Ideological Education in the Specialized Course for Postgraduates: Exploration in "Principles of Embedded Systems"

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ABSTRACT

In view of the problems of the postgraduates of lacking of faith, clear learning goals and motivations during their studies, the specialized course "principles of embedded system" is used to promote the core values of socialism and the spirit of the times by integrating ideological education into the teaching professional knowledges. It aims to help the students to build the right view of values and gain scientific spirit so that they will be inspired to work for the rejuvenation of the nation and realization of Chinese dream in pursuing of their career. More active classes, improved learning efficiency, improved skills and virtues of the students have been achieved with one year teaching practice, which shows the effectiveness of the proposed method for practicing ideological education in specialized courses.[1]

CHARACTERISTICS AND STRENGTHS OF POSTGRADUATES

Postgraduate students have stronger learning abilities compared to undergraduate students. However, they are often confused about goals and motivations, i.e. what professional knowledges should be learned, where to apply these knowledges and how to apply. Making clear the answers to these three questions is the key to improving the quality of teaching.

Courses with ideological education, different from ideological courses, are specialized courses embedded with ideological elements so that the ideological content are passed on to the students during the process of teaching the professional

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knowledges in a more subtle way[1-4]. Postgraduate professional courses provide good conditions for ideological education in the following three aspects.

1) Postgraduate teaching emphasizes on the application of the professional knowledges. Therefore, it is important to guide the students to find out the problems in practical applications, establish the model, analyze and solve the problems. Wide applications of specialized knowledges, which often include rich and vivid materials, provide a good condition for ideological education.

2) The course embedded with ideological education is designed to help postgraduates to find the directions of application for their learnt professional knowledges and skills. The choice of application determines the level of innovation and research achievements. It is important to follow the national strategic needs and technological trends at the forefront in order to have a good pay off.

3) Postgraduate students, though of strong learning ability, are often perplexed as a result of lacking learning motivations, which appears as lacking of goals and plans and easily distracted by social activities and entertainments on the web. Professional knowledges cannot help to solve this problem. Courses with ideological education use the power of examples to inspire and motivate the students to learn.

THE PRACTICE IN "PRINCIPLES OF EMBEDDED SYSTEMS"

As special computer system of scalable software and hardware with dedicated functions for application, embedded systems find their applications in all aspects of production and life, which provides a rich source of material for the ideological education. Inspired by the methods of ideological education for undergraduate courses in literatures[5-6], considering the characteristics of postgraduate students, we explored to integrate this course with ideological elements and put into practice.

Ideological Content

According to the curriculum architecture, 9 aspects of the ideological elements are included: 1) national consciousness;2) faith;3) steadfastness and dedication;4) heart for the nation;5) the spirit of the times;6) self-reliance and cooperation; 7) Chinese tradition;8) responsibility; 9) law abiding and integrity. For each class, one or several of these ideological elements are included, hence a comprehensive coverage is achieved overall.

Teaching Methods

The course is designed to have a positive impact on the thoughts of students while they are acquiring professional knowledges. The integration is made through selection of cases, class organization as well as teaching methods.

1) Fresh materials attract interest: Fresh material is the key to attracting the interest of the students. Important and encouraging current news of national interest

that are related to the course are collected as materials for preparing the lessons. The students will be pleased to find fresh materials in their professional study and even have resonance at certain part of it and be stimulated.

2) Immersive ideological education: In order to complete the course, the students have to finish three tasks, i.e. attending classes, doing homework and passing the assessment. Ideological elements have been integrated into all of the three parts to realize full coverage.

Classroom teaching is the most important part. Through carefully selected suitable specific cases of application, not only the professional knowledges are enhanced, but also the underlying ideological content is transmitted to the students.

At homework stage, we guide the students to applications with ideological values. For example, the students are required to watch the documentary "projects of a big country" to find the applications of embedded systems in every major projects and write reports. The good reports will be demonstrated in class.

The objectives for the course emphasize the ability for the students to apply the basic principles. Therefore, the weight of theoretical examination in the total score is reduced and added to the weights of papers or design reports, which makes it convenient to integrate ideological elements.

3) Diversified and active classes: Great efforts have been made to design diversified classes, which are more willingly be accepted by students.

Questions and discussions lead to active thinking: For example, in introduction to the situation of employment in embedded system industry, we brought to class the hot dialogue on job hunting between Dr. Liang from Tsinghua and Xiaosong Gao of a TV program, triggering discussion on job hunting, to guide students to link personal career planning with the needs of the country.

Use the situation and extend to bigger things: The students are guided to learn to write and debug codes from the smallest application system. It is the smallest and lowest level of mistakes that make the whole program fail. When this situation happened, an extension was made to the real system made up of hundreds of thousands of code, for instance, the automatic terminal of Yangshan port. In this way, the students learnt what it means to be of responsibility, steadfast and dedicated.

Set up examples and share experiences: The key to improving classroom efficiency is to stimulate students' initiative and create activate classroom atmosphere. The students who did the homework well were set as good examples and offered the chance to present their reports in front of the class, which creates an atmosphere of competing and sharing among the students.

Teaching Outcome

The one year exploration and practice shows that professional teaching, when combined with ideological education, is enhanced in the following three aspects.

1) Increased grades: As for the compulsory course, the theoretical examination assessing the basic knowledge and basic abilities is required. Comparing the grades students gained for the course with ideological education and without, we found that the grades of the students have generally been improved after integrating the course with ideological education, and higher teaching quality of the professional course is achieved.

2) Improved quality of research report: Without ideological education, most of the reports were mere combining, extending and improving of the old cases taught in class, and only a few reached the frontier of research and application in depth. After ideological education integrated, their reports have been improved in terms of the significance of the topics, the completion of the work and the results obtained.

3) Higher ranking of teaching evaluation: The ranking of the teaching evaluation by students has risen from top 13% to top 11%. This indicates that teaching method of specialized courses with ideological education has been well accepted by students.

CONCLUSIONS

Postgraduate students are standing at the preparation stage for scientific research. They are often confused when lacking of good motivations and clear goals. Therefore, it is necessary to add ideological education in specialized courses to provide guidance. The key to successful course with ideological education lies in the refining of professional content to be naturally combined with ideological content. Positive outcomes of teaching are shown with one year practice including more active classes, improved efficiency, and improved skills and virtues of the students. Therefore, the initial goal for ideological education in professional course is attained.

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