

Cultivation of New Energy Power Generation Talents under the Mode of College Students' Innovation and Entrepreneurship Education

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Abstract: In the past ten years, China's new energy industry has developed rapidly and is a world leader in wind power generation, solar thermal power generation, biomass energy utilization, and hydrogen energy development. In view of the current shortage of talents in the new energy industry, under the innovative and entrepreneurial mode of college students, combined with the characteristics of this specialty, cultivate multi-level talents that are in line with the new energy power generation industry. At the same time, promote the curriculum adjustment of the major, enhance professional vitality, and create a more professional team of teachers. After the implementation of the project, students will be trained and improved in many aspects such as professional skills, innovative thinking, entrepreneurial ability, management ability, and business ability. To a certain extent, they will increase the employment channels of the major and alleviate the social problems of employment pressure.

1. Introduction

In recent years, with the increasing distribution of traditional energy (coal, oil, natural gas, etc.) in China, the new energy industry, such as solar energy, wind energy, biomass energy, geothermal energy, tidal energy and so on, has been developed rapidly, and the new energy industry, based on new technology, has been developed rapidly. The main form of new energy generation in China is wind power, biomass, photovoltaic and so on. At present, China's new energy power industry has been ranked the world's leading producer in terms of production capacity and installed capacity. But in the process of the rapid development of China's new energy and electric power industry, there are many problems, such as the serious lack of talents in the industry, so that the development of new energy power generation enterprises is restricted to a great extent. Therefore, the training of talents in the new energy power generation industry is imperative. This paper introduces the development

of China's new energy power generation industry in the context of innovation and entrepreneurship, and analyzes the current situation of talent training in China's new energy power generation industry. This paper expounds the reasons for the talent training in the new energy generation industry behind the development of the industry, and puts forward the countermeasures to strengthen the training and speed up the training of talents in the new energy generation industry.

2. Introduction to New Energy Generation Methods

2.1. Wind Power Generation

At present, the efficiency of small wind power generation system is very high, and has reached the commercialization level. Wind turbine and wind power generation have initially formed industry. Wind power generation technology is a specialized elective course for this specialty. The principle of wind power generation is to use the wind to drive the blade of the windmill, and to increase the speed of rotation through the speed increasing machine, to make the generator power generation. Wind power generation has no fuel problem, nor does it produce radiation or air pollution. It is a particularly good way of generating electricity.

The course of wind power generation technology involves the knowledge of DC generator, synchronous alternator, asynchronous alternator, generator control, charger and inverter. Most of these knowledges are abstract. Students will only calculate the theory, do not understand the practical application and operation of the project, and make the project be obstructed during the process.

2.2. Solar Thermal Power Generation

(1) Solar photovoltaic power generation.

Solar energy is the most ideal alternative energy source for conventional energy such as oil and coal. Solar photovoltaic power generation is one of the most promising applications in various new energy sources. Master the working principle of solar photovoltaic power generation system through the installation process.

(2) Solar thermal power generation.

The technology of solar thermal utilization is roughly divided into low temperature, medium temperature and high temperature according to the temperature range of terminal use: low temperature range below 100 C, mainly used for living water, heating, drying, distillation, agricultural greenhouse and so on; middle temperature 100~300, used for industrial heat, refrigeration, air conditioning, cooking and so on; high temperature is over 300 centigrade. It is used in thermal power generation, high temperature treatment of materials and detoxification of toxic materials. Solar energy utilization technology is also the core of the utilization of new rural energy, and plays a vital role in the construction of new energy in the new socialist countryside.

There are two forms of solar thermal power generation, one is to use solar thermal energy to produce high temperature steam to drive the steam turbine to generate electricity, the other is to coupling thermal energy to thermoelectric materials, and to use the cogeneration effect of thermoelectric materials to generate electricity. Among them, the second form of solar power generation is called solar thermal power generation.

2.3. Hydroelectric Power Generation

Although hydroelectric power is not a new energy generation, it is also a renewable energy source for energy conservation and environmental protection. Hydroelectric power is the use of rivers, lakes and other high potential energy flow to low. The potential energy is converted into the kinetic energy of the turbine, and the turbine is used as the driving force to drive the generator to generate electricity.

3. The Historical Development and Current Status of New Energy Power Generation

In order to solve the problem of energy and environmental pollution, developed countries such as Europe and the United States actively cultivate scientific and technological talents in the field of new energy. The Oregon Institute of Technology opened the first undergraduate program in renewable energy engineering in the United States in 2005. The University of Hohenheim, which ranks first in the comprehensive scientific research strength of European agricultural and forestry universities, offers specialized courses related to bioenergy.

China's new energy power generation started in the 1980s, early in 1986, Rongcheng in Shandong built our first wind farm installed capacity of 3 sets of 55 k W wind turbines. In the following years, China has successively built a number of small wind farms. Like wind power, as early as in the "Plan" (1981--1985) and the "Plan" (1986--1990 years) plan, the state would be support for the development of photovoltaic power generation, central and local governments established in many applications Some demonstration projects, such as microwave relay stations, force communication systems, small household systems and village power supply systems. In 2002 , the State Planning Commission launched the "Electricity Plan for the Power-free Township in the Western Provinces", which solved more than 700electricity-free in seven western provinces (Tibet, Xinjiang, Qinghai, Gansu, Inner Mongolia, Shaanxi, Sichuan) through photovoltaic and small-scale wind power generation. Township of electricity problems, China's PV installed capacity has reached 15. 5 MW.

The development of new energy is inseparable from the cultivation of talents. China also attaches great importance to the training of professionals in the field of new energy. However, compared with the rapid development of new energy power generation technology, the status quo of specialized talent training in the new energy power generation industry is still not satisfactory. In particular, the lack of international innovative talents has become an important factor restricting the internationalization of new energy power generation technology enterprises.

After teaching research and teaching experience for many years and found the following problems in new energy generation technology personnel training process :(1) technical issues and teaching cases localization, internationalization compound cultivating innovative talents is not enough; (2) Professional The knowledge content is too much, which is not conducive to the cultivation of students' reasoning and problem-solving ability. (3) Teaching is mainly in Chinese, which limits the improvement of students' English communication ability and learning initiative; (4) Lack of engineering site teaching is not conducive to the improvement of students' innovative thinking ability; (5) The number of optional teaching materials is too small, and the focus of the single textbook is different, and the knowledge system is incomplete. This requires the teaching staff to constantly update the teaching concept and teaching content, and explore the all-round talent training mode that combines theoretical teaching, practical teaching and innovative ability.

4. Reform and Optimization of New Energy Power Generation Personnel Training Curriculum Under the Model of Innovation and Entrepreneurship Education

The teaching of "new energy power generation technology" has done a systematic study, mainly on the teaching concept, teaching content, teaching methods, assessment methods and other aspects of innovation and optimization.

4.1. Advanced Teaching Philosophy

As a new technology-led course, its knowledge content is updated very quickly. Therefore, teachers need to use advanced teaching concepts to guide teaching work. The teaching concept contains a lot of content, including learning theory, teaching theory, educational communication theory and so on. Taking learning theory as an example, more mature theories include behavioral learning theory, cognitive learning theory, constructivist learning theory, and humanistic learning theory. Constructivist learning theory holds that students' knowledge and wisdom are not innate, nor are they given by schools and teachers, but that students themselves are gradually constructed in the process of interacting with school education with a specific cultural background.

4.2. Updated Teaching Content

More diverse forms of new energy power generation. Combined with the actual development of the engineering field, this course selects three types of mainstream new energy power generation technologies with broad development prospects, such as solar power generation, wind power generation and nuclear power generation, as the main teaching targets, while biomass power generation and tidal power generation are used. The introduction object is supplemented. As the research of new energy power generation technology belongs to cutting-edge science, its technological development is changing with each passing day. Therefore, the teaching content needs to be constantly updated, and existing teaching materials are often difficult to meet the teaching requirements. Therefore, teachers integrate the latest scientific and technological development achievements and scientific research achievements as professors, explain the basic principles, key technologies and development trends of new energy power generation to students, so that students can fully access various knowledge, broaden their horizons, and understand the latest developments in science and technology. Inspire and cultivate students' sense of innovation. Take the wind power generation as an example. Wind power involves a variety of electrical engineering majors such as fluid mechanics, engineering thermodynamics, and so on. Therefore, how to systematically and efficiently introduce the relevant basic knowledge and abandon the redundant part is the key to the problem.

4.3. Innovative Methods and Means

Innovative teaching concepts and teaching content must be achieved through corresponding teaching methods and means. In terms of teaching methods, the use of modern educational techniques and means to further emphasize the development and utilization of educational resources, to enhance the teaching effect, expand the amount of teaching information for each class, and enrich the teaching content for the purpose of teaching means innovation. In the teaching method, integration of experiments and multimedia teaching and other methods in one.

The teaching of practice links is based on student practice and supplemented by teacher guidance. In view of the characteristics of students' sense of distance to the new energy power generation technology model, an experimental platform for solar photovoltaic power generation and small fan power generation was built to stimulate students' interest in learning, to guide students to design experiments independently, and to focus on cultivating students' knowledge and hands-on solutions. The ability of energy technology engineering to practice problems links theory to practice and applies it to practice.

4.4. Accelerate the Construction of New Energy Technologies Training Base

The technical personnel in the new energy power generation industry are mostly application-oriented technicians. As the current employees in the new energy power generation industry are mostly transferred from other industries, they are less familiar with new energy power generation equipment and lack practical experience. In order to enable employees to better understand the performance of related equipment and cultivate comprehensive skills, It is necessary to form a systematic knowledge and skill system for installation and commissioning, operation and maintenance, and accident handling of new energy power generation equipment. Pre-job technical training is necessary. According to the survey, many new energy power generation companies in China cannot find a base for employees to carry out technical training, and most of the training bases cannot meet the requirements of enterprise technology training. Therefore, the construction of new energy technology training bases is urgent.

4.5. Flexible Assessment Methods

As an integral part of teaching activities, the assessment process is one of the important links in the whole teaching process. Long-term practice has proved that this link can effectively encourage students to review and consolidate what they have learned, and to check their understanding, mastery and application of the knowledge, methods and skills they learn. It is not only an effective means to assess students' academic performance, but also to test the teaching effect. The main ways to obtain feedback, improve and improve the quality of teaching, and promote teaching reform. As a professional elective course for senior students in electrical engineering, new energy power generation technology should focus on the combination of science and professionalism, which inevitably requires flexible and diverse forms of course assessment. Although the examination has its rationality, it has constrained the students' divergent thinking and neglected the examination of students' learning ability and innovative ability.

4.6. Dynamic Programming Algorithm in Education Data Mining Algorithm

As an important branch of data mining, educational data mining is the use of mathematical methods and computer technology to dig out valuable information from the vast amount of educational data to improve the quality of teaching and education management.

Dynamic programming algorithm A_d can decompose the multi-valued decision table to obtain multiple related sub-tables, and arrange the sub-tables in a certain order at each stage, and analyze the sub-tables for a given stage state first Then, the optimal solution of the multi-valued decision table is obtained from the solution of the sub-table. The dynamics of algorithms are usually manifested in sub-problems that appear multiple times. When they are encountered for the first time, they can be calculated and solved, and then the results of the calculations can be saved for later

reuse. The so-called impurity function refers to an index that measures the uncertainty of the current sample partition, which can evaluate the quality of the sample partition, which is represented by $I(T, f_i)$. The impurity function value $I(T, f_i)$ can be calculated by formula (1):

$$I(T, f_i) = \sum_{j=1}^k U(T_j)N(T_j) \tag{1}$$

Among them, $U(T)$ represents the uncertainty index, which is a function from the set of multi-value decision values to the set of true decision values, so $U(T) \geq 0$. Record all records in the multi-value decision table T as $N(T)$, and record the record containing the most frequently used decision as $N_{\text{mcd}}(T)$. Calculate the difference between all records in the multi-value decision table T and the record containing the most frequently used decision as the uncertainty index. Therefore, the expression of uncertainty index $U(T)$ is formula (2):

$$U(T) = N(T) - N_{\text{mcd}}(T) \tag{2}$$

4.7. Analysis of the Corresponding Job Ability of the New Energy Power Generation Major

Through the investigation of new energy power generation companies, this research grasps the professional quality requirements and job requirements of new energy power generation talents, so as to grasp the corresponding enterprise employment needs and hierarchical relationships, and builds new energy power generation talent training under the innovation and entrepreneurship education model of college students. The pointed direction of the reform and training model.

Investigate the factors that companies pay attention to when recruiting new energy power generation talents. In the questionnaire, several questions such as skill level, educational background, practical ability, and others are mainly designed. The results are shown in Table 1:

Table 1. Job abilities corresponding to majors

Factor	Frequency	Percentage
Moral	43	35.83%
Education	10	8.33%
Skills certificate	12	10%
Hands-on ability	49	40.83%
Other	6	5%

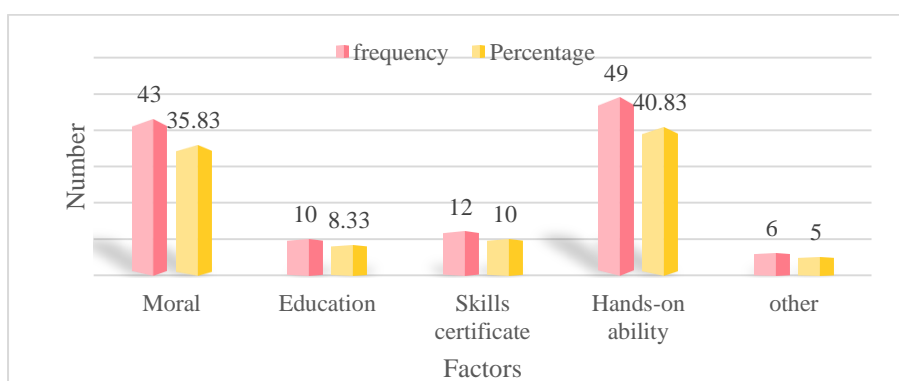


Figure 1. Job abilities corresponding to majors

4.8. Students Should Strengthen the Ability to Cultivate

In the investigation of the ability of college students to find new energy power generation talents, the questionnaire designed several options such as theoretical knowledge, hands-on ability, self-learning ability, teamwork, and professionalism. The statistical results of the survey are shown in Table 2: 17.5% think that professional ethics should be cultivated, and 8.33% think that the expression ability of college students should be cultivated.

Table 2. Students should strengthen the ability to cultivate

Ability	Frequency	Percentage
Express communication	10	8.33%
Teamwork	16	13.33%
Theoretical knowledge	24	20%
Operational ability	17	14.17%
Comprehensive quality	16	13.33%
Self-learning	16	13.33%
Professional ethics	21	17.5%

It can be seen from Figure 2 that new energy power generation companies most value the personal professional ethics, ideological ethics, professional theoretical knowledge, operational skills, and professional literacy of major students, followed by students' personal comprehensive qualities, teamwork capabilities and self-learning capabilities, and lastly students' personal professional ethics, ideological ethics, professional theoretical knowledge, operational skills, and professionalism. Professionalism mainly includes a dedicated work attitude, safe production ability, and attention to environmental protection, quality, cost, and safety awareness in the production process. Therefore, companies suggest that schools should strengthen the training of relevant abilities for college students.

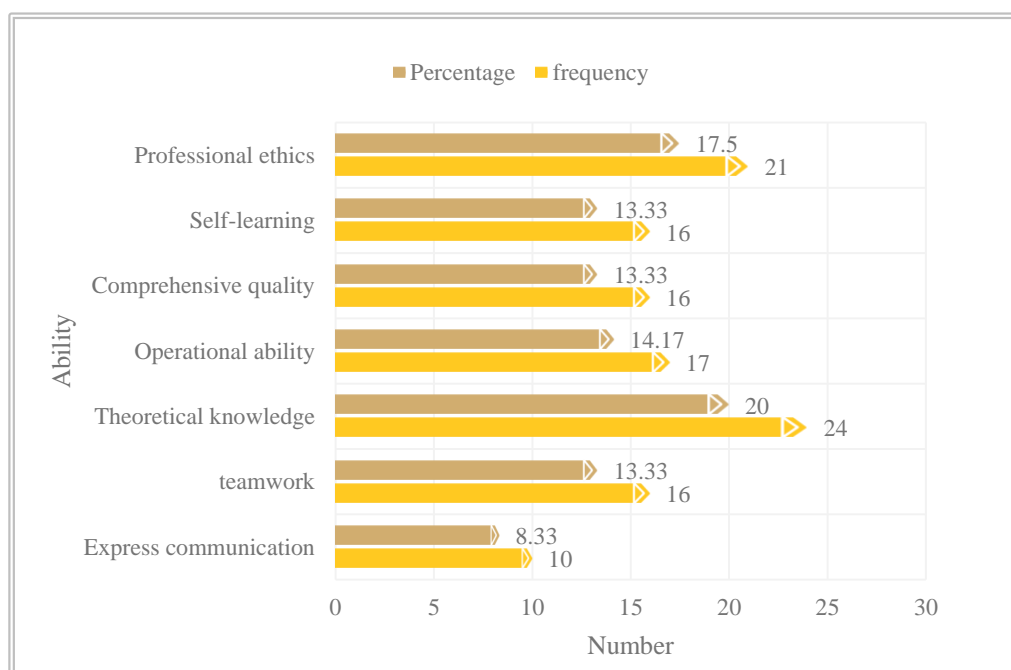


Figure 2. Students should strengthen the ability to cultivate

5. Conclusion

As a professional elective course at the forefront of electrical engineering disciplines, new energy power generation technology will continue to adjust its teaching content with the continuous development of new energy power generation technology, and teaching methods should be continuously improved. The teaching of "new energy power generation technology" should focus on talent cultivation, optimize teaching methods, update teaching content, strengthen experimental links, strengthen innovation awareness, and cultivate students' active learning ability and innovative ability. The teaching innovation of the "new energy power generation technology" course needs to be continuously explored, such as tracking the latest new energy power generation and intelligent control technology, cultivating research-based learning methods, and strengthening design-oriented experimental practice links, etc., which are waiting to be explored in the future. And innovation improvements.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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