

The Theory and Practice of Innovation and Entrepreneurship Education in Teaching for Chinese College Students

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Abstract: Amid the progression of our societal economy, the concepts of innovation and entrepreneurship have emerged as salient subjects in our contemporary era. Being a paramount conduit for fostering inventive minds, the focus on innovation and entrepreneurship education tailored for university students has been steadily amplifying. In this discourse, we shall delve into the delineation, import, present circumstances, and stratagems pertinent to innovation and entrepreneurship education for these students, with the aim to proffer valuable insights towards its enhancement.

Keywords: Theory Practice, Innovation, Entrepreneurship Education, Teaching

1. Elucidation of Innovation and Entrepreneurship Education for University Students

Innovation and entrepreneurship education signifies an instructive methodology devised to nurture students' inventive cognition, entrepreneurial ethos, and pragmatic competencies, thereby facilitating their individual growth and societal advancement via autonomous entrepreneurship. When tailored specifically for university students, it implies pedagogical endeavours that steer students towards practising innovation and entrepreneurship by fostering their innovative consciousness, capabilities, and spirit, whilst igniting their entrepreneurial fervour during their tertiary educational phase.

The ultimate objective of this brand of education is to foster a cadre of talent imbued with innovative prowess and entrepreneurial zeal, thereby bolstering economic expansion and societal progression. It endeavors to instill within students an innovative mindset, potent innovative capabilities, and an entrepreneurial spirit, hence providing robust support for their future career trajectory.

Numerous universities and vocational educational institutions incorporate courses pertinent to innovation and entrepreneurship within their curricula. For instance, some institutions proffer courses such as "Entrepreneurship Management" and "Entrepreneurship", designed to acquaint students with the foundational knowledge and skills essential for innovation and entrepreneurship. These courses frequently employ pedagogical techniques such as case studies and teamwork, which prove efficacious in stimulating students' enthusiasm for innovation and entrepreneurship [1-3].

2. The Significance of Innovation and Entrepreneurship Education for University Students

2.1. Facilitates Holistic Development of Students

Innovation and entrepreneurship education serves to cultivate students' creative cognition, pragmatic skills, and a spirit of collaboration, thereby fostering their comprehensive development. By actively partaking in innovative and entrepreneurial practices, students can enhance their practical operational and managerial capabilities, consequently elevating their overall quality and competitiveness.

2.2. Fuels Socio-Economic Progression

Innovation and entrepreneurship act as significant catalysts for social and economic advancement. The impartation of innovation and entrepreneurship education to university students engenders a proliferation of innovative talents, thereby supplying society with a wealth of inventive and entrepreneurial resources, and consequently stimulating the rapid progression of the socio-economic landscape.

2.3. Augments National Competitiveness

Innovation and entrepreneurship education tailored for university students is instrumental in fostering a greater volume of innovative talent, thereby providing robust backing for the nation's development. In the context of today's globally integrated economy, innovation and entrepreneurship have emerged as critical tools for international competition [4-6]. As such, innovation and entrepreneurship education for university students serves to amplify a nation's competitiveness. (Figure 1)

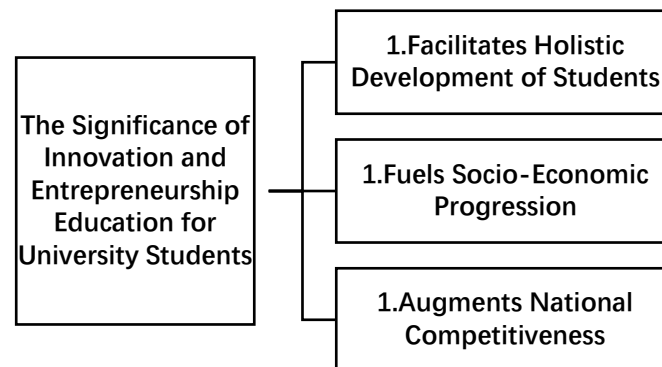


Figure 1: The significance of innovation and entrepreneurship education.

3. Present Circumstances of Innovation and Entrepreneurship Education among Chinese University Students

Currently, innovation and entrepreneurship education for university students in China is receiving extensive attention and emphasis. Universities have introduced pertinent courses and orchestrated competitions centered around innovation and entrepreneurship, thereby providing students with an expanded array of opportunities for such endeavours. While this approach to education in China has shown considerable progress, it is not without its shortcomings. These include a dearth of practical opportunities, an insufficiently professional teaching cohort, and a relatively low level of student interest in innovation and entrepreneurship.

The current landscape of innovation and entrepreneurship education for university students in China is characterised primarily by the following facets:

3.1. The Pedagogical Philosophy is Insufficiently Progressive.

Certain universities persist in adopting traditional educational paradigms within the realm of innovation and entrepreneurship education, with an overemphasis on the impartation of knowledge while neglecting to foster students' innovative spirit and practical abilities.

3.2. Deficiencies in Curriculum.

The curriculum pertaining to innovation and entrepreneurship in some tertiary institutions is found

wanting, with a lack of systematisation and practicality, consequently failing to effectively furnish students with opportunities and platforms for genuine engagement in innovation and entrepreneurship.

3.3. Insufficient Student Awareness of Innovation and Entrepreneurship.

A subset of students exhibit a lack of sufficient comprehension and knowledge pertaining to innovation and entrepreneurship. They lack the requisite interest and motivation in these areas, thereby resulting in their inability to actively participate in practical innovation and entrepreneurship endeavours.

3.4. Immaturity of the Innovation and Entrepreneurship Ecosystem.

The innovation and entrepreneurship environment in certain regions is not sufficiently mature, lacking the requisite atmosphere and support structures for these endeavors, thereby failing to provide an optimal platform for students to engage in and develop their innovative and entrepreneurial capabilities.

In light of these challenges, it is imperative to devise appropriate countermeasures, such as bolstering practical instruction, enhancing faculty development, and stimulating student interest in innovation and entrepreneurship, among others, with a view to furnishing a more conducive environment for the evolution of university students' innovation and entrepreneurship education [7-9].

4. Discussion on Teaching Innovation and Entrepreneurship

4.1. Development of Teaching Objectives

Entrepreneurship practice course is a relatively new teaching method. In this kind of course, students will experience the process of entrepreneurship, including market research, product design, business plan writing and so on. This kind of course can help students better understand the actual situation of entrepreneurship, as well as improve their practical and innovative abilities.

In the teaching of innovation and entrepreneurship, appropriate teaching objectives need to be set. The teaching objectives should be in line with the actual situation of students and can stimulate their enthusiasm for innovation and entrepreneurship. The teaching objectives of innovation and entrepreneurship education are to cultivate students' innovation ability and entrepreneurial spirit, improve their practical ability and comprehensive quality, and lay the foundation for their future development. The teaching goal should focus on practical operation and experience summation, so that students can improve their abilities continuously in practice. For example, some courses or activities related to innovation and entrepreneurship can be developed to help students understand the cutting-edge developments in the field of innovation and entrepreneurship and cultivate their innovation consciousness and entrepreneurial ability.

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Teamwork and competition represent integral components of innovation and entrepreneurship education, capable of kindling students' enthusiasm for innovation and competition, whilst augmenting their pragmatic skills and holistic competence. Via the mediums of teamwork and competitions, students are afforded the opportunity to enhance their capabilities through hands-on experience. The education surrounding innovation and entrepreneurship for university students mandates the application of certain specialised pedagogical approaches, aimed at nurturing their innovative spirit and practical

abilities. For instance, the following instructional methodologies are applicable to innovation and entrepreneurship education for university students (Figure 2):

Case-Based Learning: Through the study of authentic cases of innovation and entrepreneurship, students can gain insight into the processes and methodologies underlying these activities, whilst concurrently cultivating their entrepreneurial cognition and decision-making aptitudes.

(2) **Project-Based Learning:** By involving students in tangible innovation and entrepreneurship projects, offering genuine entrepreneurial platforms and resources, students are granted the opportunity to enhance their entrepreneurial competencies through practical experience.

(3) **Innovation Laboratories:** Provision of labs imbued with distinctive innovative and entrepreneurial characteristics, where students are free to explore and engage in self-directed practice, thereby fostering the development of their innovative thought processes and practical proficiencies.

(4) **Mentorship:** Providing students access to mentors possessing considerable experience in innovation and entrepreneurship, thereby aiding students in refining their skills in these areas through the guidance and direction imparted by these mentors.

(5) **Interdisciplinary Instruction:** By integrating knowledge gleaned from diverse academic disciplines into the framework of innovation and entrepreneurship education, students are enabled to comprehend knowledge and skills from various fields, thereby enhancing their comprehensive interdisciplinary competence [13-15].

The aforementioned pedagogical strategies can be amalgamated and innovatively adapted in accordance with varying circumstances and requirements, thereby better conforming to the characteristics and demands inherent to innovation and entrepreneurship education tailored for university students.

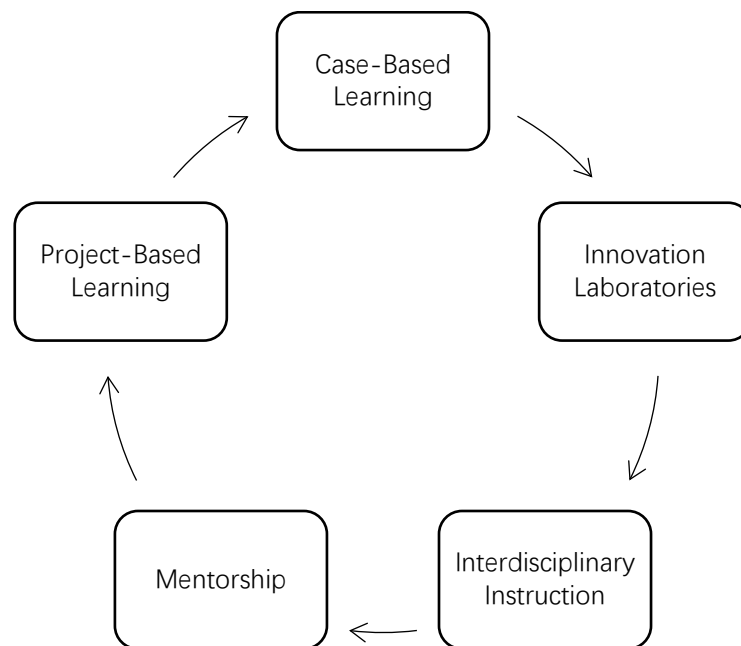


Figure 2: Devise appropriate countermeasures.

4.3. Mastery of Technology and Fostering of an International Perspective

The instruction within innovation and entrepreneurship education should underscore the importance of mastering technology and cultivating an international perspective, thereby enabling students to comprehend cutting-edge international technologies and market demands, and fostering their global competitiveness and innovative capabilities. Concurrently, it should emphasize technological innovation and industrial upgrading as catalysts for promoting economic development and societal progression.

Innovation and entrepreneurship competitions serve as highly effective pedagogical tools in this domain. Such competitions can ignite students' enthusiasm for innovation and entrepreneurship, whilst

providing a platform to hone their practical and teamwork skills. For instance, the International Entrepreneurship Competition and the National Student Entrepreneurship Competition have garnered significant student participation and have successfully served as springboards for aspiring entrepreneurs to launch their own ventures.

4.4. Bolstering Education in Traditional Cultural Virtues

The interplay between innovation and entrepreneurship education for university students and traditional cultural education exhibits elements of connection and complementarity, while also presenting certain contradictions and conflicts [16-18].

On one hand, traditional cultural education, with its emphasis on humanistic spirit and moral ethics, can foster creativity and innovative consciousness among students. For instance, traditional Chinese culture, with its focus on concepts such as "the unity of heaven and man" and "the way of nature," can stimulate students' enthusiasm for innovation and entrepreneurship, thereby promoting the development of their innovative and entrepreneurial mindset.

On the other hand, the focus of innovation and entrepreneurship education for university students is the cultivation of practical skills and market competitiveness. Meanwhile, traditional cultural education underscores humanistic considerations and social responsibility. This dichotomy necessitates a pedagogical approach that concurrently cultivates students' sense of social responsibility and humanistic qualities within the framework of innovation and entrepreneurship education. Simultaneously, there should be an emphasis on the development of students' practical skills and market competitiveness within the context of traditional cultural education.

Thus, an organic amalgamation of innovation and entrepreneurship education for university students and traditional cultural education should be pursued to realise a symbiotic and mutually beneficial outcome. Within the pedagogical process, elements of traditional culture can be woven into the fabric of innovation and entrepreneurship education, for instance, through the naming of innovation and entrepreneurship projects or product design, as a means to bolster students' cultural self-confidence alongside their innovation and entrepreneurship consciousness. Concurrently, traditional culture can be propagated through practical innovation and entrepreneurship activities, such as the perpetuation and promotion of traditional crafts via entrepreneurial projects.

Innovation and entrepreneurship education should prioritize the preservation and evolution of traditional culture and progressive virtues, thereby allowing students to comprehend and respect their traditional culture, and foster a sense of cultural self-confidence along with a national spirit. Simultaneously, there should be an emphasis on fostering progressive virtues and guiding students towards the establishment of a sound perspective on life and values, thereby enabling them to contribute positively to societal progression and development.

4.5. The Role and Function of Educators

The role and function of educators bear significant weight in the teaching of innovation and entrepreneurship. They are not merely conveyors of knowledge, but also serve as guides and proponents for students throughout their journey in innovation and entrepreneurship. Educators are expected to adopt a guiding and promoting role, providing indispensable guidance and assistance to students. Concurrently, educators ought to possess sufficient industry and teaching experience to offer effective guidance and advice tailored to students' actual circumstances. The following elucidates the roles and functions of educators within the context of innovation and entrepreneurship education for university students (Figure 3):

Provision of Guidance and Support: Educators can steer students' innovation and entrepreneurship projects by offering professional knowledge, experience, and resources. They may also furnish necessary support for students, which can encompass the provision of venues, equipment, and funding.

(2) **Stimulating Students' Interest and Potential:** Educators can ignite students' interest and unlock their potential by guiding and encouraging them to explore and venture into novel directions within the realms of innovation and entrepreneurship.

(3) **Facilitating the Development of a Sound Innovation and Entrepreneurship Concept:** Teachers can play a crucial role in helping students gain a deeper understanding of the essence of innovation and entrepreneurship, as well as cultivating a proper conceptual framework. They can achieve this by

sharing their own personal experiences, both successful and unsuccessful, to provide valuable insights and lessons for students [19-20].

(4) **Fostering Teamwork Skills:** Educators can contribute to the enhancement of students' teamwork and leadership abilities by designing team projects and tasks that encourage collaborative work. Through such initiatives, teachers can provide students with opportunities to develop and refine their teamwork skills.

(5) **Offer Tangible Opportunities:** Educators can avail practical opportunities to students by orchestrating experiential activities and visits, enabling students to acquire a deeper comprehension of the practical intricacies and market dynamics within the realm of innovation and entrepreneurship.

In conclusion, educators assume a pivotal role in the innovation and entrepreneurship education of university students, as their guidance and support are instrumental in empowering students to actualize their aspirations in innovation and entrepreneurship.

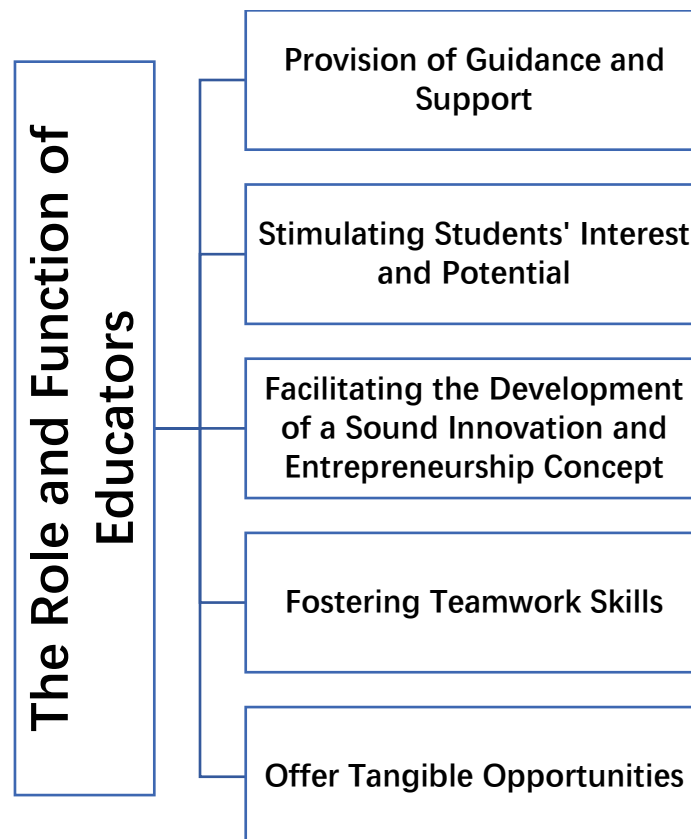


Figure 3: The role and function of educators.

4.6. Evaluation of Innovation and Entrepreneurship Education

In the realm of innovation and entrepreneurship education, assessment holds significant importance. It enables students to gain a better understanding of their innovation and entrepreneurship capabilities, aids educational institutions and teachers in identifying teaching shortcomings, facilitating timely adjustments and improvements to enhance teaching quality and effectiveness. Moreover, it helps teachers gauge the impact of their instruction and identify areas for further growth. Therefore, it is crucial to establish an effective assessment system within innovation and entrepreneurship education, encompassing elements such as students' self-assessment, teachers' assessment, and peer assessment. The following are some approaches to evaluate innovation and entrepreneurship education:

Student Assessment: Students serve as the primary participants in education, and their perspectives and feedback hold immense value. Gathering students' opinions and feedback regarding innovation and entrepreneurship education can be accomplished through questionnaires and interviews, allowing for an understanding of their evaluation and suggestions regarding teaching content, methods, and outcomes.

(2) **Project Evaluation:** Within innovation and entrepreneurship education, students typically engage

in various innovation and entrepreneurship projects. The quality and significance of these projects, along with students' innovation and entrepreneurship abilities and practical experiences, can be assessed by evaluating the outcomes, market impact, and social influence generated by the projects [21-22].

(3) **Teacher Evaluation:** Teachers play a crucial role in innovation and entrepreneurship education and can be evaluated based on teaching quality, instructional methods, and educational outcomes. This assessment allows for an understanding of their teaching proficiency and effectiveness within the field of innovation and entrepreneurship education.

(4) **External Evaluation:** In addition, external experts and institutions can be invited to conduct evaluations of innovation and entrepreneurship education. This external evaluation provides insights into the strengths and weaknesses of educational institutions and teachers in delivering innovation and entrepreneurship education, as well as the evaluation of educational outcomes and social impact. These various evaluation methods collectively aid in identifying issues and shortcomings in education, enabling timely adjustments and improvements to enhance the quality and effectiveness of educational endeavors.

5. Skills and Approaches for Teachers in Guiding University Students in Innovation and Entrepreneurship

5.1. Provision of Positive Motivation and Support

Teachers should possess the ability to comprehend students' interests, strengths, and potentials, and proactively encourage and support their pursuit of innovative and entrepreneurial endeavors. By providing students with essential resources, information, and networking support, teachers can assist students in realizing their innovative and entrepreneurial goals.

5.2. Foster an Open Platform and Environment

Teachers should establish an open platform and conducive environment that empowers students to freely express and implement their ideas and innovations. Such an environment nurtures the growth of students' creative thinking and innovation skills while also enhancing their self-management and teamwork abilities.

5.3. Facilitate Practice Opportunities and Guidance

Teachers should offer students ample opportunities for practical engagement and provide guidance to assist them in transforming their ideas into tangible innovative practices. This can be accomplished by organizing participation in innovation and entrepreneurship competitions, practical projects, or social engagement activities, while concurrently providing necessary guidance and support. Practice constitutes a vital aspect of innovation and entrepreneurship education, enabling students to gain a deeper understanding of the realities of innovation and entrepreneurship and enhancing their practical skills.

5.4. Foster Innovative Thinking and Aptitude

Teachers should foster students' innovative thinking and abilities, assisting them in mastering fundamental theories and methodologies of innovation and entrepreneurship. Through classroom teaching, case studies, discussions, and practical exercises, teachers can guide students in acquiring the knowledge and skills necessary for innovation and entrepreneurship, while simultaneously enhancing their innovative thinking and abilities.

5.5. Enhance Teacher Development

Teachers should prioritize the enhancement of their own knowledge and abilities in innovation and entrepreneurship education, continuously improving their teaching proficiency and innovation and entrepreneurship practice skills. This can be achieved through ongoing professional development, attending training programs, seminars, and staying abreast of the latest advancements in the field. By continuously updating their knowledge and skills, teachers can provide superior educational services to

students.

6. Case Study: Innovation and Entrepreneurship Education for University Students

Innovation and entrepreneurship education within the classroom should emphasize the integration of theory and practice. Through case studies and hands-on activities, students can develop a profound understanding of the practical aspects and experiential facets of innovation and entrepreneurship. The teaching approach should prioritize the cultivation of students' innovative mindset and entrepreneurial spirit, while simultaneously fostering their independent innovation and entrepreneurial practice.

Presented below are two cases exemplifying innovation and entrepreneurship education for university students:

Case 1: Design Thinking Challenge

In this case, students are presented with a real-world problem or challenge, and they are encouraged to employ design thinking principles to develop innovative solutions. Through a series of workshops, brainstorming sessions, and prototyping activities, students learn to approach problems from a user-centered perspective, think creatively, and collaborate in multidisciplinary teams. The case provides students with practical experience in applying innovation methodologies, honing their problem-solving abilities, and nurturing their entrepreneurial mindset.

The "Entrepreneurship Camp" program at Guilin University of Aerospace Technology is an immersive four-week initiative aimed at equipping students with fundamental theories and methodologies in entrepreneurship, while enhancing their innovative and entrepreneurial capacities. Organized by the Center for Entrepreneurial Practice, this program attracts students from various disciplines who aspire to engage in entrepreneurial pursuits.

During the program, students are divided into groups, engaging in a comprehensive curriculum that combines classroom instruction, case studies, teamwork, and practical exercises. This multifaceted approach enables students to acquire essential knowledge and skills in entrepreneurship. Additionally, the program invites accomplished entrepreneurs and investors to share their experiences and valuable insights, providing students with a practical understanding of the entrepreneurial landscape (Figure 4).



Figure 4: The "Entrepreneurship Camp" program.

As the program draws to a close, students are tasked with developing and presenting a business plan. These plans are evaluated by a panel of professionals and entrepreneurs, who provide constructive feedback and guidance. This process not only serves as an evaluation mechanism but also offers students the opportunity to receive direct support and guidance from experienced investors, enhancing the prospects for their entrepreneurial endeavors.

Guilin University of Aerospace Technology "Entrepreneurship Camp" program serves as a platform that combines theoretical learning with practical experience, empowering students with the necessary skills and knowledge to embark on entrepreneurial ventures successfully.

Case 2: Business Incubator Program

The "Innovation and Entrepreneurship Practice Base" project at Jiangsu University of Science and

Technology encapsulates a remarkable endeavor. This one-year program in entrepreneurship serves as a crucible for students, equipping them with a profound comprehension of the genuine intricacies and requisites of entrepreneurial ventures, while fostering an amplification of their innovation and entrepreneurial acumen. Sponsored by the esteemed Innovation and Entrepreneurship Center at Jiangsu University of Science and Technology, this program allures students hailing from various academic disciplines to partake in its offerings.

In this case, students participate in a business incubator program where they have the opportunity to develop and launch their own ventures. Under the guidance of experienced mentors, students receive support in refining their business ideas, developing business plans, securing funding, and navigating the challenges of starting a business. Through this hands-on experience, students gain valuable insights into the practical aspects of entrepreneurship, including market research, product development, financial management, and marketing strategies. The case aims to foster students' entrepreneurial skills, resilience, and adaptability in the dynamic business environment.

Throughout the program, students are organized into groups, engaging in classroom instruction, practical training, corporate visits, and collaborative teamwork to imbibe fundamental entrepreneurial knowledge and skills. In addition, this initiative extends a suite of services encompassing entrepreneurial consultancy, investment support, and resource sharing, assiduously safeguarding and bolstering the students' entrepreneurial pursuits (Figure 5).



Figure 5: Jiangsu university of science and technology innovation and entrepreneurship project.

Culminating in the program's denouement, students are required to conceive and submit an innovative entrepreneurial project, which shall be meticulously assessed and presented. This consequential process entails the guidance and evaluation of corporate investors and experts, thereby furnishing the students with enhanced opportunities and platforms for their entrepreneurial undertakings. These case studies exemplify how innovation and entrepreneurship education can be effectively implemented, enabling students to bridge the gap between theory and practice, and equipping them with the necessary skills and mindset to succeed in the realms of innovation and entrepreneurship.

The aforementioned case study elucidates the intricate mechanics and experiential dimensions of innovation and entrepreneurship, empowering both educators and students alike to internalize and harness practical insights. These case studies ought to be centered on pragmatic operations and experiential synopses, galvanizing students to draw inspiration, garner wisdom, and apprehend the indomitable spirit of unity and tenacity intrinsic to innovation and entrepreneurship. Unity serves as the bedrock of teamwork within the realm of innovation and entrepreneurship, fostering an astute comprehension of the value of collective effort. By nurturing students' collaborative proficiencies, they shall acquire a profound understanding of the tenet "one for all." Struggle, being an integral facet of innovation and entrepreneurship, is explicated through the guidance and hands-on engagement of students in innovative and entrepreneurial practices, thereby instilling within them a sagacious

understanding of the essence of arduous labor and ascension to the zenith.

7. Optimization Measures of Innovation And Entrepreneurship Education for College Students

7.1. Strengthen the construction of teachers' team College students' innovation and entrepreneurship education needs professional teachers' team to support

Meanwhile, the construction of teachers' team is strengthened to improve teachers' innovation and entrepreneurship ability. Teachers are the key to innovation and entrepreneurship education, and it is necessary to strengthen the construction of the faculty and improve the teaching level and innovation and entrepreneurship ability of teachers.

7.2. Designing Innovation and Entrepreneurship Curriculum

It is necessary to design innovation and entrepreneurship curriculum that is more in line with students' needs and market demand, focus on combining practice and theory, and cultivate students' practical ability and innovation spirit. Innovation and entrepreneurship education needs to focus on practical teaching and provide more practical opportunities and resources so that students can have better access to the market and practical operations and enhance their innovation and entrepreneurship abilities. More practical opportunities can be provided for students through innovation and entrepreneurship practical training, innovation and entrepreneurship competition, innovation and entrepreneurship projects, etc. Innovation is the core of innovation and entrepreneurship education. By guiding students to carry out innovation practice, they can cultivate their innovation consciousness and innovation ability, which is also a core value of Chinese craftsmanship.

7.3. Strengthen School-Enterprise Cooperation

School-enterprise cooperation is an important way of innovation and entrepreneurship education, which can provide students with more opportunities and resources for innovation and entrepreneurship and enhance their practical experience and market sensitivity.

7.4. Provide Innovation and Entrepreneurship Support

Schools need to provide more innovation and entrepreneurship support, such as providing support in terms of venue, capital, technology and law, to help students better innovate and start their own businesses.

7.5. Guide College Students to Establish Correct Concepts of Innovation and Entrepreneurship

Schools need to guide students to establish correct concepts of innovation and entrepreneurship, focus on the social value and responsibility of innovation and entrepreneurship, and encourage students to play an active social role in innovation and entrepreneurship. College students' innovation and entrepreneurship education needs to stimulate students' interest in innovation and entrepreneurship. Students' passion for innovation and entrepreneurship can be stimulated by offering innovation and entrepreneurship courses, organizing innovation and entrepreneurship competitions, and inviting successful entrepreneurs to give lectures.

The above are some countermeasures to optimize college students' innovation and entrepreneurship education. By strengthening the construction of teachers, designing innovation and entrepreneurship courses, strengthening practical teaching, strengthening cooperation between schools and enterprises, providing innovation and entrepreneurship support and guiding students to establish correct innovation and entrepreneurship concepts, the quality and effect of college students' innovation and entrepreneurship education can be improved and more innovative and entrepreneurial talents can be cultivated. In conclusion, innovation and entrepreneurship education for college students is of great significance to cultivate innovative talents, promote social and economic development and enhance national competitiveness. We should pay more attention to and support the innovation and entrepreneurship education of college students, and make positive contributions to the cultivation of more innovative and entrepreneurial talents.

8. Conclusion

Innovation and entrepreneurship education serves as a crucial pathway to nurture individuals with innovative prowess and entrepreneurial zeal, while driving economic growth and societal advancement. Within the classroom setting, it is vital to strike a balance between theory and practice, empowering students to engage in independent innovation and entrepreneurial pursuits. Concurrently, efforts should be made to promote teaching reforms and research, fortifying the theoretical framework and innovating the teaching methods employed in innovation and entrepreneurship education. By fostering teamwork and organizing competitions, students' enthusiasm for innovation and their competitive spirit can be kindled, thereby enhancing their practical abilities and holistic development. Innovation and entrepreneurship education should encompass the acquisition of technological proficiency, the cultivation of an international perspective, and the preservation and evolution of traditional culture and progressive values. In contemporary society, innovation and entrepreneurship have emerged as pivotal avenues for pursuing success. Education, as a significant social institution, plays a vital role in cultivating individuals with innovative and entrepreneurial capabilities. Consequently, research on teaching methodologies and teaching approaches assumes particular significance within this domain.

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References

- [1] Lai, Yuefei, Yan, Yuting, Wang, Beiyi. *Research on the design of the basic course of innovation and entrepreneurship education "integration of specialization and creation". Innovation and Entrepreneurship Theory and Practice*, 2022(24)
- [2] Anoop Desai, Anil Mital, *Sustainable Product Design and Development, Industrial Engineering*, 2020. 10
- [3] B. Schleich, M. A. Dittrich, T. Clausmeyer, R. Damgrave, J. A. Erkoyuncu, B. Haefner, T. Wuest, *Shifting value stream patterns along the product lifecycle with digital twins, Procedia CIRP 86 (2019) 3–11*
- [4] Riffitts Michelle, Cook Harold, McClincy Michael, Bell Kevin. *Evaluation of a Smart Knee Brace for Range of Motion and Velocity Monitoring during Rehabilitation Exercises and an Exergame. Sensors*, 2022, 22(24)
- [5] Zou Baoling, Zheng Wolin, *Exploring the cultivation of technical talents in liberal arts in the context of new liberal arts. Heilongjiang Higher Education Research*, 2021(11)
- [6] T. Tomiyama, E. Lutters, R. Stark, M. Abramovici, *Development capabilities for smart products, CIRP Ann. 68 (2) (2019) 727–750.*
- [7] P. John Clarkson, Roger Coleman. *History of Inclusive Design in the UK. Applied Ergonomics*. 2015
- [8] Li Fengyun, Dong Zhijie. *Policy diffusion of innovation and entrepreneurship education in Chinese colleges and universities: process, mechanism and outlook. Innovation and Entrepreneurship Education*, 2021(06)
- [9] A. S. Ullah, *Modeling and simulation of complex manufacturing phenomena using sensor signals from the perspective of Industry 4. 0, Adv. Eng. Inf. 39 (2019) 1–13.*
- [10] G. Bourhis, Y. Agostini. *The Vahm Robotized Wheelchair: System Architecture and Human-Machine Interaction. Journal of Intelligent and Robotic Systems*. 1998 (1)
- [11] Günther Schuh, Eric Rebutisch, Michael Riesener, Thorben Ipers, Christian Tonnes, "Merle-Hendrikje Jank, *Data quality program management for digital shadows of products, Procedia CIRP 86 (2019) 43–48.*
- [12] Wang Hongcai. *The meaning and essence of innovation and entrepreneurship education and its realization. Innovation and entrepreneurship education*, 2020(06)
- [13] Qin Jin, Huo Kai, *Exploration and practice of innovation and entrepreneurship education reform in art and design in the post-epidemic era. Innovation and Entrepreneurship Theory Research and Practice*, 2022(16)

- [14] Yang J, Jtjrat Emeviint. *Cultural and Creative Industries (CCI) and Sustainable DeVelopment: CHINA'S Cultural Industrjes Clusters. Post—Print*, 2017, 5(2):231-— 242.
- [15] M. Bock, M. Wiener, R. Gronau, A. Martin, *Industry 4. 0 enabling smart air: digital transformation at Kaeser Compressors*, in: *Digitalization Cases*, Springer, Cham, 2019, pp. 101–117.
- [16] E. A. Gromova, *Digital economy development with an emphasis on automotive industry in Russia*, *Revista Espacios* 40 (06) (2019).
- [17] Dorst, K. (2019). *Co-evolution and emergence in design. Design Studies*, 65, 60-77.
- [18] Lloyd, P., & Oak, A. (2018). *Cracking open co-creation: Categories, stories, and value tension in a collaborative design process. Design Studies*, 57, 93-111.
- [19] FDA, U. S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research (CDER), *Quality Considerations for Continuous Manufacturing Guidance for Industry (Draft Guidance)*, 2019
- [20] G. Tian, A. Koolivand, N. S. Arden, S. Lee, T. F. O'Connor, *Quality risk assessment and mitigation of pharmaceutical continuous manufacturing using flowsheet modeling approach*, *Comput. Chem. Eng.* 129 (2019), 106508.
- [21] N. Metta, M. Ghijs, E. Sch` afer, A. Kumar, P. Cappuyns, I. Van Assche, R. Singh, R. Ramachandran, T. De Beer, M. Ierapetritou, I. Nopens, *Dynamic flowsheet model development and sensitivity analysis of a continuous pharmaceutical tablet manufacturing process using the wet granulation route*, *Processes* 7 (2019) 234.
- [22] N. Zaborenko, Z. Shi, C. C. Corredor, B. M. Smith-Goettler, L. Zhang, A. Hermans, C. M. Neu, M. A. Alam, M. J. Cohen, X. Lu, L. Xiong, B. M. Zacour, *First-principles and empirical approaches to predicting in vitro dissolution for pharmaceutical formulation and process development and for product release testing*, *The AAPS Journal* 21 (2019) 32.