Research on Autonomous Learning of Higher Mathematics

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Abstract: The acquisition of autonomous learning ability is a process of internalizing external learning skills into internal capability. The content of Higher Mathematics learning as well as teachers' teaching ideas and teaching methods have an important impact on students' independent learning. Students' learning concept, learning motivation, learning methods and strategies all affect students' ability and effectiveness of autonomous learning.

1. Introduction

Driven by the worldwide trend of "learning society", as the basis of subjectivity education, "independent learning" has attracted more and more attention. The proposal and in-depth discussion of the new educational concept of autonomous learning marks the beginning of a profound reform in discipline education, which will also bring a series of fundamental thoughts on the promotion of higher education reform. The 21st century is an era of knowledge economy. Knowledge learning is becoming more and more a lifelong process. Our era needs a new generation with lifelong learning and physical and mental health. In addition, the rapid development of knowledge, which requires our education to cultivate students' learning ability, especially lifelong learning ability, while the cultivation of independent learning ability is one of the important ways to improve students' lifelong learning ability.

With the further advancement of basic education reform, modern education thoughts and modern teaching methods are gradually accepted by schools and teachers. At the same time, the formulation of new curriculum standards and the use of new teaching materials also open up more independent space for students' learning in terms of prescribed educational content and requirements. From the current education reality, analysis and study on the influencing factors of students' autonomous learning, to construct a mathematics teaching strategy marked by the improvement of students' autonomous learning degree, then the research of subjectivity education will be further introduced into the substantive field of subject teaching, and provide theoretical and empirical support for the research of subject teaching mode under the significance of subjectivity education.

Independent learning is the concrete reflection of "people-oriented" concept, is the need of lifelong learning society, is the need of school education and teaching reform, as well as the need of students' all-round development, and the objective requirement of knowledge economy for talent quality. As a kind of ability, autonomous learning, is of great significance to the lifelong development of students, which is a shortcut to achieve the efficiency and effect of education. Therefore, in the context of quality education in China, cultivating learners' independent learning ability is a crucial and urgent research topic.

It should be said that mathematical knowledge includes the acquisition of ideas and methods, and the formation of mathematical ability is permeated with many factors of independent learning. The materials and background of higher mathematics learning are not only derived from the rich and colorful natural environment, but also closely related to students' actual life and the accumulation of original knowledge. However, in the actual learning, due to the restriction of curriculum factors, the influence of teachers' educational philosophy and teaching methods, students' awareness of independent learning is weak, and their ability of independent learning urgently needs to be improved. Teachers' evaluation of students' learning and students' understanding of autonomous learning remain at the level of "conscious learning" or "passive autonomous learning". The evaluation method that takes the examination result as the ultimate goal

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makes students generally lack the ability of self-selection and self-evaluation in the true sense, as well as lack the ability of questioning and reflection, which affects the basis and motivation of students' sustainable development, and the cultivation of their innovative spirit and practical ability. With the further development of China's quality-oriented education reform and the proposal of life-long education, people increasingly realize that the traditional higher mathematics teaching seriously hinders the development of students' initiative, autonomy and creativity in mathematics learning. Therefore, it is one of the main tasks of the reform of higher mathematics to cultivate students' autonomous learning ability of higher mathematics.

2. The present situation and analysis of self-study on higher mathematics

2.1 The present situation

From the perspective of the four dimensions of college students' autonomous learning of higher mathematics, which are motivation stimulation, content selection, process monitoring and environment construction, the conclusion shows that the autonomy or ability is at a general or low level.

2.2 Influencing factors

Like the general form of learning, autonomous learning of higher mathematics is affected by many internal and external factors, including the existing mathematical knowledge, learning motivation, mathematical learning methods and strategies mastered by mathematical learners, and the level of volitional control in mathematical learning.

2.2.1 Existing mathematical knowledge and skills

Independent mathematical learners must have certain mathematical knowledge, which is an important guarantee and necessary condition for independent mathematical learning, that is, to be able to learn. Because the process of mathematics autonomous learning is a gradual learning process from simple to complex, which is constantly accumulated, any learning process should be based on certain cognitive ability and knowledge experience, and it is difficult for learners to complete corresponding learning tasks without certain learning ability and knowledge experience. The original mathematical knowledge plays a selective role in the learning of new knowledge. On the other hand, it helps and supports the understanding and learning of new knowledge. It is the "growth point" of new knowledge, which is constructed by assimilation and adaptation on the basis of original experience and knowledge. Students original mathematical knowledge or flexible use of mathematical learning methods and strategies of the foundation. Therefore, the quantity and quality of mathematical knowledge acquired by students have a direct impact on their level of independent learning ability in mathematics. At the same time, this point can also be drawn from the results of this study, the level of independent learning of higher mathematics of students in grade two is significantly higher than that of students in grade one.

2.2.2 Students' learning view and learning motivation

Learning is a process in which students actively think, analyze and test scientific knowledge to form their own opinions. It is also a process in which students actively participate in the exploration of knowledge and use their own thoughts to solve problems. Learning concept refers to students' understanding of the task and essence of learning, that is, what learning is and what to do. The positive learning concept enables students to show initiative and positive behavior, and they will persist in completing learning tasks even when they encounter difficulties in learning, while the negative learning concept makes students show passive and coping behaviors. Learning motivation is also related to learning concept. According to the student's interview, when asked "what prompted you to study hard", some students answer "family expectations", when asked "what causes you don't want to learn", some students think that they "do not understand", some students think that it is because of their "lazy", some students think that they can "not keep up with the thinking" when learning. Obviously, if a student studies for the purpose of "family expectation", he/she may study

passively. If a student thinks that he/she cannot "keep up with his/her thinking" in study, it will affect his/her learning enthusiasm. On the contrary, if students voluntarily study out of their own interest, think that they can learn knowledge well through hard work, and that knowledge should be acquired through various ways such as laboratory activities and data access, they will take the initiative to study and explore.

2.2.3 Mastered mathematical learning methods and strategies

Having sufficient mathematical learning methods and strategies and being able to skillfully use these methods and strategies is an important guarantee for mathematics autonomous learning, that is, "knowing how to learn". Mathematical learning method refers to the means or ways for students to complete mathematical learning tasks. It is the basic activity mode and basic guiding ideology adopted by students in the process of acquiring knowledge, mastering technology and forming skills. Learning strategies mainly refer to the learning rules, methods and techniques implemented by learners in order to achieve certain learning objectives. Mathematical learning strategy refers to the cognition of mathematical learning tasks and conditions, the selection and use of mathematical learning methods, and the regulation of mathematical learning steps and processes in a specific mathematical learning context in order to achieve a certain mathematical learning goal. The process of using mathematical learning strategies includes metacognitive activity, selection and implementation of mathematical learning methods, and monitoring of mathematical learning process. In mathematics learning, in the face of specific learning tasks, if students lack the corresponding learning methods and strategies, it is difficult to complete the learning tasks well even with a high level of motivation. Therefore, it is a necessary condition for autonomous learning of higher mathematics for students master enough learning methods and strategies, while use consciously and effectively. Therefore, in the higher mathematics teaching, the teacher must pay attention to the student mathematics study method and the strategy training. Because of these reasons, the teacher must pay attention to the student mathematics study method and the strategy training in the higher mathematics teaching.

2.2.4 Influence of higher mathematics learning content

The content of higher mathematics learning has an important influence on students' independent learning. In this survey, some students think that the learning content is divorced from reality, some think that the learning content is boring, and some students are not interested in learning. It can be seen that the content of learning plays a very important role in inquiry learning. It should not only show students knowledge, but also show how to acquire knowledge, and provide the necessary basis and methods to solve new problems, so as to help students form a positive learning style and scientific values. At the same time, the quality of teaching materials will also affect the level of learning.

2.2.5 The influence of teachers

In school, students accept the mathematical culture edification, and learning mathematics knowledge cannot leave the mathematics teachers' teaching and guidance, therefore mathematics teacher's teaching idea, teaching method and teaching level is an important factor of influencing students' autonomous learning higher mathematics, and plays an important role in training students' ability of autonomic learning higher mathematics.

According to our interview survey, a small number of students in the interview think that teachers have a bad impression on them and their teaching methods make them unwilling to learn. Some students said that teachers "rarely guide students to design and practice", some said that "teachers rarely guide students to observe new things, make new attempts, encourage students to conduct more in-depth experiments and thinking", and some said that "teachers rarely use open questions to stimulate students to explore, observe and think". Thus it can be seen that teachers usually pay little attention to the organization, guidance, participation and training of students' independent learning and independent inquiry learning. In classroom teaching, teachers speak more but students practice less. In students learning process, if teachers can give students more in terms

of self-regulation of teaching, guidance, supervision and inspiration, students will gain more experience, more clearly aware of the whole process of their learning activities, such as to teach students the strategies to solve the problem, students are encouraged to actively to try and effort, guides the student to reflect the process of study, help students to eliminate interference and improve self-control, inspire the student to continue to improve and perfect their own learning activities, so that the autonomous learning ability was improved and perfected.

Independent learning of higher mathematics puts forward higher requirements for the majority of mathematics teachers. In order to cultivate new talents in the new century, mathematics teachers should establish new educational concepts and keep learning to improve their professional quality.

3. Conclusion

The realization of independent learning is the requirement of quality education and the need of students' all-round development. Only when students practice by themselves, use their own brains to think actively, discover and innovate, can they give full play to their autonomy, initiative and enthusiasm, and thus give full play to their main role. The acquisition of independent learning ability is a process of internalizing external learning skills into one's own ability. The cultivation of independent learning ability should be carried out in independent learning activities. There are two necessary preconditions for the implementation of independent learning, that is, learners have the ability of independent learning, and the school provides the space for independent learning. The former is a subjective condition, while the latter is an objective condition. The objective condition refers to the hardware facilities that can provide learners with free choice of learning materials, activity sites, learning methods and means.

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