From "Insertion" to "Integration": An Innovative Pathway for Integrating Ecological and Professional Education in Economics and Trade Universities

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Abstract: The ecological civilization needs a green revolution of economic activities, which will generate new needs in talent development in economics and trade universities. These institutions should not only preserve their traditional advantages in economics and management, but also develop the ecological literacy and awareness of sustainable development in students. Over the past few years, the integration of ecological education and professional education has been actively studied in many Chinese universities of economics and trade, which has produced a range of practical solutions and new experiences. This paper, based on a systematic review of these practices, argues that the integration of talent cultivation should be centered on three strategic transformations: the transition to cognitive restructuring of knowledge rather than simple knowledge embedding, the transition to immersive learning in scenarios rather than traditional classroom instruction, and the transition to systematic institutional design rather than isolated initiatives. The paper also shows that, through their disciplinary edge in associating the luscious waters and fertile mountains with the invaluable resources, economics and trade universities are in a unique position to create a special channel of developing green talent. The pathway is also a good source of information to the overall growth of application-oriented universities.

Keywords: Ecological Education; Professional Education; Economics and Trade Universities; Integrated Talent Cultivation

1. The Distinctive Role of Ecological Education in Economics and Trade Universities

1.1 New Talent Demands under the "Dual Carbon" Goals

In 2020, China declared its strategic ambitions of reaching peak carbon emissions by 2030 and carbon neutrality by 2060. This pledge is not only indicative of the will of the country to combat climate change but also a tremendous shift in the production patterns, lifestyles, and even ways of thinking. Consequently, the expectations of the market towards economics and trade professionals are changing drastically. Businesses no longer find it satisfactory to have accountants who are only good at bookkeeping, financial analysts who only understand financing, or trade managers who only understand international trade regulations. Rather, they are in greater need of a new generation of professionals who are able to recognize ecological risks and exploit green development opportunities in their respective areas. As an illustration, accountants with knowledge in carbon emissions accounting and corporate financial management, and finance professionals with knowledge in carbon market mechanisms and portfolio optimization have become very desirable compound talents in the labor market. To economics and trade universities, the disciplinary foundations of which are firmly based on economics and management, this trend is not only a historical task but also a good chance to transform and develop the institution [1].

Ecological education in such universities is not meant to make all students an environmental expert. Instead, it is meant to incorporate green thinking in professional training of future economic and management practitioners. This represents a form of "embedded professional competence." It does not substitute the supply-and-demand analysis of economics, the decision-

making models of management, or the pricing logic of finance. Rather, it integrates an ecological approach into the basis of professional knowledge itself. An example is a student who is taking Corporate Finance, he or she must not only know how to calculate the net present value, but also be able to assess the carbon cost of a project. Equally, a student who majors in International Trade must not just be aware of tariff laws but also be aware of how carbon tariffs can transform the world trade trends. It is this combination of professional knowledge and green orientation that makes the ecological education unique in economics and trade universities [2].

1.2 The Inner Logic of Integrating Ecological and Professional Education

Universities of economics and trade have a number of natural strengths in facilitating the incorporation of ecological education into professional education. The former is their disciplinary orientation [3]. The main problems related to ecological civilization, including the conversion of the so-called lucid waters and green mountains into the so-called invaluable resources, the realization of the value of ecological products, the price of carbon, and the green investment and financing are essentially the questions of economics and management. Economics and trade universities are well-placed to be at the heart of these new challenges with their solid backgrounds in applied economics and business administration. The second benefit is policy connectivity. These institutions have long-standing ties with government agencies, financial institutions and industry associations. These links allow them to react quickly to changes in the policies of dual carbon and to integrate the newest policy frameworks and institutional innovations into the teaching content in a timely fashion. The third benefit is the industry-education synergy. The years of collaboration with other industries like finance, trade, and consulting offer a rich source of practical resources to develop talent in an integrated manner. Students can also practice on carbon emissions trading exchanges, pilot zones of green financial reform and innovation, and enterprises that practice ESG. The fourth benefit is internal cooperation. Economics and trade universities tend to have a more focused disciplinary structure and fewer obstacles to interdepartmental collaboration than comprehensive universities, where disciplines are more varied but usually more fragmented. This institutional feature helps to create interdisciplinary courses and to create cross-disciplinary teaching teams. Together, these benefits allow economics and trade universities to pursue a unique avenue of ecological education that is not similar to the strategies typically embraced by comprehensive universities [4].

1.3 Toward Integration: Three Fundamental Shifts

According to the above conceptual analysis, the main work of integrating ecological education and professional education in a profound way can be reduced to three interconnected strategic changes [5].

The initial change is the one between knowledge embedding and cognitive restructuring. Superficial “insertion” emphasizes “what is taught,” such as adding several ecological case studies or a few sections of green-related content to existing courses. Deep integration, on the other hand, is concerned with what has changed, i.e. whether there has been substantive change in the way students think. The goal of cognitive restructuring is to develop an economy-ecology cognitive system, which allows students to add ecological aspects to their analysis whenever they face an economic or management issue. This reorganization works on various levels. On the most basic level, students need to know that all economic processes occur in the natural environment and that their ecological effects cannot be externalized in any way. This is the degree of factual cognition. The second level is about students being taught to use economic theories and tools to understand ecological problems: How can externalities be internalized through institutional design? What can be done to solve the problem of the public goods dilemma using collective action? What is the best way to distribute limited resources among generations? This step entails the development of an analytical framework. On a higher level, students should be able to practically use such thinking in professional practice, such as incorporating ecological thinking into corporate strategy, assessing climate-related risks in investment decisions, and predicting green trade obstacles in international trade negotiations. This phase is an indication of the development of action competence. These three levels, taken

together, are the entire process of cognitive restructuring.

The second transition is the shift of classroom lecturing to scenario-based immersion. Conventional professional training is based on a lecture-based model whereby the teacher imparts knowledge and the student absorbs it. This method is good in providing systematic theoretical knowledge, but it is not enough to develop ecological literacy. Ecological literacy is not only about knowing what, but also about being able to do what and becoming used to thinking in a certain manner, which cannot be easily acquired by lectures only. Immersion Scenario-based immersion immerses students in real or simulated problem-solving situations, allowing them to learn by doing and engaging in practice. Such immersion can take place in various contexts. In a carbon emissions trading simulation laboratory, students can take on the roles of various market participants and can feel the logic of the carbon markets in action with the price fluctuations [6]. Students are directly involved in the carbon management departments of enterprises in terms of carbon inventory processes, such as data collection, analysis, and report preparation. In field studies, students can go to rural communities, forest areas or river basins to face the real-life issues of putting the value of ecological products into practice. In both of these situations, knowledge is not received passively via one-way teaching; instead, it is actively built up through problem-solving and learning by doing. This type of thinking is more lasting and more easily applicable to the future work situations.

The third change is the move between individual efforts to system design. Unless the integration of ecological education and professional education is carried out on a larger scale, i.e. on the basis of courses, individual instructors, or independent projects, it will be hard to produce large-scale effects or have a sustainable impact. Although the isolated initiatives will be useful in terms of experimentation and demonstration, the integrated cultivation will be only a bonsai, but not a landscape, unless the successful experiences are institutionalized and implemented in a systematic manner. Systemic design involves the philosophy of integrated cultivation being incorporated in the whole process of talent development. At the talent training program level, this is by clearly stating the purpose of ecological literacy in talent development goals and structuring of curriculum and credit systems. At the curriculum level, it requires systematically identifying the "interfaces" between core professional courses and ecological content in order to avoid fragmentation, redundancy, or omissions. Systemic design at the practical training level requires the development of a tiered practice system that builds on on-campus experimental learning to off-campus internships and professional training. At the assessment level, it requires the creation of assessment mechanisms that can adequately measure the ecological literacy of students and their capacity to put it into practice. Lastly, on the support level, it involves the establishment of faculty development systems, resource allocation systems, and quality assurance systems that are aligned to the objectives of integrated cultivation. These five systemic design dimensions are reinforcing and each of them is an essential element of a successful integrated talent development system.

2. Key Challenges in the Integration Process

Despite the significant achievements of economics and trade universities in the recent years to combine ecological education with professional education, this process is still at the critical phase of deepening and transition. In the view of the general implementation, there are five significant challenges that have become more evident.

2.1 Structural Contradiction: "Easy to Embed, Difficult to Integrate" in the Curriculum

The need to integrate ecological content in professional education has been realized by most economics and trade universities. But in reality, implementation is usually at the level of knowledge embedding. Typical approaches include adding one or two environmental case studies in Principles of Economics, briefly mentioning green bonds in Corporate Finance, or providing a superficial introduction to carbon tariffs in International Trade. Despite the fact that this embedding strategy is comparatively easy and achievable, it has a number of limitations. First, embedded content is usually perceived as optional or supplementary, and thus it is prone to compression or deletion in cases where teaching time is limited, thus not being stable and systematically covered. Second, the

fragmented nature of such embedding makes it difficult for students to develop a coherent "economy–ecology" cognitive framework. Students can learn about the concept of a carbon tariff without necessarily knowing how it is structured to affect the international trade system, or they can learn about the concept of ESG without necessarily knowing how to use it in the practical analysis of investment. Third, the embedding strategy tends to have no horizontal coordination between courses, leading to either redundant coverage or conceptual gaps. Thus, the shift between the knowledge embedding and systematic integration is of paramount importance [7].

2.2 Faculty Competence Gaps: "Specialized but Not Broad"

The most important implementers of integrated talent cultivation are faculty members, but their competence structures demonstrate a definite imbalance. The majority of the faculty in economics and trade fields were trained in traditional academic fields and their knowledge systems were mostly developed before the period of the dual carbon. This state of professional specialization and lack of interdisciplinarity has resulted in two significant issues [8]. On the one hand, there are those teachers who demonstrate aversion to ecological material, because they believe that they do not have enough knowledge about environmental and sustainability-related problems. They are afraid of inaccuracies and, therefore, they do not want to include such issues in their instruction. Conversely, despite the inclusion of ecological content, it is frequently treated in a superficial manner, and there is little depth in relating ecological problems to fundamental disciplinary theories. As an illustration, in teaching green bonds, a teacher who lacks technical requirements of green project certification or how the funds are monitored might not be able to offer a thorough and rigorous explanation of this financial tool. This competence gap in the faculty has become a bottleneck that limits the further development of integrated ecological and professional education.

2.3 Resource Bottlenecks in Practical Teaching: "Ideas but No Means"

Practical learning elements are essential in the development of ecological literacy. The competencies that include carbon emissions trading, corporate carbon inventory accounting, and ESG reporting cannot be successfully trained in the classroom setting; they need to be exposed to relevant practice platforms and training materials. But in the real sense, there is still a disparity between the intentions and the means of education, with many institutions having a huge shortage of resources. On the one hand, on-campus practical platforms are not developed. Carbon trading simulation, carbon footprint accounting, and green investment portfolio optimization are specialized experimental systems that are expensive and technically challenging to implement in most institutions. Even in the case of the availability of such simulation platforms, they are usually constrained by the outdated datasets and case materials that are not well aligned with the current industry practices. On the other hand, off-campus practice bases frequently exist in a nominal or superficial form. Cooperation agreements with carbon trading exchanges, green financial institutions, and carbon management enterprises tend to be on the level of formal partnerships, without offering students any significant opportunities to get in-depth internships or to be involved in real-life projects. This lack of practical resources is a serious limitation to the development of integrated cultivation, which does not allow it to go beyond the stage of knowledge transmission to the real development of competence.

2.4 Financial and Institutional Constraints: "Willing but Unable"

Integrated cultivation should be encouraged by providing adequate resources, but many economics and trade universities are limited by a lack of resources between the desire and the ability. The initial limitation is financial. Curriculum development, textbook compilation, training of faculty, construction of experimental platforms, and maintenance of practice bases are all activities that require constant investment. With tightening university budgets, integrated cultivation, which is often viewed as an incremental reform, is often not a priority in the budget. The second constraint is institutional. The current talent training programs are run within set credit limits; hence, the introduction of ecology-based courses will inevitably require the elimination or modification of other current courses. This zero-sum design establishes a strict limitation at the curriculum design level.

Moreover, faculty assessment systems also hinder improvement. Research output is generally much more important in promotion and tenure evaluations than teaching innovation. Consequently, teachers who spend a lot of time in creating the so-called dual carbon courses or overseeing student practical training tend to get little credit in the existing evaluation systems, thus undermining their incentives to engage in integrated cultivation programs.

2.5 Cooperation Temperature Gap: "Hot School, Cold Enterprise"

The field of ecological economics and trade is highly practice-oriented, making industry–education collaboration a critical component of high-quality integrated talent cultivation. Nevertheless, the existing university-enterprise collaboration has a conspicuous hot in universities, cold in enterprises trend. Universities show a high level of interest and are eager to find a partner, but enterprises are rather unmotivated and show rather superficial interest. This imbalance is caused by a number of factors. From the enterprise perspective, functions such as carbon management and green finance are still in the early stages of development in many organizations. Such companies usually experience a lack of specialized staff and experience in running their operations, which restricts their ability to devote staff to engage in meaningful talent development efforts. Moreover, the advantage systems of collaboration are not clear. Companies that invest time and resources in educational partnerships do not get direct or immediate economic benefits, which leads to poor and ineffective incentives to participate. Institutionally, there are still inadequate or inconsistent supportive policy instruments that promote deep enterprise involvement. Tax preferences, academic credit recognition, or preferential evaluation and award mechanisms are either narrowly focused or not effectively implemented. This temperature difference in external cooperation greatly limits the richness and efficiency of practical training, and it is hard to have experiential aspects of integrated cultivation to attain substantive and long-term growth.

3. Recommendations for Deepening Integration

3.1 Construct a Full-Chain Curriculum System

The solution to curriculum integration is to move beyond the piecemeal embedding of curriculum to systematic curriculum design and to build a three-tier curriculum framework that incorporates general education, professional integration, and specialized expansion [9]. Enhancing the overall base: The courses like Ecological Civilization and Sustainable Development must be made mandatory general education courses to all majors in economics and trade. These courses must serve as prerequisite knowledge before professional training and not as optional courses based on interest so that every student develops a common cognitive foundation in sustainability before moving on to specialized courses. Enhancing professional integration: Every academic program must periodically review its core curriculum to determine effective interface points where it can incorporate the content of the so-called dual carbon and create teaching modules. As an example, Principles of Economics ought to improve its coverage of environmental externalities and public goods; Corporate Finance ought to include ESG-based investment decision-making models; and Financial Accounting ought to increase the amount of material on carbon asset recognition and measurement. This will provide breadth of coverage and depth of integration. Developing specialized elective modules: It is based on this that institutions can further develop specialized elective modules or micro-majors in fields like Low-Carbon Economics and Management, Green Finance, and Carbon Management, offering students with a deep disciplinary interest in-depth learning pathways. These special modules must focus on systematic and application oriented knowledge frameworks without superficial generalization and course fragmentation. Creating a dynamic updating system: Since the knowledge systems of dual carbon are rapidly changing, there is a need to create a system of continuous curriculum renewal. This involves inviting industry leaders to give frontier lectures on a regular basis, forming faculty teams to monitor policy changes and academic progress, and incorporating new knowledge, data, and case studies into the teaching material as soon as they become available.

3.2 Develop a Composite Faculty Team

The solution to the faculty competence gap is a two-fold approach of building on the current faculty and bringing in new talent, in a combined capacity-building and recruitment strategy to build a teaching team that fits the integrated cultivation requirements. To begin with, there should be a thorough retraining program. All in-service faculty in economics and trade disciplines should be provided with a systematic training system that is dual carbon in nature. The training material must cover the fundamental modules like carbon emission accounting procedures, carbon market, green financial products systems, and ESG assessment frameworks. The formats of delivery can be a combination of intensive workshops, online courses, and enterprise-based practice. The goal is to accomplish systematic retraining of all core faculty in 3-5 years, which would greatly enhance the overall teaching capacity. Second, interdisciplinary teaching teams are to be created. Faculty in economics and management ought to be invited to cooperate with specialists in environmental economics, energy economics, and other areas of interest in key courses and applied projects. Such teams can attain knowledge complementarity and pedagogical co-development through co-teaching arrangements and joint lesson preparation. Moreover, cross-institutional virtual teaching groups, which capitalize on online platforms to combine the experience of several universities, are also a promising complementary model. Third, faculty positions based on industries should be created. Adjunct professors or industry mentors can be hired as experienced professionals in the carbon trading exchanges, green financial institutions, and low-carbon technology consulting firms. These professionals must be substantively engaged in course delivery, supervision of practical training, and revision of the curriculum, thus putting the real world experience directly into the teaching process. Lastly, faculty appraisal systems need to be changed. The criteria of promotion and appointment must clearly reflect the results of integrated cultivation, such as the creation of courses on dual carbon, writing of textbooks, building of case studies, and overseeing of practical training. Faculty incentives can be successfully aligned with teaching innovation and long-term development of integrated cultivation by modifying this assessment guiding mechanism.

3.3 Build Shared Practical Teaching Platforms

To overcome bottlenecks in the practical training resources, there is need to have coordinated efforts on and off campus as well as better use of resources through co-construction and shared access mechanisms. Creation of virtual simulation platforms on campus: In practice-intensive fields like carbon emissions trading, carbon footprint accounting, green investment portfolio optimization, and ESG rating systems, standardized virtual simulation experiment modules must be created. A central kitchen model can be implemented to prevent overlapping development in institutions, with the core modules being developed by leading universities and shared nationally via the National Virtual Simulation Experiment Teaching Project Sharing Platform. Creation of a national case database on dual carbon: There should be a concerted effort to have the economics and trade universities across the country to create a national teaching case database on the practice of enterprises, policy innovation, and the application of financial markets. This database must be run on a system of co-construction, joint access and continuous updating, whereby the institutions can use the available materials freely and add new cases as they are developed on a continuous basis. Enhancing the development of off-campus practice bases: Stable and substantive relationships with carbon trading exchanges, green finance reform pilot zones, low-carbon industrial parks, and other organizations should be developed. It is necessary to move away formalized agreements and towards meaningful engagement, allowing students to access real datasets, engage in project workflows, and take structured internships instead of just making observational visits. Using competitions as an effective training channel: Academic and disciplinary competitions like the “Challenge Cup” Green Track and the National College Student Energy Economics Academic Innovation Competition are to be encouraged. These platforms must motivate students to use theoretical knowledge to practical issues. The results of competition can be included in course evaluation or graduation, thus creating a reinforcing loop of learning-competition-application.

3.4 Increase Resource Investment and Institutional Guarantees

The limitation of resource allocation can be solved through the concerted efforts of government, universities, and society to offer sustainable institutional support. Creating special funding sources of integrated cultivation: In the central and local university teaching reform budgets, a special category of funds must be established to fund the integration of ecological civilization education with professional education. Such funds may be used to develop the curriculum, collect textbooks, train the faculty, build experimental platforms, and maintain practice bases, which will reduce the pressure on resources in the early implementation stages and provide stable program development. Increase interdisciplinary majors in ecological economics and trade: New undergraduate majors like Low-Carbon Economics and Management and Green Finance must be included in the official academic program catalogue. Alternatively, green tracks can be organized within existing majors. At the postgraduate level, universities ought to be assisted in establishing second-level disciplines or research directions independently in relation to Ecological Civilization and Green Development. These institutional arrangements at the program level offer a disciplinary base of long-term integrated cultivation. Encouraging reforms in the system of double degrees and major-minor: Economics and trade universities are to be urged to cooperate with the institutions of environmental science, energy engineering, and other related fields to create the system of double-degree programs. Meanwhile, internal major-minor systems are to be further developed to enable flexible interdisciplinary learning routes, thus enhancing the development of compound talent with cross-sector skills. Setting up quality control and incentive systems: The results of the integration of ecological education must be included in the undergraduate teaching assessment and disciplinary assessment systems, and the performance of the institution should be steered by an efficient steering mechanism. Moreover, a special section of the national teaching achievements award should be established on the integration of ecological civilization education with professional education to appreciate the institutions and individuals who have shown excellent performance, thus increasing motivation and long-term participation.

3.5 Forge a Multi-Stakeholder Industry-Education Integration Ecosystem

The most important way to overcome the temperature gap in university-enterprise cooperation is to create a collaborative mechanism on the basis of common interests and common responsibilities, which will turn enterprises into active participants and, finally, direct beneficiaries. Building regional industry–education integration alliances: Local governments should take the lead in establishing "dual carbon" economics and management industry–education alliances that bring together regional economics and trade universities, carbon trading exchanges, green financial institutions, low-carbon industrial parks, and third-party carbon service organizations. Such partnerships must put in place frequent communication and coordination systems to maintain constant alignment between talent development and changing market needs. Enhancing policy incentives to participate in the enterprise: Enterprises that actively participate in substantive educational collaboration, including co-developing courses, offering internship placements, or creating student scholarships, should be supported by policy, including tax benefits, credit benefits, and priority in awards and recognition. Moreover, the involvement in university talent development might also be included in enterprise performance assessment systems or corporate social responsibility (CSR) reporting systems, which would contribute to the motivation of institutions. Standardizing industry competency standards with university training systems: Standardized competency frameworks and vocational certification systems of new jobs like carbon asset manager, ESG analyst, and green financial product manager should be expedited. Universities can modify the curricula to suit, and enterprises can identify and embrace these certifications, creating a closed-loop system of university training-industry certification-enterprise recognition. The investigation of specific talent development models: With the experience of the "Excellent Engineer Education and Training Program in mind, specific training programs may be implemented in the sphere of the so-called dual carbon economics and management. In this model, local governments or major businesses

establish talent needs, universities develop customized training, businesses offer internships and scholarships, and students are channeled into particular job streams when they graduate. This order-based cultivation model can be used to successfully fill the talent supply and market demand gap [10].

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