Practice and Thinking of Problem Design in "Problem Driven"

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Abstract. Discussed the "problem driven" teaching mode for the implementation of the basic steps and design issues of basic principles. Expounded the design of problem-based learning mode that based on different teaching objectives, teaching content, discussed the related teaching mode from five aspects, which are inspired problem driven, "bridge type" problem driven, multi angle problem driven, stepwise recursive problem driven and applied problem driven.

Introduction

The teaching reform takes cultivate the innovation ability of cadets for purpose, which is the fundamental requirements of military academy in order to produce high-quality new type military personnel for our army who are "competent to fight and fight to win". The core of innovation ability is to generate new ideas and innovative thinking, reflected in a" new ". Therefore, education is to guide and inspire cadets to generate new ideas, new methods. However, all thinking activities are aimed at the problem, there is no problems without thinking, let alone innovative thinking, much less embody and cultivate innovative ability. So we can say that the problem consciousness is the most critical factor of cultivating innovation ability. The problem-driven teaching method is a method that takes raising problems, analyzing problems and solving problems as the main content and means.

Significance of Implementing "Problem Driven" Teaching Method

Mathematics is the basic subject of subject education in our academy so far, which is also an important medium of training cadets' ability of raising problems, analyzing problems and solving problems. However, in current mathematics teaching, cadets "have no question to ask", even if there is, the question is only for the solution of some problems , but not thinking get the deep-seated problems with thinking the nature of the problem. As a mathematics teacher, we reflect on the: is there a problem with the way we are teaching? The traditional mathematics teaching methods pay more attention to mathematics basic skills training, focus on mathematics as a problem-solving "tool", in this idea, cadets do not understand why they have to learn mathematics and what's the use of the learnt knowledge, how to use the knowledge. Once the "mathematical useless theory" perception shaped, then naturally the cadets will lost interest in learning, then it is impossible to find the problem, put forward the problem, let alone to analyze the problem and solve the problem. Obviously this kind of teaching method is not conducive to the cultivation of cadets' ability. In fact, mathematics curriculum teaching goal is not only to enable cadets to learn important mathematical concepts, formulas and conclusions, but also let cadets to get mathematics thinking method, understand the essence of mathematics and cultivate the ability to solve problems in the teaching process. Therefore, according to our academy cadets' characteristic, teachers in the class need to guide cadets to raise problem, analysis problem, solve problem, to make sure the mathematics teaching be carried out by following the process of "problem, research, explore, analyze, solve, improve", to allow cadets to learn in research, and to research in learn. Therefore, we introduce the problem-based learning method in mathematics

teaching, in order to stimulate cadets' interest in learning, cultivate the ability to discover and solve problems, and enhance practical ability and innovative ability.

Theoretical Research of "Problem Driven" Teaching Method

Concept of Problem-based Learning. [1] Problem-based learning is a teaching method that based on problem, which is Problem-Based-Learning, PBL is called for short. It is a kind of learning that put cadets as main body, put various problems in mathematics as the starting point of learning, taking the question as the core of the planning and learning content, let cadets to find a solution around the problem and to learn theoretical knowledge.

Basic Steps of "Problem Driven" Teaching Method. Raise Problem. "Problem" is core of problem-based learning, problem can either be raised by teacher or can be raised by cadets that under teacher's guidance. This requires teachers not only familiar with teaching contents, but also familiar with cadets' learning status, which is the foundation of implementing problem-based teaching.

Analyze Problem. The analyzing process should take cadets as main. Teachers should encourage cadets to express their views actively, to discuss and communicate with each other, in which teachers should pay attention to guide the direction and rhythm of the discussion, so it is high requirements to teachers that they must control the class well and know the cadets well, this is the key of implementing problem-based learning.

Solve Problem. On the basis of analysis of the problem, let cadets themselves put forward the method of solving the problem. Teachers can guide cadets to summary and sublimate the method and conclusion that they get.

Result Evaluation. Result evaluation can be self-assessment and peer evaluation in group or teacher evaluation, evaluation content can be a method to solve the problem of rationality, thinking of the flash point and so on. At the same time, it can guide cadets to summarize the correct method to analysis and solve problem.

Design Principle of the "Problem" of "Problem Driven" Teaching Mood. (1) The problem should serve the teaching content and teaching objectives

The design of the problem must be closely around the teaching content and teaching objectives, teachers should understand the teaching materials and cadets of the specific circumstances, the design and guidance of the problem should serve the teaching content and teaching objectives.

(2) Problems should be able to stimulate the interest of cadets' thinking

The fundamental basis of implementing problem-based learning is that cadets think and solve problems actively, so teachers must design problems carefully to make sure to arouse the cadets' interest in thinking.

(3) The problems should have appropriate difficulty

The problems that have appropriate difficulty are the critical factor of stimulating cadets' interest in thinking. This requires teachers to have a full understanding of cadets' knowledge base and learning status, to design problems with appropriate difficulty according to cadets' learning status.

(4) The problems raised should follow the principle from the shallower to the deeper

In order to put forward the appropriate degree of difficulty problem, the teacher can design according to the degree of difficulty of the problem. For the complex problem , teachers can break down it into a number of small problems that easy to digest, by solving problems one by one, not only can stimulate cadets' interest in learning, but also can improve the enthusiasm of the cadets to think and enhance their confidence in learning.

(5) Problem driven and knowledge skill training complement each other

Solving problem is the main aim of problem-based learning, but not the only aim of problem-based learning. Clearing this point, teachers in the problem-based learning must pay attention to refining and

sublimation of knowledge, to allow the cadets not only master the problem solving method, but also master the relevant basic knowledge, to train cadets' mathematics thinking ability.

"Problem Driven" Teaching Mood Design that Based on Different Teaching Aims and Teaching Contents

Mathematics Concept- Heuristic Problem Driven Method. Advanced Mathematics has many concepts and theorems, so compared with other subjects; usually it gives the cadets an abstract complexity profound impression. In fact, mathematics and real life relationship is very closely, many concepts are raised from solving some problems or some specific problems, which are abstracted from specific problems from life. When teaching, teachers need to seize this characteristic of mathematics, to trace back to source of concept, restore the "real" problem that before the "abstract" concept, to guide cadets themselves to abstract and generalize the mathematical concepts, change the simple theory teaching to problem solving driven teaching method. By presenting the concept of background, to guide the cadets to solve problems themselves, so that cadets become mathematical "research" and "founder". Besides, in the process of guiding cadets to solve problems, cadets can master problem-solving ideas and methods, strengthen the understanding and application of the related concepts, and improve their solving problem ability.

Connection between the Old and the New Knowledge-"Bridge" Type Problem Driven. The connection between Advanced Mathematics knowledge is very closely, if cadets already have a certain foundation of Advanced Mathematics, while teaching new knowledge, teachers can design some connective problems which have "bridge" role according to the inner connection between new knowledge and old knowledge, thus to build a framework for cadets, guide cadets to construct new knowledge based on review, comparison, test of old knowledge, develop problem-based learning. In the process that cadets solving problem, teachers' main role is to design problems, construct framework, guide cadets themselves，how to analyze and solve problems. Actually this problem design uses a main method in mathematics solving problem: boils down the unknown problem to an already solved problem. This method not only helps to develop cadets' ability to solve problems, but also is an important way to make cadets benefit from their lifetime.

The Nature of Knowledge-Multiple Perspective Problems Driven. All knowledge should experience confirmation repeatedly from different angles, different side，after the test of the twists and turns in the process can the nature of the knowledge get mastered. Mathematics learning is even more so. In the teaching process, teachers should raise questions from different angles and side questions around the same knowledge point, to let cadets understand the knowledge nature by using questions, to catch the key points. Multi angle driving mode can not only enhance the cadets' ability of observation, but also help to the cultivation of cadets' logical thinking ability.

Abstract Knowledge-Gradual Recursion of Problem Driven. For some abstract concepts and theorems, if directly gives the conclusion, let cadets stiffly to remember to use, then not only will cause the cadets learning difficulties, but also cause logical thinking disorder, which is not conducive to the cultivation of cadets' ability. Of course, many concepts are first given practical problems, and abstract concepts from practical problems solving, such as above "the concept of the constant series". But for some concepts, even so, cadets still can't understand and accept fundamentally. For example, the concept of limit sequence. After example - cutting circle method, cadets still do not understand the "$\varepsilon - N$" definition of the limit of sequence [2]. For this kind of concept which is difficult to understand, the teacher can design problems around "keywords", guide cadets to deliberate carefully and study important factors repeatedly, to reveal the essence of the concept by gradual recursion. Through the "key words" of the gradual recursive problem driven, let cadets shape a specific impression of the abstract concept and theorem, it helps cadets to fully understand the knowledge, to grasp its essence and significance [3].

Practical Problems - Application Problem Driven. Many concepts and theorems of advanced mathematics have its background and source in life. Above we discussed how to use this background to design inspired problems, to guide the cadets to solve the problem, draw the corresponding definitions and theorems, training students analyze problems, problem-solving ability. Mathematics is origin from life and return to life. In the teaching process, by designing the practical problems of life, not only can cadets use learned math knowledge and methods to solve practical problems, but also can let cadets feel mathematics of "magic", improve cadets' interest in learning, enhance cadets' self-confidence.

In addition to real life problems, teachers in the teaching process can also be in accordance with the teaching content design some of the problems on military, such as Taylor's formula in the plane landing curve, "reduction of the high order differential equation of missile pursuit problem and so on. Apply mathematics knowledge to solve real life problems and military issues, enable cadets to discover mathematics is neither an abstract concept, theorem, symbols, nor a simple math games, but is closely linked to daily life, so as to improve the cadets' learning initiative and enthusiasm.

Summary

Mathematics is an important subject that cultivate the cadets' raising problem, analyzing problem, solving problem ability, problem-based learning is mainly aims at this. Above is the experience of my teaching practice which I present to you, how to flexibly apply different types of problem-based learning for different teaching contents need further research and practice.

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