

Implementation Path of Green Vocational Education in Guangxi Under the Background of Rural Revitalization: Taking Civil Engineering Major as an Example

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Abstract: Green vocational education is a proactive response to the social objectives of sustainable development, building upon traditional vocational education. It serves as a crucial means to achieve sustainable development in both urban and rural areas. Green vocational education plays a significant role in cultivating diverse talents for rural revitalization. Therefore, there are corresponding pathways for implementing civil engineering talent training. This paper examines the current state of green vocational education development in Guangxi within the context of rural revitalization and proposes an implementation pathway based on civil engineering majors. These findings provide valuable insights towards realizing the integration and transformation of green vocational education.

Keywords: Rural revitalization; Green vocational education; Green skills; Innovative talent training

Online publication: December 25, 2023

1. Introduction

As an autonomous region inhabited by many nationalities, Guangxi has a relatively weak economic foundation, amplifying the urgency of the goal for rural revitalization. The effect and progress of the transformation and upgrading of the construction industry, particularly in the building and real estate industries, are closely related to the transformation and upgrading of China's economic structure. The successful implementation of the transformation and upgrading of the construction industry hinges on enhancing its core competitiveness, and a key prerequisite for this is the availability of a large number of high-quality and highly skilled construction personnel. The huge demand for talent has stimulated the development of civil engineering vocational education. Under the guidance of the background of rural revitalization and the theory of sustainable development, the construction of a civil engineering vocational education system and the implementation of talent training programs need to align with the low-carbon development of the economy, and transform to the

direction of green education, so as to achieve the sustainable goals of vocational education.

2. The connotation of rural revitalization and green vocational education

2.1. Rural revitalization strategy

As one of the important pillar industries and power engines of China's national economy, the construction industry has played a vital role in promoting the integrated development of urban and rural areas, addressing the shortfall in rural infrastructure, and contributing to the construction of beautiful and habitable villages. However, through literature review and research, it is found that with the rise of agriculture-related industries, the infrastructure in the countryside conflicts with and contradicts the growing scale of the industry. The construction of public infrastructure in the countryside began relatively late, and the construction of individual houses lacks a standardized management framework. Consequently, the construction industry in the countryside remains disorganized, with scattered management and other associated issues. With the rise of the three rural industries and rural tourism, the standardized management of the rural construction industry will inevitably be pushed back, thus there is an urgent need to formulate the construction industry management standards that are suitable for the characteristics of rural areas, strengthen the qualification management of rural construction teams, standardize the rural construction market, cultivate the industrial army, and establish the construction brand.

2.2. Green vocational education

Green vocational education is based on the development of the theory of education for sustainable development, aiming to provide training and continuing education for the subject of education in employment, entrepreneurship, and lifelong learning skills. In China's dual-carbon context, the transition of vocational education from traditional skills-based education to align with the sustainable development of society and the requirements of a low-carbon economy necessitates a significant evolutionary process. This evolution spans not only vocational and technical education and training but also requires integration with the traditional roles of the workplace ^[1,2]. Therefore, vocational education, which is currently based on traditional job roles, is facing new challenges. With the goal of a sustainable society, job functions need to be performed in a way that is sustainable and balances both economic and environmental dimensions. Since the traditional vocational education and training system focuses more on skills and less on the relevance to the green economy, the previous vocational education and training need to be directed towards new areas of activity and gradually replace ecologically unfavorable production and labor practices ^[3]. For example, in traditional industries such as construction and iron and steel, the evolution involves developing skills and promoting technological research, avoiding the use of irreplaceable raw materials, and reducing energy consumption and environmental impacts through various channels. Expanding entrepreneurial learning opportunities through vocational education and training can lead to the creation of sustainable enterprises and green chains committed to social sustainability.

The goal of training participants in green vocational education is to acquire the technical knowledge of energy-saving applications, renewable energy technology applications, etc. ^[4,5]. In addition, in the production chain of various industries, the effective utilization of energy and resources in industrial production, material recycling control, and energy-saving application technology should be trained accordingly.

Compared with traditional vocational education, green vocational education incorporates more cognitive education on the relationship between industry management, production, and ecological impacts, so a complete product value chain needs to be disaggregated into different levels, with clear skills and competency needs and matching training and education. Research suggests that moving towards a sustainable society will pose

at least two challenges related to skills requirements, the first challenge is ensuring a sufficient supply of skilled professionals for green jobs. The second challenge involves providing targeted training to address skills shortages. These changes can contribute to fostering a stronger sense of purpose for the transformation of green vocational and technical education.

3. The current situation of green education development in Guangxi in the context of rural revitalization

The support of the central government has laid a solid foundation for rural revitalization in the western region. Along with the continuous investment and operation of various infrastructure construction projects, the social demand for talent that meets the requirements of rural revitalization, urban-rural integration, and sustainable social development is also gradually increasing, and the contradiction between supply and demand of talents in construction and other industries in particular has been highlighted.

Guangxi, as a province with rich cultural resources from various ethnic minorities and extensive rural coverage, has an economic development status that falls within the middle range. The early vocational education output is still dominated by traditional industry with relatively lower technical content, which caused the problem of limited upward mobility in the talent cultivation chain. Green vocational education is a new vocational education route with foresight and feasibility, especially for Guangxi, which possesses unique advantages. The rural architecture in Guangxi, with its dual responsibilities of preserving regional architectural history and national culture, is particularly noteworthy in the implementation of green vocational education. However, it is undeniable that under the background of rural revitalization, the transformation of green vocational education in Guangxi still faces the following problems.

3.1. Insufficient match between market demand and talent supply

Guangxi, being a gathering place for China's ethnic minorities, has consistently maintained a national economic development level that is generally in the middle to lower range. The overall educational foundation in the region is relatively weak, especially in the construction of civil construction-related specialties. The approach has mainly involved drawing on and relying on the vocational education development models implemented by more economically developed provinces and cities within the country. However, Guangxi is rich in national cultural resources and has its own characteristics in the inheritance of traditional architecture, which needs to be integrated with local national culture traditions, as well as climate and natural resources to carry out rural construction. Thus, the civil construction personnel training program developed in accordance with other regions cannot fully meet the needs of the construction market in Guangxi, and there is a phenomenon of insufficient matching of market demand and talent supply. Therefore, the cultivation of civil construction talents under the background of rural revitalization in Guangxi still lacks a systematic top-level design with its own characteristics.

Among the objectives of green vocational education, construction personnel should be trained to possess knowledge and skills related to green production, to implement the highest environmental standards in the production process, and to promote the practice of sustainable processes in construction through design, construction, and other aspects. At present, these related theoretical knowledge and skills training are lacking to a certain extent in the current vocational education training programs. This issue results in a mismatch between market demand and available talent with composite skilled and comprehensive capabilities during the green transformation of the construction industry.

Vocational education has always emphasized the practice of teaching, and civil construction professionals

training requires a large number of practices to promote the enhancement of professional skills. However, through the visit to various types of vocational education institutions in Guangxi, the research found that there is a current mismatch between the demand for enhanced practice teaching systems, practice teaching conditions, and the development of professional talents in civil construction. With the transformation of civil engineering and construction industry to informatization and intelligence, the traditional construction personnel training program needs to be adapted to the development of the industry, informatization, and digital personnel training direction, such as Building Information Modelling (BIM) technology-based civil engineering talents, etc. In addition, combined with the actual conditions of Guangxi region, the cultivation of minority traditional construction talents and craftsmen-level talents should also constantly look for innovative paths.

3.2. Lack of teachers with professional skills

With the transformation of traditional vocational and technical education to green vocational and technical education, it is essential to integrate green education in vocational education to further meet the goals of social production transformation and economic structure optimization and adjustment. The greening of the economy is leading to unprecedented changes in the demand for skills. Realizing a green economy will require greater integration of skills and employment development policies into the green economy agenda, even as skills shortages will emerge in some sectors. The transition to a green economy will require adjustments in skills development strategies, such as adapting to industry developments, developing teachers and trainers who can effectively transfer knowledge and skills, expanding the existing scope and delivery mechanisms of Technical and Vocational Education and Training (TVET), and adapting the workforce to technological shifts. Guangxi has been facing challenges in attracting high-end talents. In the civil engineering profession, it is necessary to rely on rich design and construction experience, a broad vision, and continuous innovation to promote the overall improvement of professional skills. However, at present, the level of teachers in universities in Guangxi region is significantly insufficient, with fewer reserves, and the innovation and entrepreneurial abilities of teachers are low. This situation adversely affects the sustainable development of talent cultivation related to civil construction in universities in Guangxi region.

3.3. Lack of culture-driven consciousness and innovative power

Professional education can play a crucial role in ensuring that individuals acquire the knowledge, skills, and abilities needed to contribute to the development of a green economy, and promote sustainability practices in various aspects of life. In the field of architecture, which is currently facing transformational changes in digitalization and informatization, it is imperative to contemplate how to leverage professional skills to help rural revitalization, and ponder ways to breathe new life into the traditional architecture of ethnic minorities in the new era. Through the questionnaire survey of graduates and students, it is found that they have an insufficient understanding of local history, inadequate national self-confidence, and lack of in-depth thinking about the sustainable development of architecture. Therefore, in the green vocational education system, the key considerations that need to be carried out in the talent cultivation program include how to deepen the local sentiment and national pride for the cultivation of talents in civil construction majors and realize the inheritance of culture and history through architecture.

4. Implementation path of green vocational education in construction class profession under the rural revitalization background of Guangxi

The industrial and economic development of ethnic areas requires sustainable talent training. Guangxi, being a

province with natural advantages of ethnic rural revitalization, continuously explores diversified talent training modes starting from the construction industry, the specific implementation path is as follows.

4.1. Drawing on green vocational education theories and experiences from many sides

Green vocational education is rich in theoretical research and practical experience in the international arena, but it is still in its infancy in China, so it should fully draw on the advanced theoretical achievements and experience at home and abroad in the future research and practice ^[6,7]. In terms of theory, attention should be paid to international comparative research based on different national conditions. For example, the three-dimensional action framework proposed by Shyamal Majumdar in his study can be instrumental. This framework advocates a comprehensive approach, addressing vertical aspects from the international level, the national level, and the regional vocational education institutions ^[8,9]. Simultaneously, focus should be put on the implementation of green vocational education, goal setting, and promotional strategies in various regions and regions with different industrial bases. From a practical point of view, we can pay more attention to the green vocational education practice in industrial design and low-carbon economy in the United States, Australia, and Germany; as well as the green vocational education development practice experience in economically challenged regions, such as Latin America and Africa, to serve as a reference model for the development of green vocational education in China's more developed vocational education areas and Western vocational education.

4.2. Broadening teacher introduction

Under the background of rural revitalization, the renewal of urban and rural landscape requires architectural, engineering, and planning talents, and the sustainable development of rural areas necessitates resource professionals and other professionals to carry out innovative research in combination with economic related contents. It is necessary to apply theory to guide practice, which requires not only profound scientific theoretical knowledge but also a wealth of practical experience. This puts forward a higher demand for green vocational education and requires the participation of more teachers with different specialties. At present, there is a certain disadvantage in the level of vocational education teachers in Guangxi, thus emphasis should be put on the construction of teachers' capacity, and creating a group of professionally representative teacher teams through training, introduction, and other internal and external circulation modes to provide assistance for the realization of rural revitalization in Guangxi and create a brand of green vocational education in Guangxi.

4.3. Strengthening policy support and guarantee

In the future transformation of vocational education to green vocational education, further guarantee mechanisms are needed to promote the implementation of green vocational education programs. The goal of green vocational education is to cultivate green skills, promote the green development of education and employment, cultivate composite talents with green knowledge, green skills, and green values, and strengthen the seamless link between the talent market and education. Therefore, the relevant departments should start from the talent cultivation chain, including the implementation of student sources, program development, standard establishment, qualification certification, and other aspects of the refinement of measures, so as to provide clear guidance to the implementation of vocational education units.

4.4. Cultural integration based on local conditions

Guangxi, as a minority region, has close ethnic and cultural ties with minority graduates. Guangxi possesses unique green development resources, thus in the vocational education system in Guangxi, its minority characteristics should be maximized through the guidance of publicity and value orientation. Cultivating

graduates with national self-confidence and strengthening their connection to the native land will foster the retention of talents with professional skills. It is also essential to continuously provide professional support for individuals, offer more labor employment positions that meet the needs of the construction of ethnic areas, and encourage local young people through policies to leverage their professional strengths and build a better life in their hometowns.

5. Conclusion

With the continuous improvement of the economic level and the continuous innovation of industrial technology, the construction industry is also facing digital transformation. At this critical stage, vocational education should be fully aware of the necessity of transformation and actively respond to the transformation of the demand for talents and skills in the construction market. Particularly in the context of rural revitalization, some ethnic minority areas in China with deep historical and cultural deposits are in need of large numbers of professional and skilled personnel. It is vital to carry out continuous integration and innovation, break down barriers of the traditional vocational education model, and explore a way to comply with the green development. The green vocational education route that meets the goal of sustainable development society is explored on the premise of green development. Green vocational education involves the upgrading and expansion of traditional vocational education, and in order to meet these needs, it should expand from the small-scale task of providing specialized knowledge education and training to the broader task of providing workforce development, lifelong learning for sustainable development, and the skills needed for inclusive growth.

Funding

This study was financially supported by Education and Teaching Research Projects of China Construction Education Association 2023- Exploration and Practice of Digital Talent Cultivation for Intelligent Buildings Oriented towards China-ASEAN(Grant No.2023265).

Disclosure statement

The authors declare no conflict of interest.

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