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## The Misunderstanding About Inquiry Teaching in High Education in China

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### Abstract

Inquiry teaching has got great development and achieved remarkable results in China, but the problems still exist in the teaching practice of primary education. This paper analyzes the formal problem of inquiry teaching, pointed out that there are four misunderstanding about inquiry teaching: Firstly, inquiry teaching is experimental course; Secondly, inquiry teaching has curing routines; Thirdly, inquiry teaching can replace the other teaching methods; Fourthly, inquiry teaching is not conducive to improve test scores. The misunderstanding of inquiry teaching affected teaching effect. Based on the above analysis, this paper try to explores the main cause of inquiry teaching formal problems from the subjective perspective, in order to seek the way to overcome the formal problems of inquiry teaching.

**Key words:** Inquiry teaching; Misunderstanding; Formalization

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### INTRODUCTION

Inquiry teaching and learning has been a topic within science education reform. In fact, The National Science Education Standards (NSES) view scientific inquiry as an integral component for restructuring science education (National Research Council, 2000). By allowing the students to develop problem-solving strategies, the students develop the initiative to pursue, discover, and evaluate answers, a transferable capability, with far-reaching consequences for future learning endeavors (Wu et al., 2014). Scientific inquiry may be defined as the activities and processes which scientists and students engage in to study the natural and physical world around us. In its simplest form, scientific inquiry may be seen as consisting of two critical aspects, the what and the how of understanding the world we live in (Lotter, Harwood, & Bonner, 2007). Inquiry teaching based on students development, trust and respect the students' potentials, Pay attention to the cultivation of students' innovation spirit and practice ability (Chang & Wu, 2015). It highly consistent with the new curriculum theory, and emphasizes the cultivation of students' scientific inquiry ability, form a scientific attitude and scientific spirit philosophy. As the new curriculum reform deepening, the inquiry teaching has been widely recognized and applied. At the same time, Several teachers and experts point out that there are some problems existing in inquiry teaching practice. The cause of the problem is various, but the subjective cognition is the most critical factor. This paper based on the in-depth analysis of inquiry teaching formal problems, explore the main cause of inquiry teaching formal problems from the subjective perspective, in order to seek the way to overcome the inquiry teaching formal problems.

## 1. THE INQUIRY TEACHING FORMAL PROBLEMS

The inquiry teaching formal problem has four main features. Firstly, inquiry teaching is equivalent to grouping experiment, practical operation in the classroom teaching; Secondly, focus on the process model of inquiry teaching, neglect the effectiveness of teaching ; Thirdly, inquiry teaching mostly used as a teaching competition showing of open class, but have little applicability to daily lesson; Fourthly, inquiry teaching is used in any classroom teaching, ignoring the appropriateness of the teaching method.

As the first form of inquiry teaching, the inquiry activities are equivalent to grouping experiment or operation process, the problems in teaching are determined, tools and methods are relatively fixed, students only need to verify in operation. On the surface, classroom atmosphere is active and animated, But it is actually a kind of experiment or practice teaching, not the true sense of the inquiry teaching because of the lack of openness and initiative of teaching, the lack of students to find problems, active thinking, analysis and other elements.

The second form of inquiry teaching has such characteristics: Design teaching activities according to the process of inquiry teaching before the class, then organize the students to follow the prescribed order of practice or experience step by step in the course. In the whole process of teaching, the students learning lack of autonomy and necessary guidance, just completion the process of scientific inquiry teaching according to the fixed requirements, can not play a role in fostering students' critical thinking and innovation effect. In essence, this kind of inquiry teaching pays little attention to explore the internal process of the student experience. It caused the inquiry teaching apparently right but actually wrong in practice.

The third form of inquiry teaching shows that inquiry teaching has not been fully implemented in teaching practice, only use inquiry teaching as a tool to perform the gorgeous in the open class, race courses and other special occasions. In order to have an excellent performance in teaching, teachers usually consumed an enormous amount of time and energy for careful planning and preparation, even to communicate with the students how to cooperate with teacher before the class. Inquiry teaching in such form, be good to hear or see, but in fact, it has been out of the teaching reality of soil, no strong vitality, can only serve as the role of the vase.

The fourth form of inquiry teaching is behaved for inquiry any teaching content, exclusion of other teaching methods. Some teachers tend to think that the inquiry teaching is superior than other teaching methods, scientific and advanced, so they emphasis too much on inquiry teaching in teaching. Although inquiry learning method is the most basic learning method of human, but

not all of the learning process is necessarily exploratory. Every teaching method has its advantages, but also has its shortcomings, inquiry teaching is no exception. From the teaching content point of view, inquiry teaching must have applicability in the practice. Use inquiry teaching in any course means inquiry teaching is suitable for any teaching content, which is obviously not objective. In addition, if we use inquiry teaching in every class, teachers and students will struggle to cope with teaching and learning, the enthusiasm of scientific inquiry will be loss, and the burden will be increased. As a result, it can not achieve the desired teaching effects.

The above four types of inquiry teaching, although the appearance is different, but there is a common feature in nature, from the essence of inquiry teaching to cultivate students' innovative spirit and practice ability, the teaching form is similar to the inquiry teaching, or even consistent with inquiry teaching, but in essence, it can not reached on the instructional objectives of inquiry teaching. In summary, we believe that lack of openness and initiative in inquiry teaching , machinery to apply inquiry teaching mode, just use inquiry teaching as showing tools but lack of use in daily teaching, excessive emphasis on inquiry teaching and inquiry any problems are all the inquiry teaching formal problems.

## 2. THE ANALYSIS OF MISUNDERSTANDING INFLUENCE ON INQUIRY TEACHING

Subjective understanding of inquiry teaching is the prerequisite of inquiry teaching, to eliminate misunderstanding and set up the correct teaching idea, undoubtedly has a very important role in overcoming the inquiry teaching formal problem. From the subjective point of view, there are mainly four kinds of misunderstanding about inquiry teaching resulting in inquiry teaching formal problem.

### 2.1 Think of Inquiry Teaching as Experimental Class or Practice Class

There is no clear understanding the distinction of inquiry teaching and experimental class, think of students hands-on activities in class as inquiry teaching. Inquiry teaching and practical operation may have some overlap, such as inquiry teaching often through experiments, the practical way, so inquiry teaching is easy to be misunderstood as manual operation. In fact, inquiry teaching and experiment teaching has obvious difference, Firstly, the explore process of inquiry teaching is not necessarily through experiments. For some problems, students can through the collection of data and information, the argument and discussion to achieve the purpose of inquiry. Secondly, Inquiry teaching has qualitative difference with experiment and practice. The inquiry activities focus on the problem, the students making inquiry plan under the guidance of teachers, and then complete the inquiry

process. The action of students has high autonomy, the process is open, the result is generated. While the experimental class or practice class is often scheduled plan, equipment, methods and steps are determined, the result is verified or completion of the works.

Therefore, hands-on activities are not the standard of inquiry teaching method is used in a class. It should be seen that whether the students have sufficient autonomy, whether the process and method is open, whether the result is generated.

## 2.2 Think of Inquiry Teaching as Curing Routines

Seen inquiry teaching as a curing routines process, teaching process is going on step by step according to the prescribed strictly, this concept is the main cause of mechanization of inquiry teaching. Inquiry teaching is usually composed of the following six parts: First, put forward the scientific problems; second, hypothesis or conjecture; third, evidence collection; fourth, explain; fifth, evaluation; sixth, communication and promotion. But it doesn't mean that only contains the above six steps of teaching activities, is the real inquiry teaching. In the actual teaching, inquiry teaching has variety forms. Some teaching activities include the above six steps, some of the steps involved in teaching activities may be more, but most of the inquiry teaching activities only composed by part of above six steps, which is partly inquiry teaching. A stiff applies process mode of inquiry teaching, the form looks like inquiry teaching, but may not be accurate grasp of the spirit of inquiry teaching, so it can not root in the soil of teaching.

Inquiry teaching should not be rigid fixation for several steps, should not emphasize the exhaustive, But should be adapted to local conditions and decide what should to do, how to do. Only according to the actual situation, combined with other teaching methods flexibly, inquiry teaching be full of vitality.

## 2.3 Think of Inquiry Teaching Can Alternative to Other Teaching Methods

Some teachers exaggerate the superiority of inquiry teaching, they think that inquiry teaching is the most advanced and the most scientific teaching method, so it can replace the other teaching methods, this point of view leads to the blind worship of inquiry teaching, and exclusion of other teaching methods. Inquiry teaching advocates students' active participation, willing to explore, practice, trains the student to find the problem consciousness and the ability to solve problems, so as to develop students' innovative spirit and practical ability. Based on this the inquiry teaching method is superior to other methods of teaching point of view, this view has certain popularity, its performance is the inquiry teaching method is tend to use in any issues. This view of point ignores the appropriateness of the teaching methods and teaching content, ignores every teaching method has its

superiority and the common sense that there is not certain method of teaching. The problem is time-consuming, struggling to cope, inquiry teaching becomes a mere formality.

There is no universal teaching method, each teaching method has its advantages and disadvantages, so we should advocate flexible use of various teaching methods according to teach content, combined with each other, learn from each other, in order to improve the teaching effect.

## 2.4 Think of Inquiry Teaching Is Not Conducive to Improve Test Scores

Inquiry Teaching need to spend more time than other teaching methods, so, some teachers think that efficiency of inquiry teaching is low, and can not conducive to improving students' test scores. It can not be avoided that teachers judge the teaching methods according to the score, because the exam is still the core index of the current teaching evaluation. However, only use the time of new curriculum in the classroom teaching to evaluate the teaching effect and efficiency are not objective. Teaching efficiency and effect are often need a longer period of time to be reflected. In addition to the new courses, there are a large number of chapters summary class, review class, exercise class in the classroom teaching, moreover, students use a lot of time to do homework, self-study, and so on. Obviously, new course teaching in classroom teaching is not the only factors affecting the teaching effect and efficiency, in addition to the new course teaching, teachers also need to spend a lot of time on teaching content repeated consolidation, review and practice, which will greatly extend the overall time teaching. Although Inquiry teaching spent more time in the new course teaching, but because of active learning and thinking deeply, students have a more profound understanding to learning content, from essentially established the logical framework of knowledge and internal relations, so they largely saving or reducing the practice and other teaching time, the total teaching time can be comparable to other teaching methods, or even less. In fact, students taught through the inquiry teaching approach attained higher scores in the SPAT than those taught through the regular teaching methods (Njoroge, Changeiywo, & Ndirangu, 2014).

## 2.5 Don't Believe Students Inquiring Ability

Some teachers think that inquiry cannot be carried out by students effectively as they will not be able to discover anything worthwhile. This view is equivalent the students' inquiry learning to the scientists' scientific inquiry, pay attention to the result, but despise the process.

Firstly, we discuss the relation between scientists' scientific inquiry and inquiry teaching. From the two aspects of the basic process and basic spirit, scientists' scientific inquiry and inquiry teaching are unified.

Scientists' scientific inquiry and inquiry teaching have a similar process, they all advocate the enterprising and practical spirit, so the inquiry teaching should simulate the form of the scientific inquiry. At the same time we should also be aware of the differences between scientists' scientific inquiry and inquiry teaching. As Inquiry teaching, teachers and students imitate the process of scientific inquiry to explore the knowledge the mankind has proved in limited time, in order to achieve the learning of scientific knowledge, training practice ability, and cultivate the spirit of innovation. But scientists' scientific inquiry often takes a long time, even a lifetime, to explore the scientific problems which has been never discovered by mankind, in order to achieve the understanding of nature, to grasp the truth, to promote the development of science and technology. There are essential differences in many aspects between scientists' scientific inquiry and inquiry teaching, so the students cannot be asked to discover the unknown world just as the role of scientists, inquiry teaching should be combined with other teaching methods to complete the course task and purpose of training people.

Secondly, we discuss the results and process of inquiry teaching. In teaching practice, teachers often restrict inquiry method, make the results "correct". Inquiry teaching is an open teaching method, which means that the process and results of the inquiry are diverse, different methods, different voices and different results should be encouraged. Guide students to think, debate, proof, gradually precipitation of the original appearance, as a result, the process and results of exploring will be blended naturally. Fully understand the difference between scientists' scientific inquiry and inquiry teaching, respect and believe students, the inquiry process will be true, vivid and effective, and there will be unexpected wonderful.

In all scientific inquiry, the adoption of certain mental attitudes such as curiosity, creativity, objectivity, integrity, open-mindedness, perseverance and responsibility is advocated. Attempts should also be made to promote safety consciousness among students and to encourage them to adopt safe practices. Opportunities should be provided for students to ask questions, students should be encouraged to ask both closed and open questions. By the type of questions, teachers could gather information on their frame of mind and the quality of their understanding.

In summary, compare the efficiency and effect of different teaching methods according to one class teaching is unfair, from the whole and long-term point of view, inquiry teaching is helpful to improve test scores and graduation rates.

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## CONCLUSION

There are many factors relate to the inquiry teaching formal problem, such as teaching resources and

conditions, teaching evaluation system, teachers' experience and quality etc.. Although to overcome of inquiry teaching formal problems need to improve and enhance the many aspects of the inquiry teaching, but to form a correct understanding is the prerequisite. Inquiry teaching should not be regarded as a kind of curing mode, but should have a certain degree of flexibility. Just as other teaching methods, inquiry teaching can be used in appropriate circumstances, but it should not be used in any case. On the premise of reasonable application, inquiry teaching is conducive not only to achieve a short-term teaching objectives, but also conducive to the realization of the long-term effects of the cultivation of innovative talents.

Correct understanding of Inquiry Teaching is the premise of the rational use of inquiry teaching. Inquiry teaching seeks to nurture the student as an inquirer. The starting point is that students are curious about and want to explore the things around them. Inquiry teaching leverages on and seeks to fuel this spirit of curiosity. The end goal is students who enjoy science and value science as an important tool in helping them explore their natural and physical world. Inquiry teaching must go beyond merely presenting the facts and the outcomes of scientific investigations. Students need to be shown how the scientific investigations were derived and be provided. Students should be offered opportunities such as ask questions about knowledge and issues that relate to their daily lives, society and the environment, be actively engaged in the collection and use of evidence, formulate and communicate explanations based on scientific knowledge and so on. The teacher should be the leader of inquiry in the science classroom. They are facilitators and role models of the inquiry process in the classrooms. They create a learning environment that will encourage and challenge students to develop their sense of inquiry. Teaching and learning approaches centre around the student as an inquirer. Through inquiry learning, students will be able to acquire knowledge and understanding of their natural and physical world based on their own investigations, apply the skills and processes of inquiry and develop attitudes and values that are essential to the practice of science.

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