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A Rational View of Inquiry Learning with the Contradiction Analysis-In the Case of Primary School Scientific Course

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Abstract: In recent years, inquiry learning is one of the hot topics in the field of education, and it also is vigorously advocated in the curriculum of primary and secondary education. However, there are still many problems in the process of implementation. Contradiction analysis is the basic method of Marxist philosophy, which is the most universal and fundamental method for human to understand and transform the world. Now, the dialectical analysis methods help educators to take a rational view of inquiry learning, promoting the scientific development of education in our country.
Keywords: Inquiry Learning, Contradictory Analysis, Primary School Science, Marxist Philosophy, Education, Curriculum.

What is inquiry learning?

It is necessary to understand what is "inquiry" if we want to study inquiry learning. Inquiry is "repeatedly in-depth discussion and research". Discussion is to seek for knowledge, truth and origin. Another important concept is research, that is problem discussion, tracing back to the sources and searching the answers to solve the questions[1]. "Inquiry" used widely. It is called Practical Research, which is to explore practical issues. And it is also applied to society, that is Social Inquiry. However, this general sense of society "inquiry" is different from the science education "inquiry", and different from what the scientist engaged in.

Inquiry learning is a learning activity which basic characteristic is inquiry. Students' inquiry is not a scientific inquiry, but the exploration of scientific inquiry. The United States "National Science Education Standards"[2] notes "Scientific inquiry refers to scientists to study nature and to present the explanations in many ways based on this study inquiry also refers to the students to gain knowledge, understand the scientific concepts, understanding of scientific methods used in the natural and carried out a variety of activities." From this definition, it can concluded that the inquiry learning is a learning activity that students conducted in a way, similar to scientific inquiry. And NSES also advocate scientific inquiry to approach to learning science. Based on analysis of inquiry learning process, which has relation and difference between scientific inquiry. It has five features:

1.Raise Question: learners involved in the exploration of scientific issues;

2.Collect Data: learners attach importance to evidence in the explanation and evaluation of scientific problems;

3.Formation of interpretation: learners explain the scientific problems according to evidence ;

4.Evaluate Result: learners evaluate themselves according to the explanation of others;

5.Test Result: learners communicate and validate their explanation.

Raise the Question

February 19, 2014, "the Elementary School Science (Grades 1-6) Curriculum Standard" (ESSCS)issued a revised version [3]. It notes: Science learning in primary school are a variety of ways, and inquiry learning are important ways of student learning sciences. Inquiry learning, referring to the direction, organization and support of the teachers, making students actively participate in scientific inquiry, positively experience, practise and think, experience the processes of scientific inquiry to obtain scientific knowledge, understand scientific thinking, learn scientific method, is a way of learning. It divided into nine processes of scientific inquiry: raise question, make assumptions, draw up plans, gather evidence, process information, reach conclusion, expression and communicate, application migration, introspection and appraisal.

First proposed using the inquiry method in school science education is John Dewey's. Inquiry learning is one of the hot topics in the field of education in recent years, and controversy is very big in the field of theory and practice both at home and abroad , and that debate never stops. Many people believe that inquiry learning known as a "hands-on activities", or a mere formality for students just "fun" learning, making most of students become “accompanying inquiry" due to improper application. It has caused great harm to our country’s elementary educational curriculum reform because of misunderstanding and misusage. The new curriculum reform is still growing vigorously, so it is very necessary to take a rational view of inquiry learning and the research should be deeper. The ESSCS in 2014 is following 2011 China elementary education, which combines the practice of science curriculum in primary school to dig into the development of inquiring learning in China and makes some introspection.

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For a correct understanding of inquiry learning to adhere to the view of "one divides into two"

Contradictory analysis is the most fundamental methods of materialistic dialectics. Marxism holds that contradiction is the fundamental driving force for the development of things. "Conflicts are universal, absolute, which exists the process of development of things, and penetrates all the process from beginning to end." It demands that we avoid subjectivity, one-sidedness and superficiality, but should be split into two to look at the problem, attention to in-depth studies of internal contradictions, comprehensive, realistic analysis on the inquiry learning. Inquiry learning both as an educational concept and the methods and means, also has two aspects.

1.From the perspective of human nature and human existence

On the one hand children are natural inquirers. Inquiring is spontaneously going on before children entering school. After entering school this inquiry should not be banned or cut, but should be encouraged[4]. Children adapt to society and learn to survive by constantly inquiring, and human also rely on inquiry to constantly move forward. But on the other hand most of inquiry learning becomes a mere formality after students enter the school. They just kill the time with playing, and even called it euthanasia with no gain and simple pleasing students’ activities. From young children's grope to primary school's experiment, that is a step-by - step gradual development: children gradually changed from spontaneity to take methodical attitude, from aimlessly asking questions to selectively proposed problem, from simple relying on senses to using variety tool, from no rules of observation to more reasonable and orderly of research, from attracted by the magic to learning knowledge happily. Otherwise inquiry learning not only serve a positive purpose, but will become a mere formality.

In case five"our body " [5] the design process of scientific inquiry is based on children's understanding of the existing fragmented self body. Firstly, students enter into natural museum with the teacher’s company, then carry out planned and purposeful science learning. Secondly teachers guide students to review, reflect, adjust and sort out their own development and changes in awareness, thus promoting the development of metacognition. However, inquiry learning can become a mere formality, eventually turned into a "trip to the Museum" if teachers simply taught or did not have a guide purposefully.

2.From the perspective of students' all-round development

(1) Inquiry learning has a positive effect on students' all-round development. Young children from families or communities is not a blank paper to schools, and not with a blank brain into the classroom. Through inquiry learning students' awareness and understanding of the world, getting knowledge is actively constructed by children themselves, which is "accommodation" and "assimilation" unified, truly understood, and belong to children. However, not everything can be used to "inquiry", the content appropriate for all students to inquiry is just a few . The ESSCS includes four areas, and its 18 main concepts are broken down into 75 points. Students are required to master mankind for thousands of years of accumulated knowledge in a short time and go through the inquiry process, which is both impossible and unnecessary. Even though inquiry learning based on direct experience, conducive to the all-round development of students, but there are a number of indirect knowledge. In addition, some knowledge is more difficult to design for inquiry learning's activities for various reasons. There is a large amount of content can be designed into inquiry activities, but due to its high degree of difficulty and challenge, only a few students are able to experience the joy of success, resulting in most of the students have become "accompanying inquiry."

(2) The curriculum standards describes the scientific attitude from five dimension: explore interests, seek truth from facts, the pursuit of innovation, cooperation and sharing, harmony between human and nature. Inquiry learning helps to train students' scientific attitude, and integrates a great deal of knowledge. Students learn to cooperate, communicate, listen, criticize and introspect. There is

no doubt that it trains children's thought, protects the curiosity of children, and cultivates the children's innovation.

However, in the curriculum standards, can teachers afford to repeatedly stress the importance of teachers' guidance? From the results of the domestic research found that teachers have complained: The weight-bearing-laden teachers will have to take on more. On the one hand, primary school teachers lack of ability and knowledge for scientific inquiry , so that insufficient guidance make students feel dull, and teachers are at a loss. How teachers should be reasonable assurance "coaching inquiry", "guided inquiry" and "independent inquiry", then deal with relationship between " Help " and " put "? On the other hand, teachers are generally a heavy burden because there are many things to prepare before class. Such as in the case five "Natural History Museum Exhibition to explore the human body activities". Teachers may not just be responsible for guiding the students to understand the human body organs, they also need to set the student materials, ensure the safety, coordination with the staff and so on.

3.From China's national conditions

Now, primary and secondary schools all over the world put great emphasis on curriculum and teaching under the guidance of teachers to give students ample time and opportunity to carry out an independent inquiry. China need to be strengthened. Such as the United Kingdom science national curriculum goals, the first is "scientific investigation". In United States science curriculum standards, a number of States emphasized learning science by doing science. Science is not just a bunch of facts and theories. It is a process, a way to think about and explore the world. Students should be able to understand and practice the basic processes and methods of scientific inquiry. Influence of exam - oriented education in China and curriculum reform should be accelerated, and promoting the development of inquiry learning to foster kids loveness of science, and cultivate students' creative consciousness and creative ability.

However, most people ignore china's conditions that inquiry learning cannot quickly spread in our country. Because inquiry learning requires a certain amount of material support, more time, small class and so on. Now our country is difficult to meet: only from the amount of class, the China Statistical Yearbook of Education (2000) points out 35% of primary school classes with more than 40 people in China, 79% of junior middle school classes with more than 45 people and 43% classes with more than 55 people. From actual survey, the data has far exceeded expectations

Therefore, the inquiry learning cannot completely replace other educational methods. We need to grasp the unity in opposition, grasp the opposite uniform. In order to achieve the best results, we only play up strengths and avoid weaknesses, and make comprehensive use of various methods.

Case by case for proper implementation of Inquiry Learning

Materialist dialectics think with the particularity of contradiction. That is, contradictory thing and each side has different characteristics. Performance for different contradiction have different characteristics, the same thing in different process and different stages of contradictory characteristics varies. The particularity of contradiction principle requires that we adhere to the concrete analysis of concrete problems. In terms of education, different students have their own characteristics , and different educational content have different characteristics. So the response should address their differences.

For different students cognitive development level and ability disaccord, and there is no identical student in the world. After inquiry learning, some students can quickly accept large amounts of information or in advance, but it is maybe hard to accept and understand for some students. At that time, the inquiry learning should make appropriate adjustments, and cannot ignore the slow development's. We can give them different learning tasks on same course, so that students get all-round development. For different knowledge, teachers can select appropriate content for inquiring in order to let all the students to inquiry which based on the school actual situation. But some content is hard to understand, and only a few students can experience the joy of success, most students became the "accompanying inquiry". As a result, this kind of learning content is not suitable for all the inquiry learning, we should put it on the extra-curricular interest groups.

The case one "what's in the light bulb?" [6] that belongs to the sixth concept of material science: Circuit is a closed circuit, including power supply, on and off of the circuit can be controlled. This knowledge is suitable for 3 ~ 4 grade of primary school children's cognitive development levels, and easy to be designed to scientific inquiry activities: around the problem of seemingly "closed" but the light bulb has gone and the students' interpretation. Then students focus on the research questions, obtain information from observation, through the analysis and experiment prove the right interpretation, finally to deepen understanding the simple circuit of "closed" of "light bulb". About the knowledge, the students has a preliminary understanding of simple circuit before, so they have higher interest. Schools are able to meet the basic requirements of the course and the content for most students have some difficulty. students experience the joy of exploring, so it is suitable for all students to

learn. For the instance of the teaching process evaluation:

One of the most important features of inquiry teaching is to put forward the validation process based on evidence that research on students' proper scientific problems. Because only students experience of reasoning based on facts, accessing to information by observing the experiment, analysis of confirmation, students can gradually learn how to use the reasoning analyze data, how to amend some of your existing knowledge through the affirmation.

This class presents the elements of inquiry: the teacher create problem situation by judging activities, and make students produce the problem of "why only the bulb of figure 2 can be light;" Students hypothesize "Can bulb be lighted? It maybe associated with the structure? After observation and collecting evidence, it found that "the visible part of the bulb structure can't help to explain the problem." As a result, we have clear the further research plan, from reasoned that invisible part of the structure and function to the anatomy of bulb, supposing for verification; Then, analysis the collected information, draw conclusions, and applied to the reflection and reasonable explanation; Finally, applying correct understanding of the migration in order to deepen the understanding of concepts.

In this case, the teacher also adopts the approach of "deconstructed black-box". In scientific research, the black-box refers to those who can not open and can not be observed directly from the external system. The teaching of the lesson, the teacher guides the student to contact the fact that filament light according to the visible light bulb structure, supposed bulb invisible parts of he structure and function. While exposes students to the initial idea subtly triggers the cognitive conflict, problems centered around the inside of the bulb's "black box", which inspired the students anatomy, observed the structure of the bulb with desire, that is "deconstructed black-box". Make students deep experience the inquiry process of reasoning based on facts, observation experiments to obtain information and analysis. Finally, primary school students comprehend the meaning of the empirical, cultivate scientific thinking habit

Reasonable use of inquiry learning, we should adhere to combine universality and particularity of contradiction together

Materialist dialectics believes that contradiction particularity and universality of objective things are interconnected, the universality of contradiction analysis (common) through its particularity displays (personality), and abstract from its universality in the particular; Conversely, contradictions analysis method of personality and particularity contain（or show）its universality, and it exists because of association with the universality of contradiction analysis method; No contradiction analysis method in common, and you can't have personality contradiction analysis method

Dewey first suggested using inquiry methods in science education at school. Before 1909, most educators agreed that the method of scientific education is mainly to teach directly students to learn a lot of scientific knowledge, concepts and principles. In 1909, it is Dewey the first time criticized this method in American association for advancement of science(AAAS). He said that overemphasis on accumulation of science teaching, and science as a way of thinking and attitude have not given enough attention. Dewey thought science education is not only to let the students learn a lot of knowledge, even it is more important to learn processes or methods of scientific research.

From 1950 to 1960, the rationality of the inquiry as a method of teaching was becoming more and more clear. Educator Schwab believed teachers should show the scientific knowledge by the inquiry and students should learn science by the inquiry too. To achieve these changes, Schwab recommended science teachers must go to the laboratory, guiding the student to experience the process of scientific experiments, rather than scripted in the classroom. That is to say, introducing students to the formal scientific concepts and principles should allow them to do the experiments. Applied experimental evidence to explain and deepen the contents of textbooks.

Constantly reform makes the development of the students' inquiry ability and the view of scientific understanding to the process of inquiring is widely spread. This follows from the particular to the general understanding of order and apply the general awareness to the particular. Based on successful experiences, not applying mechanically, respecting the students individual and comprehensive grasp the characteristics of each student. It will get twice the result with half the effort if insist on combining the universality and particularity of contradiction

Actively advocate the inquiry learning, we should insist on the unity of two-point and key-point

Materialist dialectics thought, we must be good at grasping the mainstream to analyze problems, to solve the main contradiction or major aspects of contradiction, while not neglecting tributaries. We must hold the key to balanced things. That is to insist on the unity of two-point and key-point

Now, education step into information age. However, the teaching reform is still slow. How to accelerate the pace of teaching reform, comprehensively promote education modernization process, is still an urgent task in front of us. Practice has proved that from

the point of pioneering education and social characteristics, inquiry learning should become the dominant learning style in knowledge economy era. The study and implementation of inquiry study has very important realistic meaning and time significance. The better conditions of school and teachers who have a larger interest, they can step ahead especially for the students with interest and specialty of after school club. In brief, we need to seek truth from facts and adjust measures to local conditions. Don't have to march. Let some people get inquiry. Do not rush. Inquiry learning should combine with other methods.

We should be bold reform, efforts to innovation, with the world first-class new education idea lead the education practice in our country towards a higher level. And every educator should have a rational analysis of the educational methods, means or educational philosophy, for any form of education is not perfect and omnipotent. In addition, the application of inquiry learning is also need to rational thinking, don't forget that we are developing , as well as the uneven development, large regional differences of our country. Don't ignore most of China's rural and poor areas of education development, not to overlook these areas of basic education development strategy and way of deep investigation and research.

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