

Research and Practice on Cultivating Students' Independent Learning Ability in basic Chemistry of Higher Vocational Colleges

Kaihua Guo

wuhan institute of vocational technology, wuhan, hubei 430074, China

Abstract. vocational colleges should cultivate students' independent learning ability to enhance their employability. In basic chemistry teaching by stimulating the students' learning motivation and interest in learning, learning as the main body of the chemical experiment teaching and classroom teaching pattern, professor of chemical knowledge and skills of learning strategies and other methods to cultivate higher vocational students' autonomous learning ability.

Keywords: Independent learning ability; learning strategy; teaching strategy.

1. Introduction

The higher vocational colleges should train high technical personnel in chemical industry not only to master the basic theoretical knowledge and basic operational skills of chemical industry, but also to have the comprehensive quality and ability to adapt to the modern industrial environment. The research results show that the learning ability of modern chemical enterprises is the first among the ability requirements of operators. Therefore, cultivating students' independent learning ability has become an important issue in the reform and development of education teaching in higher vocational colleges. We choose basic chemistry as the carrier of the professional basic course for freshmen majoring in chemical engineering to carry out the research and practice of cultivating the independent learning ability of senior vocational students.

2. The Necessity of Cultivating the Independent Learning Ability of Vocational College Students

2.1 Lifelong Learning Education Concept

Today's society is a learning society, the school education for students to cultivate professional ability is impossible to make it useful - students. Only through continuous learning and lifelong learning can we acquire new knowledge, acquire new skills and adapt to new positions, and meet the common needs of social and personal development. Therefore, education, as an integral part of an individual's lifelong learning career, must cultivate students' ability of independent learning for the sustainable development and lifelong development of students.

2.2 The Requirement of Improving Professional Ability

Higher vocational education is employment education, and improving students' vocational ability is the fundamental goal of higher vocational education. Professional ability by certain professional ability, general ability and professional core ability, independent learning, team cooperation, information technology, etc.), the independent learning ability is an important part of professional core abilities. Employment status shows that unit of choose and employ persons, increasingly professional core ability, professional core ability strong people can better adapt to society, in mastering new knowledge, update technology more initiative and enthusiasm.

2.3 The Need of Education Teaching Reform in Higher Vocational Colleges

Higher vocational education teaching reform is to, the project course, case teaching has become the characteristics of higher vocational education teaching, based on the "real one" teaching mode of "consultation, decision-making, planning, implementation, inspection, evaluation," the six steps of

teaching, teaching way is the mainstream of the current higher vocational teaching, in which every step of the protagonist is a student. All the core of the reform to the course of "the students from the accessory into the body of the course participants", requests the student to have the strong awareness of autonomous learning and higher levels of autonomous learning ability.

3. Status Quo of Independent Learning of Vocational College Students

3.1 Learning Autonomy Drive

The driving force of learning autonomy includes five aspects: learning attitude, learning motivation, attribution, confidence and dependence on teachers. To grade 2009 applied chemical technology, fine chemicals production technology and industrial analysis and inspection of three professional altogether 70 students interview survey results show that more than 70% of the freshman in basic chemistry learning positively in the process, main show is actively involved in the teaching in class, finish the homework and experiment report, after class some students take the initiative to ask questions to teachers, etc.; On learning motivation, while a freshman learning motivation of concrete and diversity, such as to obtain a scholarship, or elected as the class cadre miyoshi students, but in the end point is through good grades and so honor and so on, to get a good job, reflected the reality of the current higher vocational students' learning motivation and utilitarian; On attribution, more than 60% of the students think that the majority of chemical knowledge can be master through memory, as long as you work hard, you can get good grades, indicates that most of the students chemistry learning method is not quite right; In terms of dependence on teachers, more than 80% of the students think: the teacher's teaching plan is their own learning plan, learning materials shall be designated by the teacher, hope by teachers to supervise their learning process and learning result should be composed mainly of teachers evaluation, shows a freshman of teachers still have very strong dependent psychology; In terms of confidence, more than 50% of the students' confidence in their ability to learn, but there is a weak foundation in nearly 50% of the students think they enough, smart enough, to have no confidence in their ability to learn or lack of confidence.

3.2 Ability to Learn Independently

In the middle school stage, the impact of examination-oriented education, teachers and students are mostly in order to pass the college entrance examination for learning objectives, classroom teachers use cramming education way more fine play each chemical equation, every physical and chemical properties, basic don't give students independent thinking space and time; The teaching process is dominated by classroom teaching, and the classroom teaching is centered on teachers. The teaching and learning process is controlled by teachers, which leads to the weak consciousness of students' independent learning. After class, students are surrounded by a large number of exercises and exams, and have no opportunity to plan and monitor themselves. After entering higher vocational stage is characterized by: there is no clear learning objectives, won't make learning plan, spare time besides, the textbooks don't know what to learn to solve the problem, can't effective use of reference books, study, rarely to monitor their own learning methods and adjust, can't timely and accurate evaluation of their own learning. In a word, freshmen in higher vocational colleges have lower level of independent learning ability.

3.3 Chemical Learning Strategies

According to the interviews with freshmen, more than 50% of the students had not done chemical experiments in high school, and only watched teachers conduct classroom demonstration experiments. Even when doing experiments in the laboratory, only the reaction principle, reaction phenomenon and theoretical explanation are emphasized, and less attention is paid to the experimental operation skills, and there is no link to write experimental reports. Mainly by teachers' explanation and related problem to obtain "written" knowledge of chemical experiment, the lack of basic chemical experimental ability of organization and operation skills, it is difficult to adapt to higher vocational teaching pattern of "learn to do a whole".

The learning mode of knowledge of elemental compounds is mainly memory, that is, memorizing chemical equations, physical properties and chemical properties. The learning of chemical concepts and principles is generally strengthened by teachers' explanation and exercises. Most students do not analyze, summarize and summarize their knowledge by themselves. The learning strategies of chemical knowledge are inefficient and unitary.

4. How to Cultivate Students' Independent Learning Ability

4.1 Cognitive Chemistry Teaching and Learning in Higher Vocational Colleges

First of all, help students to understand higher vocational chemistry teaching, from the concept of passive learning of middle school chemistry to the independent learning of higher vocational education as soon as possible, form a correct learning view. In the stage of professional education, higher vocational learning and to the students in this paper, the difference of high school, namely: the emphasis on the application of chemical knowledge on learning goals, emphasis on applying knowledge, analyzing and resolving problems emphasized the mastering skills; Advocate the independent study of students in learning mode; Both theoretical knowledge and practical skills are emphasized in the learning content. In thought, students should be discouraged from relying on teachers for learning, listening and learning, and mastering knowledge and skills by doing exercises. Secondly, help students to establish a correct learning concept and realize that the ability, attitude and values of independent learning are as important as the learning knowledge and skills themselves. "The illiterate of the future are not illiterate people, but people who have not learned to learn. "Only by mastering the learning method and developing the ability of independent learning can a person continuously acquire new knowledge and adapt himself to the needs of social and post development.

4.2 Stimulate Students' Learning Motivation

Learning motivation is the psychological factor that promotes learning activities and is the driving force of learning activities. The more clearly motivated you are, the more autonomous you become. However, the research results and teaching practice all show that the learning motivation level of the freshmen in higher vocational colleges is generally not high, and some students are bored with learning. Therefore, in chemistry teaching, teachers must help students improve their learning motivation, stimulate their interest in learning and lay a psychological foundation for independent learning through various education teaching activities.

To fulfill the professional development needs. Learning for personal development is the main motivation of higher vocational students. Most freshmen in higher vocational colleges do not know much about their majors and are not clear about their future career development direction. They even think that operators in production positions do not need the basic chemistry knowledge they have learned at present. Aimed at this problem, on the one hand, guides the student to clear vocational chemical professional training target, from "develop chemical companies a line post operation workers", the transition to "develop chemical enterprise knowledge, developing skills talents", this kind of talented person must have a certain theoretical knowledge and learning ability. On the other hand through the scene to watch in the professional education graduates work video, understand the chemical post operators professional standards, in the teaching guide students to use professional knowledge to solve problems of chemical production analysis, causes the student to fully understand the importance of professional knowledge learning in his career, promote the formation of learning motivation.

Some students are interested in learning. Interest is the deep internal driving force that leads learners to self-conscious learning. Many students lost their interest in learning, because the foundation is bad, difficult to learn, don't understand of the teaching content, unable to participate in the learning process, it is the universality of higher vocational teaching is faced with problems.

One of our measures is to transform abstract into concrete, so that the teaching content conforms to the cognitive characteristics of vocational students. The network and various chemical teaching resource Banks provide us with a large number of videos, pictures, animation and other resources. By

using the multimedia courseware organized by these teaching materials, the abstract theoretical knowledge becomes vivid, intuitive and understandable. It not only improves students' interest in learning, but also helps to build their confidence in learning.

The other is to change from being nice to being active. For example, the reaction mechanism of organic chemistry is important but difficult, and some students even decide to give up the study of this part. We take the "cooperative learning" mode, the students to form study groups, to provide each group organic structure model and the reference site, layout of each group class. Check data and then use a model or courseware in class to demonstrate reaction mechanism, and the evaluation of teachers and students, please. It has been proved that students attach great importance to this opportunity to show their abilities, download materials online, discuss problems with teachers, and study how to express themselves so that the audience can understand and understand them. In class, some groups use "model + oral explanation", while others use "animation + text" to explain the reaction process on the platform. As a result, the difficulty that the teacher cannot teach is overcome by the students themselves. This shows that, if the teacher guides the method, the students are willing to use their hands to brainstorm and cooperate with each other in learning.

Blank sets learning goals in layers. There is no denying that the knowledge base of higher vocational students is weak and their abilities are uneven. However, higher vocational colleges require students' theoretical knowledge to be "necessary and sufficient". Therefore, we set learning goals at three levels: A, B and C for each teaching unit, each experimental project and each class. A. For 30% of students with low academic level; B, for 50% of middle level students; C, for 20 percent of students with high academic level. the teaching objective is clear, detailed and the measurement method is given, and whether the target can be achieved by measuring the level of practice, homework and experiment operation. Face through hard for everyone to achieve goals and more challenging to a higher goal, students in the class actively by reading the teaching material, help the teacher study and discuss with classmates, and complete the goal; After class through reference books, network and other learning, in order to achieve the goal of higher level; Some students can only achieve B or C in theoretical knowledge, but they can reach A target when the experimental project is completed. The hierarchical teaching goal enables most students to experience the progress and success of learning, enhances their learning confidence, and stimulates their desire to learn independently.

4.3 Reform the Experimental Teaching Model

Traditional experiment teaching is a teacher according to the experiment instruction on experimental principle and the experimental steps, students according to their instructions step by step according to the experiment, structures, experimental apparatus, the experiment operation. Students become puppets of experimental instruction books, with little effect other than training basic experimental skills. It can be said that as an important carrier of chemistry teaching, the education function of the experiment has not been fully played. Since 2008, we have used the six-step method to carry out experimental teaching. Every step is carried out with students as the main body, giving full play to students' subjective consciousness and training students' independent learning ability. In the preparation of aspirin, for example: (1) information: teachers and students through the Internet, reference books, learning experiment main reagents salicylic acid and acetic anhydride and product physical properties, chemical properties of aspirin and aspirin historical process of the invention, the reflux device principle and application of aspirin reaction principle and method for the preparation, aspirin in factory production methods, etc., rich perceptual knowledge.(2) decision: due to the production rate is an important indicator of evaluation experiment results, the experimental group tend to compare various experimental methods, carefully formulated to improve the yield of experimental scheme, and teachers, please check for approval. Test plan: prepare test plan according to the test plan. It is required to draw the block diagram of the experimental process and the schematic diagram of the experimental device, list the required drugs and instruments, clarify the division of labor among the experimental team members, and design the experimental data record form. Teachers check and guide. Implementation: students check whether the equipment and drugs are in readiness and meet the requirements, set up experimental devices and implement experimental plans; Teachers

on-site guidance, demonstration of correct operation, to solve experimental problems. Inspection: students judge whether the products meet the expected requirements of the experiment through the appearance and weighing of the products; Teachers check whether the experimental data records are standardized, and check whether the experimental equipment returns to its original appearance. Evaluation: students reflect on and summarize the reasons for success or failure in the experiment report. Teachers comprehensively evaluate students' experimental skills, experimental attitude and experimental reports.

Although there are many restrictions on students' experimental plans due to equipment and reagents, students are still enthusiastic. There are only 6 hours in the class for experimental operation, but students should use one week's spare time in advance to check materials and make experimental plans. Every time an experimental project is completed, the students feel quite fruitful. I believe that I have not only learned professional knowledge, but also learned the method of independent learning, and experienced the pleasure of independent learning.

Teach learning strategies

In order to achieve independent learning, students must be able to learn, that is, master certain learning strategies and apply them effectively in the learning process. But in teaching, the majority of high vocational students reflect that they cannot learn, the learning method is improper, urgently need the teacher's guidance. By observing the teacher also found that some students or no learning strategy, or the use of invalid or not mature strategy, most students can't develop their own learning strategies in time according to the learning content. We use different learning strategies to instruct and demonstrate students in different learning periods and contents in chemistry teaching, and teach them to "learn".

Current classroom learning strategy 1 is to ask and guide students to take pre-class notes and post-class summary notes. Pre-class preview enables students to clearly define the classroom learning objectives and key problems, actively participate in the teaching process, become the main body of classroom learning, and improve the classroom learning efficiency. After-school summary is a continuation of classroom learning, for chemical experiment practice, writing test report is the best way to summarize and reflect on, including the items listed (experimental targets, experimental principle, experimental process and experimental results discussed, the experiment the key to the success or failure, etc.) to guide students to comb, the whole process of experimental training in teaching, we refer to the pattern of experiment report, students are required to write in time after class, mainly include the learning objectives, emphasis, teacher way of thinking, analyzing and resolving problems personal views and questions (two aspects of knowledge and methods), an important figure or table, etc., Lead the students into a goal-oriented, methodical and evaluative learning model, and form the ability of independent learning unconsciously.

The second is to guide students to carry out learning discussions. Most high school students fail to recognize the positive significance of discussion among classmates in learning. To design relevant to students both in teaching practice, can arouse students' positive and discuss the quality issues and create a beneficial discussion atmosphere, guide students to carry out the discussion-based learning, experience from divergence to agreement, from fuzzy to clear the process of problem solving, guides the student to form through cooperation with people solve problems, to understand and grasp the knowledge of learning strategies, ensure that autonomous learning can continue to proceed smoothly.

Review summarizes the strategy of higher vocational stage, students have ample can discretionary time, after class autonomous learning has become the main study way, they mainly include the review summary and expanding knowledge. The most common review strategy used by students is repetition, but they are not good at analyzing, summarizing and summarizing. The teacher should show the students how to connect the net of knowledge through the review class. Such as chemical equilibrium learning: chemical equilibrium including chemical reaction equilibrium, acid-base ionization balance, precipitate dissolve balance and coordination, balance, the balance of each contain more formulas, principles and concepts, if not to sum up, students feel more knowledge and miscellaneous, difficult to master. We used to design a good form to guide students to analyze all kinds of the equilibrium constant expression method, the significance of the equilibrium constant, the influence of various

factors and balance of mobile application principles of balance, and then concludes the writing rules of chemical equilibrium expression, the universality of the essential significance of the chemical equilibrium and balance principle of mobile. Later, students found that they could write formulas without memorizing them, and they could analyze and solve problems. Moreover, they also experienced the process of "from thin to thick" to "from thick to thin" in learning. In the subsequent teaching process, the design forms and similar tasks are gradually left to the students themselves, and students are required to submit their own learning summary in the form of homework.

5. Conclusion

The cultivation of higher vocational students' autonomous learning ability is a systems engineering, and by the idea of teaching and learning, attitude, policy, environment, technology, and many other factors, cultivate their autonomous learning ability also will not happen overnight, one pace reaches the designated position. Higher vocational education workers should be fully aware of the vocational students' background knowledge and cognitive characteristics, on the basis of through effective means of education teaching, arouse their learning interest and motivation, establishment of autonomous learning teaching environment, promote and improve their learning strategies, take the student as the main body of teaching mode, cultivate and develop their ability of autonomous learning.

References

- [1]. pang weiguo. Principles and strategies of independent learning -- learning and teaching [M]. Shanghai: east China normal university press,2003.
- [2]. zheng lixiao. Enlightenment of cognitive strategy teaching -- reflections on the cultivation of independent learning ability of vocational college students [J]. Journal of zhejiang university of industry and trade,2008,8(4):14-18.
- [3]. shi wenjie. Comparison of foreign higher vocational education teaching model and its enlightenment [J]. Education exploration,2008(8),136-137.
- [4]. he feiyue, fu dajie, pan jie. Study on learning strategies of higher vocational students [J]. Research on vocational education, 2009(9),18-19.