Universe Scientific Publishing

DOI:10.18686/ahe.v7i27.10490

Exploration of Practical Teaching Mode of Functional Materials Major under the Background of New Engineering

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Abstract: The new engineering construction is a deep revolution in higher education in our country,which aims at cultivating high-quality compound talents with innovative consciousness and engineering practice ability.As a new engineering major,the major of functional materials has higher requirements for students'practical ability.There are currently two undergraduate teaching plans for functional materials related majors:Material Science and Engineering and composite materials,which are metal,inorganic,nano and composite materials,etc.These courses mainly focus on theoretical teaching.And practical teaching mechanism and mode have many problems in the teaching process.The major of functional materials is one of the core majors of new engineering construction,which puts forward new requirements for talent training under the requirements of new engineering construction. This paper takes the major of functional materials as an example to explore how to further improve students'practical ability and innovative consciousness under the background of new engineering construction,and how to better train talents with innovative ability and engineering practical ability.

Keywords: New engineering;Functional materials major;Practical teaching;Model exploration

1. Introduction

Functional materials major is the discipline that studies materials with specific functions and the preparation,characterizat ion,and processing of materials corresponding to these functions.Due to the rapid development of the field of new materials,its development and application are of great significance to the development of China's manufacturing industry.With the rapid development of China's economy,the demand for functional materials is also increasing,and the demand for functional materials talents is also increasing.Therefore,many domestic colleges and universities have set up functional materials majors,such as Zhejiang University,Nanjing University of Aeronautics and Astronautics,Tongji University and so on.These universities have also carried out different degrees of exploration in personnel training.For example,Zhejiang University has set up a leading group for the construction of"new engineering"and organized and implement a series of new engineering construction reform pilot projects,such as intelligent manufacturing engineering pilot,Made in China 2025 pilot,and Zhejiang's"four new"action plan,etc.

As a new engineering major,functional materials major needs to be reformed in training mode and teaching methods.Functional materials major carries out teaching activities by combining theoretical teaching with practical teaching.However,there are many problems in the process of practical teaching:Practical projects cannot meet the needs of students'independent design and innovation. There are many problems in practice teaching,such as obsolete equipment,slow update and poor use effect.The problems in practice have not been solved in time.There is a lack of interaction between teachers and students in practice teaching.These problems directly affect students'understanding and mastery of knowledge as well as their ability to absorb and apply new knowledge.Therefore,strengthening practical teaching reform of functional materials specialty and cultivating talents with innovative consciousness and engineering practice ability are inevitable requirements for the development of functional materials major.

2. Reform Practical Teaching Mode to Stimulate Students'Interest in Learning

Since the major of functional materials involves many courses,it is impossible to meet students'learning needs for knowledge only through classroom teaching,so we need to adopt a variety of teaching methods and means.Firstly,we should strengthen practical

teaching so that students can acquire knowledge in practice.In the classroom,teachers can carry out some teaching activities that combine theoretical knowledge with practical operation,so that students can apply theoretical knowledge to practical operation.In practice class,practical teaching can be carried out in the form of groups.Since the major of functional materials involves more courses,we should classify practical courses,such as basic practice,comprehensive practice and innovative practice.Secondly,we should guide students to strengthen their understanding of professional curriculum knowledge.For example,in the course of materials physics,students can be organized to visit and study in the laboratory,so that students can understand the layout,equipment and materials of the laboratory,material preparation and performance testing knowledge.Finally,we should encourage students to take an active part in teachers'research work.Through scientific research activities,students can learn about the latest scientific research results,and at the same time,they can understand the ability of talents required by the current market,so that they can be clearer about their study and work direction.

In short,under the background of new engineering,functional materials major need to pay more attention to practical teaching. Optimizing the content of practice teaching and reforming the mode of practice teaching and other measures can be adopted to improve students'grasp of knowledge and application ability.At the same time,it is also necessary to strengthen the interaction between teachers and students and the exchange and communication between students and teachers in the practice class,so that students can better understand the connection between practical knowledge and theoretical knowledge.Only through continuous improvement of teaching methods and means can we improve students'ability to master and apply knowledge.

3. Strengthen the Construction of Practice Platform to Improve the Quality of Practice Teaching

The existing laboratory area of functional materials specialty is small,the equipment is aging,and the practice content and means are relatively backward,which can no longer meet the requirements of the training of new engineering talents.Therefore,the major of functional materials must strengthen the construction of practical teaching platform,and constantly improve the quality of practical teaching from the hardware.

The laboratory of Functional Materials major is equipped with a number of large-scale instruments and equipment with high level of physics,chemistry and materials,which can meet the teaching needs of multiple levels such as course practice of material physics and material chemistry,graduation design practice and scientific research practice.The laboratory is also equipped with a certain number of computers,material synthesis testing equipment,high-resolution microscopes and other modern teaching equipment.At the same time,the laboratory also has a high level of scientific research and has a number of large scientific research equipment introduced by the well-known universities or research institutions at home and abroad.In order to effectively utilize the existing resources of the laboratory and give full play to the role of the practical teaching platform,the functional materials major has formulated a strict laboratory management system and arranged practical managers.Through the rational and effective use of instruments and equipment by managers and strengthening the laboratory management,the laboratory resources are utilized to the greatest extent.

4. Strengthen the Management of Practical Teaching and Perfect the Guarantee Mechanism

Firstly,schools should strengthen the management of practice teaching,incorporate practice teaching into the whole teaching process,formulate scientific practice teaching management methods,establish a reasonable practice teaching evaluation mechanism and incentive mechanism,and strengthen the training of practice teachers.Secondly,a diversified practical curriculum system should be established to give full play to the role of various professional laboratories and functional materials research institutes. Thirdly,the open practice teaching mode should be established with students as the main body,teachers as the leading and teachers and students participating together to fully mobilize the enthusiasm and initiative of teachers to carry out practical teaching,promote teachers to improve their professional level and professional ability through various ways,and give play to the leading role of teachers in practical teaching.In the process of learning,students can also actively participate in practical teaching and become the main body of practical teaching activities.Finally,schools should increase the investment of funds and establish a perfect practical teaching guarantee mechanism.It is not only necessary to improve the construction level of practice equipment,site and laboratory opening,but also to increase the investment in the reform and construction of practice teaching.At the same time,we should strengthen the management of students'off-campus practice activities and off-campus practice base construction.In short,we should strengthen practical teaching management through various measures and ways to improve students'practical ability and innovative consciousness.

5. Strengthen the Construction of Practice Bases Inside and Outside the School to Improve the Quality of Practical Teaching

At present,the on-campus practice bases of functional materials major are mostly scientific research topics of on-campus teachers,which cannot meet the actual needs of students in practice.The major of functional materials should take the construction of"new engineering"as an opportunity to further strengthen the construction of internship bases inside and outside the school,and establish industry-university-research bases by strengthening school-enterprise cooperation,so that students can better contact the front line of production and provide more practical opportunities for students.At the same time,combined with the characteristics of functional materials major itself,it is necessary to give full play to the advantages of school-enterprise cooperation to expand the construction of off-campus practice base.In the construction process of off-campus practice base,we should take students as the base and carry out production practice teaching activities under the premise of ensuring students'safety.Schools should provide certain policy support and financial support in the construction of practice base to promote the construction of off-campus practice base.

6. Conclusion and Future Development Direction

Under the background of new engineering,the practical teaching mode of functional materials major needs to be deeply reformed and explored.Through strengthening the construction of practice platform,improving the quality of practice teaching,strengthening the management of practice teaching and improving the guarantee mechanism,and strengthening the construction of practice bases inside and outside the school,we can effectively improve the quality of practice teaching,stimulate students'interest in learning,and cultivate more high-quality talents with practical ability and innovative spirit.

Future development direction:It is necessary to deepen practical teaching reform and innovate practical teaching methods. According to the subject development trend under the background of new engineering,the content of practical teaching is constantly updated to improve the pertinence and practicability of practical teaching.It is necessary to strengthen the integration of practical teaching and theoretical teaching.Combining practice teaching with theory teaching,can make students better understand and master relevant knowledge through practice teaching on the basis of theory learning.It is necessary to improve the openness of practice teaching.Students are encouraged to participate in various academic exchange activities at home and abroad to broaden their horizons and improve their innovative and practical abilities.It is necessary to establish and improve the practical teaching evaluation system.In order to ensure the quality of practical teaching,it is necessary to improve the evaluation standards of practical teaching to incorporate the results of practical teaching into the comprehensive evaluation system of students.It is necessary to strengthen the construction of teaching staff.Improving teachers'practical teaching ability is to provide students with high quality practical teaching guidance.

References:

[1]Qing Yuan,Jindou Huang,Naisen Yu et al.Research and Practice on Online and Offline Mixed Teaching Reform of Fundamentals of Materials Science for Functional Materials Major[J].The Theory and Practice of Innovation and Entrepreneurship,2021,4(24):32-34.

[2]Hongmei Li,Da Jiang,Xingmin Liu et al.Exploration of Organic Chemistry Teaching for Functional Materials Major[J].Chemical Engineering&Equipment,2022(01):268-269.

[3]Guanghuan Li,Tao Long,Xiangming Li.Exploration of Experimental Teaching Mode of Functional Materials Major under the Background of New Engineering[J].Education Forum,2023(25):144-147.