

Medical Education Path Exploration from the Perspective of Innovation and Entrepreneurship in Local Medical Colleges of ASEAN

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Abstract

This paper discusses the new challenges to medical education posed by the new industrial revolution represented by artificial intelligence, with the aim of finding solutions to medical education in the field of innovation and entrepreneurship education to address the current problem of incongruity between innovation and entrepreneurship education and medical education in local medical colleges. Through the review and analysis of relevant literature, four main problems existing in the innovation and entrepreneurship education in medical colleges are concluded: lack of guiding ideology, lack of innovation and entrepreneurship goals, lack of specialized organization and lack of supporting measures. This paper also aims to clarify the concept and direction of innovation and entrepreneurship education in medical colleges, reform teaching and evaluation methods, strengthen the development of faculty as well as innovation and entrepreneurship curriculum system, and build and implement the supporting system of innovation and entrepreneurship education in medical colleges and universities, which will provide a reform path of medical professional education as well as innovation and entrepreneurship education. Local medical colleges and universities, therefore, need to implement high-standard innovative education reform, integrate the existing teaching resources, build internationalized vision in education, enhance their own core competitiveness, and establish the sustainable development of medical education and innovation entrepreneurship education mechanism, providing reference for local medical education reform planners to enrich the similar research.

Keywords

Local medical colleges and universities; Innovation and entrepreneurship education; Medical education; Resource integration; New medical science.

1. INTRODUCTION

In the face of the arrival of new Industrial Revolution 4.0 represented by artificial intelligence, coupled with the recent challenges of COVID-19 in China and the resulting social employment problems, [1] innovation and entrepreneurship education has been emphasized by party and state leaders. At present, a number of scholars have conducted studies on innovation and entrepreneurship education. Shi Li and Li Jizhen focused on the connotation, dilemma and path optimization of innovation and entrepreneurship education in colleges and universities, holding that innovation and entrepreneurship is the driving force of China's economic

development [2]. Joseph A. Schumpeter, a representative of western "innovation theory", studied entrepreneurship education from the perspective of innovation and integrated the characteristics of innovation into entrepreneurship education. [3] Some scholars believe that innovation and entrepreneurship education is the continuation and inheritance of quality education [4], and some others believe that innovation and entrepreneurship education is the inevitable choice for colleges and universities to adapt to the development tide of the times [5]. Manly scholars put forward the idea that entrepreneurship can promote employment[6]. There are a large amount of literatures on the reform of innovation and entrepreneurship education, however, few of them on the reform of medical innovation and entrepreneurship education in the context of new medical sciences. The reason is that medical education has its preciseness and some common problems like those of other disciplines that have not been well dealt with. Therefore, exploring the reform of medical innovation and entrepreneurship education in the context of new medical science is necessary for local medical colleges and universities to actively respond to social challenges and enter into high-quality development [7].

2. PROBLEM ANALYSIS

In order to fully implement the state's important deployment of innovation and entrepreneurship talent training, based on the Opinions of The General Office of the State Council on Deepening the Reform of Innovation and Entrepreneurship Education in Institutions of Higher Learning (No.36, 2015) and the Notice of the General Office of the People's Government of Guangxi Zhuang Autonomous Region on Printing and Distributing the Implementation Plan of Deepening the Reform of Innovation and Entrepreneurship Education in Institutions of Higher Learning (No.50, 2016, Guangxi Administration Office), some local colleges and universities have implemented in-depth reform in innovation and entrepreneurship education, and some achievements have been made. However, problems still exist in innovation and entrepreneurship reform of medical colleges and universities, as discussed in the following sections.

2.1. Lack of Guiding Ideology

The lack of guiding ideology in local medical colleges is reflected in the problems between innovation and entrepreneurship education and the orientation of the development of colleges [8]. The implementation of national education policies, the development of colleges, and what kind of innovation and entrepreneurship education to shape, are all important reform problems that require medical colleges to consider and cope with [9]. Therefore, currently the critical issues that medical colleges and universities are faced with include the full implementation of the principle of the 19th CPC National Congress under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a new era, the full implementation of the party's education policies, the strengthening of moral education and cultivation, adherence to the idea that innovation leads the entrepreneurship, while entrepreneurship creates more employment opportunities, the actively adaptation to the new normal social change development, promotion of the quality education, the shaping of values, ability cultivation, exploration of innovative education mode, [10] the promotion of high-level innovation and entrepreneurship education in primary-level medical care, which can integrate creativity, innovation and entrepreneurship to stimulate and cultivate students' initiative spirit, innovation and entrepreneurship ability, as well as how to serve local regional economy on the basis of the development of primary medical and health care undertakings, radiate the construction of "The Belt and Road" economic belt of ASEAN, construct regional large health industry group, and train high-level medical and health talents [11].

2.2. Lack of Innovation and Entrepreneurship Education Goals

Innovation and entrepreneurship education lacks clear educational objectives in teaching reform. As we all know, China's development is driven by a model of five years of major changes and one year of small changes. In the five-year transformation plan, the integration of the innovation and entrepreneurship education system into the student training system, aiming to realize the normalization and sustainable development of innovation and entrepreneurship education, the promotion of the organic integration of innovation and entrepreneurship education with professional education, and attaching importance to the cultivation of innovation spirit, entrepreneurship awareness, innovation and entrepreneurship ability, while making innovation and entrepreneurship education cover all students are major problems to be solved in local medical colleges and universities. Therefore, it is necessary to strengthen the integration of theory and practice in education, establish "College Students Innovation and Entrepreneurship Training Center", and create a good atmosphere of innovation and entrepreneurship where everyone pays attention to innovation and entrepreneurship and participates in it. An integrated system of classroom teaching, autonomous learning, practice training and guidance, as well as culture should be established and improved. Organically integrated, connected and efficient innovation entrepreneurship education mechanism should be built to form a complete set of perfect operation system. A batch of innovation entrepreneurship educational reform and practice projects should be conducted to produce a series of innovative education achievements. Local medical colleges and universities should integrate the concept of innovation and entrepreneurship education into the whole process of personnel training [12]. Entrepreneurial universities should be built as a demonstration area to form a complete set of system with integration of "evaluation, teaching and practice". With the guidance of the national educational reform policies, medical colleges and universities should strengthen college students' innovative ability, promote the implementation of self-employment projects, enhance the originality and innovativeness of intellectual property rights, and hatch a area with large healthcare industry chain projects. More efforts need to be made on applying for national demonstration base of innovation and further expansion of innovation and entrepreneurship center for software and hardware construction to preliminarily form a big health industry chain of the regional economic development, namely the Association of South-east Asian Nations (ASEAN), to provide service for the economic circle, increase the innovation ability of students and cultivate high-level personnel.

2.3. Lack of Specialized Organization

Innovation and entrepreneurship education reform involves many subjective departments. In the process of innovation and entrepreneurship education reform, there are many cross-department, cross-disciplinary, and cross-institution issues. At present, colleges and universities lack specialized organizations in the process of promoting innovation and entrepreneurship education. Some universities have set up working groups on innovation and entrepreneurship education led by their presidents. The University Innovation and Entrepreneurship Education Coordination Committee should be established under the leadership of the Office of Education Affairs with the cooperation of departments including Student Affairs Office, Recruitment and Employment Office, Youth League Committee, etc. In the "Special innovative teaching committee" under the college teaching committee, innovation and entrepreneurship education experts and scholars can be invited to be directly involved in the colleges' academic innovation entrepreneurship education work to provide professional consulting and evaluation, contributing to the development of innovation and entrepreneurship education, and these measures are effective.

2.4. Lack of Supporting Mechanisms

In the innovation and entrepreneurship education of local medical colleges, many measures have been taken simultaneously, but the results are not effective, the reason for which lies in the lack of supporting operational mechanisms [13].

2.4.1 Lack of sound legal supervision mechanism

There is no special working group for innovation and entrepreneurship education in medical colleges, such as the group leader appointed by the president, the group leader in charge of the project, the deputy group leader, and the leaders of the teaching affairs Office, the Students' Office, the Youth League Committee, the Science and Technology Office, the Employment Office and other relevant departments to lead, organize, coordinate and guide students' innovation and entrepreneurship activities. There is no effective management mechanism for innovation and entrepreneurship education, and a special working group that can integrate resources from both inside and outside the campus to ensure the collaborative work of multiple departments of the colleges [14]. No external departments are involved to supervise the innovation and entrepreneurship process. There is no office which is attached to the corresponding department to take charge of specific daily work. Through strengthening the organization and leadership, overall planning, careful organization, guidance and implementation, the various work of innovation and entrepreneurship education can be put into practice to form a leadership system and working mechanism with the cooperation of various departments and the active participation of all faculty, staff and students.

2.4.2 Job responsibilities are not clear

Without the unified leadership of the working group for innovation and entrepreneurship education, the departments in universities can not explore the establishment of an innovation and entrepreneurship teaching system guided by educational affairs departments and innovation and entrepreneurship centers and other secondary colleges. There is no innovation and entrepreneurship training and practice system coordinated by Educational Affairs Office, Students Office, Youth League Committee and other functional departments [15]. There is no perfect employment and entrepreneurship guidance service system coordinated by the department of engineering and the college students' entrepreneurship guidance service center. The innovation and entrepreneurship incubation system coordinated by the departments of engineering, scientific research, college students' entrepreneurship guidance and service center, college students' entrepreneurship park, college students' science park and other units has not been improved. There is no clear job responsibility, which leads to unclear division of work, thus the efficiency is low.

2.4.3 Lack of incentives

The performance of students' innovation and entrepreneurship education has not been included in the performance evaluation system of colleges and universities, and the effect evaluation of innovation and entrepreneurship education should be strengthened. There is no perfect personnel assessment and incentive mechanism for identifying and assessing the workload of college students' innovation and entrepreneurship supervisors. There is no annual reward for teachers who have made achievements in guiding students to carry out innovation and entrepreneurship practice activities, and no award for students who have won prizes in various science and technology competitions and made outstanding achievements in practice activities. Among them, the reward for teachers is not included in the reward system for teaching work, and the reward for students is not included in the relevant reward system of the Students' Office [16].

2.4.4 Funding is not enough

Innovation and entrepreneurship education needs a corresponding stage, thus only by strengthening the construction of entrepreneurship laboratory and training center can the local medical colleges and universities solve the space required by college students' innovation and entrepreneurship education. However, at present, colleges and universities do not create conditions to assist in the cultivation of mature entrepreneurial projects into entrepreneurial entities. The process of cultivating entrepreneurial projects into entities can ensure that qualified and willing students have entrepreneurial practice experience. The golden seeds have not germinated. At present, some colleges and universities have set up college students' innovation and entrepreneurship funds to support college students' entrepreneurship. The sources of these start-up funds include the colleges' annual allocation of special funds, special funding from superiors and social donations, venture funds, and other legal income. However, local colleges and universities have not formulated the management measures for college students' innovation and entrepreneurship funds, thus the maximum benefit of the fund has not been realized. The service system for venture capital investment and financing has not been established and improved. There is no guarantee mechanism to promote undergraduate entrepreneurial projects to angel investors, VC, PE and other social investment institutions. There is no active guidance for social funds and investment institutions to invest in projects and solve the capital problems of start-up enterprises.

3. PATH OF REFORM

The advance of the education reform of medical innovation is a systematic, synergetic and sustainable development process. Local medical colleges and universities need to integrate existing teaching resources and create conditions to promote the reform and development of education innovation [17]. In view of the above four aspects, it is proposed to solve the integration of innovation and entrepreneurship education with medical education from the following aspects.

3.1. Clarifying the Concept and Direction of Innovation and Entrepreneurship Education in Medical Colleges and Universities

3.1.1 Promoting a new mechanism for training innovative and entrepreneurial personnel through collaborative education

Local medical colleges and universities should actively explore a new mechanism for cultivating innovative and entrepreneurial talents across departments and colleges. Innovation and entrepreneurship education need to be integrated into the talent training programs of all majors to achieve organic integration with traditional majors. In accordance with the needs of economic and social development and the individual needs of students, local medical colleges and universities should make in-depth reform in personnel training mechanisms and create new models for personnel training, focusing on cultivating innovative spirit and ability. First, a credit accumulation and transfer system for innovation and entrepreneurship should be established [18]. The credit system for innovation and entrepreneurship based on innovation experiments, academic papers, patents and independent entrepreneurship should be implemented, and the relevant results can be converted into corresponding credits for non-professional courses with a certain proportion and vary with students' grade. The second is to include the students' participation in subject research, project experiments and other activities into a part of the talent training system. Entrepreneurship graduation design can be set in the undergraduate graduation design project to support students entrepreneurship. Third, local medical colleges and universities should promote the flexible academic system for undergraduates, relax the restrictions on the length of undergraduate programs, allowing them to adjust their academic progress, retain their student status and leave for innovation and entrepreneurship, and relax the restrictions on changing majors for students who are involved

in innovation and entrepreneurship. Fourth, the comprehensive evaluation of students should be improved, and the achievements of students' social practice in innovation and entrepreneurship, participation in innovation competitions, innovation and entrepreneurship project approval, innovation experiment, paper publication, patent acquisition and independent entrepreneurship can be included in the incentive mechanism [19].

3.1.2 Promoting international education in innovation and entrepreneurship

The goal of innovation and entrepreneurship education reform in medical colleges is to cultivate medical talents' international competitiveness. Therefore, it is inevitable for high-level medical innovation and entrepreneurship education reform to choose the road of internationalization. Medical colleges and universities need to cultivate students' global vision and innovative and entrepreneurial spirit, and explore a new mode of training international and cross-border innovative and entrepreneurial talents [20]. Local medical colleges and universities should cooperate with well-known ASEAN universities and outstanding emerging companies to establish global innovation colleges in the area of "the Belt and Road", offering double bachelor's degrees. Resources of the two sides can be integrated to design training programs across colleges and departments with innovation and entrepreneurship education, and cultivate students' global vision as well as their innovative and entrepreneurial spirit. By organizing international student exchange programs in summer schools, hosting and participating in international innovation and entrepreneurship competition, international university innovation and entrepreneurship education collaboration and alliance, and international bilateral innovation and entrepreneurship education seminars to promote the internationalization of our innovation and entrepreneurship education. Medical colleges and universities should take the social responsibility of innovation and entrepreneurship education, and provide high-quality educational resources for "mass entrepreneurship and innovation" to promote innovation and entrepreneurship education in colleges and universities in ASEAN and construct cooperation platform of innovation and entrepreneurship education for colleges and universities, as well as enterprises to improve the interaction between education institutions and industry, thus the education reform can be comprehensively deepened to make contribution to innovation.

3.2. Reforming Teaching Methods and Evaluation Methods

Local medical colleges and universities should carry out research on innovation and entrepreneurship education and establish a quality assurance system for innovation and entrepreneurship education. Local medical colleges and universities should actively carry out practice-oriented educational and academic research, from which they can summarize the law of cultivating innovative and entrepreneurial talents. They should pay attention to the traceable process management of innovation and entrepreneurship education, explore scientific evaluation methods of innovation and entrepreneurship education effect, establish feedback mechanism of innovation and entrepreneurship education, ensure the quality of large-scale innovation and entrepreneurship education. In addition, innovation and entrepreneurship demonstration specialties should be constructed to encourage teachers to consciously incorporate innovation and entrepreneurship education elements in daily professional teaching, and to integrate case teaching, heuristic teaching, discussion teaching, participatory teaching and project teaching into classroom teaching. Students' innovation and entrepreneurship concept should be updated and the overall professional thinking should be acquired [21]. The critical and creative thinking of college students' on entrepreneurship should be exercised to inspire students' innovation and entrepreneurship awareness. The transformation and realization of entrepreneurship effect should be emphasized by applying various teaching modes, including online, offline and mixed teaching modes. The existing information technology resources and big data analysis technology should be applied to

enhance the innovation and entrepreneurship course effect [22]. Demands and regularity of students with different specialties should be analyzed, thus a richer variety of high quality education resources can be provided accordingly. Students can choose their own path for innovation and entrepreneurship education according their own interests, rather than the traditional way of evaluation in the theoretical curriculum of innovation and entrepreneurship. As long as the corresponding innovation and entrepreneurship achievements are obtained, they can be regarded as the academic performance of innovation and entrepreneurship courses with the new evaluation method[23]. The reform of the academic evaluation system should be introduced to change the percentage system into ranking system to guide students to weaken the pursuit of utilitarian examination results and reorient the focus of course selection on the improvement of innovation ability and quality that are really beneficial to their long-term development.

3.3.Strengthening the Construction of Teaching Team and Innovation and Entrepreneurship Curriculum System

3.3.1 Strengthening the training of teachers for innovation and entrepreneurship

Teachers of innovation and entrepreneurship education course should be trained and introduced simultaneously[24]. Local medical colleges and universities need to cultivate part-time mentors, business practice instructors and career development instructors inside and outside the university, establish a sound management system for full-time and part-time teachers, hire successful entrepreneurs, experts and scholars and other outstanding talents in various industries as the instructors of innovation and entrepreneurship courses, and formulate corresponding management measures [25]. Local medical colleges and universities should strengthen practical guidance for entrepreneurship and encourage teachers with rigorous attitude, strong sense of responsibility and high academic level to guide students in scientific and technological innovation [26]. Local medical colleges and universities should further improve the ranks of vocational guidance teachers, organize regular training, practical training and exchanges, and encourage teachers to obtain professional certificates such as vocational guidance teachers and entrepreneurial vocational planners to raise their professional level. Local medical colleges and universities should give full play to the network resources of outstanding alumni and entrepreneurs outside the university, and jointly strengthen the construction of teaching team for innovation and entrepreneurship. They also need to emphasize the development of teachers for innovation and entrepreneurship, and launch the "Teacher Plus" campaign. Based on the cooperation of the faculty of innovation and entrepreneurship education in the university and the faculty of technology innovation and design thinking, the organization mechanism of trans-boundary learning can be established to promote the construction of undergraduate innovation and entrepreneurship courses, certificates, specialties and degrees. International top makers can be invited to act as on-campus mentors to guide student makers to conduct innovative projects. The course "Face to Face with Famous Entrepreneurs" should be offered, where entrepreneurs can share their entrepreneurial experience with students. Local medical colleges and universities should also hire entrepreneurs and investors as entrepreneurial mentors to establish cooperation with investment institutions and entrepreneurial professional service institutions, and provided comprehensive support for entrepreneurial teams.

3.3.2 Establishing a curriculum system for innovation and entrepreneurship education

Local medical colleges and universities should establish compulsory public courses in innovation and entrepreneurship, encourage colleges and departments to open more high-quality courses on innovation and entrepreneurship, attach importance to the innovation and development of students' professional fields, and improve their comprehensive quality and ability [27]. Medical colleges and universities should also strengthen the construction of

courses on innovation and entrepreneurship, carry out general education on innovation and entrepreneurship among undergraduate and junior college students, integrate the content of innovation and entrepreneurship education into the existing undergraduate and junior college training sections, and bring it into credit management system. The curriculum connotation construction of the deep integration of innovation and entrepreneurship education and professional education should be strengthened, and the training of innovative thinking and innovative methods should be emphasized in the professional courses [28]. All kinds of education resources related to professional course of innovation and entrepreneurship should be fully explored, including the innovation entrepreneurship teaching, the establishment of the classic cases, the integration of online and offline channels of knowledge structure, the development for different professional, innovative entrepreneurship curriculum system with the characteristic of professional disciplines, and the integration of curriculum construction and course construction[29, 30]. Medical colleges and universities should implement the curriculum construction strategy of high-quality innovation and entrepreneurship curriculum resources with cultivation being the major mode and introduction being the auxiliary mode to form a unique innovation and entrepreneurship education curriculum system. Local medical colleges and universities should also coordinate the first-level and second-level education to promote the sustainable development of innovation and entrepreneurship education. Based on the first-level education, local medical colleges and universities should comprehensively promote the collaborative training with all kinds of programs to encourage teaching innovation, strengthen heuristic teaching, and improve course interest, academic challenge and student-teacher interaction. Local medical colleges and universities should vigorously promote the reform of the training programs of all schools and departments, and included innovation and entrepreneurship education in the guiding opinions on the training programs as a basic requirement. The innovation on teaching content should be emphasized, and teaching methods focusing on interaction (including conducting participatory and heuristic teaching, encouraging the personalized and small class teaching mode, and paying attention to the cultivation of critical and creative thinking, etc.) should be implemented. Training project management should focus on flexibility to support the development of the students according to their own characteristics and interests, and their choice of path to learn and grow[31]. A series of elective courses in innovation and entrepreneurship should be established, focusing on supporting the cultivation of "Internet +" innovation and entrepreneurship projects, and forming a new curriculum system and teaching mode that combine thinking and skills, cross-border learning and practice exchange, which can lay a good foundation for honing students' innovative thinking and skills, and enhance innovative and entrepreneurial leadership [32].

Local medical colleges and universities should actively organize students to participate in national and autonomous regional disciplines and skills competitions, such as the "Internet Plus" College Students Innovation and Entrepreneurship Competition and College Skills Competition, and fully guarantee the funds for supporting college students' innovation and entrepreneurship training and skills competition. Colleges should make full use of government and social resources, strengthen publicity and organization, guide students to actively participate in entrepreneurship courses and training, and improve entrepreneurship awareness and ability. The minor courses of Internet finance and entrepreneurship should be built to cultivate the entrepreneurial quality and ability in combination with the social demand and technological development trend of Internet finance. The university-level challenging innovation and entrepreneurship demonstration courses should be constructed based on the current global challenges. New curriculum design should be carried out and small classes should be adopted to highlight the cultivation of innovative awareness and ability.

3.4. Building and Implementing A Supporting System for Innovation and Entrepreneurship Education in Medical Colleges and Universities

3.4.1 Developing education bases for innovation and entrepreneurship

Local medical colleges and universities should expand the development of innovation and entrepreneurship bases both on and off the campus. The student innovation and entrepreneurship base is an important practice platform for colleges and universities to carry out innovation and entrepreneurship education and promote students' independent research and development [33]. They should actively promote the construction of college students' innovation and entrepreneurship base, improve the software and hardware facilities of college students' innovation and entrepreneurship base, create conditions for college students' innovation and entrepreneurship education, and form a business incubator base with vitality and nurturing value to cultivate talents. For students who have the desire and intention to start a business, local medical colleges and universities should guide them to make a business plan scientifically, encourage those with mature conditions to enter the base for business practice, and provide better conditions and broader space for students' innovation and entrepreneurship practice. On the basis of the construction plan of ASEAN innovation and entrepreneurship base, as well as the the planning of university pilot sites and urban entrepreneurship parks, innovation and entrepreneurship incubation base of local medical colleges and universities should be expanded [34]. Meanwhile, local medical colleges and universities should establish long-term cooperative training agreements with excellent enterprises, which can be built into excellent off-campus training base for cultivating innovative and entrepreneurial talents from medical colleges. The enterprises that pass the identification and evaluation can be officially authorized. The general education of innovation and entrepreneurship should be promoted, general courses of innovation and entrepreneurship aiming at cultivating innovative thinking should be set up for all students, and the core courses of general education should be established, which will gradually cover 100% of the students.

3.4.2 Building A Service Platform For Innovation And Entrepreneurship

As a major platform, "College Students Innovation and Entrepreneurship Center" provides all-round and professional guidance and services for college students' innovation and entrepreneurship. Colleges and universities should encourage and support all kinds of associations that are conducive to cultivating college students' entrepreneurial ability, and support student innovation and entrepreneurship associations to carry out various activities with different themes. Innovation and entrepreneurship salons, seminars and summits should be regularly held to build academic exchange platforms for innovation and entrepreneurship. Activities for sharing successful experience can stimulate students' passion for entrepreneurship practice and create a good cultural atmosphere for innovation and entrepreneurship. Innovative and entrepreneurial education resources can be provided for the public with modern education technology, including "Xuetang Online", a large-scale online education course platform that gathers courses from well-known universities at home and abroad, providing a series of online courses on entrepreneurship [35].

4. CONCLUSION

Local medical colleges should actively respond to the situation and promote the organic integration of professional courses with innovation and entrepreneurship education. This paper analyzes the path of innovation and entrepreneurship education reform in medical professional education from four aspects: clarifying the concept and direction of innovation and entrepreneurship education, reforming teaching methods and evaluation methods, strengthening the construction of teaching team and the curriculum system of innovation and entrepreneurship, as well as building and implementing supporting systems of innovation and

entrepreneurship education in medical colleges and universities. As this study is carried out on the basis of literature, further discussion is needed to verify the practice, which is also the limitation of this study.

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