

# The Mixed Teaching Mode of Metal Materials and Thermal Processing Technology Based on the Residential College System

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**Abstract:** *The residential college system is a reform and exploration of the student management system in China's colleges and universities in recent years, and has unique advantages in the practice of college culture education. However, as a new type of education model, the residential college system has a violent conflict with the traditional education model, and this conflict has become a pain point and difficulty in the development and construction of the residential college system. This paper relies on the residential college system to conduct research on the mixed teaching mode of "metal materials and thermal processing technology", which can well combine residential college and college. The conflict between the residential college education model and the college education model was solved.*

**Keywords:** *residential college system; metal materials and thermal processing technology; mixed teaching model*

## 1. Introduction

The original intention of colleges and universities to implement the residential college system education reform is mainly "to solve the contradiction between the growing demand of the state, society and industry for compound rule of law talents and the shortcomings of talent training under the traditional professional education model" [1]. Under the background of the construction of new liberal arts, colleges and universities continue to deepen the educational reform of The Residential College System, take talent training as the core, adhere to the cultivation of morality and cultivation of both virtue and law, practice the unity of knowledge and action, actively adapt to the new tasks and new requirements of the construction of a country ruled by law, a government under the rule of law, and a society under the rule of law, and actively carry out the exploration and practice of innovation in the training mode of rule of law talents with the entity residential college as the platform and carrier.

The residential college system is a reform and exploration of the student management system in China's colleges and universities in recent years, and has unique advantages in the practice of college culture education. Combined with the educational theory of developing comprehensive people, according to the new needs of social development and the needs of students' main development, the relevant concepts of cultural education in colleges and universities are defined, so that students can learn in activities and activities in learning, so as to stimulate students' enthusiasm for active learning, and then improve students' comprehensive quality and achieve the purpose of comprehensive education.

Abroad, the Osnabrück model, the other is the University of South Carolina's Initiative Model for Sustainable Development, are the only two EMS models proposed by the College and the Residential College. Through a period of experiments, it has been found that the bicameral model formed by the combination of college and residential college can promote students' innovation ability, stimulate students' enthusiasm and interest in learning, and after the implementation of this model in the environmental management system of American universities, good results have been obtained.

In China, The Residential College System is an innovative attempt to manage college students and cultivate talents. Since the introduction of the residential college system by Fudan University and Xi'an Jiaotong University in 2005, the reform process of the residential college system in domestic universities has been rapid. The pilot of residential college has been expanded from undergraduate colleges to vocational colleges, and from undergraduate education to master's education. In September 2020, General Secretary affirmed the far-reaching impact of residential college education on the

traditional spiritual temperament and social and cultural inheritance of Chinese universities in the inspection and investigation of Yuelu Residential College, and put forward expectations for its role in the reform of higher education with Chinese characteristics, which aroused the attention of the society to the modern residential college system. The reason why the residential college system can develop so rapidly is because it has played an incomparable role in traditional colleges in terms of student safety management, ideological and political education and comprehensive quality education, and is an effective exploration to implement the fundamental task of cultivating virtue and cultivating people and practicing the concept of three comprehensive education. While the construction and development of the residential college system is in full swing and the educational advantages of the residential college system are highlighted, the residential college system as a new type of education model and the traditional education model have a violent conflict, which has become the residential college Pain points and difficulties in the development and construction of the system. The reason for this "pain point" and "difficulty" is, in the final analysis, that the school does not really combine the college with the residential college, and cannot really play the role of the residential college.

This article is based on the "Metal Materials and Thermal Processing Technology" hybrid teaching mode based on the residential college system, which can well combine the college and residential college. The course "Metal Materials and Hot Working Technology" is very practical, and the theoretical knowledge explained in the classroom is difficult for students to truly understand. Students must go through a lot of experiments or practical activities, combined with theoretical knowledge to learn this course. However, due to the small number of hours in the classroom, it is difficult to achieve such a goal. The Residential College System focuses on student practical activities, and its emergence just makes up for the lack of classroom hours, and many activities of students can be put into the residential college, and at the same time, the Residential College System will combine everyone's interests and divide into different activities for everyone to practice. Let students learn in activities and activities in learning, so that residential college can play a role in promoting teaching, so as to stimulate students' enthusiasm for active learning, and then improve students' comprehensive quality and achieve the purpose of comprehensive education[2-3].

## **2. Research content and specific measures**

Residential College mainly educates students through complete activities, business education, etc., so as to cultivate students' sound personality, excellent leadership and other skills; The college mainly educates students on theoretical knowledge through professional teaching and general education, so as to cultivate students' solid professional quality ability. The mixed teaching mode is a relatively stable teaching activity structure framework and activity procedure established under the guidance of certain teaching ideas or teaching theories, and the mixed teaching mode is the embodiment of teaching theory, and the form and system of generalization of teaching practice, which has diversity and operability. Only residential colleges and colleges cooperate with each other, share resources and work together to promote the benign interaction between teachers and students and build a good common system for teacher growth, so the "residential college + college" dual-college hybrid education model is an important guarantee to achieve the goal of students becoming a whole-person education and cultivation. However, due to factors such as the mismatch between the activities set up by the residential college and the professional knowledge of students and the difficulty of matching suitable activities, students have fatigue with residential college activities, in the final analysis, our school has not really integrated college education and residential college education, which has become a stumbling block to the development of "residential college + college". Based on this, this paper explores and researches the hybrid teaching mode of "Metal Materials and Thermal Working Technology" based on the residential college system, and the research content is mainly based on the teaching reform of "Metal Materials and Thermal Working Technology" course.

### **2.1 In terms of college teaching**

Adjust the syllabus in combination with residential college activities, modify teaching resources, including teaching PPT, teaching plans, lesson plans, experimental content summary, etc., and integrate residential college activities, residential college interesting facts and competition results into classroom teaching, stimulate students' interest in learning this course, and make residential College activities as part of teaching allow students to learn with purpose and initiative. Based on the online teaching video created by Xuetong, based on the course teaching objectives, course characteristics, student characteristics and demand analysis of "Metal Materials and Thermal Processing Technology", combined with residential college activities for teaching reform, the online and offline teaching mode and scheme of the course "Metal Materials and Thermal Processing Technology" are constructed, so as

to realize the combination of online and offline teaching mode for students without space and time restrictions, and promote students' in-depth learning and mastery of the course of "Metal Materials and Thermal Processing Technology"[4-6].

## ***2.2 In terms of residential college activities***

Through the residential college to organize some activities related to the course of "Metal Materials and Thermal Processing Technology", such as metallographic preparation competition, steel performance test competition and other activities, at the same time, designate some activities as complete activities, organize students to participate in corresponding complete activities, and promote students' learning and practice of theoretical knowledge. The metal heat treatment experimental group is organized by students to verify professional theoretical knowledge through experiments, so as to promote students' in-depth mastery of professional knowledge and experimental hands-on ability, and promote the comprehensive development of students' professional knowledge and skills. Set up a studio in Residential College, and regularly invite outstanding teachers in material courses in the college to hold academic activities and answer questions on the spot, build a good interactive platform between teachers and residential college students, deepen the understanding of residential college students on the basic courses of material forming technology, understand professional knowledge and development prospects, and solve the problems encountered by students in practical activities. At the same time, freshmen of residential college are encouraged to participate in the scientific research projects of faculty members according to their professional interests, strengthen the scientific research and academic guidance of supervisors to students in the process of implementing scientific research projects, aiming to stimulate students' interest in academic scientific research, cultivate students' scientific research ability and teamwork ability, and promote students' mastery of professional knowledge through this method of integration of competition and education, so as to achieve the purpose of promoting competition with teaching.

## **3. Research objectives**

### ***3.1 Combined with residential college activities, the online course system of "Metal Materials and Thermal Processing Technology" was reconstructed***

The offline course system of "Metal Materials and Thermal Processing Technology" was reconstructed, and the school's complete activities and life examples related to the course of "Metal Materials and Thermal Processing Technology" were integrated into the teaching of professional courses

Based on the Superstar Learning Pass software, combined with residential college activities, a three-dimensional teaching resource library is established, including teaching activities such as recording teaching videos for each chapter, test exercises for each chapter, course assessment plans, and course-related extracurricular learning packages. When recording teaching videos, study the teaching materials in depth, explore the life examples related to the teaching content and the ideological and political elements of the curriculum, and integrate them into the video teaching.

### ***3.2 Integrate college teaching and residential college activities to build a professional pilot, "residential college + college" collaborative education system***

In residential college, with the content of the National College Students Metallographic Skills Competition as the guide, create corresponding complete activities, organize students to participate in related activities, for students with good practical skills and theoretical foundation, after the selection of the school, it is recommended to participate in the provincial or national college students' metallographic skills competition, so as to achieve the purpose of promoting teaching with competition. In the college, the complete activities of the residential college are integrated into the teaching process, and the professional teachers of the college regularly hold academic lectures and on-site Q&A in the residential college studio to promote students' mastery of professional knowledge and achieve the purpose of promoting competition with teaching. In this way, the school's teaching and residential college's complete activities are integrated together, forming a professionally led "residential college + college" dual-institute collaborative education system[7].

### ***3.3 Study the "residential college + college" dual-chamber collaborative education mechanism***

Residential College mainly educates students through complete activities, business education, etc.,

so as to cultivate students' sound personality, excellent leadership and other skills; The college mainly educates students in theoretical knowledge through professional education and general education to cultivate students' professional quality and ability. Only residential colleges and colleges can cooperate, share resources and work together to promote the benign interaction between teachers and students and build a good common system for teacher growth, so the study of the "residential college + college" dual-institute collaborative education mechanism is very important for the benign development of colleges and residential colleges, students and teachers.

This teaching reform can not only achieve the traditional goal of professional teaching in the college, but also achieve the reform goal of complete teaching in the residential college system, not only promote the improvement of students' professional knowledge, skills and abilities, but also promote the improvement of students' teamwork ability, and at the same time achieve the purpose of "promoting teaching by competition" and "promoting competition with teaching", so that college teaching and residential college activities can promote each other, integrate together, and achieve 1+ The effect of 1>2 truly exerts the effect of hybrid teaching and collaborative education of college teaching + residential college activities.

#### 4. Main features and innovations

(1) Combined with the course of "Metal Materials and Thermal Working Technology", the theoretical concepts, teaching objectives, and actual teaching modes based on the mixed teaching mode of The Residential College System were studied.

(2) It has formed a "professional" + "practice" teaching mode that combines the advantages of traditional professional teaching and residential college practice, and through the organic combination of two teaching organization forms, learners can learn from professional theoretical knowledge to in-depth mastery of practical application.

(3) Adhere to the combination of reform and construction, form a new all-round teaching system including the update of the curriculum teaching content system, the construction of practical teaching, the promotion of teaching by competition, and the promotion of competition by teaching, etc., and solve the problem of disconnection between theory and practice from the root.

(4) It solves the conflict between the residential college system of the new education model and the college system of the traditional education model, so that the residential college education model and the college education model are truly integrated, and the role of the residential college in the education model is maximized to achieve the effect of cultivating all-round talents.

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