

A study of China-ASEAN “University-Enterprise” new engineering collaborative education with multiple subjects

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Abstract. The integration of industry and education has become an important way for universities to cultivate new engineering talents. The cooperation to create “university-enterprise” alliances can improve the collaborative education mechanism of multiple subjects by building a bridge of communication for the new engineering, which is an important means of integration of industry and education. This study of “university-enterprise” new engineering collaborative education with multiple subjects analyzes the collaborative education mode and its implementation path for China-ASEAN new engineering cooperative education of multiple subjects from the perspective of discipline professional construction and industrial transformation and upgrading, discipline professional group and industrial agglomeration development, and the effect of the ability of multiple subjects.

1 Introduction

In the context of the rapid development of big data and economic globalization, artificial intelligence has become an important driver of economic development in various countries, and the application of artificial intelligence has brought about new changes in industry and technology, profoundly changing the way people work, live, and learn. According to the current situation of China-ASEAN AI development, the cooperation on practical AI education, scientific research, and other aspects can effectively promote the development of China-ASEAN AI and education cooperation and broaden the new cooperation in frontier science and technology. Building a China-ASEAN collaborative education platform for the integration of industry and education between universities and enterprises with multiple subjects can form a double-creative talent training system that adapts discipline and professional construction to industrial transformation and upgrading, to promote the development of discipline and professional clusters and industrial clustering, bring into play the native effect of the ability of multiple subjects, and make the discipline and professional system closely matches the industrial chain and innovation chain for the cultivation of double-creative talents.

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2 Problems of China-ASEAN “University-Enterprise” new engineering collaborative education with multiple subjects

2.1 Existing problems

Firstly, the cooperation mechanism and framework are not sound enough. Although China-ASEAN has signed numerous inter-university cooperation agreements and regional education cooperation frameworks on education cooperation, the overall coordination and planning of the above joint training programs as well as the characteristics of cross-border cooperation in education are not obvious. Secondly, the funding support for China-ASEAN education cooperation is insufficient and the development of policy funds in ASEAN countries is uneven. Thirdly, the quality of China-ASEAN international cooperation in education is poor, as joint education is mainly offered by Thailand, Laos, Cambodia, and China’s less well-known institutions at a low level. Fourthly, the communication between China and ASEAN is mostly in the traditional way such as forums, meetings, and visits, with a single form of personnel exchange and cooperation.

2.2 Solutions and development trends

Based on the differences in the education systems of China and ASEAN member countries, the existing “China-ASEAN”, “Davos Forum”, “Boao Forum for Asia”, “Shanghai Cooperation Organization”, “Xiamen International Ocean Week” and other organizational platforms can be used. With the help of these trade agreement organizations, we can promote international education cooperation and enrich the content of education exchange and cooperation. In the future, China-ASEAN education cooperation will be oriented towards and closely focused on the “One Belt, One Road” strategy. It is an inevitable trend to strengthen the construction of new engineering science between China and ASEAN countries along the route, build the brand of Silk Road New Engineering University Alliance, and cultivate international talents in new engineering science [1]. Under the background of the booming new economy led by artificial intelligence, it is meaningful to cultivate and export new engineering talents in China-ASEAN “university-enterprise” education cooperation with multiple subjects.

3 Structure of China-ASEAN “University-Enterprise” new engineering collaborative education with multiple subjects

The China-ASEAN “university-enterprise” new engineering collaborative education with multiple subjects will be carried out based on the establishment of the alliance of engineering colleges and universities for the construction of new engineering, with the construction of new engineering talent cultivation system as the core, and relying on strong disciplines to deepen new engineering innovation education, the integration of arts and science, and humanities exchanges. The structure is shown in the figure below.

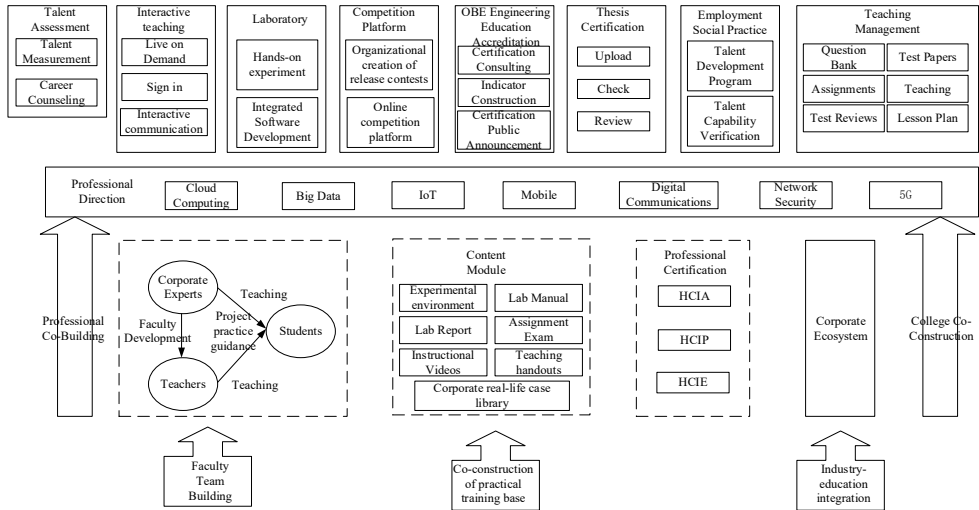


Fig. 1. Structure of China-ASEAN “University-Enterprise” New Engineering Collaborative Education with Multiple Subjects.

Market-oriented, by the school-enterprise cooperation, engineering, and certificate training model, to train cloud computing composite innovative high-quality high-skilled personnel. Meet the professional teaching, skills training, teaching and research, and training needs of cloud computing platform operation and development certification courses. The organization form of a “university-enterprise” new engineering university alliance with multiple subjects is confirmed, and the cultivation system of internationalized talents in new engineering is formulated from the aspects of curriculum, assessment, and quality standard. We will focus on building a new international talent cultivation model with integrated and interdisciplinary collaboration among higher education institutions, research institutes, and new industries.

4 Mode of China-ASEAN “University-Enterprise” new engineering collaborative education with multiple subjects

4.1 Facing Internationalization-oriented discipline construction and industrial transformation and upgrading

We will make up for the shortcomings with the power of industry to develop advantageous disciplines, and integrate industrial production, management, and services into professional courses. The construction of academic disciplines will be always closely focused on international social and economic development, playing the role of “power source” to accelerate industrial transformation and upgrading [2].

An ecosystem of new engineering university alliance with interconnection and interdependence of China-ASEAN “university-enterprise” multiple subjects will be created, and a new engineering talent cultivation system that adapts discipline and professional construction to industrial transformation and upgrading will be formed. We will also develop an action plan for the integration of industry and education to establish models for different disciplines and industry needs and promote the development of clusters of disciplines and industries. Then, we will break through the boundaries of disciplines, majors, and courses according to the needs of industrial development, and build an innovative system of industry linkage, diversified schooling, and virtual supply chain

industry-education integration. We will construct a collaborative education platform across majors, schools, and regions through cooperation among schools, campuses, and enterprises. We will promote two-way docking between education supply and industrial demand according to the relationship between discipline structure and industrial structure suitability. Finally, in the construction of the ecological environment for the integration of industry and education, we will strengthen the function of technology and talent gathering, industrial traction ability, and establish different models for various disciplines, specialties, and industrial demand.

4.2 The development mode of discipline professional group and industry clustering under the support condition of “University-Enterprise” multiple subjects

The development mode of academic specialties and industrial clusters is based on the overall circle of China-ASEAN “university-enterprise” multiple subjects. According to the internal and external correlation and development trend of the cluster, we will match the advantageous discipline groups and industrial clusters to form a “discipline-industry” education alliance, to eliminate the drawbacks of single, crude, and transient cooperation. Then, the discipline and industry can integrate, support, and develop as a whole. Industry development needs to guide the adjustment and optimization of discipline clusters in the region, and the iterative renewal of academic specialty clusters builds a solid scientific and technological foundation for regional industrial clusters. Therefore, the linkage, integration, and division of advantageous discipline clusters and industrial clusters will not only enhance students’ knowledge and technical ability but also increase the industrial-added value of enterprises [3].

The linkage mechanism of academic specialties and industrial clustering should insist on the integration of “industry-university-enterprise” subjects. We should promote industrial clustering enterprises and make universities associate with enterprises so that the subjective initiative of multiple subjects can work to carry out education and teaching practice, scientific and technological research, and product development on the collaborative education platform. The cooperation between China and ASEAN universities, enterprises, and research institutions will build high-level international training bases with radiation leading roles. This will promote the development of academic disciplines and internationalized industry clusters, and bring into play the native effect of the ability of multiple subjects so that the cultivation of new engineering innovation talents is closely connected with the industrial chain, and the innovation and entrepreneurial ability and level of talents can be improved[4]. Industry, universities, and enterprises influence and promote each other to promote the win-win development of disciplinary specialization and industry agglomeration.

4.3 The mode of the native effect of ability of multiple subjects of “University-Enterprise” collaborative education to dock with innovation chain

The ability-based effect of university enterprise is a talent training method that takes the industry and market demand as the starting point and aims to master the professional knowledge, practical ability, and innovation ability of the job. Oriented to the competence-based approach, the development of the China-ASEAN collaborative education model with multiple subjects for the construction of new engineering disciplines is the cross-organic integration of “theory, practice, and innovation ability”, in which innovative concept and innovative ability play a decisive role in the cultivation of new engineering talents. Education alliance will form an organic integration that connects universities, students,

industries, companies, and employees. By determining the training objectives of different industries for each job ability demand, the theoretical courses, practical courses, scientific research, and innovation and results from incubation can be set up and optimized into a reasonable curriculum system, so that the various abilities of university students and enterprise employees in scientific research, practice and innovation will be greatly improved [5].

Technological innovation and knowledge innovation can be used to promote the organic combination of each innovation involved in the “university-enterprise” multiple subjects, to promote the achievement of technology and knowledge and the optimization of the innovation system.

5 Implementation path of China-ASEAN “University-Enterprise” new engineering collaborative education with multiple subjects

Joint college mode among colleges and universities. By actively exploring the new form of cooperation and exchange between China-ASEAN colleges and universities with multiple subjects, we can realize cross-border, cross-university, and cross-professional cooperation and sharing of educational resources, and develop the internationalized talent cultivation mode of new engineering disciplines. On the one hand, we can explore international joint training mechanisms such as “1+3”, “2+2”, “4+1”, “3+2” programs, etc. to rapidly enhance the internationalization of the education of new engineering talents in the process of joint training. On the other hand, we can encourage China-ASEAN universities, research institutions, and multiple entities of enterprises along the route to cooperate, conduct joint research on specific topics, and carry out overseas internships and short-term practices for students.

Joint training mode among majors. First of all, we should clarify the professional talent training programs. According to the requirements of the idea of new engineering construction, the joint interdisciplinary training should realize the deep integration of emerging industries and engineering science, Chinese culture, and ASEAN culture in synergy and coexistence, so that the training program of new engineering talents has distinctive characteristics. Secondly, we should formulate sound planning of the professional curriculum system. We can develop a curriculum system that strengthens the foundation of mathematics and science, logical thinking, and project research ability, and focuses on the characteristics of cultivating new technology applications and transformation ability of new engineering talents. Finally, we should construct a curriculum guarantee system. We can take full advantage of the discipline's leading domestic faculty and the large-scale introduction of international high-level faculty to ensure the smooth implementation of the construction of the curriculum system.

Inter-disciplinary scientific research cooperation mode. Through the vigorous development of inter-disciplinary scientific research cooperation among China-ASEAN universities, we can study various ways for scientific research cooperation to serve the cultivation of talents, drive the exchange of talents with scientific research cooperation, and drive the teaching cooperation with scientific research cooperation [6]. We can also utilize the competitive advantage of cross-disciplinary knowledge creation to realize the establishment and development of multi-level synergistic relationships between multiple disciplines and their members, to achieve a synergistic effect of resource integration.

6 Conclusion

Under the new historical opportunity brought by the “One Belt, One Road” strategy, higher education is an integral part of humanistic exchanges in the construction of interconnection. To innovate new contents and forms of China-ASEAN cooperation of multiple subjects, we should improve the quality assurance system of international student education, establish an education quality monitoring mechanism, and enhance the quality of international student education service internally. Internationally, we can create a high-quality education system open to the outside world, explore and innovate new paths for China-ASEAN cooperation, promote China-ASEAN university cooperation, and realize the common construction, sharing, and win-win situation of education resources. Moreover, we can utilize the multilateral dialogue framework to promote regional integration and institutionalize quality assurance in higher education.

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