Innovation in Higher Education Content Driven by Societal Demands: Core Issues and Strategies for Aligning with China's Economic Development

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Abstract. Chinese economy is at the critical transitional stage besides the high-quality and rapid development. This change requires a proportional adjustment of industries against which a novel demand on the quality of talent and their competencies applies. Education, a major instrument in developing talents, has a direct impact on the level of human capital production and the rate of economic growth. Nevertheless, the prevailing education system in China has three fundamental issues, namely excessively teaching and minimally using theory to practical application, high levels of gameness in educational provision and a slower pace of reviewing the curricula. These challenges help to create the disparity between the supply of talents and the needs of the markets. Based on the human capital theory and the education-based economic growth theory, the present study is an in-depth analysis of the bridges between industry and education, the advance of region-specific educational contents, as well as the active mechanism to adjust the educational curriculum on time. The goal is to focus the theoretical approach to education-related interaction on the economy, mitigate the imbalance between the supply and demand of talent, and finally, supply solid human capital to support economic progress and productivity rates.

1 Introduction

Today, Chinese economy is undergoing a severe transition period between fast growth and high-quality development, when digital economy is expanding and capital inflow in the new sphere is growing constantly. These forces are sewing deep structural changes, including the modernization of manufacturing to high-end production and the variety of the services industry. In order to promote a balanced economic development of the region, new requirements on the quality and skills mix of the labor force are made, including a great number of professionals of interdisciplinary competences, innovative thinking, and practical working capabilities. Being the main channel of talent formation, education is inherently connected with the level of economic growth and has to correspond to the requirements in industry exactly [1]. The educational contents depending on science and economics directly

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influence whether the cultivated talents will follow the rhythm of economic growth and drive industrial restructuring in a sustainable manner. Nonetheless, the gap between the existing curriculum in China and the needs of the economic growth is considerable; however, the gap has led to the creation of a real paradox: the abilities of the graduates do not necessarily correspond to the reality of the positions, and they thus cannot adjust swiftly to the industrial requirements concerning production and innovation [2]. This supply-demand imbalance is basically because of the lack of alignment among educational material, industrial transformation, regional economic aspects and the rate of technology innovation. With these problems in mind, the paper will focus on the central theme of Innovating Higher Education Content in China to align itself with Economic Development. Hypothetically, the proposed research should enhance the theoretical framework of the interaction between education and the research proposes specific reform initiatives. It provides practical plans of implementation to streamline educational material, relaxing the mismatch of skills and jobs and granting strong talent assistance to the industrial renewal and economic reforms.

2 Analysis on the key issues and causes of the mismatch between current Chinese education content and economic development

2.1 Educational content prioritizes theoretical knowledge over practical application, resulting in a disconnection from the actual demands of the industry.

Though content setting of professional courses in China's higher education focuses on the integrity of the discipline system and the systematization of theoretical knowledge, it is loosely connected with the production processes and technical standards of enterprises. Specifically, the experimental courses in science and engineering of regular undergraduate colleges and universities are mainly verification experiments lacking practical projects that closely match real industrial scenarios. This indicates that students' abilities to solve actual production problems cannot be fully trained. The update speed of educational courses in vocational colleges significantly lags behind the development of industries. Some vocational colleges still use such teaching content of traditional industries and the training of key skills as core technologies and equipment operation in emerging industries like artificial intelligence and new energy, which is seriously insufficient, making it difficult to meet the demands of industries for skilled talents [3]. Meanwhile, the evaluation system in Chinese education centers on examination results, and practical courses gradually become formalistic as they are not directly related to college entrance examinations. Such an evaluation model is a mere oversight of the essence of practical ability in developing talents. When it comes to optimizing weight of evaluation of practical competence and changing the reform of the practical assessment mechanism, the experience of the United States is helpful to China: diversified sources of funds give universities wide discretion in designing their curriculum, while the satisfaction of the demands of the market teaches the institution of higher learning to train practical competencies. The operational logic of this model is rooted in the close integration of institutional autonomy and competitive market mechanisms, which differs from China's national conditions. Nonetheless, it provides a meaningful reference for adjusting curricular content in China.

On the other hand, enterprises' participation in the design of college courses is insufficient. There is a lack of regular cooperation platforms between schools and enterprises, making it difficult for schools to accurately obtain the latest demands of the industry. The development of courses is not in sync with the development of the industry. Compared with successful

practice of the "dual system" in Germany, where enterprises and schools are deeply integrated, jointly formulate training programs, and co-build a curriculum system, school-enterprise cooperation in China mostly remains at a shallow level such as short-term internships and equipment donations and has not formed a stable mechanism for collaborative education [4]. Given that Germany's successful implementation of its dual education system relies on its unique vocational education tradition and the social partnership among enterprises, government, and trade unions, China should not seek to replicate it simplistically. Nonetheless, valuable insights can be drawn from it to deepen industry-academia collaboration in China.

2.2 Educational content exhibits significant homogeneity, rendering it difficult to accommodate the differentiated development needs of regional economies.

Significant disparities exist in China's regional economic development, with distinct sectoral focuses such as digital trade in the eastern regions, specialty agriculture in the central and western regions, and industrial transformation in the northeastern region. Yet educational content has been hindered by such differentiated paths, there is a strong homogenisation of curricula and of the educational system in different parts and kinds of institutions, with no conception directed to regional economic features [5]. More precisely, although eastern coastal regions demonstrate industrial agglomeration in such fields as digital trade, there are universities providing homogenized courses on traditional manufacturing as they do in central and western locations. On the contrary, special courses like the specialty agriculture in the central and western areas are in urgent needs for specialized talents, but the local institutions randomly create finance, computer science and other popular courses. The northeastern old industrial base confronting industrial restructuring is in dire need of talents in smart manufacturing and green chemistry, but local education still centers on the old industrial technologies, providing no connection to the needs of transformation.

The main issue of homogenization in the school curriculum is the uneven distribution of educational resources. The education resources in China are increasingly concentrated in some regions and major institutions and are of high quality. Most local colleges and universities, especially ordinary ones in the central and western regions and the northeast, are restricted by funds, teaching staff and research conditions, which are lacking the resources and ability to independently develop characteristic courses. With limited resources, these institutions often choose to copy the mature curriculum systems of key institutions, making it difficult to carry out localized innovation in line with regional industrial demands. By contrast, the United States and Japan have more abundant feasible experiences in this regard, which can be served as references for China to improve its educational resource allocation policies. They have implemented targeted support policies to balance the allocation of educational resources across regions, enabling local institutions to develop specialized programs with regional industrial strengths, thereby effectively mitigating curriculum homogenization [6].

2.3 The educational content is "outdated," making it difficult to keep pace with the economic transformation and the development of emerging industries.

The update cycle of textbooks in Chinese universities is lengthy, ranging from 5 to 8 years, which leads to a phenomenon where "textbook content lags behind industry development." Currently, the technological iteration cycle in emerging industries is only 2 to 3 years, resulting in the inability of textbooks to cover the cutting-edge concepts of emerging industries [7]. Examples are the digital economy (ex: big data analysis and blockchain applications) and the green and low-carbon sector (ex: carbon footprint-accounting), where

these highly advanced skills are not adequately well-represented in the current curriculum and the curricular material is obsolete, directly causing this scenario that, on leaving college, graduates have to re-learn the skills they will be required to perform on their jobs and are unable to learn the talent swiftly that new industries require.

The major aspect that limits the actual alignment of education to the industrial needs in China is the tediousness of revising the contents of education that require series of approvals. It is therefore unable to react fast to such changes in needs brought by economic transformation and industrial upgrading. Contrarily, Singapore education system is very flexible and the period of updating higher education and vocational education courses is 1-2 years only so that it is able to match the industrial requirements against educational content dynamically by facilitating the approval process and giving more autonomy to educational institutions [8].

3 Reform countermeasures for the practicality of educational content are centered on the adaptation to China's economic development.

3.1 Building a bridge between education and industry needs

Before establishing a bridge between education and industrial demands, there is an urgent need to establish a practical teaching system, requiring an in-depth integration especially in the context of higher education in three areas, theoretical teaching, project-based training and corporate internships. In the case of STEM (Science, Technology, Engineering, and Mathematics) courses, its active integration with real-life production projects of enterprises as the teaching case is necessary, which will allow students to combine the theoretical material and improve efficiency through real-life production efforts. In the case of humanities and social science subjects, practical courses like studies about industries, government and enterprise internships as well as project planning are necessary to enhance knowledge in the operational logic of industries and diminish the gap between course work and field application.

Based on this, it is essential to perfect the school-enterprise collaborative education mechanism and overcome the collaboration obstacles between institutions and industries. One of the main activities that the enterprises ought to be involved in is the processes involved in talent development and hence they can work/collaborate with academic institutions to jointly develop the training programs, design the curricula, and formulate teaching teams. They must jointly establish the important teaching priorities and skill development directions depending on trends in the industry and job real demands [9]. In the meantime, the businesses can donate hi-tech equipment, bring on technical specialists to engage in instruction and offer the students real-world industrial situations and technical advice. In turn, educational institutions are encouraged to assist the enterprises with developing the talent pipeline and providing well-suited graduates to the partner companies, so as to construct a sustainable collaborative mechanism where they would develop jointly, share resources and benefit each other through the creation of a sustainable collaborative mechanism featured by the concept of joint talent cultivation, resource sharing, and the mutual benefits [10].

3.2 Promote the construction of "regional characteristic" educational content.

To promote the construction of "regionally distinctive" educational content, local governments need to play a leading role, formulating targeted regional talent cultivation plans

in line with regional development strategies and industrial layouts. In the eastern region, which has advantages in digital trade and cross-border e-commerce, the focus should be on the demand for international talents and the development of distinctive courses with an international perspective. The course content should emphasize foreign language communication, cross-border business operations, and the application of international rules. In the central and western regions, where the pillar industries are agriculture and cultural tourism, the emphasis should be cultivating students' abilities in the application of characteristic industry technologies and the operation and management of industrial chains. In the northeastern old industrial base, which is facing the need for the transformation and upgrading of traditional industries, courses in advanced fields such as intelligent manufacturing, green chemical engineering, and industrial internet should be added with an emphasis on cultivating technical and innovative talents capable of supporting industrial transformation.

On developing characteristic courses, it is necessary to pay attention to the regional educational resource that is sharing platform to reduce development costs and enhance the efficiency of resource utilization. Building provincial and regional online open course platforms and integrating the characteristic courses, high-quality teaching resources, industrial practice cases, and industry training materials of various local colleges and universities can break down the resource barriers among institutions within the region [11]. For local colleges and universities with relatively weak financial, faculty, and research conditions, the experience of characteristic course design and teaching resources from high-quality institutions through the platforms can be directly drawn on and absorbed, basing local adaptations on their own situations. This can effectively avoid the waste of resources caused by repetitive development.

To ensure that educational content is precisely tailored to the economic demands of the region, it is of significance to improve the mechanism for researching and feeding back on regional industrial demands. Schools and enterprises should jointly establish a regional research team of industrial demand composed of professional teachers, industry experts, human resource managers of enterprises, and technical backbones. Moreover, adopting a lightweight research model is in need. The comprehensive and systematic research should be optimized to "annual lightweight dynamic monitoring + in-depth specialized research every three years." The dynamic monitoring relies on lightweight data such as job demand lists and skill update directories submitted by industry associations and key enterprises. The in-depth research focuses on the talent structure gap and long-term demand trends of regional pillar industries and emerging industries, thereby significantly reducing research costs. Therefore, research should center on the current situation and future trends of key and emerging industries within the region, as well as the specific demands for the number of talents, skill requirements, and professional qualities. A detailed and accurate research report on talent demand should be formed. Schools should adjust their professional settings and optimize course contents based on the research results, and promptly eliminate courses that are out of step with regional industrial demands, which, by doing so, ensures that talent cultivation is dynamically adapting to the regional economic development needs.

3.3 Dynamic curriculum content adjustment based on streamlined approval processes and modular design.

The ineffective system of course review is filled with inefficiency and cumbersome procedures of approval. Optimizing the control mechanism of developing and updating courses should be the first step to eliminate the problem of the traditional course review system. The educational authorities ought to allow the autonomous design of the curriculum in all institutions of higher learning. An ex-post-filing system should be applied besides the

pre-approval system in the case of emerging sectors and the untested and superior technologies, i.e., digital economy, the development of green and low-carbon technologies, and AI. This would enable institutions to first come up with course modules, then keep upgrading the content through practice and finally complete the filing process. Most importantly, there should be condensed approvals and a decreased number of review cycles to ensure the non-existence of out-of-date course content in the course of long administrative approvals.

A partial curriculum designed in a modular form contributes to the efficiency in updating courses. These modules can be interrelated but independent to specific learning objectives through the reorganization of various courses into merely independent knowledge modules, skill modules, and competence modules. When new technologies, innovations, or change of demands in the industry arise, the entire curriculum system does not even need to be overhauled but rather single modules need only to be updated so as to allow the course content to be iterated within a short time. This modular style not only reduces the update period considerably and lowers the expenses incurred but also enables institutions to assemble modules flexibly depending on the needs of individual jobs, which aids in the satisfaction of the various talent demands given the economic transformation as well as further industrial upgrading.

4 Conclusion

According to the essence of the context of economic change in China, the high-speed to high-quality development, this paper dwells upon the key topic of the alignment of educational content innovation with the Chinese economic progress. Based on theoretical framework analysis as well as practical analysis, the following conclusions have been drawn.

To start with, education content innovation is a vital stone to sustain superior economic development. The high-quality economic growth being sought by China is coupled with the structural industrial upgrading, the emergence of the digital economy, and regional development coordination, which also brings new requirements of interdisciplinary competency, innovative literacy, and applied skills among the talents. Education, being the main tool of developing talents, should ensure its contents to be scientifically based and well tied with economic development, which is the direct measure of garanteeing how well talent will be supplied to the industrial development and transformation.

However, the design of the educational content in the Chinese higher education institutions has three evident problems that limit their compatibility with economic demands. To begin with, it has a tendency to theory over practice. Higher education, as reflected in its curricula, has weak points in relation to the processes of corporate production as well as technical standards, whereas vocational training lacks the skills requirements of the new industries. Combined with poor university-industry collaborative processes, these gaps lead to a lack of fit between the practical skills of graduates and the demands within the industry. Second, there is too much homogenization: the curricula in institutions in various regions are not differentiated and do not consider the economic conditions of different regions. For instance, there is digital trade in the eastern part, specialized agriculture in the central regions, and industrial transformation in the northeast area. This generalized model increases the disequilibrium in the supply and demand of talents. Third, significant content update delays, textbook revision periods are way behind the fast technology iteration periods of emerging industries. Also, lengthy and inflexible processes of course approval delays the streamlining education to the economic restructure and the speed of emergent industrial development.

The principal value of this research is manifested in both theoretical and practical dimensions. On the theoretical level, based on the theory of human capital and the theory of education-led economic growth, this paper expounds on the logic inherence between the

invention of educational content and the quality economic growth, adding to the research framework in terms of the interactive relationship between education and the economy as a lens of analytical problem-cause-solution in future studies.

In terms pf the practical significance, such suggested reforms as the cooperative relationship between industries and academic institutions and building region-centered curricula are viable and can provide effective recommendations to educational establishments to help optimize their curricula. Additionally, the dynamic mechanism of curriculum adjustment can be proven to be useful to the education policy makers in government bodies. Such investments can reduce the imbalance between the supply and demand of talents so as to provide a powerful human capital base to support industrial upgrading.

It should be noted that while this study has established a comprehensive framework for educational content innovation in Chinese universities, it is subject to certain limitations: it lacks case analyses tailored to specific regions, and the granularity of proposed countermeasures requires further refinement.

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