

# On the Cultivation of Talents through Integrating Scientific and Technological Achievements into the Teaching of Professional Courses

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**Keywords:** Scientific and technological achievements, Course teaching, Talent cultivation

**Abstract:** Based on the idea of integrating scientific and technological achievements into curriculum teaching content and talent cultivation, this paper analyzes the implementation of curriculum teaching in detail from the aspects of curriculum theory teaching, practice teaching and teaching design; analyzes the talent cultivation mode from perspectives of industry development, teachers' teaching, students' ability and school-enterprise cooperation; evaluates the teaching process from aspects of modern teaching concepts, teaching and learning methods, as well as the cultivation of ability, emotions and values. In this paper, the author makes a systematic and in-depth study on the effects of scientific and technological achievements on the construction of professional courses and on the cultivation of applied talents, and puts forward the implementation plan.

## 1. Introduction

Under the current education system, due to the influence of examination oriented education mode for a long time, students are often satisfied with knowledge from books. They lack understanding on the current situation of social development and the development prospect of the industry. Problems such as lacking of scientific literacy, weak awareness of social interaction, weak consciousness of innovation and inadequate practical ability are commonly seen. Many college students have vague professional awareness, weak innovation and creativity consciousness, and are lack of entrepreneurial ability. In order to meet the requirements of social development, and promote the transformation of scientific and technological achievements into productivity, it is urgent to reform and innovate the training mode in higher engineering education, strengthen the combination between theory and engineering practice in professional courses, enhance the in-depth cooperation between schools and enterprises, pay attention to improving students' innovation consciousness, comprehensive qualities and social responsibilities, and strengthen the cultivation of students' engineering abilities, innovation consciousness, practice abilities and pioneering capacity, so as to improve the quality and innovation level of professional training.

## 2. Cultivation of Professional Talents and Curriculum Construction

Based on the characteristics of the photovoltaic industry and features of modern enterprise development,<sup>[1]</sup> and according to the requirements of "training application-oriented senior professional talents", in the education process, we need to strengthen the engineering technology practice ability and design ability of students, pay attention to the cultivation of innovation awareness and ability training, and provide innovative and application-oriented talents for the industry.

The concept of professional curriculum construction strengthens the integration of innovation consciousness, technologies, methods, practical abilities and the transformation of scientific and technological achievements; the content of curriculum construction highlights the experimental and practical features. The major offers courses which integrate theory with practice, so that students can think, use and create in their study process. The teaching contents combined with scientific and technological achievements not only integrate innovation consciousness, ideas, technologies and

methods, but also have strong practical and engineering features, so that students can have the knowledge, quality, methods and skills necessary for innovation, and become professional talents who can solve practical engineering problems.

### **3. Integrating Scientific and Technological Achievements into Teaching Resources and Implementation Analysis**

#### **3.1 Integrating Scientific and Technological Achievements into Theoretical Teaching**

Classroom theory teaching is a process of communication between students and teachers. Teaching is not monologue. The responsibility of university teachers in the new era is far beyond the traditional sense of “preaching, teaching and solving puzzles”. Jaspers, a German scholar, pointed out that only those who engage in scientific research can teach others something really useful, while ordinary teachers can only impart rigid doctrines. The teaching methods in university classroom need to be more diversified, so as to fully mobilize students' learning enthusiasm and subjective initiative. Through using online, offline and hybrid teaching methods, teachers can guide students to think independently, cultivate students' thinking methods from multiple perspectives, multiple directions, multiple levels and in wide fields, and make students become applied talents with solid basic knowledge, good theoretical literacy and relevant experimental skills. The theoretical teaching can be implemented from following aspects.

Firstly, classroom teaching is the most direct link in the university stage of teaching. Teachers transfer knowledge, inspire students, and cultivate the literacy and ability of students in the classroom. In the face-to-face teaching process, after relevant theoretical knowledge and methods are imparted, the teaching content shall be updated and integrated with the latest scientific and technological achievements. Specific examples can be enumerated; the theoretical innovation can be combined with application; the content of teaching materials can be connected with the scientific frontier. Through these methods, the learning interest of students can be increased; the visions and ideas of students can be widened; the teaching quality can be improved.

Secondly, the cultivation of photovoltaic talents should be the starting point and objective of the course content. The teaching contents need to be optimized to adapt to the development trend of the industry, reflect epoch features, show cutting-edge technologies and focus on application. The teaching contents should be reasonably selected to strengthen the cultivation of practical ability and social adaptability, to focus on imparting principled, strategic, developmental and creative knowledge, and to highlight the main position of students in education.

Thirdly, scientific and technological achievements reflect the thinking and innovation in ordinary teaching. College teachers are the main force of scientific research. In the process of teaching, the integration of scientific and technological achievements into teaching can not only reflect the professional knowledge level, scientific research ability and professional quality of teachers, but also show their individual characteristics and enhance their personal charm. The teaching of relevant scientific and technological achievements and teachers' scientific research experiences can help students to acquire advanced professional knowledge, deepen students' understanding of knowledge, expand their horizons, and improve the atmosphere of classroom scientific research. Students can be guided to think independently, and cultivate their ability to analyze and solve problems.

#### **3.2 Integrating Scientific and Technological Achievements into Practical Teaching**

Practice course is an important link and method to cultivate students' practical ability and enhance their comprehensive quality. It is inseparable from theory course. In practice teaching, teachers' relevant scientific and technological achievements can also be integrated into practice courses. Students can use their knowledge to solve problems they encounter, so as to cultivate their ability of independent thinking and cooperation, enhance their sense of innovation, and help students to give full play to the free space and improve their imagination. At the same time, teachers can control from the macro level, answer targeted questions, and make use of their own scientific

research advantages to improve the level of experimental teaching. Through this way, we can penetrate scientific research into experimental teaching, and cultivate high-level professionals.

Firstly, the course should focus on research experiments leading by students and reduce the proportion of confirmatory experiments. The open test experiment is beneficial to deepen students' understanding and application of theoretical knowledge, to strengthen the training of scientific research methods and to improve students' practical ability.

Secondly, teachers can guide students to contact scientific research and set up subject experiments. Experiments conform to students' interests can stimulate students' curiosity, stimulate students' free exploration spirit, and cultivate various abilities. Students should have the opportunity to master scientific and technological achievements, and master the methods of scientific and technological development, innovation and transformation. Their innovative quality can also be improved comprehensively.

Thirdly, students should learn advanced technology, carry out practical training, think more, combine theory with practice, and apply what they have learned in application. Students can choose research topics according to their own interests and employment intentions, clarify the application prospect of the technology as well as the engineering background of the project. They need to gain relevant professional knowledge independently, and acquire basic knowledge required by the research project. After that, they can use advanced instruments and equipment of the laboratory to realize the conception, design, manufacture, and installation. At last, they may even make products by themselves.

### **3.3 Transforming Scientific Research Ideas and Achievements into Curriculum Design**

Curriculum design is an important part in teaching practice and an important link to strengthen students' engineering practice ability. Designing courses appropriately can improve students' theoretical application ability and engineering practice ability, enhance students' overall understanding of the course and the connection between chapters, and help students to grasp the contents. It can investigate students' comprehensive ability of applying knowledge they have learned, so as to cultivate students' ability to analyze and solve problems.

Firstly, it is an applied, complex and comprehensive process to transform scientific research thinking and scientific methods into curriculum design ideas. In the process of teaching, teachers are often troubled by the question, "what is the use of the curriculum". Based on this, it is very appropriate to implant scientific and technological achievements into the content of curriculum. The methods and thinking of scientific research can be effectively transformed into curriculum design ideas; scientific research projects and achievements can be effectively transformed into classroom teaching contents. In that way, students can understand the background, purpose and prospect of curriculum content. It can increase the engineering and practice elements in curriculum design, enhance the content research in curriculum design, increase the practicability of curriculum design, and improve the application of curriculum design.

Secondly, the method can improve teachers' quality and integrate teaching resources. The university teachers undertake both teaching and scientific research responsibilities. They should not only effectively transform the scientific research projects and achievements into classroom teaching contents, but also constantly innovate, improve and perfect the teaching modes and methods. In terms of knowledge, they should constantly update the frontier knowledge, and teach the latest achievements to students. In terms of methods, they should control in the macroscopic level and use details flexibly. In terms of objectives, they need to make clear objectives of professional talent training and clarify the implementation plan of the courses. They also need to improve their own quality, explore available resources and optimize teaching resources in combination with the positioning of the school.

Thirdly, teachers should pay attention to the discussion teaching design to stimulate students' interests and desire for knowledge. The relaxed and active learning atmosphere should be created to carry out various forms of learning methods, such as special lectures, interest groups, and cutting-edge forums. These methods can stimulate students' interests in learning and desire for knowledge,

and complete the purposeful scientific research exercises. Students can feel the spirit of scientific research, and learn how to study, cooperate and communicate. Their ability to independently analyze and solve problems can be cultivated.

#### **4. Analysis on the Relationship between Scientific and Technological Achievements and the Cultivation of Applied Talents**

The necessity and feasibility of the effective transformation of scientific research results into teaching resources are described above. In addition, a flexible tutor system should be established to promote scientific research activities, increase communication and contact between tutors and students, improve students' professional quality and comprehensive ability, improve the quality of talent training and cultivate high-quality professional talents who can meet the needs of modern society.

##### **4.1 Analysis of Talent Training from the Perspective of Adapting to Industry Demand and Development**

Colleges need to cultivate high-level, application-oriented engineering and technical talents with solid theoretical basis, strong engineering practice capacity and innovative thinking ability; they should be familiar with standards in the photovoltaic industry, be able to meet the needs of industry development as well as the requirements of transforming technological achievements.<sup>[2]</sup>

##### **4.2 Analysis of Talent Training from the Perspective of Teachers**

There is positive relationship between teachers' scientific research results and their teaching effects. Teachers can not only produce high-level resources, but also promote professional and discipline construction by transforming scientific research results into teaching resources. Teachers are not only the most important factor of transforming scientific research achievements into teaching resources, but also the most important practitioners of effectively transforming scientific research achievements into teaching resources.

##### **4.3 Analysis of Talent Training from the Perspective of Students**

Colleges attract students to enter the laboratory through innovative experimental projects, various scientific and technological competitions and practical activities of scientific and technological innovation. Students can also participate in scientific research and training projects host by teachers, so as to understand latest scientific research results in their major, form a systematic knowledge structure, acquire knowledge and creatively use all aspects of knowledge to solve specific technical problems. These activities can enhance students' research ability, thinking ability as well as expression ability.

##### **4.4 Analysis of Talent Training from the Perspective of School-Enterprise Cooperation**

It is not enough to simply strengthen the experimental training in the school. Only by cooperating between schools and enterprises in an all-round way, seriously implementing the cooperation plan according to the idea of multiple wins among students, schools and enterprises, building practice training bases, jointly constructing laboratories targeted for different ability training, and providing students with opportunities to participate in real scientific research projects and experience the production reality, can college students really become talents who are competent for their future position and have development potentials.<sup>[3]</sup>

#### **5. Evaluation Contents in Integrating Scientific and Technological Achievements into Teaching Resources**

##### **5.1 Modern Education and Teaching Concept**

The curriculum design should take students as the center, take talent ability training goal as the guide, integrate scientific and technological achievements into teaching, pay attention to the actual

effect of classroom teaching, and take the continuous improvement of teaching quality as the guarantee. Teachers need to cultivate students into all-rounded applied talents with good ideological and political morality, solid professional knowledge, strong practical ability, innovative spirit, as well as the ability to track new knowledge, new theory and new technology in the field of this major, and consciousness of transforming scientific and technological achievements.

## **5.2 Knowledge and Ability**

Students need to master the basic knowledge and theory of the course, clearly understand concepts, be able to design and calculate correctly, make reasonable structure design, obtain reliable experimental data, draw pictures in line with standards, and write design reports in compliance with requirements. In terms of ability achievement, the teacher should cultivate students' independent thinking ability, active learning and exploration ability, in-depth professional research and problem-solving ability, adaptability and cooperation ability, as well as service engineering consciousness. They need to have the consciousness of transforming scientific and technological achievements. The teacher also needs to train students' expression and communication ability, as well as innovation consciousness and personal development ability.

## **5.3 Teaching and Learning Methods**

In the teaching process, the teaching methods such as explanation, demonstration, situation, case illustration, deduction, experiment and discussion should be integrated organically. Students can learn and think independently after class. The cooperation in class should focus on group discussion, group learning and inter group learning.

## **5.4 Emotional Attitudes and Values**

In the process of teaching, ideological education should be integrated with professional education; humanistic care should be integrated with curriculum teaching. Teachers need to help students establish production awareness, engineering awareness and overall awareness, cultivate students' emotional attitudes of respect, understanding, tolerance, patience and cooperation, and guide students to grow freely, equally, selectively and with individualized personality.

## **6. Conclusion**

We continue to explore and innovate the application-oriented personnel training mode, and combine scientific and technological achievements with teaching resources. The training method promotes the cooperation between universities and enterprises in scientific and technological innovation and personnel training, forms a mutual promotion mechanism for scientific and technological innovation as well as innovative talent training, and cultivates application-oriented personnel with strong engineering quality and high innovation ability for the economic construction of our country.

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