

Exploration and Practice of Cultivating Green and Low-Carbon Talents in Economics Major under the Dual-Carbon Goals

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Abstract: The cultivation of talents in green and low-carbon economy serves the needs of the national "dual carbon" goals and presents an opportunity to reshape the core competitiveness of economics majors. Currently, the cultivation of talents in green and low-carbon economy faces challenges such as insufficient integration of the "dual carbon" concept, limited teaching resource support, weak faculty strength, and irregular qualification certification. Through a case study of the cultivation of talents in green and low-carbon economy in the economics major at Anhui University of Finance and Economics, the results indicate that it is necessary to optimize talent cultivation objectives, strengthen support for green and low-carbon teaching, enhance the construction of green and low-carbon teacher teams, and explore certification methods for green and low-carbon economic talents. The above findings provide valuable references and insights for the reform of talent cultivation in economics majors at local universities.

Keywords: Economics Major, Green and Low-carbon Talent, Dual-carbon Strategy.

1. Introduction

The development of a green and low-carbon talent pool is a key component of China's implementation of the 'Dual Carbon' goals. In response to global climate change, China has committed to achieving carbon peaking and carbon neutrality. The Fourth Plenary Session of the 20th Central Committee of the Communist Party of China proposed that 'with carbon peaking and carbon neutrality as the driving force, we should synergistically advance carbon reduction, pollution control, green expansion and economic growth'; this major policy initiative elevates the 'Dual Carbon' goals to a strategic driving force for green and low-carbon socio-economic development. Achieving the 'Dual Carbon' goals requires mobilising the efforts of higher education institutions, enterprises and society as a whole to cultivate a large number of multidisciplinary talents capable of meeting the demands of these goals. Policies such as the 'Action Plan for Carbon Neutrality Science and Technology Innovation in Higher Education Institutions', the 'Work Plan for Strengthening the System for Cultivating Talent in Higher Education for Carbon Peaking and Carbon Neutrality', and the 'Implementation Plan for Scientific and Technological Support for Carbon Peaking and Carbon Neutrality (2022–2030)' have clearly defined the objectives, tasks and policy measures for cultivating green and low-carbon talent. However, the current stock, quality levels and allocation structure of green and low-carbon talent still fall short of the requirements of the 'Dual Carbon' goals [1]. At the same time, the comprehensive green transition of the economy and society has expanded the demand for talent in the green and low-carbon economy, presenting entirely new challenges and higher demands for economics education. Therefore, accelerating the cultivation of green and low-carbon talent in economics programmes to provide a solid talent foundation for achieving the 'Dual Carbon' goals is a pressing issue that must be addressed in the cultivation of economics talent in the new era.

Existing research on the cultivation of green and low-carbon talent centres on three aspects: firstly, green and low-carbon concepts and talent development. As the climate crisis intensifies, integrating green and low-carbon concepts into talent development has become a consensus within the academic community. Henderson et al(2017). [2] argue that green and low-carbon education not only cultivates students' capacity for sustainable development but also drives a transformation in talent development models. It is necessary to construct an interdisciplinary, multidimensional knowledge system for green and low-carbon development, to foster a sense of responsibility and mission regarding green and low-carbon development among economics graduates, and to integrate the concept of ecological civilisation into the entire process of economics talent development [3]. Secondly, the challenges facing the cultivation of green and low-carbon talent. The cultivation of green and low-carbon talent faces a mismatch between supply and demand, a lack of effective interaction between industry, academia and research, and insufficient green and low-carbon skills [4]. Thirdly, pathways for cultivating green and low-carbon talent. These primarily involve increasing investment in the training of 'dual carbon' talent [5], establishing a networked curriculum system for green and low-carbon economics and management professionals [6], improving long-term mechanisms for industry-education integration [7], and refining incentive mechanisms for green and low-carbon talent development [8]. However, there is a scarcity of literature addressing the cultivation of green and low-carbon talent within economics programmes. At present, economics programmes face multidimensional challenges in student recruitment, training and employment; cultivating talent for the green and low-carbon economy is not only a responsibility in serving the nation's 'Dual Carbon' goals, but also a strategic opportunity to reshape the discipline's core competitiveness and secure a leading position in future talent development.

2. The Necessity of Cultivating Green and Low-Carbon Talent in Economics

Talent for the green and low-carbon economy comprises multidisciplinary economic professionals who are well-versed in economic management theory whilst also possessing green and low-carbon knowledge and skills, and who are capable of leading enterprises' low-carbon transition and high-quality green development. Rooted in the principles of prioritising ecology and green development, they possess cross-disciplinary thinking that integrates green and low-carbon knowledge and skills with economics, as well as solid and extensive practical expertise; they are the practitioners and drivers of the 'Dual Carbon' strategy. As a social science that explores the allocation of scarce resources, the enhancement of social welfare, and the incentives provided by socio-economic policies, the economics discipline should leverage its professional strengths to serve the needs of the nation's 'Dual Carbon' goals. It should cultivate innovative green and low-carbon economic talent with an interdisciplinary perspective, thereby providing robust human resource support for the 'Dual Carbon' goals.

Firstly, addressing the challenges of climate change. The implementation of the 'Dual Carbon' goals is a key measure for China in tackling climate change, and there is an urgent need for green and low-carbon talent to underpin this effort. At present, China is actively building a climate-resilient society and has become a leader in global climate governance; the contribution of green and low-carbon industries to high-quality economic development is continuously expanding, leading to a surge in demand for green and low-carbon talent. In terms of the structure of talent demand, there is a need not only for foundational talent equipped with low-carbon and environmental protection concepts, and new types of applied talent familiar with climate policy instruments and the operation of carbon markets, but also for multidisciplinary talent capable of effectively addressing green trade barriers such as carbon border adjustment mechanisms. Notably, the demand for highly educated young professionals in the new energy and environmental protection sectors has increased significantly, far exceeding that of other traditional industries [1][8]. Emissions-controlled sectors such as power generation, petrochemicals and steel have generated substantial demand for carbon reduction professionals, whilst demand for carbon sink management talent in ecological carbon sink industries such as agriculture and forestry has grown against the general trend. In 2021, 'carbon emissions and carbon sink managers' were formally included in the Classification of Occupations, providing a basis for professional accreditation for green and low-carbon talent. On the other hand, the scale of enrolment in economics programmes has continued to expand, with a marked increase in the proportion of science students and a significant decline in the proportion of arts students. Between 2021 and 2025, the national enrolment quota for undergraduate economics programmes in the standard admission batch increased from 52,230 to 71,046, with the proportion of arts students falling from 35.2 per cent to 20.7 per cent, whilst the proportion of science students rose from 48.6 per cent to 63.8 per cent. Consequently, integrating 'dual carbon' content into the teaching and talent development objectives of economics programmes, establishing a 'science and engineering plus economics' interdisciplinary talent development system, and cultivating professionals for a green,

low-carbon economy are essential for addressing climate change and enhancing climate governance capabilities.

Secondly, promoting the transformation and upgrading of green trade. Green trade is a new trade model that integrates concepts such as environmental protection, resource conservation, and low-carbon circularity into the cross-border circulation of goods and services. According to a UNCTAD report, the global export value of environmentally friendly products (green goods) reached US\$2 trillion in 2024, with a growth rate exceeding 8 per cent [9]. As the world's largest green trade economy, China has witnessed rapid growth in green trade, becoming a core driver of global low-carbon transition. However, green trade barriers—represented by the EU's Carbon Border Adjustment Mechanism, the green provisions of the US 'Indo-Pacific Economic Framework', and carbon footprint declarations and labelling—are becoming increasingly stringent. There is an urgent need to cultivate talent in the green and low-carbon economy who are familiar with international low-carbon regulations, carbon footprint accounting and green product certification, in order to support the transformation and upgrading of green trade and to build a stronger voice in international competition. At present, economics curricula remain dominated by traditional trade theories, with insufficient coverage of green trade content, leading to a severe mismatch between the supply of talent and industrial demand. The 'Implementation Opinions of the Ministry of Commerce on Expanding Green Trade' emphasise the need to strengthen the cultivation of green and low-carbon talent, enhance adaptability to green trade rules, and increase influence in rule-making. Therefore, cultivating talent for the green and low-carbon economy is not only a proactive response to the trend towards green trade but also an inevitable choice for building a trade powerhouse.

Thirdly, we must strengthen enterprises' new-quality productive forces. Enterprises are the micro-level actors driving green and low-carbon development; achieving the 'dual carbon' goals requires enterprises to exercise their proactive role and work collaboratively to reduce carbon emissions, minimise pollution and enhance efficiency. At present, as enterprises accelerate their transition towards green, digital, intelligent and integrated operations, there is an urgent need to cultivate more talent equipped with green and low-carbon skills that meet the requirements of new-quality productive forces. This will facilitate a virtuous cycle among education, science and technology, and talent, providing a solid talent foundation for the development of new-quality productive forces. To this end, economics programmes must focus on the demand for green, new-quality talent within enterprises, prioritising the development of students' professional practical skills in areas such as environmental information disclosure, carbon accounting and green supply chain management, enabling them to provide actionable solutions to help enterprises address environmental risks and drive green transformation.

Fourthly, we must advance the integrated and collaborative development of talent through the convergence of science, education, industry and vocational training. The 'Action Plan for Carbon Neutrality Science and Technology Innovation in Higher Education Institutions' explicitly calls for 'deepening the integration of industry and education to promote the organic linkage between the education chain, the talent chain, the industrial chain and the innovation chain'. However, some research institutes place greater emphasis on the research and development of specific technologies and solutions, often

facing bottlenecks such as a lack of knowledge, time and channels when it comes to the commercialisation of research outcomes, resulting in a large number of green and low-carbon patented technologies failing to be commercialised in a timely and effective manner. Therefore, cultivating talent for the green and low-carbon economy will, on the one hand, facilitate the industrial application of green and low-carbon technologies and think-tank solutions, and on the other hand, encourage university lecturers to pay attention to the technical needs of enterprises and industries, accelerate collaboration between industry, academia, research and application, and form a new framework for the integration of science, education, industry and education and collaborative talent development.

3. Practical Challenges in Cultivating Green and Low-Carbon Talent in Economics under the ‘Dual Carbon’ Goals

As analysed earlier, the implementation of the ‘Dual Carbon’ goals has highlighted the necessity of cultivating talent for the green and low-carbon economy, presenting new opportunities for universities to train economics students in this field. However, at the present stage, the cultivation of economics talent in higher education faces practical challenges in terms of training objectives, teaching resources, the teaching staff, and the certification of professionals in the low-carbon economy.

Firstly, the integration of the ‘Dual Carbon’ philosophy into educational objectives remains insufficient. Educational objectives are specific requirements formulated in accordance with national educational aims and the nature of the institution. According to the ‘Work Plan for Strengthening the System for Cultivating Talent in Higher Education for Carbon Peaking and Carbon Neutrality’, economics programmes must align with the ‘Dual Carbon’ goals, strengthen green and low-carbon education, and drive the transformation and upgrading of the discipline. However, most economics programmes at universities do not place sufficient emphasis on cultivating talent for the green and low-carbon economy. Their educational objectives remain skewed towards traditional economic thinking and analytical skills, lacking clear references to specific contemporary missions such as ‘serving the Dual Carbon Strategy’ or ‘promoting green and low-carbon transition’; consequently, the integration of the Dual Carbon philosophy and green and low-carbon competencies remains inadequate. From the perspective of knowledge structure, economics education remains centred on economic theory and the logic of resource allocation, whilst interdisciplinary theories such as the green and low-carbon economy, resource and environmental science, and ecology have not been incorporated into the discipline’s knowledge framework. In terms of competencies, the training objectives emphasise mastery of modern economic theory and analytical skills, yet fail to incorporate core competencies such as carbon accounting, carbon products and low-carbon policy analysis. The curriculum focuses predominantly on theoretical courses concerning the allocation and utilisation of economic resources, whilst lacking cutting-edge courses in areas such as the measurement of carbon emissions and carbon sinks, carbon market trading, carbon asset management and carbon financial analysis. This hinders the development of green thinking and interdisciplinary

knowledge integration capabilities among economics graduates.

Secondly, support for green and low-carbon teaching resources is limited. In the era of Education 4.0, and against a backdrop of significantly shorter knowledge renewal cycles in the field of green and low-carbon development, the demands on the theoretical knowledge and practical skills of professionals in the green and low-carbon economy are becoming increasingly stringent. At present, the curriculum frameworks for economics programmes at most universities are dominated by theoretical courses such as political economy, macro- and microeconomics, development economics and econometrics, whilst the proportion of green and low-carbon courses remains relatively low. There is insufficient integration with science and engineering disciplines such as energy, environmental science and ecology. Course content lags behind ‘Dual Carbon’ policies and market practices, lacking cutting-edge material in areas such as carbon accounting and climate risk assessment. The development of digital teaching platforms, such as virtual simulation laboratories, has lagged behind; there is a lack of specialised experimental facilities such as carbon trading simulation platforms and carbon accounting analysis systems. Experimental teaching case studies are largely concentrated on economic and financial analysis, with a shortage of cutting-edge cases relating to green and low-carbon transition and carbon sink trading. In particular, there is a lack of experimental scenario data on local enterprises’ carbon emissions, energy consumption, investment in green R&D, and green product trading. Consequently, students’ knowledge base and practical capabilities in emerging fields such as carbon finance and carbon trading remain relatively inadequate. The quality of off-campus practical training bases is substandard, with a lack of interaction and cooperation with ecological and environmental authorities, carbon exchanges and green enterprises. Specialised surveys and professional placements are often merely a formality, preventing students from engaging with real-world scenarios and challenges associated with the green and low-carbon transition—such as green credit approval, carbon asset management, ESG investment analysis and low-carbon marketing—making it difficult for them to translate theoretical knowledge into practical skills.

Thirdly, the teaching staff specialising in green and low-carbon studies is under-resourced. Lecturers are the main drivers and catalysts of reform in the cultivation of green and low-carbon talent within economics programmes, and the ‘Dual Carbon’ strategy poses a formidable challenge to the development of the economics teaching workforce. Currently, the economics teaching staff is primarily concentrated in the fields of theoretical and applied economics, lacking interdisciplinary backgrounds in environmental science, management and other related disciplines; consequently, the teaching capacity in green and low-carbon studies remains weak ([6][8]). Most lecturers lack experience and exposure to ‘Dual Carbon’ education; their understanding of practical cases such as carbon market operations and carbon sink measurement is limited; and they lack systematic, specialised training. Consequently, their environmental awareness, professional competence and teaching standards require improvement. Furthermore, most universities have yet to establish high-calibre ‘Dual Carbon’ economics teaching teams, and there is an insufficient number of ‘dual-qualified’ lecturers and industry mentors to meet the multifaceted

demands of green and low-carbon teaching.

Fourthly, there is a lack of standardised qualification certification for talent in the green and low-carbon economy. As the 'Dual Carbon' strategy progresses steadily, the green and low-carbon industrial chain continues to expand, and the range and scale of related occupations and roles are growing daily, creating an urgent need for standardised qualification certification for emerging green and low-carbon occupations and roles. However, green and low-carbon occupational certification is still in its infancy, and there is a lack of occupational identifiers in the field of the green and low-carbon economy. For example, the 2022 edition of the *Classification of Occupations of the People's Republic of China* identifies 134 green occupations spanning fields such as energy conservation and environmental protection, clean production, clean energy, ecological environment, green upgrading of infrastructure, and green services. These primarily include national vocational qualifications (such as Carbon Emissions Administrator), sector-specific competency assessments (such as Carbon Asset Managers, Carbon Emissions Consultants and Carbon Traders), and departmental specialised competency verifications (such as the Carbon Emissions Administrator verification). Among these, the registration and examination processes for vocational qualifications such as Carbon Accountants and Carbon Emissions Administrators are overseen by the Ministry of Human Resources and Social Security and the Ministry of Ecology and Environment respectively. This fragmentation and lack of standardisation make it difficult for employers to accurately assess and recognise the competencies associated with these qualifications. Due to the lack of authoritative recognition and professional qualification certification for talent in the green and low-carbon economy (such as low-carbon brokers and carbon asset valuers), the majority of green enterprises do not have clearly defined green and low-carbon economy roles or recruitment plans [8], which undermines students' motivation to study the green and low-carbon economy and limits the enthusiasm for cultivating talent in this field.

4. Explorations and Practices in the Training of Green and Low-Carbon Talent in Economics under the 'Dual Carbon' Goals

To address the challenges of cultivating green and low-carbon talent in economics under the 'Dual Carbon' goals, there is an urgent need to drive the transformation and upgrading of economics programmes, and to cultivate multidisciplinary economic professionals who embody the 'Dual Carbon' philosophy and possess green and low-carbon skills. As a regional university specialising in finance and economics, Anhui University of Finance and Economics has proactively aligned itself with the national 'Dual Carbon' goals and the requirements for the development of Anhui's 'Three Bases and One Zone'. It has undertaken exploration and practical implementation in the cultivation of talent within the Economics programme, covering aspects such as educational objectives, green and low-carbon teaching resources, the development of green teaching staff, and the certification of low-carbon talent.

4.1. Optimising Talent Development Objectives to Serve the 'Dual Carbon' Goals

Centred on the 'Dual Carbon' goals, the Economics programme at Anhui University of Finance and Economics, guided by Xi Jinping's Thought on Ecological Civilisation and in line with the needs of Anhui's green and low-carbon industrial development, has optimised its talent development objectives. It has established an interdisciplinary talent development model that integrates and empowers new economics and management disciplines with new engineering disciplines, thereby driving the transformation and upgrading of the programme. Firstly, green and low-carbon concepts have been integrated into the talent development objectives, incorporating value-based goals such as 'putting the Two Mountains philosophy into practice' and 'promoting green and low-carbon transition', thereby embedding the 'Dual Carbon' goals throughout the entire talent development process [7] to cultivate versatile economics professionals with a sense of national and social responsibility, green and low-carbon competencies, and a sense of responsibility towards the ecological environment. Secondly, greater emphasis has been placed on developing a green and low-carbon knowledge structure and green skills, helping students to form an interdisciplinary knowledge framework and acquire versatile innovative practical abilities. With a theoretical foundation in economics at its core, this approach promotes the deep integration of economic knowledge with digitalisation, intelligent technologies and green development, equipping students with an interdisciplinary knowledge framework spanning economics, ecological and environmental sciences, artificial intelligence and data science; building upon economic analysis capabilities, it cultivates green skills such as carbon accounting and carbon footprint analysis, carbon trading, green investment and financing analysis, and the evaluation of ecological and environmental projects. Thirdly, a 'Dual Carbon + Economics' curriculum system is being established. New modules have been introduced, including a compulsory 'Dual Carbon Economy' module, an elective 'Dual Carbon Skills' module, and an 'Extended Dual Carbon Trade' module, whilst the range of elective courses in interdisciplinary subjects such as the dual carbon economy, carbon accounting, carbon neutrality, data science and artificial intelligence has been expanded. Projects and competitions in the 'Dual Carbon' field have been integrated into the training programme to strengthen project-based and competition-based learning, ensuring that professional education, innovation education, skills development and curriculum design align with the talent requirements of the 'Dual Carbon' sector. Fourthly, a dynamic adjustment mechanism for talent development programmes has been established to ensure that talent development objectives align with the talent needs of industries and enterprises. The School of Economics has proactively engaged with local governments, industry associations, industrial parks and green enterprises to understand employers' demand for green and low-carbon talent in economics, and has dynamically adjusted talent development programmes accordingly. Cooperation with leading green enterprises such as Huaihe Energy, Guoxuan High-Tech and Datang Power has been strengthened to explore enterprise-sponsored programmes and order-based training models, thereby meeting the talent needs of these enterprises.

4.2. Strengthening Support for Green and Low-Carbon Teaching Resources

Strengthening support for green and low-carbon teaching resources is essential for cultivating green and low-carbon talent in economics. Firstly, we are strengthening the development of teaching materials in the ‘Dual Carbon’ field. We have organised experts from both within and outside the university to develop a series of courses on the ‘Dual Carbon’ economy, such as ‘Assessment of Dual Carbon Targets and Low-Carbon Policies’, ‘Carbon Accounting and Carbon Asset Management’, ‘Theory and Practice of Carbon Trading’, ‘ESG Analysis Methods and Practice’, ‘Digital Green Trade’ and ‘Global Climate Governance’. We are establishing course clusters and repositories of high-quality teaching resources and textbooks, categorised by level and subject area, to create model courses for ‘Dual Carbon’ education. Secondly, we will expand the development of experimental teaching resources for green and low-carbon education. Led by the School of Economics, a cross-departmental and cross-faculty ‘Low-Carbon Development and Carbon Trading Laboratory’ will be established to develop a carbon trading simulation system, enabling students to conduct simulated operations such as quota auctions and the design of carbon financial products. We will strengthen the development of a case study database on the green and low-carbon economy, integrate various online and offline resources, and create an integrated smart teaching platform for green and low-carbon education. AI teaching assistants in the field of green and low-carbon development will be developed to assist with carbon footprint calculations, carbon trading and carbon tax simulations, and green bond rating analysis, thereby providing support for students’ practical training in green and low-carbon initiatives. Thirdly, with a focus on the application and practice of the ‘Dual Carbon’ goals, cooperation with organisations such as the Anhui Carbon Emissions Exchange, green industrial parks and zero-carbon communities will be intensified. Through collaborative research projects, staff training programmes and legal advisory services on the green and low-carbon economy, stable internship and practical training bases will be jointly established. Establish undergraduate research funds and targeted internship programmes centred on local enterprises’ green and low-carbon trade, the design of carbon incentive and carbon credit mechanisms, the low-carbon smart economy, carbon capture technology and carbon sink trading. Support students in carrying out social practice activities themed around green and low-carbon initiatives, and incorporate the outcomes of students’ participation in high-quality practical projects into the credit recognition and awards and honours systems. Fourthly, the School of Economics will establish the ‘Dual Carbon Economy Forum’, regularly inviting experts from both within and outside the university, as well as industry mentors, to deliver lectures on carbon neutrality, thereby guiding students in acquiring knowledge of negative carbon, low-carbon practices, carbon management, carbon trading and carbon finance.

4.3. Strengthening the Development of a Teaching Staff Specialising in Green and Low-Carbon Development

In response to the requirements of the ‘Dual Carbon’ goals, the Economics programme has implemented a faculty development strategy centred on ‘internal training and

external recruitment, with two-way exchange’, optimising the structure of the teaching staff and driving improvements in the quality and efficiency of the faculty in the ‘Dual Carbon’ field. Firstly, investment in the training of Economics programme teaching staff has been increased to enhance their understanding of environmental issues and their teaching and research capabilities in relation to the ‘Dual Carbon’ goals. The School regularly organises activities such as ‘Frontiers in Dual Carbon Lectures’ and ‘Industry Practice Workshops’ to provide existing staff with systematic training in carbon neutrality-related theoretical teaching, thereby helping them to keep their knowledge base up to date. Secondly, experts from research institutions such as the Chinese Academy of Sciences and the Anhui Provincial Academy of Ecological and Environmental Sciences are flexibly recruited as specially appointed professors, whilst practitioners from carbon trading organisations and new energy enterprises are brought in as industry mentors, thereby establishing a teaching structure where academic and industry mentors develop in tandem. Each year, 3–5 full-time lecturers are selected to undertake work placements at leading green and low-carbon enterprises, where they participate in practical work such as corporate carbon asset management, carbon sink trading, environmental monitoring and green finance, thereby promoting the intrinsic development of ‘dual-qualified’ lecturers. Thirdly, an interdisciplinary teaching team comprising the university’s Longhu Scholars, industry mentors and sector experts has been established. This team engages in collective lesson preparation, teaching observations and case study development, whilst implementing project-based, case-based and scenario-based teaching methods to achieve a deep integration of the theoretical foundations of the green and low-carbon economy with cutting-edge skills and practical operations. Finally, a key talent programme for the ‘Dual Carbon’ economy has been implemented, prioritising talent in this field in terms of career development opportunities, remuneration, selection for talent initiatives and team building. At the same time, we will deepen KPI management at both university and school levels, incorporating the practical teaching achievements of economics lecturers in areas such as green and low-carbon teaching reform, interdisciplinary collaboration, the development of teaching case studies, and student supervision into their performance appraisal and professional title evaluation systems [8], thereby motivating lecturers to devote more energy to the entire process of cultivating talent for the green and low-carbon economy and enhancing the quality of talent development.

4.4. Exploring Methods for Certifying Talent in the Green and Low-Carbon Economy

Talent certification provides students with clear learning objectives, enhances their sense of personal achievement and employability, and serves as an effective measure to stimulate and enhance students’ proactive engagement in learning. In response to the current challenges of limited certification types and a lack of standardisation in the green and low-carbon economy sector, the university is actively exploring certification methods for economics professionals specialising in green and low-carbon initiatives, with a view to broadening their social recognition and providing greater scope for reform in economics talent development. The university has proactively engaged with local government and industry associations to organise the development of ‘micro-

certifications' for roles such as 'Carbon Finance Analyst' and 'Green Trade Specialist', thereby providing a reference for government departments in standardising the recognition and competency assessment of talent in the green and low-carbon economy. In collaboration with the human resources and social security department of Bengbu City, the university administers professional certification examinations for roles such as carbon sink measurement and assessment specialists and carbon emissions managers. Furthermore, it has integrated the assessment content of existing green and low-carbon professional certificates into the talent development programmes and course curricula for economics students, thereby advancing the integration of coursework and certification, as well as the 'one exam, three certificates' initiative. This enables students to complete their specialist coursework whilst simultaneously gaining eligibility to sit for relevant green professional examinations or obtain certification, thereby achieving a seamless transition from 'talent development – competency certification – industry employment'. On the other hand, we are accelerating the development of micro-specialisation clusters in the green and low-carbon economy, supporting leading green and low-carbon enterprises in offering customised micro-specialisations in areas such as the low-carbon economy, carbon trading, carbon finance and green digital trade. Students will follow training programmes jointly developed by the university and industry, with course content and practical components closely aligned with actual enterprise production practices, thereby bridging the 'last mile' from the classroom to the workplace and enabling joint certification of talent in the green and low-carbon economy by both the university and industry partners. Upon completing all courses and passing the assessments, students will receive a micro-specialisation certificate jointly awarded by the university and organisations such as the Provincial Carbon Emissions Exchange; this certificate carries priority recognition in recruitment processes at key emitting enterprises within the province.

5. Achievements in Green and Low-Carbon Talent Development within the Economics

Through the practical explorations outlined above, Anhui University of Finance and Economics has achieved initial success in the training of green and low-carbon economics graduates. Firstly, the degree to which training objectives are met and the suitability of graduates for their roles have improved significantly. Over the past three years, students have won a cumulative total of 126 awards in provincial, ministerial and higher-level academic competitions and green skills contests; successfully secured funding for over 120 national and provincial innovation and entrepreneurship projects; and published more than 150 journal articles. 70 per cent of graduation project topics are aligned with the needs of the green and low-carbon industries, and 12 green and low-carbon patents have been granted. Graduates not only possess a knowledge base that integrates new finance with new engineering disciplines, but have also mastered green skills such as carbon accounting, carbon trading, green investment and financing analysis, and ecological and environmental project assessment. In terms of further education and employment, over 25 per cent of graduates have gone on to pursue research in the green and low-carbon economy at

prestigious universities both at home and abroad, with the admission rate for the Economics Excellence Experimental Class exceeding 70 per cent. Aligned with the integration of the Yangtze River Delta and the needs of Anhui's green and low-carbon industries, the employment rate has remained stable at over 95 per cent, whilst the match between graduates and their roles continues to improve, ensuring that talent development is in sync with national strategic needs and resonates with regional development. Secondly, employers' overall satisfaction with graduates remains high, consistently exceeding 98 per cent. Thirdly, the 'One Exam, Three Certificates' scheme empowers talent certification, with 85 per cent of graduates obtaining at least one green vocational skills certificate. Furthermore, the influence of micro-specialisations such as low-carbon economy, carbon finance and low-code applications continues to expand, and these have been selected for the Ministry of Education's 'Double Thousand' Programme. Fourthly, the faculty's capacity to engage with the green and low-carbon industries has significantly improved. Over the past three years, six teams have been selected as provincial-level teaching innovation teams, more than 20 faculty members have been recognised as provincial-level or higher talent, the proportion of 'dual-qualified' teachers has reached over 40 per cent, and a cumulative total of 15 Ministry of Education industry-academia collaboration projects for coordinated talent development have been approved, marking a paradigm shift from a theory-led approach to the integration of science, education, industry and education.

6. Conclusion and Suggestions

Amid China's profound socio-economic transition towards a green and low-carbon economy, and the impact of artificial intelligence on economics education, cultivating talent for the green and low-carbon economy is not only a responsibility in serving the nation's 'Dual Carbon' goals, but also a strategic opportunity to reshape the core competitiveness of academic disciplines and secure a leading position in future talent development.

The policy recommendations are as follows: Firstly, accelerate the top-level design of talent certification for the green and low-carbon economy. As the authoritative body for talent certification, government departments should expedite the top-level design of the identification, classification and competency standards for talent in the green and low-carbon economy; promote the extension of green occupational identification to the green and low-carbon economy sector; expand the types and scope of talent recognition in this field; and standardise the eligibility criteria, competency standards, assessment grading systems and certifying authorities for all categories of talent in the green and low-carbon economy, thereby providing a benchmark for the cultivation of green and low-carbon economic talent in economics. Increase policy support for the cultivation of talent in the green and low-carbon economy; establish a platform for the joint participation of the government, higher education institutions, industry and enterprises in the development of the talent certification system; and incorporate contributions to regional green and low-carbon development into the evaluation system for economics programmes, thereby further enhancing the motivation to cultivate talent in the green and low-carbon economy. Secondly, deepen interdisciplinary integration and establish a more flexible training system. The convergence of new finance and new engineering disciplines represents a key

trend in cultivating talent for the green and low-carbon economy. We must proactively break down disciplinary boundaries within economics programmes, introduce more interdisciplinary courses, and form interdisciplinary teaching teams. A mechanism for forecasting and early warning regarding talent demand in the green and low-carbon economy should be established to enable timely adjustments to the training programmes and curriculum frameworks for economics programmes. The mechanism for collaborative education involving industry, academia and research should be refined, and project-based joint training deepened, ensuring that the cultivation of talent for the green and low-carbon economy aligns with industrial needs. Thirdly, we must strengthen the application of digital and intelligent technologies to drive the digital and intelligent transformation of talent development models. Digital and intelligent technologies-such as big data analysis, blockchain and artificial intelligence-should be deeply integrated into ‘dual carbon’ courses covering carbon accounting and carbon trading. We should develop digital teaching resources, including databases on the green and low-carbon economy and virtual experimental platforms, promote the sharing of high-quality educational resources, and cultivate versatile economic professionals who possess both digital literacy and green skills.

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