

Action Research on the Development of Geography Experimental Exploration Course in High School*

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Abstract—In this research, the level of geographical practice power competency of students in this school were preliminarily measured by taking 251 students from School K in Shenzhen, Guangdong Province, China as the test subjects, and the objectives of geography experimental exploration course in high school were initially determined by taking the national education policy, school running concept and other factors for references. On the basis of the preliminary draft of the course objectives, the geography experimental exploration course for high school was finally developed and finalized in the action research method "consulting expert, modifying objectives, determining objectives, determining the course content, consulting experts related, amending course content, consulting relevant experts and finalizing the course". Over this research, it was concluded that a geography experimental exploration course for cultivating the geographical practice power competency of students in high school needed to include two parts of content such as experimental exploration and experiment design; in the process of implementing the course, the curriculum plan, teaching methods and teaching conditions should also be conducive to cultivation of students' geographical practice power competency; in aspect of evaluation, it was necessary to take such methods as "combination of teachers' evaluation and students' evaluation" and "combination of process evaluation and summative evaluation" and formulate an "Academic grade evaluation standard" for this course.

Keywords—*geographical practice power competency of students in high school; geography experimental exploration course in high school; course development; action research*

I. INTRODUCTION

As one of the four core competencies to be cultivated in geography major of high school, geographical practice power competency has become one of the most important factors in the talent cultivation value of this major. With respect to the connotation of geographical practice power competency, it was stated as follows in the Geography Curriculum Standard for high school (2017): "geographical practice power refer to the will power and action competence that people have in making visit, investigation and

experiment and other geographical practice activities" (Ministry of Education of the People's Republic of China, 2017; Xu Yanhua & Lin Peiying, 2018). [1] [2] As the goal of the geography curriculum in high school, "geographical practice power" means that "students could get what they have learnt in this major and geographical tools applied in the real indoor, field and social environments, obtain geographic information in manner of field visit, experiment and investigation, explore and try to solve real problems and have the ability to plan and implement activities." (Ministry of Education of the People's Republic of China, 2017; Xu Yanhua & Lin Peiying, 2018) [1] [2] Since the beginning of revising Geography Curriculum Standard for Common high school (2017), relevant geographical practice power competency has been widely concerned by the majority of geography educators. Recently, quite a lot of literature was created around the theme of cultivation of geographical practice power competency. Among these achievements, what the authors talked about the most was how to cultivate high school students' geographical practice power competency. And the main challenge that many researchers were facing was how to practically develop such courses and put them into action on the basis of "evaluation first". However, studies have shown that what impede high school students' development of geographical practice power competency are the lack of geographical practice power competency evaluation tools and the lack of such competency cultivation course developed by action research.

Regarding the cultivation of geographical practice power competency, most experts and scholars mainly talked about the micro level of participatory and research-based learning (Wei Xuefeng, Mou Liyun, Shu Dequan, 2016; Wang Encai, Jin Zixing, 2016) [3][4]. Based on the specific practices of the Geography Comprehensive Practice Curriculum Base in Nanjing No.1 high school, Lu Zhiming summarized the major strategies for cultivating the practical ability of students, enumerated the routes and measures respectively oriented to three levels such as all students, elective students and special students from shallow to deep extents and provided operable and learnable successful cases for cultivating students' geographical practice ability (Lu Zhiming, 2015). [5] Based on the actual conditions of geography teaching in high school and from the perspective of cultivation of geographic practice ability, Wu Xiangzhong

*This paper was a research result of the "Research on Cultivating Geography Practical Ability of high school Students in Shenzhen" under the Shenzhen Education Science Planning 2018 Project (No. 254).

discussed the cultivation of students' geographic practice power competency in the practical environment of geography curriculum base (Wu Xiangzhong, 2016) [6]. Li Jingyan, an expert in the curriculum standard group, talked about "It is strived to put forward relevant suggestions for the cultivation direction and route and evaluation idea about geographical practice power competency by analyzing the connotation and appearance characteristics of geography practical power rationally to make discussion and communication about it among people engaging in the same field" (Li Jingyan, 2017) [7]. However, by far, most of the researches are limited to the micro level or to the experience-based meso level. Most scholars payed too little attention to the action research on such course. According to the domestic and foreign literatures, it was found that few experts and scholars had talked about the "opinions on action research" with respect to development of course on how to cultivate high school students' geographic practice power competency.

As inducted by Wang Xiaojun and Gao Xinyan, many experts and scholars once discussed action research (Wang Xiaojun & Gao Xinyan, 2015, p.64) [8]: "Action research began in the United States in the 20th century and was initially proposed by a social psychologist Kurt Lewin in 1946." Lu Litao and Jing Guixiang mentioned that the influence of action research has been very large through

unceasing efforts of three generations of advocates represented by Corey, Foshay, Stenhouse, Elliott and Kemmis (Lu Litao & Jing Guixiang, 2012) [9]. Nunan proposed that teaching action research is to explore new ideas and methods in practice, improve the understanding and recognition of the outline, teaching and learning process and further promote the improvement of teaching and development of teaching practice (Nunan, 1990) [10]. Kemmis and McTaggart believed that action research was a spiral self-reflection behavior process which can be divided into four steps such as planning, implementation, observation and reflection (Kemmis & McTaggart, 1982) [11]. Admittedly, action research is an effective approach for curriculum development (Feng Yingying & Cai Min, 2008) [12]. Deng Yongchao and Huangfu Quan believed that in order to make development it is firstly needed to make planning and put forward predictive and new mode of action research (Deng Yongchao and Huangfu Quan, 2014) [13]. Wang Jianjun and Huang Xianhua thought that the ideal procedures of school-based curriculum development and education action research are almost the same (Wang Jianjun & Huang Xianhua, 2001) [14]. As for what kind of approach should be followed, different experts give different suggestions. Wherein, the two modes proposed by Skilbeck (1983) and OECD (1979) are widely accepted (see "Fig. 1" and "Fig. 2").

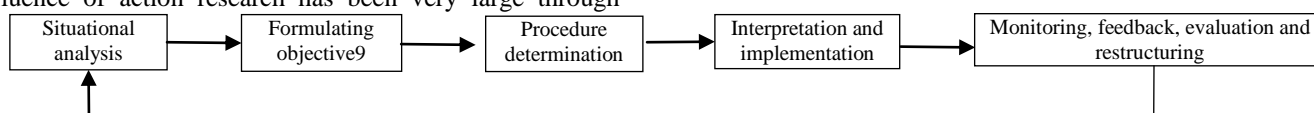


Fig. 1. School-based curriculum development mode proposed by Skilbeck in1983 (Wang Jianjun & Huang Xianhua, 2001, p. 23) [14].

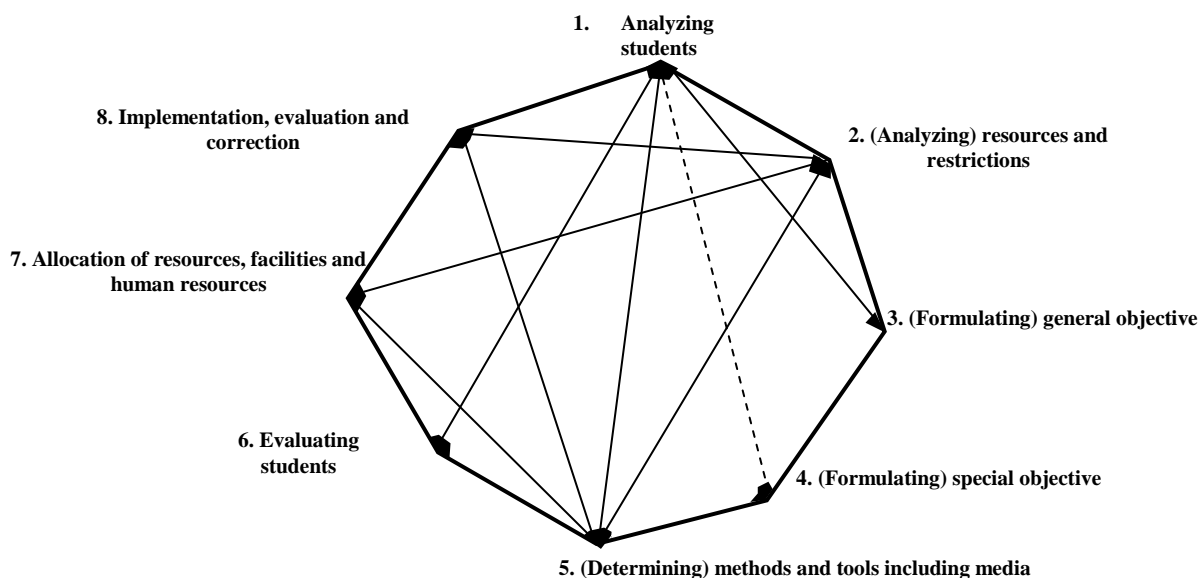


Fig. 2. School-based Curriculum Development Mode proposed by OECD in 1979 (Wang Jianjun & Huang Xianhua, 2001, p. 23).

As inducted by Wang Jianjun and Huang Xianhua, there were also many influential procedural modes in references about educational action research (Wang Jianjun & Huang Xianhua, 2001, p.24) [14]: "among them, the 'spiral cycle' mode early proposed by Kurt Lewin has the greatest impact.

In later times, affected by this mode somewhat (Chen Huibang, 1998; McNiff, 1992), a considerable part of the later procedural suggestions could be regarded as a detailed and supplemented version of Lewin's mode because there was no change in the basic procedures in general (such as

Elliot, 1991, Kennis & McTaggart, 1982, McNiff, 1992, etc.). Strictly speaking, Lewin did not put forward a very clear-cut action research 'procedure or mode', but make a rough description (Lewin, 1964). Later scholars got Lewin's action research procedures divided in different ways based on their own understanding. Although the simplified degrees were different, the basic links (Lewin called it "period") were not

very different." The following "Fig. 3" is a chart simply created based on the description of Lewin and referring to Kennis & McTaggart (1982) and Chen Huibang (1998)'s understanding, taking the Ebbutt's mode (sourced from 'McNiff, 1992') as an example (Wang Jianjun & Huang Xianhua, 2001, p. 24) [14].

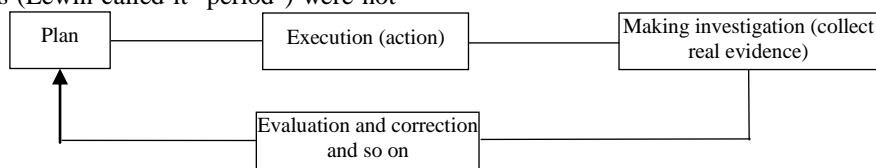


Fig. 3. Kurt Lewin's Action Research Mode (Wang Jianjun & Huang Xianhua, 2001, p. 24) [14].

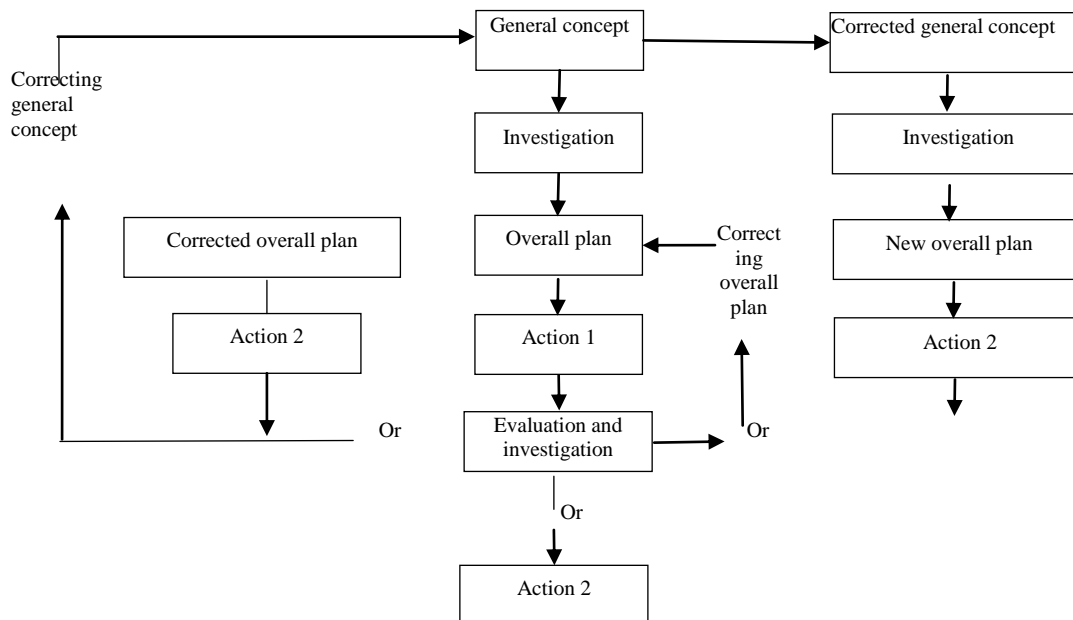


Fig. 4. Dave EBBUTT's Educational Action Research Mode (Wang Jianjun & Huang Xianhua, 2001, p. 24) [14].

As pointed out by Wang Jianjun and Huang Xianhua, "Fig. 1" and "Fig. 2", "Fig. 2" and "Fig. 4" even have similarities in form; and there are also some similarities in major procedures and the relation among each part without previous consultation (Wang Jianjun & Huang Xianhua, 2001, p24) [14]. Those similarities are mainly reflected in:

- The indispensability of such steps as analysis, planning, action, revision and reaction.
- The spiraling feature of action research.
- The flexibility and multiple connections of action research.

Taiwanese scholar Cai Qingtian particularly emphasized the relationship between "course development" and "action research" which were regarded as the two aspects of school curriculum development. At the same time, he also emphasized to master and effectively combine the relationship between action research and curriculum and discuss the way of practice through curriculum action research, hoping to put into practice the concept of action

research and curriculum development (Cai Qingtian, 2004) [15]. In addition, he also mentioned the concept of guiding teachers to understand the curriculum and make research on the basis of hypotheses to treat teachers as researchers and treat classrooms as research laboratories (Cai Qingtian, 2005) [16]. However, his research only discusses the issue from a macro perspective and does not make case research on the basis of a specific course.

In this research, based on the above-mentioned literature, it is attempted to use action research method to develop such a geography experimental exploration course in high school as that can be used to cultivate students' geographic practice power competency. In the process of this research, quantification and qualification combined method was adopted as assistance; and further, the first geography experimental exploration course for high school students in China was developed after accurately testing the actual level of students.

II. RESEARCH METHOD AND PROCESS

Regarding the method of school-based curriculum development, previous experts and scholars often conduct such development directly from their own experience or the will of education authorities. They rarely truly answered the questions about "what educational goals should the school achieve?", "which kind of educational experience should be provided in order to realize this goal?", "how to effectively get those experiences organized together" and "how to judge

whether those goals are really realized?" in strict accordance with Taylor's target model and further make step-by-step advancement of the course (Ralph W. Tyler, 1949) [17]. The experience-based approach is mainly based on subjective experience of the course designer and the actual situation of the true learners may be out of line with the course. Therefore, this research mainly adopts action research in mixed methods. The specific technical route is shown in "Fig. 5":

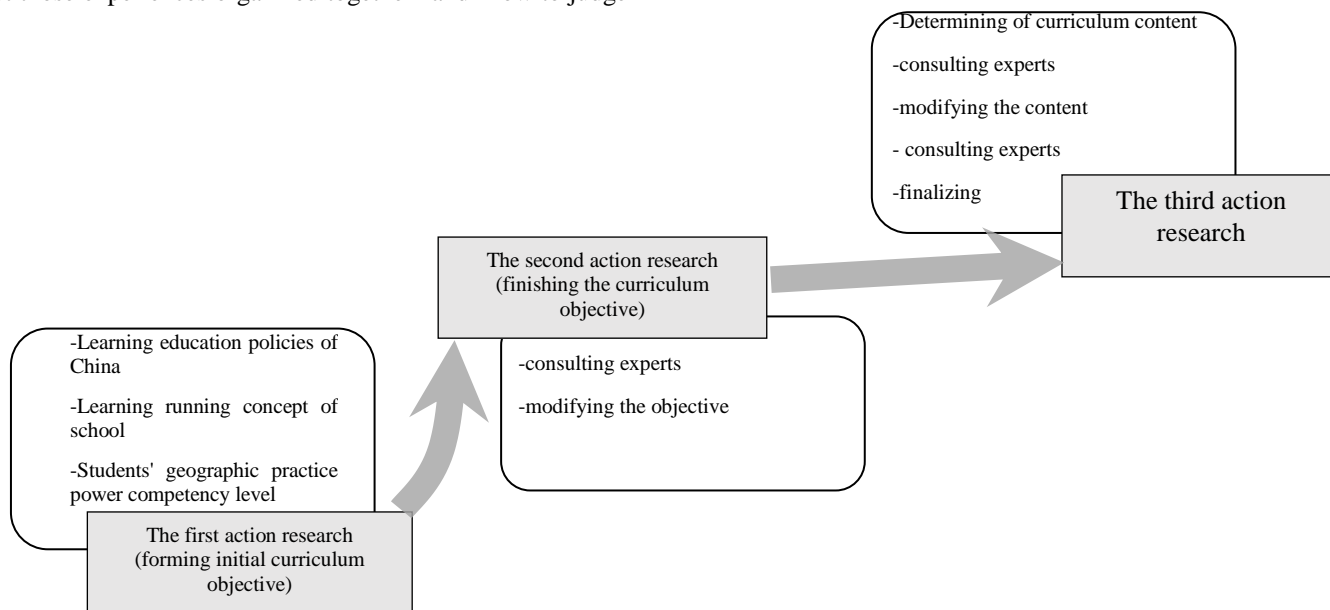


Fig. 5. Technical route of this research.

A. Research Object

In this research, the core competency to be developed for students, senior middle school students' geographical practice power competency and the running concept of School K in Shenzhen, Guangdong Province, China was taken as the text object, 251 students of grade one in this school were selected as the testees, the tools for testing and evaluating the geographical practice power competency of high school students in China as developed by Xu Yanhua and his team were taken as the testing tools and the development of high school geography experimental exploration course was taken as the main line of the activity. As shown in "Fig. 5", the development team of this course as the researcher and practitioner always abided by the core concept of "research by actor", "research for action" and "research in action" in designing the research framework during the research (Zhang Yi and Zhou Pinghong, 2013) [18]. The high school geography experimental exploration courses which can practically cultivate high school students' geographical practice power competency were further concluded over constant improvement in the process of developing the course.

B. Research Method

Based on the commonality of action researches mentioned above and through cyclic iteration of four core sections such as "planning, action, observation and

reflection", this research tries to design a perfect course objective at first, and then select the learning content and method suitable for development of students based on the course objective and finally attempts to select a rational evaluation tool to construct a evaluation-first conceptual course.

C. Research Plan and Steps

The high school geography experimental exploration course involves natural geography, humanistic geography and regional geography in the science of geography. It focuses on cultivating students to the extent that they can gradually learn to obtain effective information, explore and try to solve practical problems in the study of this course and possess the ability to make planning for and executing activities. The three rounds of action researches as shown in "Fig. 5" were designed in this research in order to improve the design quality of the course and meet the requirement for education in China, the development need of school and the lifelong beneficial demands of students. The specific process is as follows: the first round of action research mainly puts forward a rational course objective in combination with the national education policy, school's running concept and students' geographical practice power competency level; the second round of action research mainly modifies the objective in combination with opinions of experts; the three round of action research mainly determines the course content based on the course objective, amend the course

content upon obtaining instruction from experts of the course and finally finalize the course through consulting experts. In this research, the research method was constantly perfected and optimized in a cyclic manner in the three rounds of action researches.

III. RESEARCH FINDINGS AND DISCUSSION

A. The First Round of Action Research

As a good course established in city level of Shenzhen, Guangdong Province, geography experimental exploration course is an elective course in School K and even in Shenzhen City. It is a strengthening force for cultivating students' geographical practice power competency, but how can its course objective truly satisfy the demands of the state, local place, schools and students? The objective of first round of action research is to put forward a more reasonable course objective in combination with the education policy, school's running concept and students' geographical practice power competency level.

1) *Putting forward questions:* What kind of course objective can truly satisfy the demands of students and the society and truly put into practice the fundamental task of educating talents by setting moral standards and cultivate students' geographical practice power competency? This is the question to be answered urgently.

2) *Making research plan:* In response to the above problems, the research plan proposed in this research is as follows: review and study the national education policy, learn relevant documents to educating talents by setting moral standards, learn the core competency to be developed for students in China and that for high school students in discipline of geography and further determine the nature of the discipline, make sampling investigation on students to practically know about their status quo of geography practice ability level and further preliminarily conclude the objective of this course.

3) *Carrying out actions:* According to the plan of this action research, the research team practically learnt the national education policy, relevant documents to educating talents by setting moral standards, the core competency to be developed for students in China and that for high school students in discipline of geography and got them fused with this course and formed the nature of the geography experimental exploration course. Over this action research, it is initially determined that "in this course, the process of students' observation, design and operation in experiment can be mainly adopted to deepen students ability to understand and apply geographic knowledge and can better cultivate students' geographical practice power competency. This course is an experimental operation and design based geographic course. This course is a basic course under the general high school geography curriculum. Students mainly use geographic knowledge to do experiment assisted with knowledge of biology, chemistry and physics related disciplines. It is a relatively comprehensive discipline." In

this nature, what is the specific goal of this course? Next, observation and reflection were conducted.

4) *Practice observation and reflection:* What needs to be explained here is that the observation in this section refers to making interview with the running concept and school motto of School K and making survey on the actual level of students' geographical practice power competency. The survey results show that students in this school has low level of consciousness and behavior of geographical practice power and good recognition of such power and attitude toward such power and their overall level of geographical practice power competency is general.

So, what kind of course objective does the course need to formulate?

- In levels of the nation, society and school: this course is an important carrier for implementing the fundamental task of "educating talents by setting moral standards".
- In levels of the nature of geography and the level of geography education: from the perspective of geography, the ability to analyze and solve problems mainly includes putting forward geographical questions, acquiring geographic data, organizing geographic data, analyzing geographic data and solving geographic problems.
- In level of students: students should be able to form skills to some extent such as observation, reasoning, prediction and communication, measurement, sequencing, comparison, classification, investigation, conclusion, reading, writing, using tools, design and planning. In general, it is to improve the geographic practice power competency of high school students and the thinking quality to analyze and solve problems from a geographical perspective.

But, is the course objective very perfect? Through thinking, it is found that from a philosophical point of view, it is lacking; from the perspective of subject experts, it is also lacking; from Taylor's point of view, this is at least not perfect indeed, because what surely cannot be ignored in the source of the course objective is "the research on the learners themselves", "the research on contemporary life beyond the school", "the subject experts' suggestions for the objective", "the philosophy applied when selecting the educational objective", "the learning psychology used in selecting the educational objective" and "helping to explaining the educational objective in a manner of learning experience and guiding the teaching"(Ralph W. Tyler, 1949) [17].

B. The Second Round of Action Research

Based on the reflection from the first round of action research, the main goal of the second round was to improve the course objective in Delphi Technique.

1) *Putting forward questions:* The above mentioned course objective ignores the opinions of relevant experts, relevant content about learning psychology and the way of description of the course objective. This is also an important

reason why it is needed to make a second round of action research.

2) *Making research plan:* In view of the deficiencies in design of the course objective, the research team in this stage respectively selected and consulted three to five experts from fields of geography, education and psychology and further practically compensated for the said deficiencies.

3) *Carrying out actions:* In order to eliminate the possible problems existing in geography, the research team consulted three geographic experts with title not inferior to associate professor and in geography major of the Normal University; in order to eliminate the problems existing in education, especially geography teaching and learning, the research team consulted two experts majored in education and geography education and not inferior to associate professor and two famous teachers engaged in basic-level geography education, and also consulted one senior editor in geography education related magazine publisher; in order to eliminate problem existing in learning psychology, the research team also consulted a psychologist in a normal university and two senior teachers in Guangdong Province.

4) *Practice observation and reflection:* In the process of consulting experts, the research team timely recorded the shortcomings and deficiencies in the course objective and then revised and finalized the course objective. According to the experts' opinions, the course objectives revised by the research team are as follows:

- General objective: High school geography experimental exploration course is an important carrier for implementing the fundamental task of fundamental task of "educating talents by setting moral standards". Its general objective is to enable student to master the skills such as observation, reasoning, prediction, communication, measurement, sequencing, comparison, classification, investigation, conclusion, reading, writing, using tools, design and planning to some extent. In general, it is to improve the geographic practice power competency of high school students and analyze and solve problems from a geographic perspective.
- Meso objective: Geographical practice power refers to the action ability and quality of people in doing geographic practice activities such as outdoor geographic survey, social investigation, simulation experiment and experimental design. If students have geographical practice power, they would be able to apply appropriate geographic tools to complete the designed practice activities, become full of interest and enthusiasm in geographic exploration activities and will be able to recognize and appreciate geographic environment from perspective of geography.
- Micro objective: students should have the ability to analyze and solve problems from a geographic perspective, including putting forward geographic questions, acquiring geographic data, organizing

geographic data, analyzing geographic data, and solving geographic problems.

How to design the course content after determining the course objective? How to implement the course? How to evaluate the course? Those questions will be mainly explored in the following text.

C. The Third Round of Action Research

Task in the third round of action research is to select the course content, determine the implementation plan and evaluation plan.

1) *Putting forward questions:* In order to achieve the above objectives, it is needed to think about: what kind of course content, implementation plan and evaluation plan should be chosen?

2) *Making research plan:* In response to the above problems, the research team firstly determined the course content and implementation plan in principle of Tyler's experience selection and experience arrangement on course, called to the mentioned experts to consult for constructive advice, then revised the course content, later re-consulted the experts and revised again to finalize the course content.

3) *Carrying out actions:* The course content was selected in the following general principle of Tyler's experience selection: "in order to achieve a certain objective, student must have such experience as that may enable him/her to obtain the opportunity to practice the behavior implied in the objective", "the learning experience must be satisfactory to student due to practicing the behavior implied in the objective", "the expected response to the learning experience should be within the ability of students", "many special experiences can be used for presenting the same education objective" and "the same learning experience may often lead to several results" (Ralph W. Tyler, 1949) [17]. The course content was implemented in the principles of continuity, subject ordering and integration of Taylor's experience arrangement (Ralph W. Tyler, 1949) [17]. Evaluation method was selected in the principle of "defining the target" and "determining the situation that students have the opportunity to perform the behavior hidden in the educational goals" (Ralph W. Tyler, 1949) [17].

After the course content, implementation plan and evaluation method were developed, the research team re-consulted the mentioned experts and accordingly revised the course, then re-consulted the experts to finalize the course.

4) *Practice observation and reflection:* Through step-by-step revisions, the course content, course implementation plan and evaluation method are finalized as follows:

a) *Course content:* This course consists of two parts: experimental exploration and experiment design.

Part one is about experimental exploration.

This part mainly includes five chapters of contents such as atmospheric environment, water cycle, vegetation and soil

degradation, soil texture and fertility as well as rock and geological process.

After learning this part, students should be able to observe geographical phenomena or geographical matters, conduct simple geographic reasoning and prediction based on the observed content and communicate their observations, reasoning and predictions in geographic terms. In addition, students also need to learn how to make measurement, sequencing, comparison, classification and investigation on specific geographical matters, further get true geographic conclusion and then write a simple research report.

The specific objective of each chapter is as follows:

Chapter I: can observe, sort out and analyze the data of greenhouse effect, draw corresponding conclusions and create a simple simulated greenhouse by them; after being able to operate by hand, observe the simulated condition of thermal circulation, identify the phenomenon in the thermal circulation experiment and be able to infer the trend.

Chapter II: can measure the experimental results under different conditions and analyze and infer the influence factors in water cycle section and the influence of water cycle on geographic environment by observing the simulation experiments of runoff and infiltration in the water cycle.

Chapter III: can verify the relation between vegetation and ecological environment problems through observation and inferring and can get known about the existing research achievements on ecological environment problems by investigation.

Chapter IV: can describe the texture and fertility of the soil through observation, analysis, inference and discrimination and can apply these achievements in practice.

Chapter V: can describe the types of rocks by observation, analysis, inference and discrimination, analyze the influence of weathering on rock and form a completed research report.

Part two is about experiment design.

This part is mainly composed of three parts: global warming, settlement, and "functional area and industrial planning".

Through the study of this part, students are required to be able to actively discover geographic problems, design simulation experiments, analyze geographic information and solve geographic problems.

b) Implementation recommendations

- First, suggestions for curriculum plan:

High school geography experimental exploration course is divided into two parts such as experimental exploration (compulsory) and experiment design (elective), with class hours respectively accounted for 7/8 and 1/8. In the elective part, the teacher may guide students to summarize and improve the experimental methods stated in the first five chapters in the class and sum up with the general methods and steps for the experiment design. Students can choose one

of the three sections to complete their homework design by themselves. The specific content structure and course plan are shown in "Table I":

TABLE I. COURSE PLAN FOR THE HIGH SCHOOL GEOGRAPHY EXPERIMENTAL EXPLORATION COURSE

Course structure	Class hours (total class hours: 16 hours)
Compulsory part	
Five chapters of contents such as atmospheric environment, water cycle, vegetation and soil degradation, soil texture and fertility, rock and geological effects.	7/8 (about 14 class hours)
Elective part	
Experiment design for the "influence of global warming", experiment design for the "formation and development of settlements" and experiment design for the "internal spatial structure of urban area".	1/8 (about 2 class hours)

- Second, suggestions for teaching methods:

Before providing lectures about each chapter, teacher should formulate applicable teaching plan, determine the teaching activities and them teach as per the plan. In each theme of experimental exploration activity, teachers should encourage students to ask geographical questions and personally find the answers and draw conclusions or even obtain information and experience about some contents in self-designed method, and further guide students to think about problems from different perspectives; in making experimental exploration, students can discuss with other classmates, or try to write something to make them more enlightened. In addition, students can learn to learn independently and further introspect.

- Third, suggestions for teaching conditions:

Schools must provide teaching devices required in making the course related simulation experiments, such as experimental equipment related to atmospheric greenhouse effect simulation experiments, plasticene, three major types of rock specimens, soil samples and other related equipment. According to the objective conditions, each school can use the nearby materials to make some simple experimental devices which can also achieve certain experimental results. Students and teachers are also encouraged to personally make experimental equipment by using simple materials, which is more conducive to improving students' creativity and manipulative ability.

c) Course evaluation

- First, combination of teachers' evaluation and students' evaluation:

The methods for teachers' evaluation in teaching should be diversified, mainly including continuous evaluation and correction and feedback. Among them, continuous evaluation and correction is a method of scoring a work in stages. After achieving the achievement of each section, teachers should give an assessment so that students can make clear what needs to be improved and how to make

improvements. In terms of feedback, teachers should give feedback on relevant content immediately and regularly and should try to give students constructive feedback so that students can understand the requirements of the course and the sections to be improved. Teachers should also be good at using file management methods to help them make objective evaluation.

The evaluation on students mainly includes two categories: self-evaluation and mutual evaluation. Self-evaluation mainly requires students to personally find out what they are good at and what needs to be improved. The evaluation forms can be varied, including one-on-one interviews between teacher and student, self-assessment checklists, reflection record books, interview records and group discussions.

- Second, combination of process evaluation and summative evaluation:

The total score of the course is 100 points; of which full score of compulsory part is 90 points and that of elective part

is 10 points. Course evaluation is completed by a combination of process evaluation and summative evaluation, in which process evaluation accounts for 50% and summative evaluation accounts for 50%. Process evaluation is divided into students' evaluation and teachers' evaluation, respectively accounted for 30% and 70% in process evaluation. Specifically, in the process of learning, teachers should pay attention to observe and record the performance of students in classroom and score for the process. At the end of each lesson, students should make self-evaluation and mutual evaluation. Teacher should sort out and collect students' works and make summative evaluation and scoring at the end of each chapter.

- Third, determination of academic grade and evaluation criteria:

At the end of the course, the academic rating should be conducted based on students' scores. The specific scoring and grading requirements are shown in "Table II".

TABLE II. ACADEMIC GRADING, STANDARD AND SCORING

Evaluation grading	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Evaluation standard	Can do preliminary experiment with the help of others	Can do experiment better with the help of others	Can do experiment independently but unskillfully	Can do experiment independently and skillfully	Can do experiment independently and very skillfully
Score	0-59 points	60-69 points	70-79 points	80-89 points	90-100 points

IV. CONCLUSION

A. Research Conclusion

This research aims to develop a geography experimental exploration course suitable for cultivating students' geographic practice power competency by means of action research. In the process of the development, a summary was made on the achievements of action researches on the geographic practice power competency and the course development. Over researches, it is found that action research method has not been used for develop the course relevant to cultivating high school students' geographic practice power competency.

Therefore in this research, the definition of goals, selection of course content, determination of course implementation plans and implementation of course evaluations are all conducted in such a way as "finding problems in action — making plan — personally practice — reflection — practice again — making reflection again — repeating like this again and again — finalizing the course" on the principle of relevant opinions of Tyler's course principle.

B. Research Value

First, this research enriches the theoretical connotations of action research. In current China, most action researches are applicable to teaching and moral education in basic education stage; on the curriculum level, its use mainly focuses on a certain course in colleges and universities. But

as a fundamental part of education in China and even the world, basic education courses require more to be completed by action research. It can be say that the geography experimental exploration course developed in this research by adopting action research method enriches the content of action research. It provides a new orientation for course development in basic education.

Secondly, this research gets theory better linked to actual situation. In the development of school-based curriculum, the majority of basic education workers always take experience as the orientation in making relevant research and few of them apply theory to the use of theory to course development. Whereas, this research takes the initiative to develop such a course as for cultivating students' geographic practice power from perspective of geographic experiment by using relevant theories of Tyler's course principle, further providing a demonstration for subsequent school-based curriculum development.

Finally, this research has greatly enriched the research on high school students' geographical practice power competency. At present, the researches on high school students' geographical practice power competency in China mainly focus on relevant cultivation strategy. Hence, how to develop such as course as for cultivating students' geographical practice power competency in the principle of "evaluation first" becomes a brand new topic. The geography experimental exploration course developed in this research by action research method based on evaluation on the real situation of students and further combination of a series of correlated factors. It can provide an experience for reference

in future development of geographical practice power competency course. At the same time, it will also enrich the research on high school students' geographical practice power competency.

C. Aspects to Be Improved

This research provides a demonstration for the development of geographical practice power competency and other core competencies related cultivation courses in mainland, China. However, it is necessary to admit that there are still many aspects to be improved due to financial and material constraints in this research. Subsequent researches will make further action research to develop such school-based textbooks as suitable for students based on relevant content of the course so as to truly cultivate high school students' geographic practice power competency.

ACKNOWLEDGMENT

The development of this course was supported by the financial support of Shenzhen Institute of Educational Sciences in China as well as the support and guidance of many experts. It is also inseparable from the help of teachers of the research team.

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