed that if students are equipped with various conditions, every student can master the content to be mastered. (zheng,1990; Xu,1992; Song, et al 2000)

3. Self-directed learning theory

Self-directed learning is a series of processes in which learners decide on their own learning behaviors and contents, give autonomy to themselves, set their own learning links, learning goals, control their own learning procedures, and deepen their own learning content, with three characteristics: self-reliance, self-activity and self-discipline. This fully demonstrates that learning is ultimately accomplished by the learners themselves, who can decide their own learning process, learning progress and learning methods, and dominate their own learning. In the flipped classroom, whether it is in the pre-course knowledge transfer link, or in the classroom knowledge skirt link, is the classroom learning rights and autonomy to the students, learning to take what kind of learning methods, using what kind of learning strategy, along what kind of learning path are decided by the students themselves, the learning task is mainly completed by the students themselves, so that the students have the full right to learn, and to become the master of learning, fully embodied the theory of independent learning. Fully embodies the theory of independent learning. (Wang, & Wang ,2023; Fei. 2020)

Material and Method

In the study of " Development of Flipped Classroom Teaching Model to Improving Research Ability of Undergraduate Students". The researcher used mixed method of research. This research is divided into 3 phases.

Phase 1 was conducted to answer research objective 1: To examine the factors to improving research ability of undergraduate students.

Topics	Details
Research Process	Analysis of internal and external factors.
Research Objectives	To examine the factors affecting students' Research ability
Research Method	The questionnaire for students and the interview for the lecturers.
Resources/Target Group	1.Population - 150 students 2. Key Informants - 5 Lecturers
Instruments	1. The questionnaire for students 2. Interview for teachers
Data Analysis	Descriptive Statistics i.e., Frequency, MEAN (μ), Standard Deviation (σ) Content analysis
Results	The result of the factors affecting research ability of undergraduate students

Phase 2 was conducted to answer research objective 2: To develop flipped classroom teaching model to improving research ability of undergraduate students.

Topics	Details
Research Process	1.Design Handout 2.Develop assessment form of flipped classroom teaching model 3.Collect appropriateness of the flipped classroom teaching model
Research Objectives	To develop project-based flipped classroom teaching model to enhance research ability of undergraduate Students at Yulin Normal University
Research Method	Conformity assessment based on the flipped classroom teaching model
Resources/Target Group	3 experts
Instruments	Development of outcomes-based education and creativity-based learning instructional model. in terms of accuracy standard, propriety standard, feasibility standard, and utility standard.
Data Analysis	Descriptive analysis i.e. frequency and percentage.
Results	The result of the flipped classroom teaching model's acceptable

Phase 3 was conducted to answer research objective 3: To examine the results of flipped classroom teaching model to improving research ability of undergraduate students.

Topics	Details
Research Process	Design the Lesson plan, design the grading rules. The implementation of instructional model.
Research Objectives	To study the results of flipped classroom teaching model to improve students' research ability
Research Method	Lesson plan Rubric scoring form
Resources/Target Group	Population – 46 students
Instruments	1. Lesson plans using flipped classroom teaching model. 2. Rubric scoring form
Data Analysis	Categorize students' performance according to rubric scoring criteria into their levels descriptor.
Results	Results of implementing based flipped classroom teaching model – students' performance according to rubric scoring criteria into their levels descriptor.

Results

The Results of Analysis findings derived from the fieldwork procedures outlined previously, focusing on data collection crucial to this study. The objectives, outlined in Chapter I, serve three primary purposes:

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

The amount of students College.

From class A: 50 students, Primary Education of Yulin Normal University.

From class B: 50 students, Primary Education of Yulin Normal University.

From class C: 50 students, Primary Education of Yulin Normal University

Common data of the respondent in overall (N=150)

The common data of respondents show that the overall gender is mostly female, female accounting for 92.0% of the total. Male respondents accounted for8.0% of the total. This is very consistent with the characteristics of more woman in primary education. People aged 20-21 years old accounted for 76.0% of the total, 18-19 years old accounted for 14.7%, under 18 years old accounted for 0.6%, and over 21 years old accounted for only 8.7% of the total. This is also very much in line with the age characteristics of second-year undergraduate students.

The result of questionnaire from students in overview (N=150)

The indicates that internal factors affecting the students' research ability for Yulin Normal University are found to be at a high level overall ($\mu = 4.18$). Considering each item individually, it was found that No.5 have the highest mean ($\mu = 4.31$), followed by No.6 ($\mu = 4.21$). and the lowest mean is No.3($\mu = 4.08$).

For external factors affecting the students' research ability for Yulin Normal University, the overall level is also found to be at a high level ($\mu = 4.26$). Considering each item individually, it was found that No.2 and No.4 has the highest mean ($\mu = 4.29$). followed by No.5 ($\mu = 4.26$. and the lowest mean is No.6($\mu = 4.22$).

The Lecturers Interview analysis results

The amount of lecturers University. From 5 lecturer, work on Yulin Normal University.

The common data of the lecturers shows that the most common gender is male, representing 60.00% of the respondents, while female lecturers make up 40.00% of the sample in terms of teaching experience, 7-9years accounted for 20.00% and over 9 years accounted for 80.00%; In terms of the age of teachers, 25-35years accounted for 20.00%, 35-49 years accounted for 60.00% and Over 49years accounted for 20.00%. In terms of Professional title, Professor accounted for 40.00%, Assistant Professor accounted for 40.00% and Lecturer accounted for 20.00% each. It can also be seen that the interviewees are experienced and representative.

Through interviews with 5 teachers, the factors affecting research ability in Yulin Normal University are summarized as follows:

Internal Factor

The internal influencing factors of teacher interview mainly include Interesting, Motivation and attitude, Physical health. After finishing, it is mainly manifested in:

Interesting: Interest is a very important factor. 5 lecturers agreed that interest in learning is a non-important factor. Chen believed that interest is the best teacher, students are interested in learning, interested in research, students will listen attentively to the class, students will be able to explore independently, students will learn independently, and they will spend more time on improving their own research ability. Li believed that interest is equally important to the Teacher Li thinks that interest is also important to the teacher, if the teacher is interested in teaching, then the teacher will spend more time on researching and teaching, the teacher will spend more time on preparing the materials needed for teaching, and the teacher will spend more time thinking about how to improve the students' research ability in the research methodology course. Liu believes that only when students are interested in learning, they will be willing to cooperate with the teacher's teaching work and the teacher's teaching plan, and that interest is very important for learning, especially for improving students' research ability. Therefore, students' interest in learning is one of the very important factors affecting their research ability.

Motivation and attitude: The five teachers felt that the motivation and attitude of the teachers of the Educational Research Methods programmed were very important. Scientific research is a very rigorous thing, and scientific research is a logical and methodical thing. It is difficult for students to improve their research ability only through self-study, and they need the teacher's demonstration and guidance. The improvement of research ability requires long-term practice and accumulation, and very professional teachers. Therefore, the teaching of educational research methods courses is very demanding for teachers. Teachers' personal research ability and understanding of educational research will affect the improvement of students' research ability, especially teachers' motivation and attitude. Chen believes that attitude determines everything, educational research methods course is a very practical course, it is difficult for students to improve their own research ability only by self-study. Only when the teacher carries out serious teaching, guidance and demonstration can the students' research ability be improved. This requires teachers to spend a lot of time on teaching design and discussion, and without motivation and a good attitude, they can't do this job well. li believes that only when teachers are motivated and have a good attitude towards teaching, teachers will devote themselves to teaching, and teachers will seriously guide students to practice, and students' research ability will be really improved. li also believes that that the improvement of students' research ability requires students to learn seriously and more importantly, teachers need to teach seriously, if teachers do not teach seriously, the learning of learning cannot be carried out, which will affect the improvement of students' research ability.

Physical health: Teachers' physical condition and health will affect the teaching of educational research methods in the classroom and will affect the students' learning effect. Chen believes that a healthy body is the prerequisite for teachers to teach the course, if the

teachers do not have a healthy body, then the teachers cannot devote themselves to the teaching, which will affect the effectiveness of the teaching, and will affect the students' ability to improve their research skills. Ni believes that only with a healthy body can the teachers teach the course. If the teacher is not healthy, the teaching cannot be carried out at all, which will affect the students' learning and the improvement of their research ability. Li believes that physical health is very important. It will affect the improvement of research ability. Liu thinks that teacher's health is a prerequisite for teaching educational research methodology courses and a key factor for improving students' research ability. So, the teacher's physical condition and health are very important.

External Factor

The external influencing factors of teacher interview are mainly carried out from three aspects: Method of Teaching, Time, Environment of friends and family and facilities and infrastructure. After finishing, it is mainly manifested in:

Method of Teaching: This includes the selection of teaching models, the preparation of course materials, the organization of course delivery, evaluation and feedback. Good education must have a good teaching model. All five interviewees agreed that a comprehensive understanding of the students' situation, the selection of a suitable teaching mode in conjunction with the teaching objectives of the educational research methods course, and the scientific organization of its implementation are among the factors affecting students' research ability. Chen believes that many teachers are now trying to use project teaching mode, flipped classroom teaching mode, problem-oriented teaching mode, online and offline blended teaching mode and so on in the teaching of educational research methods, but they have achieved certain results and have certain shortcomings. At present, the author is also in the flipped classroom teaching mode, and the effect is relatively significant. Chen believes that by analyzing the students' situation, level, and grasping the students' needs, and carrying out the selection of the appropriate teaching mode, choosing the appropriate teaching strategy, and improving and adjusting it according to the students' situation, the teaching goal can be achieved. Ni believes that the characteristics of the educational research methods course with strong practicality determines the choice of teaching mode. Flipped classroom teaching mode is a teaching mode that focuses on students' self-learning motivation development and independent inquiry, which is in line with the structure of students' research ability, so the flipped classroom teaching mode is more suitable for the teaching of educational research methods course. It can achieve the purpose of improving students' research ability. Liu believes that there is no definite method of teaching, but there is a method of teaching, and its most fundamental purpose is to improve students' ability and improve their research ability. No matter which teaching mode is adopted, students should be put in the position of the main body, and the teacher is only the participant and guide of learning. The flipped classroom teaching mode precisely reflects the characteristic of student subject teacher leading. This will help students to improve their research ability. Li believes that teaching mode largely affects the teaching effect, and different courses have corresponding teaching modes, teachers should choose the appropriate teaching mode according to the nature of the course and the situation of the students.

During the interviews, all five teachers mentioned the need to reform the current evaluation mechanism for teaching educational research methods courses. Li believes that research ability is a comprehensive ability, and that it is inappropriate to judge the learning effect of students only through the question paper examination in the past. Because the most important criterion for judging research ability is whether the students can do research alone, not the examination. Chen thinks that educational research methodology courses are very practical courses, and it is not suitable for the assessment of such courses to be carried out through the examination of paper. We can't evaluate students' learning effect only by paper examination, students' performance before and after class, students' usual practice, report of learning and so on should be part of the course evaluation. This also relates to the teachers'

ability to make reasonable decisions on the selection of course materials, the organization of teaching, the implementation of the course, etc. Ni believes that research ability is a comprehensive ability, and the evaluation criteria should be diversified. This is one of the factors affecting students' research ability.

Time: The five interviewees consistently agreed that time is a key factor affecting research ability, and that research ability is a comprehensive ability that requires sufficient time guarantee to improve students' research ability. Mr. Chen believed that the improvement of research ability requires students to spend a lot of time practicing and practicing to really improve students' research ability. Adequate time is also very important for teachers because they need sufficient time to design lesson plans, answer students' questions and discuss with them, etc. Ms. Li thinks that sufficient time is very important for the course of Educational Research Methods because it is a course that requires a lot of practice, and Ms. Liu thinks that sufficient time is very important for both teachers and students, because research ability must be improved through practice. Because a lot of training is necessary for the enhancement of research skills. Ms. Ni believes that different courses have different characteristics, and the nature of the Educational Research Methods course dictates that teachers must invest a lot of time in teaching the course, such as preparing course materials for students and having academic discussions with students. Students must spend more time on practice and hence self-improvement.

Environment of friends and family and facilities and infrastructure: All five interviewees said that a good curriculum teaching environment, campus atmosphere, home learning environment and good teaching facilities contribute greatly to the improvement of research ability. Mr. Chen believes that a good learning environment is very important for learning, and there has been a saying in China since ancient times that Mencius' mother moved three times. It shows the importance of environment to a person's growth, and learning is the same, the environment is very important, if the school has a good learning atmosphere, then students will involuntarily study hard, if the family learning environment is good, students can devote themselves to learning, if the learning infrastructure is good, such as the library environment is good, then it will be conducive to students' learning. Obviously, a good environment is very important to enhance students' research ability. Mr. Li believes that a good teaching environment is very important to students' research ability, for example, the number of classrooms, if the number of classes is too large, the teachers will not be able to take care of them, which will affect the quality of learning. A good infrastructure that facilitates after-class discussion and exchange between teachers and students is also conducive to the enhancement of teachers' research ability. Liu believes that a good environment allows students to learn happily and teachers to teach smoothly, which is naturally conducive to the teaching of the curriculum and to the enhancement of students' research ability. Ni believes that the environment is an invisible force that affects the quality of students' learning, and I've seen a lot of universities. I have seen many universities, often the good ones have a better learning environment, and the quality of students' learning is also better, which shows that a good learning environment is conducive to the enhancement of students' research ability.

The interviews with teachers, it is found that the results of factors affecting students' research ability are basically consistent with the results of students' questionnaire survey.

References

Chang. (2021). *Analysis of the value of the flipped classroom teaching model in higher education.* Journal of Jilin College of Commerce and Industry.37(4),121.

Chen, Y. & Zhao, C. L (2014). *Research on instructional design and application based on flipped classroom model.* Modern Educational Technology (02), 49-54.

Dai, N. (2016).*Cold thinking about flipped classroom : values and limits.* Inner Mongolia Normal University Journal , (6),13-18.

Han. (2013). *The bottleneck of flipped classroom development in China and the choice of road.* Journal of Jiangsu Radio and Television University(02),41-44.
He & Ou &Gao(2014). *Inspiration of USA Universities' Inverted Classroom Teaching Model.* Research on Higher Engineering Education,(2).148-152
Huang, Y.Q. (2013). *Research on micro-course teaching design model in flipped classroom.* Software Guide (06), 157-159.
Li & Liu(2013). *SWOT analysis of the application of the flipped classroom teaching model.* China Education Skills Equipment.(03),88-89.
Li, Xin. (2015). *Research on Teaching Quality Evaluation System of Flipped Classroom - Drawing on the Evaluation Criteria of CDIO Teaching Model.* Research on Electrochemical Education (03), 96-100. doi:10.13811/j.cnki.eer.2015.03.014.
Song & Yu(2014). *Research on Project- based Teaching Model Based on Flipped Classroom.* Journal of Distance Education(1).96-104
Vogel, I. (2012). Research capacity strengthening: learning from experience. UK Collaborative on Development Sciences.
Wang, H., Zhao, W., Sun, L.H. & Liu, H.H.. (2013). *Design of Flipped Classroom Teaching Model - Based on Typical Case Analysis at Home and Abroad.* Modern Educational Technology (08), 5-10.
Wang, W. & Dong, Y. K.. (2018). Flipped classroom: Opportunities, challenges and development path. Theatre House (23), 152-153.
Wang, Y. Liu, H. l.(2017).*The Improvement of Elementary School Teachers' Research Ability Logical Starting Point and Countermeasures.* Teaching and management.21.
Wen, Y.l. Zhao, D. (2015)*The Spiritual Imperative of Flipped Classroom Change from Education Informatization*. Contemporary Education Science,(24),50-52.
Xu, D. S.. (1999). The current situation of educational research ability of high teacher students and its cultivation. Journal of Hangzhou Normal College(04),116-117.
Ye, B.(2014). *What the flipped classroom subverts : On the value and limits of the flipped classroom.* Curriculum-Materials-Methodology,(10),29-33.
Zhang, (2014). Design and application of task-based flipped classroom teaching model. China Education Technology Equipment (22), 61-62.
Zhang, F., Li, Q., Wang, Z., Yan, Q. & Xu, Y. Q.. (2014). How postgraduate students cultivate independent scientific research ability. Northwest Medical Education (01), 77-78. doi:10.13555/j.cnki.c.m.e.2014.01.075.
Zhang, J. L., Wang, Y. & Zhang, B. F.. (2012). Research on flipped classroom teaching mode. Journal of Distance Education (04), 46-51. doi:10.15881/j.cnki.cn33-1304/g4.2012.04.008.
Zhang, W.Z.(2012). *Research on Flipped Classroom Teaching Model.* Journal of Distance Education.211(4),46.