The Application of Problem-Solving Method in Classroom Teaching

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Abstract: Questioning is an indispensable link of classroom teaching for the establishment of communication between teachers and students. This article by "problem-solving method" as the theme, explores the design of classroom teaching, so that students in problem solving, thinking and put forward the process of learning knowledge, development thinking, development intelligence and improve ability, aiming to pave way for the reform of teaching methods.

Keywords: problem-solving method, teaching reform, strategies

1 Introduction

“What is good education? Giving systematically opportunity to the student to discover things by himself….”[1] This is an important evaluation indicator for “good education” put forward by the well-known American mathematician George Polya. According to him, “good education” should enable students to find problems and solve them by themselves.

We know that class teaching is teachers and students common participation and interact and creative in the implementation of teaching objective process. In the fifty minutes and have the exciting conflict, there are hard to avoid confusion and anxiety, for a special kind of happiness and swopped pointers teachers and students … … so we can say that there is a full of spirit and vitality “big stage”. In the big stage, “questions” are an indispensable part of classroom teaching for interactions between teachers and students. The teacher will set for a while, asking, but students will inevitably the question, wisdom is to solve problems among the students, and solve problems in progress. Therefore, “Problem-solving method” is able to demonstrate the real value of teachers and to satisfy the diversified demands of students. It is also an effective strategy for the realization of teaching reform.

2 “Problem-solving method” is a Shortcut for Intensifying Teaching Reform

A conclusion from the historical development of human sciences is that science begins with questions, because only questions can inspire people to study, to observe, to do experiments, and to create. “Questions”, with great charm, will arouse people's desire for exploration and become a strong driving force for men to scale the heights of science. Along with the speedy development of science and technology, high talent quality requirements have reinforced the need for the introduction of “problem-solving” to teaching, with the aim of cultivating students' exploring spirit and creativity.

The origin of “problem-solving method” can be traced back to Ancient Greece. Socrates' midwifery is a teaching method, in which students are inspired to think actively and derive conclusions by themselves based on questions. As a new educational idea, “problem-solving” was applied systematically in the field of education since the 1980s. With the vigorous development of science and technology, as well as the launch of curriculum revolutions, increasing attention has been paid to the problem-solving method, which has become a shortcut for intensifying teaching reform.

Problem-solving method refers to a teaching model, in which the teacher raises different types of questions purposefully, to guide the students to find problems actively and solve the problems through energetic exploration, so that to get a deep understanding of elementary knowledge and put their knowledge to use, thus realizing an overall development of both ability and personality, and becoming

effective problem solvers. Main characteristics of the method: question-based, emphasizing students’ hands-on practice in problem solving process, encouraging free discussion among students, teacher-student cooperation and communication between students, and enabling students to put their respective strategy into practice, to participate in relevant activities, and to rethink and evaluate the effects of the activities together with the teacher, and share the delight of the success.

3 Feasibility of the Application of “Problem-solving Method”

3.1 “Problem-solving method” is a kind of teaching model
According to its definition, problem-solving method is a kind of teaching model. A teaching model means a relatively stable structure or pattern for teaching activities, extracted from teaching practices, under the guidance of certain teaching theories or teaching thoughts. It is a methodological framework for teaching in nature, themed by question-based teaching; aiming at helping students obtain a deep understanding of elementary knowledge and realize an overall development of both ability and personality; with a strategy to guide students to find problems actively and solve them through energetic exploration, instead of realizing teaching aims by means of the “transmitting-accepting” teaching model; and following the procedure of “teacher raising problems——self-exploration of students——solving the problems”.

In the traditional teaching process, in order to complete teaching tasks, teachers prefer to adopt the lecture-style teaching approach only and overemphasize knowledge itself, so students think highly of scores and learn everything by rote for examinations; their abilities are only evaluated based on their performance in final exams, without any consideration of their overall quality development. In this way, the cultivation of students’ thinking skills, reasoning ability, application ability and creativity is ignored and does not receive enough attention. In fact, to students, it is more important to raise new problems base on criticism and reflection than to understand and master knowledge. Therefore, the adoption of “problem-solving method” in teaching process is an effective way to enhance teacher-students interaction, develop students’ critical spirit and exploration awareness, increase their interest in learning, and improve their problem analysis skills and problem-solving ability.

3.2 Teaching subject of “problem-solving method”——“double subjects”
“Double subjects” indicates that both students and teachers are the teaching subjects. Students undoubtedly play a dominant role in problem solving, because “problems” are essentially problems for students; only when they are solved by students, will the problems carry significance. Without the participation of students, “problem solving” will become impossible. Students should take the initiative to find problems and solve them through energetic exploration and practice.

Since “problem-solving method” is a kind of systematic and integrated teaching model, with clear objectives and a rigorous structure. It cannot do without an elaborate plan, a creative design, specialized guidance and coordination control of the teacher, which sets high requirements of creativity and depends on the development of teachers’ enthusiasm and innovative potential. As Paulo Freire said, teachers also benefited from conversations with students in the teaching process; both teachers and students became the teaching subjects. Moreover, because students’ experience and self-control ability are limited, curriculum resources are insufficient, and knowledge reserves of students are not enough to integrate teaching situations with teaching objectives, the guidance and help of teachers are necessary. Therefore, in the “problem-solving method”, a teacher is a problem planner, as well as a guide for students in “problem solving”. Teaching activities in the teaching and learning activities is made to lap over each other and activities both have the subjective activity, so the “double subjects,” is inevitable. But the teacher’s leading role is to serve the student body, therefore, the "double subjects,” they must ensure that

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students of the centre. “Problem solving” the full implementation of fact, the mechanism can ensure the implementation of ”teaching students to this, the student center” concept.

3.3 Teaching aim of “problem-solving method”
Through a series of problems, the students in the traditional foundation of knowledge and skills to solve the problem, in the process of solving the problem and solve practical problems and the spirit of innovation and to create a sound personality. Fundamentally, The ultimate aim of “problem-solving method” is to develop effective problem solvers, to be specific, to develop creative problem solvers. Students will not only acquire knowledge through question-based learning, but also gain professional skills, including problem-solving ability, autonomic learning ability, creativity, hands-on ability, and teamwork, etc. This goal and our country new curriculum 3d curriculum function concept (knowledge and skills, the process and the method, emotion and attitude) is consistent.

3.4 Significances for the implementation of “problem-solving method”
3.4.1 Help to cultivate students’ innovation ability
Self-study ability is the most basic and important ability to acquire knowledge. The process of raising problems and asking students to analyze and solve the problems is itself a process of self-study ability improvement. To improve self-study ability is to enhance the quality and speed of knowledge acquisition, and in the mean time, to broaden knowledge constantly; self-study ability is also an important basis for men to work independently and conduct scientific research, etc. Therefore, self-study ability is a life beneficial magic weapon.

3.4.2 Help to develop students’ self-study ability
The core of currently advocated quality-oriented education is the cultivation of students’ innovative ability. How to develop innovative ability? It must be impossible to follow suit blindly and accept all traditional ideas without deep thinking. Students should insist on independent thinking and teamwork and refuse replicative thinking. Creation begins with doubts; having doubts is thinking, and namely, criticizing. Students are expected to find problems and think over the problems from multiple angles with a critical eye.

4 Strategies for the Implementation of “Problem-solving Method”

4.1 To arouse interests and cultivate students’ problem awareness
Learning is derived from thinking; thinking is originated from suspecting. Problems are stimulants which activate or awaken people’s mind. The presentation of problem situations will arouse interests among students and bring their enthusiasm and initiative into full play. Particularly, students will be motivated to search for experimental knowledge which may fill up the problem “vacancies” in their cognitive structures, and to seek methods, strategies and procedures of problem solving through processing of representations, concepts and principles in mind. Students will not only acquire knowledge, but also improve their problem-solving ability and enhance their intelligence.

As Einstein pointed out, raising a new problem is more important than solving it. Solving a problem probably requires mathematical or experimental skills; while raising a new problem or putting forward a new theory is to look at old problems from a new perspective, which demands innovation and imagination and is a true mark of the progress of science. In the teaching process, teachers should arouse students’ appetite for knowledge and their desire for exploration by means of “problems” that they are interested in, concerned about, and which are closely related to their lives. When students are facing issues that they are interested in, their curiosity will be fully aroused, and their intellectual potential will be brought into full play. And in the learning process with pleasant emotional experience, to generate further learning needs. Learning a strong interest in people often neglected, with relish learning and feel satisfied with it.

Cultivation of students’ problem awareness is the core of the implementation of problem-solving method.
Teachers should protect students’ appetite for knowledge and encourage them to find problems and raise questions actively. Teachers’ trust, encouragement and support will become a driving force for students to study and think initiatively. Some students may ask simple or incorrect questions, due to their low cognitive ability and thinking ability. In such circumstances, teachers should show their tolerance and patience while providing guidance and corrections, rather than sneering at or criticizing the students.

4.2 To design problems and enhance self-quality

This is an age of knowledge and information. Knowledge reserves and students’ visions are beyond imagination. Teachers are possible to face great challenges, if they only rely on their original knowledge. Therefore, teachers should update their knowledge, master new skills and learn how to design problems. The problems should not be raised arbitrarily, but purposefully, targeting to certain learning objectives. Problem design should have clear objectives and enlightenment, and reflect advanced teaching ideas, at an appropriate difficulty level, with the view of intelligence development and ability cultivation. A question can be an interrogative sentence or manifested by a scenario. These problems can be divided into enclosed problems and open questions. Closed-end problems, to teachers and students are known, the method for teachers and students is also are known, only conclusion should have obtained by students. Such as what is the definition of marxism, the problem is limited, which clearly problems common in mathematics. Additionally one kind is open questions, problems for both teachers and students is known, but more open and comprehensive, the methods to solve the problems and answers are unknown, such as current era why to want study theory of marxism, to the question answer, may not have a "correct" answers, students are required to collect as many information and analysis the potential method and conclusion. So teachers must to provide students with a series of various multi-layered "problem", the student to solve problems of both closed-end opportunity, have more opportunities to solve open questions. Different types of questions reflect different cognitive level and teaching values, pointing at different teaching goal, (including master traditional teaching which pays attention to the basic knowledge, also including cultivating the students' practical ability and creativity, developing students' emotion and values), guarantees teaching entirety goal realization. Based on accumulated experience in teaching practices, teachers should establish new teaching models, bring their intelligence, wisdom and creativity into full play and construct problem-solving methods with their own characteristics, to embody their own personalities and teaching styles.

4.3 To discuss problems and provide a relaxed discussing environment

Teachers should love, respect and trust students, encourage them to ask questions, and eliminate their anxiety with a leisurely and amiable attitude; moreover, they need to guide students to express their own opinions with enthusiasm and patience, create a positive, democratic and harmonious classroom atmosphere, to stimulate students’ enthusiasm for participation and their appetite for learning. In the teaching process, students, as a teaching subject, are separate individuals. They vary not only in cognitive ability, but also interest and cognitive style, so their understanding, thinking, and problem-solving methods are different. Therefore, teachers should respect and accept students’ personality traits and intelligence features, fully affirm their subjectivity, and provide a colorful and diverse learning environment for students. In this process, the teachers need to discuss the question of time and the teacher to give adequate consideration of the time. Problem a mention call person answer, or not immediately respond to questions, interference is frequently repeated students' thinking. Or answer incomplete, not let the student supplement, anxious to evaluation, etc. Deprived of students' right to think, but also about what innovation? Physiologist and psychologists study suggested that people thinking is intermittent and jumping. For sufficient time, is conducive to the emergence of thinking climax, just accord with students learning while thinking, first think, then speak, think good to say good law of thinking. The core questions raised, must let the student fully thinking, complement, lets the student making evaluation, in
order to fully ensure problem solving autonomy.

4.4 To summarize and feedback
As the old saying goes, “it is better to teach a man how to fish than to give him fish”. Similarly, with regard to the development of students, it is more important to teach a student how to master knowledge than impart knowledge to him. Teachers should guide students to grasp effective learning methods, which are like the philosophers' stone that turns all it touches into gold. In this way, students’ cognitive structures will be upgraded while knowledge acquisition, their learning ability and innovative ability will be improved, and their learning potential will be maximized.

At the stage of summarizing, lectures are principally adopted. Teachers should explain pointedly and detailedly. The comments should be concise, accurate and vivid, and the directions should be appropriate, leaving sufficient space for thinking, inducing and summarizing. In order to perfectly answer questions raised by students, it is necessary for teachers to collect information which is not available in teaching materials, on the one hand, to enrich students’ knowledge, and on the other hand, to help them get a deeper understanding on the acquired knowledge and improve their problem analysis skills and problem-solving ability. To summarize is to review the whole problem-based learning process. It is a necessary link for students’ thorough understanding and mastery of knowledge. The entire process of cognition begins with problem statements and ends with problem solutions.

Classroom teaching process is teachers' and students' communication process. In the course of the exchange, the teacher to student's answer to with positive response, takes student to problem of feedback. Teachers in question must face the class, take care to all levels of students. In teaching randomly from each question students, found in students' answers can be sure, is worth encourage place. To the student answer can let the other students discuss by means of communication to evaluate, strengthening students' master consciousness. Attention is also respect the student feedback, which class democratic a specific performance, the students more encouragement, affirmation and praise, less with or without criticism, satire, denial of language, attitude and expression, make student produces want to say and then say habit, such classroom teaching in question's guidance, student through various ways such as discussions, collect data, experiment and solve the problem, it is no longer YiYanTang of teachers.

5 Conclusion
Innovation is the soul of learning; exploration is the essence of knowledge acquisition. “Problem-solving method” begins with students finding problems and raising questions. Constant exploratory questions are from the beginning to the end of the process. Successful classroom teaching is symbolized by constant problem solving, stimulation of enthusiasm for learning and finding new problems. The purpose of “problem-solving method” is not to find answers. It attaches more importance to the cultivation of students’ problem awareness and their critical spirit, with a view to improve their observational ability and sensitivity, form an independent or cooperative problem solving habit, and help students learn through exploration and achieve success in attempts.

References