

Exploration and Practice on the Improvement of Students' Literacy and Learning Ability

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Abstract: Relying on College Computer Foundation the example, various ways and methods are used to improve students' information literacy, learning ability and stimulate learning motivation. Cultivate students' computing thinking ability to improve students' information literacy. Take discovery learning and penetration learning as the teaching method of practical courses to improve students' learning ability and lay the foundation for follow-up professional courses. From the perspective of improving teachers' and students' self-efficacy, this paper analyses the significance of self-efficacy in improving teaching effect. Several years of teaching practice shows that the reform of teaching methods is successful, and the overall teaching effect is gradually improved.

1. Introduction

The new engineering education emphasizes "computer + specialty" education, the multi-disciplinary integration, and should cultivate students' ability to solve complex problems. "Computer + problem solving" trains students to use computers to solve problems. Due to the constraints of the first-class computer examination, in the past, taking examination-oriented education for the purpose of teaching practical operation ability as the teaching goal, the basic operation skills and skills of office were taught in theoretical courses and experimental courses. As a result, after the course, students can operate documents skilfully according to the given requirements, but they do not understand enough how to use computers to solve problems, which does not play a due role in their professional disciplines and subsequent extended learning. In order to change this phenomenon, it is urgent to reform the contents and methods of students' education and teaching. This paper takes the course of *College Computer Foundation* for Non-computer majors as an example to explore and think about the curriculum teaching reform. This course consists of two parts: compute and computational thinking, technology and application. This paper explores how to improve students' information literacy^[1,2], stimulate students' interest in learning, mobilize students' subjective initiative in learning, improve students' sense of self-efficacy^[3] and cultivate students' learning ability.

2. Cultivation of information literacy based on Computational Thinking

Information literacy is an ability to adapt to the information society. "To be an information literate person, he must be able to determine when information is needed and have the ability to retrieve, evaluate and effectively use the information he needs^[1]. Information literacy education requires that in education and teaching, we should not pay too much attention to the study of subject knowledge, but should pay attention to how to guide students to apply information technology tools to solve problems, especially by combining the study of information technology with subject teaching, so that students can take technology as a tool to obtain knowledge, process information and serve to solve problems. Here, in the part of compute and computational thinking, we pay more attention to explain the computational thinking explanation in theory course, emphasizing the understanding of problem solving methods, as well as the understanding of computing system and environment.

Starting with computing problems, students should not only master the basic principles of using computers to solve problems, but also pay attention to the combination of computing thinking training and technology application practice. Let students stand in the perspective of computer science, the multiple meanings of problem solving, system design and human behaviour of computational thinking^[4], and establish the awareness of combining the method of Computational Thinking with their major. Improve students' computer application ability of "computer + professional problem solving".

During the teaching process, relevant knowledge points shall be added according to different majors. When students encounter these, they don't understand, students were encouraged to use the "Infiltration" learning method. They can have a preliminary understanding through checking the literature and discussing with others, and then continue to go on.... they can slowly master the knowledge points they haven't learned in class. Infiltration learning method should be mastered by every student and it can make full use of the law of unintentional perception and learning transfer, and learn relevant knowledge without increasing the learning burden. Through the feedback of previous students, we find that this method is of great benefit to the learning of follow-up professional courses.

3. Cultivation of learning ability based on Discovery Learning

In the part of technology and application, we adopt the education mode of "discovery learning" to cultivate the learning ability. The experimental course focuses on the practical operation ability. In the past, "transmission acceptance" teaching, students deal with the passive rather than the master role, which seriously restricts the students' enthusiasm for autonomous learning and the development of discovery and inquiry thinking ability, which is not conducive to the improvement of students' cognitive level and the exertion of their intellectual potential. "Discovery learning" gives students greater learning autonomy and practical training opportunities^[5,6]. Through independent learning and thinking to find and solve problems, it is conducive to cultivating students' learning ability and creativity.

Although the students after 00 have different degrees of information-based education, most students can obtain knowledge from the network. The sources of students' information are more extensive. It is appropriate to focus on students' learning and adopt the teaching mode of paying attention to students' participation in learning. When encountering problems, let students first seek solutions through online self-study, and give full play to their subjective initiative and enthusiasm in the process of finding solutions.

Because new knowledge is "discovered" by oneself, this joy of success is conducive to stimulate students' internal motivation and cultivate learning interest. Then, with the active and correct

guidance of teachers, we can receive good teaching results. For example, there are many Excel functions, which are completely unrealistic to explain all of them. In the experimental class, let the students explore the way of Learning & teacher guidance, and take the success of learning one function as the incentive point to encourage autonomous learning of other functions, so as to cultivate the ability of independent learning. Because learning is active, the memory is firm, and it is of great benefit to the accumulation and transfer of students' knowledge.

4. Improve self-efficacy

People with a high level of self-efficacy will choose challenging people and expect success. On the contrary, students will avoid activities they feel incompetent. People with a high sense of self-efficacy have strong self-confidence and are confident that they can master relevant knowledge and skills well, which helps to stimulate and maintain the spirit of challenging difficulties and strive to achieve goals^[3,7,8]. The improvement of teachers' self-efficacy and students' self-efficacy will have a significant effect on the improvement of teaching effect and students' learning ability.

4.1. Students' self-efficacy

Self-determination theory^[9] holds that whether the basic psychological needs are met or not is the key to the healthy growth and development of individuals. When the basic psychological needs are met, individuals will develop in a positive and healthy direction. On the contrary, when the basic psychological needs are blocked, individuals will develop in a negative direction or have functional barriers.

For freshmen, on the first test, half of them will find that they fall behind. This is an experience many of them have never had before. Many students have encountered academic difficulties. Due to the differences in learning styles between college and high school, many students have had confused moments when they always feel that some companions can't catch up no matter how hard they try, and have had dark moments when their self-confidence wavered.

At such a time, teachers should know how to protect and encourage students' learning confidence timely and effectively. Even a little praise from the teacher means a lot to the students. Most of the students said that the more motivated they were, the more effective they considered the teacher to be and it really increased their desire to perform well. So, teachers should give students positive attribution feedback and guide students to learn appropriate self-attribution.

4.2. Teachers' self-efficacy

Teachers' self-efficacy refers to a teacher's belief in his or her ability to execute courses of action required to successfully complete a specific teaching task in a particular context. Teachers with high self-efficacy influence the self-efficacy of students as well by involving them in the learning process and apply several teaching skills, manage class effectively and create a positive teacher/student relationship^[9]. Efficient teachers encourage students for understanding. They treat students' misunderstandings in the subject and they utilize different visual aids in order to make the subject more enticing and meaningful.

It has been illustrated that improved self-efficacy also improves the teaching standards, as teachers become more resilient, focused, enthusiastic and determined. It was observed that effective teachers try to understand the needs of the students, and try to solve their problems through counselling, they, in fact, increase students' self-efficacy which is likely to improve their learning.

For example, sometimes students come and complain that they have no background in using word or excel, they are studying it for the first time, they find it difficult etc. Then as teachers, we

have to motivate them that the course is designed as you have never read it before so you don't need to worry as you all are on the same footing. And also, it is a good way to let students do some relatively simple operations and experience more success to improve their sense of self-efficacy.

5. Effectiveness analysis

Through several years of teaching practice, the overall teaching effect is good. For instance, the average score for class 1801 of Land resource management is 82.9, the lowest score of the whole class is 53.9, and the standard deviation is 8.3. The average score for class 2101 of industrial design is 86.1, the lowest score of the whole class is 78, and the standard deviation is 5.2. The overall level has been significantly improved.

6. Conclusion

Undergraduate study is not to make students reach the state of ready-made, but should be a stage ready to go and lay a deep foundation for going higher, farther and more creative in the future. "Broad knowledge and Solid foundation" should become the basic orientation of undergraduate talent training. Student-centred is, of course, the criterion for all work of the University, especially teaching work. In our teaching process, various ways and methods are used to improve students' sense of self-efficacy and stimulate learning motivation. Several years of teaching practice shows that the reform of teaching methods is successful, and the overall teaching effect is gradually improved. Pay attention to students' lifelong learning and the cultivation of learning ability, so that students have the ability of lifelong learning, which plays an important role in students' future work or further study.

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