Practical Exploration of Innovation and Entrepreneurship Education in Colleges and Universities of Guangdong-Hong Kong-Macau Greater Bay Area under "Internet+
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Abstract: The Guangdong-Hong Kong-Macau Greater Bay Area (GBA) has become a vital part of the national development strategy, where innovation and entrepreneurship play pivotal roles in its progress. In order to make meaningful contributions to the GBA’s advancement, regional colleges and universities must leverage the Internet's advantages to drive educational and teaching reforms. Adopting an "Internet+" perspective, this research investigates the prospects and challenges encountered by GBA higher education institutions in the realm of innovation and entrepreneurship education. By drawing inspiration from successful international practices, it has proposed practical models encompassing the creation of online course platforms, the establishment of resource sharing systems, and the optimization of the innovation and entrepreneurial cloud ecosystem.

1. Introduction

In the era of Internet+, innovation and entrepreneurship are closely intertwined with the Internet. The stronger this connection, the greater the potential for positive outcomes. To establish a new pinnacle of innovation and entrepreneurship education in the Guangdong-Hong Kong-Macau Greater Bay Area (GBA), it is imperative to deepen this integration. "The Outline of the Guangdong-Hong Kong-Macau Greater Bay Area Development Plan," issued by the Central Committee of the Communist Party of China and the State Council in February 2019, emphasizes the importance of supporting colleges and universities in the GBA to collaborate on academic programs, encouraging the joint development of advantageous disciplines, laboratories, research centers, etc., in a way to promote the cooperative development of education of the GBA.1 The construction of the GBA is a vital strategy for national progress. Thus, it is essential to enhance innovation and entrepreneurship education in GBA educational institutions, leveraging the Internet's advantages to cultivate innovative talents and provide advanced scientific knowledge and technologies to facilitate the reform and development of college education in the GBA.

2. Inevitability of the infiltration and integration of "Internet+" into innovation and entrepreneurship

As the dominant theme of today's world economic development, innovation and entrepreneurship can effectively cope with the challenges brought by the knowledge economy, alleviate the severe pressure of employment, and achieve sustainable development. In the Internet era, innovation and entrepreneurship education provides strong guarantees for the sustainable development of the country. The integration between the Internet and innovation and entrepreneurship has become an important strategic choice for the transformation of colleges and universities, as well as the focus of education and teaching reform. Under the framework of "Internet+," innovation and entrepreneurship education should put more emphasis on incurring students with the spirit of the Internet, which is "openness, equality, cooperation, and sharing." It is crucial to not only acquire proficiency in Internet technologies and leverage online platforms but also internalize this spirit as a mindset and way of thinking. Under "Internet+," China's innovation and entrepreneurship must also achieve creative development in educational concepts, mechanisms, and models.

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3. International experience in the integration of the Internet into innovation and entrepreneurship education

Many countries and regions take innovation and entrepreneurship as important engines for economic advancement, scientific and technological growth, and job creation. Colleges and universities across the world have put innovation and entrepreneurship education on the high agenda, integrating it with Internet technologies to harness distinctive features and benefits.

3.1 Comprehensive innovation and entrepreneurship education system in the United States

With the popularization of Internet thinking, the United States has fostered a more entrepreneur-friendly environment, lowering the threshold for starting new businesses. An increasing number of entrepreneurs depend on network information technology or pursue the development of Internet platforms as their primary means to start businesses and achieve rapid financial success. These examples can be attributed to the educational practice of innovation and entrepreneurship in the country. Firstly, there is a growing trend of establishing entrepreneurship-oriented universities. In the Internet age, some universities in the United States are gradually transiting from research-oriented to entrepreneurship-oriented. For example, Stanford University offers entrepreneurship courses closely integrated with Internet entrepreneurship. Secondly, school-wide entrepreneurship education in American community schools, such as Springfield Technical Community College in Massachusetts and North Iowa Area Community College, stresses the importance of practical teaching. These community schools give full play to the role of Internet information technology as an important carrier of innovation and entrepreneurship education. Thirdly, the country has created platforms for socialized entrepreneurship. Colleges and universities in the United States have transcended the limitations of their internal platforms. Under the guidance of governments and schools, they make full use of social resources and cooperate with diversified social forces to collectively build an education platform for "mass entrepreneurship and innovation."

3.2 Innovation and entrepreneurship education with the characteristics of the times in Germany

Germany boasts a well-established curriculum system for innovation and entrepreneurship education, with numerous universities building systematic curriculum systems tailored to the specific characteristics of their schools and disciplines. Meanwhile, Germany's innovation and entrepreneurship education also attaches great importance to the combination of practice, making full use of the Internet, and actively establishing practice platforms for college students. For example, universities, governments, and enterprises integrate resources and build cooperative platforms for students' employment and entrepreneurship practice. Such platforms provide an effective way for college students to step out of the school gate and embark on a journey into society and enterprises, encouraging them to pursue entrepreneurial endeavors or secure employment opportunities.

3.3 Innovation and entrepreneurship education that highlights Internet mindset in France

Many entrepreneurship-oriented universities and firms in France have jointly built "entrepreneurship centers" and "entrepreneur houses." These centers cultivate students' practical ability and, more importantly, enhance their innovative consciousness and entrepreneurial spirit. At the same time, they also serve as communication platforms for students and entrepreneurs. The construction of these centers is closely related to the growth of the Internet. The era of the Internet begets numerous business opportunities. If one wants to stand out by means of innovation and entrepreneurship, he or she must possess an innovative corporate culture, creative thinking mode, and inventive company management mode. The entrepreneurship center established by French universities is based on the times and pays attention to cultivating students' Internet innovative and entrepreneurial mindset.

3.4 Innovation and entrepreneurship education practice in four Asian countries

In the 1960s and 1970s, the United States scored remarkable successes in economic development by virtue of innovation and entrepreneurship education. After that, many countries began to join the rank and set off a wave of innovation and entrepreneurship education reform in colleges and universities. Many Asian countries, such as Japan, South Korea, India, and Singapore, began to improve their innovation and entrepreneurship education systems and paid attention to the cultivation of innovation and entrepreneurship talents in the Internet era. For example, Japan promoted a government-industry-university-integrated innovation and entrepreneurship education system, South Korea built an inclusive innovation and entrepreneurship education system, India started the innovation and entrepreneurship practice of the Institute of Entrepreneurship Development, and Singapore established a complete innovation and entrepreneurship education system from primary schools to universities.

Under the background of "Internet+," the originally isolated and scattered social subjects are linked together due to the development of information technology, forming a netted community of destiny. In this netted environment, the overall cooperative operation can produce a synergistic effect that is greater than the mere sum of the parts. To sum up, the establishment of an innovation and entrepreneurship community in the GBA universities necessitates not only the active involvement of the government but also a strong presence within the
universities themselves as the primary source of talent cultivation. This entails serving as a social practice platform for society and enterprises and fully mobilizing the initiative and enthusiasm of college students.

4. Opportunities and challenges faced by innovation and entrepreneurship education in the GBA under "Internet+

4.1 Favorable conditions of innovation and entrepreneurship education in GBA colleges and universities

4.1.1 National strategic support

The construction of GBA is an important development strategy of China. The Chinese government attaches great importance to building an educational highland in the area, in a way to promote its economic development. During March 23-24, 2018, the GBA Innovation and Entrepreneurship Education Seminar themed on "Innovation and Entrepreneurship—The Power of Growth" was held at South China University of Technology, which saw participation from over 600 representatives coming from more than 160 universities across Mainland China, Hong Kong and Macao. During the seminar, the "Declaration on Innovation and Entrepreneurship Education in Guangdong-Hong Kong-Macau Greater Bay Area" was released, which proposed transforming the GBA into a globally renowned higher education hub and establishing a top-tier innovation and entrepreneurship ecosystem. In February 2019, "The Outline Development Plan for Guangdong-Hong Kong-Macau Greater Bay Area" was officially promulgated, emphasizing the objective of establishing the region as a highly influential global center for science and technology innovation. The Outline stressed innovation and entrepreneurship repeatedly, highlighting the need to establish a favorable ecological environment for the younger generation in the GBA to foster innovation and entrepreneurship. In the new era, the CPC Central Committee entrusted the GBA with an important mission and put forward the goal of double-area construction. The goal supports and leads the GBA to effectively enhance its scientific and technological innovation capability and boost the in-depth development of innovation and entrepreneurship in the area.

4.1.2 Alignment with the trend of in-depth higher education reform and development

Implementing innovation and entrepreneurship education is an important part of higher education reform per se. Under the background of "Internet+," to facilitate the economic development of the GBA, innovation and entrepreneurship education has become the focus of higher education reform. The execution of innovation and entrepreneurship education serves as an addition to the current education system of the GBA. It has transformed the conventional mode of educational cooperation and the objectives of higher education, representing an inevitable requirement and trend in the integration of the Internet and innovation and entrepreneurship.

4.1.3 Concentrated innovation entities, substantial economic scale, and robust capacity for innovation and entrepreneurship.

Universities and research institutes serve as the primary battlegrounds for innovation endeavors, acting as vessels of innovative knowledge and hubs where innovative talents congregate. These entities are capable of nurturing novel knowledge, technologies, and enterprises. Looking at the indexes in 2020 (as shown in Table 1), compared with the other three bay areas, the total number of invention patents in GBA ranks first in terms of innovation subjects and innovation outcomes. In terms of economic development, the number of Fortune 500 companies in GBA is second only to the Tokyo Bay Area. Under the background of the Internet, the innovation and entrepreneurship ability of the GBA has continuously improved.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Guangdong–Hong Kong–Macau Greater Bay Area</th>
<th>Tokyo Bay Area</th>
<th>San Francisco Bay Area</th>
<th>New York Bay Area</th>
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<td>Number of the world's top 100 universities</td>
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<td>1</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Number of Fortune 500 companies</td>
<td>25</td>
<td>40</td>
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<td>Total number of invention patents (10,000 pieces)</td>
<td>36.59</td>
<td>15.31</td>
<td>6.39</td>
<td>4.66</td>
</tr>
</tbody>
</table>

Data source: The data on the number of the world's top 100 universities came from the "Research Report on the Third-party University Ranking Indexes 2021" released by the third-party evaluation research group of Southern Education Think Tank University. The data on the number of Fortune 500 companies came from the "2021 Fortune Top 500 List"https://finance.sina.com.cn/roll/2021-08-09/doc-ikqciyzm0414877.shtml. The data on the total number of invention patents came from the "Guangdong–Hong Kong–Macau Greater Bay Area Collaborative

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2 Promoting the Development of University Clusters in the Guangdong-Hong Kong-Macau Greater Bay Area [EB/OL]. Chinese Social Sciences Today, March 26, 2018, No.1418

http://sscp.cssn.cn/xkpd/xszx/gn/201803/t20180326_3886860.html
Innovation Development Report (2021)” issued by Guangzhou Daily Data & Digit Institute. The meteoric development of the GBA economic scale sets a solid economic stage for innovation activities. Over the past decade, the proportion of R&D expenditure in GDP in the BGA has witnessed a steady increase annually, especially in the Pearl River Delta area, reaching the highest level of 3.41% in 2019 (Figure 1).

Data source: The data on the Pearl River Delta came from the Bulletin of the Bureau of Statistics of Guangdong Province, the Department of Science and Technology of Guangdong Province, and the Department of Finance of Guangdong Province on Science and Technology Expenditure. The data on Hong Kong comes from the Census and Statistics Department of the Government of the Hong Kong Special Administrative Region, and those on Macao came from the Government of Macao Special Administrative Region Statistics and Census Service.

4.2 Challenges Faced by innovation and entrepreneurship education in the GBA

Compared to the other three bay areas in the world, innovation and entrepreneurship education in the GBA universities started late. Although the rapid development of Internet information technology has brought numerous opportunities and provided a large number of platforms for the innovation and entrepreneurship activities of college students in the GBA, many problems still await to be navigated. For example, innovation and entrepreneurship education is lagging behind the rapid development of the Internet, and it is still on the periphery.

The innovation and entrepreneurship education in the GBA has the following limitations: Firstly, there are issues with the formalization of such education, including the presence of unclear educational concepts, lack of clear direction, and a disconnect between theory and practice. Secondly, innovation and entrepreneurship education resources are scarce, including school resources, government resources, social resources, and enterprise resources macroscopically, as well as teaching faculty, textbooks, funds, and places for social practice microscopically. Thirdly, the innovation and entrepreneurship education system is incomplete, and the educational goals are not well-defined. Hence, “mass entrepreneurship and innovation” education should be taken as an important content of higher education to avoid “empty talk.” In addition, “mass entrepreneurship and innovation” education has not yet been established as a formal discipline, and the curriculum system is imperfect and is divorced from professional education.

In addition, residents in the GBA know little about the innovation and entrepreneurship plan and the development plan of the GBA. According to the data of the Macau Entrepreneurship Index Research Report, jointly issued by the Macao SMEs Service Platform, ERS e-Research Lab, and Faculty of Business Administration of the University of Macau in 2019, 35.6% of Macao residents aged 18 or above are unaware of the development plans and policies of GBA (Figure 2).

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5. Innovation and entrepreneurship education model in the GBA in the Internet era

5.1 Building online course platforms to enrich curriculum resources

The online curriculum system of innovation and entrepreneurship education in GBA universities can draw inspiration from the curriculum system implemented by the City University of Hong Kong, known as the "Three Creations, Three New, Three Motivation and Three Actions" (3-3-3-3 Syllabus). This approach aims to establish a comprehensive, end-to-end, and systematic online learning platform and curriculum that incorporates innovative ideas, methods, and user-friendly steps for operation. As a result, the effect of innovation and entrepreneurship education can be doubled. Based on their own characteristics and realities, colleges and universities in the GBA can explore ways of cooperation in running schools and jointly build a curriculum system that caters to students' innovation and entrepreneurship in the GBA. For example, they can fully integrate the superior resources provided by the government, enterprises, and scientific research institutes to enrich the content of online courses, which can not only serve local students, but also provide valuable learning platforms and opportunities for students from countries along the "Belt and Road Initiative," thus creating a curriculum brand with unique GBA characteristics. Meanwhile, they should enhance cooperation in terms of curriculum system construction, curriculum format development, and textbook compilation, such as sharing high-quality curriculum resources and online library resources through massive open online courses and other similar platforms.

5.2 Establishing resource sharing systems for colleges and universities in the GBA

Benefiting from the strengths of Internet-based information dissemination, we can realize the data opening and resource sharing of universities in the GBA, and promote the integration and utilization of various resources in the era of big data. GBA educational institutions should consolidate their resources and establish collaborative platforms that facilitate open sharing. These platforms will serve as a shared resource pool, catering to the needs of both educators and students through online and offline channels. Such resource sharing systems provide a creative way for the theory and practice of innovation and entrepreneurship education through the integration of the Internet industry and the education industry. In addition, they can facilitate innovation and entrepreneurship education under the background of the "Internet+" in a diversified way, which broadens students' employment prospects and creates personal social value, thus accelerating the construction of an educational highland in the GBA and realizing the prosperity and development of the local economy.

5.3 Optimizing the entrepreneurial cloud ecosystem

To make full use of Internet technology, colleges and universities in the GBA should devote themselves to building a cloud ecosystem for resource sharing in innovation and entrepreneurship education. The cloud ecosystem requires a network platform that can establish network links with domestic and foreign enterprises inside and outside the GBA, gather resources from all parties, and integrate innovation, entrepreneurship, classroom teaching, internship, and incubation. Simultaneously, colleges and universities should integrate big data and artificial intelligence to drive employment through innovation and entrepreneurship and provide end-to-end service in innovation and entrepreneurship education.

About the author

Sisi Huang, born in October 1988 in Maoming, Guangdong Province, is a lecturer at the Guangzhou Academy of Fine Arts with a master's degree. Her research interests include ideological and political education and innovation and entrepreneurship education for college students.
Funding projects

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References