Teacher Entrepreneurship, Co-Creation Strategy, and Medical Student Entrepreneurship for Sustainability: Evidence from China

Guojing Zhao 1,†, Guobiao Li 1,†, Yujia Jiang 1, Liying Guo 2, Yangjie Huang 3,* and Zhaoxin Huang 1,3,*

1 College of Innovation and Entrepreneurship Education, Wenzhou Medical University, Wenzhou 325035, China
2 Faculty of Education, Fujian Normal University, Fuzhou 350117, China
3 School of Education, Hangzhou Normal University, Hangzhou 311121, China
* Correspondence: hyj7777@126.com (Y.H.); 20200001@hznu.edu.cn (Z.H.)
† These authors have contributed equally to this work and share first authorship.

Abstract: The volatile and changing healthcare landscape, heavily influenced by the COVID-19 pandemic and other contemporary crises, poses challenges to the sustainable development of medical education, and integrating innovation and entrepreneurship into medical education is the avenue by which to address the current and future medical challenges. Medical student entrepreneurship education (MSEE) contributes to the individual and social sustainable development of students in terms of their future careers. To investigate the effect of teacher entrepreneurship on MSEE, a hypothesis model of MSEE that includes teachers’ entrepreneurial competence (TEC), teachers’ entrepreneurial behaviors (TEB), and co-creation strategy (CCS) was constructed on the basis of symbolic interactionism. A total of 714 samples were collected from entrepreneurial teachers in Chinese medical universities for quantitative analysis. This study confirmed our hypothesis that TEC and TEB have a positive and statistically significant direct impact on MSEE. As demonstrated in the mediation effect test, when CCS was added as the mediating variable, TEC and TEB had a statistically significant indirect effect on MSEE. With empirical evidence from China, the study provided a new perspective for deepening the research on MSEE and laid the foundation for interdisciplinary research on medical education and entrepreneurship education. The findings contribute to entrepreneurial learning and pedagogical practices in medical education for the sustainable development of medical students.

Keywords: teachers’ entrepreneurial competence; teachers’ entrepreneurial behaviors; co-creation strategy; medical student entrepreneurship; sustainable development; teacher entrepreneurship

1. Introduction

The volatile and changing healthcare landscape, heavily influenced by the COVID-19 pandemic and other contemporary crises, poses challenges to the sustainable development of medical education, and integrating innovation and entrepreneurship into medical education is the avenue by which to address current and future medical challenges [1]. To a certain extent, integrating innovation and entrepreneurship programs into medical education has become an inevitable trend to promote medical innovation and entrepreneurship [2]. Of course, there are also opposing opinions. Medicine is concerned with science, diagnosis, treatment, and patient care. Therefore, is it appropriate to develop innovative traits and entrepreneurial competence among medical students [3]? Indeed, to improve service provision, some medical professions such as dentistry, public health, nursing, and biomedical sciences, are keen to incorporate innovation and entrepreneurship programs into their courses [4,5]. Academic surgery too has begun to explore entrepreneurship...
avenues [6]. Innovation and entrepreneurship in the medical field, whether they are related to novel treatments, new diagnostic tools, or simple technology startups, will help healthcare develop rapidly [7]. The benefits of strengthening entrepreneurship education for medical students are well established. Entrepreneurship education can promote critical problem-solving thinking and lifelong learning characteristics in medical students, effectively motivating medical graduates to become experts in education and academics [3,8]. Integrating business characteristics, such as innovation, entrepreneurship, leadership, management, and risk-taking, into medical courses and clinical practice will enable medical students to learn and implement entrepreneurial skills that will help them solve complex problems in their future careers [2]. More importantly, by enhancing their adaptability, entrepreneurship education prepares medical students to become future physicians [3]. The primary purpose of encouraging the integration of entrepreneurship education into medical education is not to encourage medical students to start businesses but to prepare them to create and work in a sustainable future by entrepreneurial learning and pedagogical practices. It can be viewed as a future sustainable development goal of medical student entrepreneurship education (MSEE). It can also be seen that the sustainable development of MSEE is not a constant state of harmony, but a lifelong evolutionary process in which medical students can not only meet the current development needs and aspirations but can also have the abilities and attributes enabling them to meet the future sustainable development goals. It is undeniable that this is essential to the sustainable development of both medical students and society.

In mainland China (herein, China), the state has initiated stimulative policies to promote MSEE under the Healthy China strategy. Two policies, (1) the Excellent Physician Education and Training Program 2.0 [9] and (2) the Guidelines on Accelerating the Innovative Development of Medical Education [10], have become the guiding documents for cultivating innovative and excellent medical talents in medical universities, indicating that China has realized that the traditional medical talent training mode is obviously not keeping up with modern medicine and sustainable development. Driven by national policies, medical universities have begun to explore the avenues of entrepreneurship education in undergraduate education, such as by integrating entrepreneurship education into the medical professional talent training program and focusing on the intrapreneurship concept to improve the employment competitiveness and innovative and entrepreneurial competence of medical graduates [11]. In addition, a reform pilot area has been established to integrate innovation and entrepreneurship programs into medical education and set up entrepreneurship courses with medical characteristics, such as Medical Entrepreneurship Foundation and Internet + Medical Innovation and Entrepreneurship [12]. A series of social entrepreneurship service programs have been carried out and teachers and students are being encouraged to co-create in science research programs, academic entrepreneurship activities, and “Internet +” innovation and entrepreneurship competitions [13]. These innovation- and design-related programs come in many shapes and sizes and broadly fall under the umbrella terms of “medical entrepreneurship”.

Internationally, we found that entrepreneurship in medical education has narrow and broad definitions in the context of different nations. For example, in Germany, various universities have introduced management competences and entrepreneurial issues into the medical curriculum as these are essential for self-employed physicians [14]. Meanwhile, in the United States, in allopathic medical schools, innovation and entrepreneurship programs in medical education are becoming increasingly common to help develop students’ competence in complex problem solving and solution design, and these programs include some educational themes of innovation, entrepreneurship, the business of medicine, and leadership [2]. At the same time, it is becoming increasingly important to promote the implementation of sustainability practices in entrepreneurship education. A common goal of entrepreneurship education is to cultivate value-oriented entrepreneurs for a sustainable society; all entrepreneurs of the future are in school today, and they should assume social responsibility so that future generations can access the
development of well-being, self-respect, and freedom. Academics have suggested monitoring student entrepreneurship in terms of sustainable development [15,16]. However, we did not find any empirical studies on monitoring medical student entrepreneurship in the field of sustainable development in existing studies. To fill the gap, we surveyed 714 teachers in Chinese medical universities; we combined the critical role of teachers in entrepreneurial learning and pedagogical practices from the perspective of teacher entrepreneurship [17,18]; and we provided empirical evidence on the effect of the teachers’ entrepreneurial competence (TEC), the teachers’ entrepreneurial behaviors (TEB), and the co-creation strategy (CCS) on MSEE.

In this study, symbolic interactionism is used as a theoretical framework to explore the effect of TEC and TEB on MSEE through CCS. According to the prior research literature on teacher entrepreneurship, teacher entrepreneurs are those who develop and improve the students’ entrepreneurial skills [19], collaborate across classrooms to achieve common goals, and create beneficial learning opportunities for students [20]. The core of teacher entrepreneurship is that teachers act the way entrepreneurs do in terms of developing the curriculum, incorporating technology to facilitate learning, building partnerships to promote students’ success, and securing resources for innovative programs [21]. In the teaching context, teacher entrepreneurship can be explored from multiple perspectives. This study focuses on teachers’ entrepreneurial competence [22,23] and entrepreneurial behaviors [24,25]. According to Harden and Lilley [26], one of the future roles of teachers in medical education will be to involve students in education programs and treat them as equal partners rather than consumers of education. This means that the students will be at the core of the learning process [27,28]. Moreover, in entrepreneurship education, CCS is a pedagogical practice that empowers learners to become future entrepreneurs via a collaborative effort to develop new ideas, paradigms, products, and services [29]. This depends on a close collaboration between students and teachers, with the aim being to have a positive influence on students who directly participate in the relationship and ultimately to improve the quality of educational innovation [30]. For the purpose of this study, we define entrepreneurship and entrepreneurship education in medical education in the most general sense. Entrepreneurship in medical education can be understood as intrapreneurship [31], in which physicians, including medical students, can act as entrepreneurs in their professional setting even if they do not start a business. Entrepreneurship education can be defined as a process of learning how to generate ideas and turn these ideas into explicit targets, such as products or action. At the same time, we proposed the following questions:

1. What entrepreneurial competence and entrepreneurial behavior of teachers will directly and effectively affect MSEE?

2. Is CCS a valid mediator of TEC and TEB in promoting MSEE?

In the next section, we describe the theoretical framework of symbolic interactionism. In the third section, we review the literature on teacher entrepreneurship, CCS, and MSEE. Section 4 is devoted to the hypotheses development of the effect of TEC, TEB, and CCS on MSEE. The method and the data analysis results are given in Sections 5 and 6. In Section 7, we discuss the empirical results. The conclusions and the academic and practical values are elaborated in Section 8. In the final section, we state the limitations of our study and the future research directions.
2. Theory Framework: Symbolic Interactionism

Symbolic interactionism presents the theoretical proposition that society consists of the perceptions, actions, and interactions of the actors [32]. A symbol was initially a philosophical concept derived from the ideas of pragmatist philosophers such as Peirce and Dewey and further developed by the sociologists Blumer and Mead [33]. The term “symbol” usually refers to meaningful gestures, such as individual characteristics, facial expressions, body language, gestures, and behaviors. “Meaning” is the most central element of symbols [32]. Action and interaction are the conditions for meaning-making, and meaning unfolds from the ongoing interplay between action, interaction, and meaning-making [34]. Through a systematic literature review, Husin et al. found that studies using symbolic interactionism in entrepreneurship are still relatively scarce and mainly focus on small and medium-sized enterprises [35]. In entrepreneurship education research, entrepreneurship is seen as a behavioral and social phenomenon that occurs in different contexts through experiential learning [33]. Therefore, we suggest that symbolic interactionism should be widely used in entrepreneurship education.

The use of symbolic interactionism as a theoretical framework in this study considers three main aspects.

First, symbolic interactionism has an element of its own that can focus on the self, society, and the environment. A combination of these elements can be revealed from the mind and self through a psychological lens and broadly from the society and environment through a sociological lens [35]. Accordingly, students, faculty, and institutions are vital stakeholders in the entrepreneurship education framework. The involvement of key stakeholders means that entrepreneurship cannot be isolated from the broader context, which means that continuous learning is facilitated by the interaction between the stakeholders and others [36]. According to Carrier, universities and teachers need to examine and reflect on what to teach, how to teach it, and how to create an appropriate educational environment [37]. To some extent, this theory fits with our research perspective.

Second, interactionists insist that teachers and students should share the same primary goals. Divergence should be addressed in teacher–student interactions to increase the possibility of cooperation for meaningful learning [38]. In this study, according to the concept of “looking-glass-self” [39], CCS is a mirror of teacher–student interaction, through which everyone can see their social roles [40]. This interaction requires the active and cooperative participation of teachers and students. More importantly, in co-creation, students understand and interpret the surrounding environment and choose, evaluate, and regulate their behavior through symbolic communication, thus developing the self [41].

Third, a central feature of symbolic interactionism is that reality is set to unfold from ongoing and daily social interactions [34]. From a symbolic interactionism perspective, interactivity implies that nothing is static or immutable and that emergence is an ongoing phenomenon [42]. Thus, our initiative here on the MSEE concept in terms of sustainable development can undoubtedly contribute to solving the critical issues related to social service, the health system, and human health through the innovation, persistence, and sustainable outcomes associated with entrepreneurship.

3. Literature Review

3.1. Teacher Entrepreneurship

Teacher entrepreneurship is often associated with social entrepreneurship, mainly because teacher entrepreneurs are not individuals concerned with material benefits but individuals concerned with positive social change [24,43,44]. Chand states that teacher entrepreneurship focuses on creating social value and should consider student development, community health, and more effective public service delivery [45]. In educational contexts, teachers do not pay attention to teaching entrepreneurship or new business management courses but are more likely to introduce entrepreneurial behaviors into the
classroom [46], integrate innovative ideas into teaching methods to address pedagogical gaps [47,48], and establish networking and entrepreneurial learning cultures within their educational institutions [49,50]. Eyal and Inbar identify the importance of entrepreneurial behavior in the education system [51]. Davis creates the term “teacher entrepreneur” to refer to teachers who engage in cross-classroom partnerships to achieve common goals and create beneficial learning opportunities for students [20]. Today, teachers are not only knowledge creators, they are also expected to play the role of entrepreneurs [52].

It is crucial to understand and measure the difference between teacher entrepreneurship and enterprise entrepreneurship in the educational context. Teacher entrepreneurship is oriented by student development rather than benefit, which implies that teachers engage in entrepreneurial behavior in their educational activities in order to sustain the entrepreneurial learning process of students and enhance the development of their entrepreneurial skills [19]. Therefore, research should emphasize who teachers are and what competence they ensure can be transferred to students [19]. Meanwhile, entrepreneurship is generally studied through a competence-based approach [53]. Entrepreneurial competence is based on the assumption that professionals can develop the core competence related to entrepreneurial success, and teachers are faced with the task of meeting the needs of students in a changing environment [23]. Therefore, the teachers’ entrepreneurship is inextricably linked to their entrepreneurial competence and entrepreneurial behaviors [23].

3.2. Co-Creation Strategy

In entrepreneurship education, co-creation is considered to be a new strategy for entrepreneurship pedagogy, an experiential approach that can lead to a greater understanding of project-based learning experiences [54,55]. Although entrepreneurship can be taught, it cannot be taught as a traditional academic subject [56]. Didactic teaching does not engage students in any tasks, activities, and projects, nor does it allow them to gain real-life experience, as a result of which students fail to acquire critical skills and competence for entrepreneurship [57]. Therefore, some scholars have proposed strategies for innovative entrepreneurship pedagogy in the form, for example, of collaborative innovation and co-creation activities [58]. Indeed, in higher education, there is a growing interest in the research and practice of “students as partners” and co-creation in learning and teaching [59–61].

According to Bovill et al., co-creation advocates close cooperation between students and teachers and emphasizes the relationship of trust, respect, mutual benefit, and symbiosis between both parties [62]. Teachers benefit from co-creation because the quality of instructional design, practice, and education can be improved through interaction with students [60], while in the students self-learning and development are promoted through active engagement, experience, and interaction [63]. For teachers and students, this relationship does not necessarily aim at entrepreneurship but can be a partnership. Therefore, Du et al. work on the traditional cultivation model and propose the teacher–student co-entrepreneurship cultivation model, which refers to collaborative innovation or collaborative entrepreneurship between teachers and students [64]. Although there have been studies focusing on the interaction between teachers and students in the entrepreneurship process [65], at present the focus on co-creation is relatively scarce in entrepreneurship education and research.

3.3. Medical Student Entrepreneurship Education

The Brundtland Commission defines sustainable development as that which is seeking to meet the needs and aspirations of the present without compromising the ability to meet those of the future [66]. In essence, sustainable development is a process of change that enhances the current and future potential to meet the needs and aspirations of humans. Countries belonging to the United Nations have committed to working on the 17 goals of the 2030 Agenda of Sustainable Development Goals [67], i.e., the social
sustainable development goals. It has been realized that education for sustainable development is irreplaceable in the university setting [68]. The mission of medical universities should be to train a new generation of physician–innovators because medical students, especially future physicians, are in the front line of achieving sustainable development goals [69]. In contrast to individual sustainable development goals, for those prepared to become a future physician–innovator social sustainable development goals are those that concern the health and well-being of humanity. In fact, we deem that individual and social sustainable development goals are syncretic. The former is the basis for the realization of the latter. Only on the basis of self-development can individuals finally promote the realization of social sustainable development goals.

At the same time, scholars have realized that entrepreneurship education can contribute to sustainable development [70]. The core of their debate on entrepreneurship education and research has also shifted to social and sustainable entrepreneurship [71]. Abrahamsson argues that sustainable entrepreneurship is used to address social and environmental sustainability issues, including poverty, health, education, climate change, ecosystems, and social stability [72]. Academics have also focused on this point, arguing that sustainable development should be integrated into entrepreneurship education systems. Sustainability is implemented and promoted through entrepreneurship teaching, programs, and practices [73,74]. Entrepreneurship education promoting future sustainable development is an interdisciplinary task.

What can be confirmed is that traditional education struggles to meet the sustainability of medical students and society. Rubino and Freshman indicate that integrating entrepreneurship and innovation into the undergraduate medical curriculum and enabling students to learn and practice entrepreneurship could advance academic research, encourage health startups, and enhance students’ learning and future work [1]. When innovation and entrepreneurship programs are integrated into medical education, students’ creativity and innovative ideas can be stimulated and translated into product/device, business, health policy, or system-wide improvements [3]. Developing the competence of medical students in innovation and entrepreneurship is critical to healthcare innovation, especially in clinical practice [75]. On the basis of the definition of sustainable development by the Brundtland Commission and the existing literature on medical student entrepreneurship, in this study MSEE is defined in terms of a broad sense that refers to the integration of entrepreneurial teaching, programs, and practices into medical education to equip medical students with innovative and entrepreneurial competence and attributes for becoming physician–innovators in their professional setting even if they do not start a business. What it advocates is not rushing medical students into solving medical problems in the present but instead helping them to acquire particular innovative and entrepreneurial competence and attributes in the process of entrepreneurship education and practice in order to respond to long-term sustainable development concerns related to human health and well-being through the ongoing medical-related outcomes in their future work.

4. Hypotheses Development

4.1. Teachers’ Entrepreneurial Competence and Medical Student Entrepreneurship Education

In teaching contexts, TEC is commonly understood as the preparedness of teachers to develop, sustain, and guide students in the entrepreneurial learning processes [23,76,77], including innovation, risk-taking, planning, and leading actions that involve creativity and innovative approaches [19]. TEC largely determines the outcomes of entrepreneurship education [78]. Peltonen argues that TEC is the ability to apply pedagogical approaches that encourage and enhance the entrepreneurial skills of students [19]. According to Huang et al., TEC refers to the comprehensive qualities of the attitude, knowledge, and skills required to successfully complete relevant work in the context of entrepreneurship education [79]. Research has shown that the positive attitude of teachers towards classroom learning helps to increase students’ participation in classroom learning.
According to Peltonen, entrepreneurial competence and a positive attitude toward entrepreneurship in teachers are prerequisites for improving students' entrepreneurial learning [81]. According to Joensuu-Salo et al. [82], TEC is important when cultivating entrepreneurial competence in students and affects how teachers encourage students to develop entrepreneurial competence. Wiek et al. argue that the relationship between sustainability and entrepreneurship education is demonstrated by the fact that sustainability competence can be developed at the individual level [83]. Competence and more profound knowledge are the key factors constituting sustainable entrepreneurship [84,85]. Therefore, we argue that TEC is not an innate attribute of teachers but derives from the continuous learning and construction of the social role as an entrepreneurship educator, which manifests in innovate teaching thinking and methods for maintaining student entrepreneurship for sustainability. Accordingly, we propose the following hypothesis:

**Hypothesis 1 (H1).** TEC directly and significantly affects MSEE.

### 4.2. Teachers’ Entrepreneurial Behaviors and Medical Student Entrepreneurship Education

Ho et al. synthesize the existing literature to describe TEB as a broad term encompassing attributes and competencies such as innovation, autonomy, risk-taking, management, and the seeking of external resources [86]. Van Dam et al. argue that TEB can be the means and funds to identify new opportunities for growth in the environment, to design exciting classroom projects, and to locate the tools students need [23]. TEB is generally expected to improve education quality in schools to match the dynamic nature of organizations and markets, thus improving the quality and preparedness of students for the labor market [23]. University teachers and researchers have the attributes of entrepreneurs or potential entrepreneurs because their entrepreneurial behavior is based on sustainability [87]. Martin et al. argue that teaching entrepreneurship is a more positive and innovative phenomenon and that teachers can improve the quality of education [88]. Mindt and Rieckmann suggest a commitment to sustainable entrepreneurship pedagogy in contemporary higher education [74]. Studies have shown that teachers can improve the entrepreneurial competence of students by transforming entrepreneurship ideas and entrepreneurial behavior into pedagogical practice [49,89]. At the same time, entrepreneurs with prior experience can better access and allocate resources [90] and identify and exploit more opportunities for innovation [91]. Although students do not have specific entrepreneurial experience, if their teachers have entrepreneurial experience, students will naturally hear, see, or feel entrepreneurship more often and refine, improve, and add to their acquired experiential knowledge through utilization-based learning, thereby enhancing their entrepreneurial competence [92]. We believe that if the aim is to promote the sustainable development of the students, then TEB is inseparable from its pedagogical and entrepreneurial practice. Accordingly, we propose the following hypothesis:

**Hypothesis 2 (H2).** TEB directly and significantly affects MSEE.

### 4.3. Mediating Effect of Co-Creation Strategy

According to the principles of symbolic interactionism, co-creation is based on trust, where both the teachers and the students perceive each other as being able to have a stable relationship in the long term, where both can respond positively to each other’s contributions, and where both can consciously and voluntarily act beyond their roles. On the one hand, co-creation lies in the teachers’ sense of identification with the idea, and it is on the basis of that identification that teachers develop the willingness to generate co-creation [59], which motivates them to impart knowledge, experience, and skills to their students. On the other hand, a good and appropriate level of interaction of the students with the organization is considered essential to their overall satisfaction with the knowledge they gain in online and face-to-face courses [93]. Students have unique perspectives on teaching and need to be invited to share their perspectives in the educational process and actively participate in the training process in order to achieve better learning outcomes, develop thinking skills and creativity, enrich the concept of understanding, and create
knowledge and new educational processes [94,95]. Through the co-creation process, students will develop their different creative abilities and analytical and convergent skills and will combine the synergy between divergent and convergent thinking [96]. In short, the better the teacher–student interactions, the more satisfied students are with the whole process and the more motivated they will be about entrepreneurship. There is growing evidence of the benefits of co-creation in learning and teaching [97]. Co-creation can improve students’ academic performance or work quality and improve their competence for future professional development in terms, for example, of the skills of teamwork, critical reflection, and communication [98,99]. Additionally, teacher–student interactions are critical to developing students’ academic self-concept and enhancing their motivation and achievement [100]. Academic confidence is significantly higher among students who frequently communicate with teachers outside the classroom and receive suggestions for educational programs [101]. Accordingly, we propose the following hypotheses:

**Hypothesis 3 (H3).** CCS mediates the relationship between TEC and MSEE.

**Hypothesis 4 (H4).** CCS mediates the relationship between TEB and MSEE.

Symbolic interactionism helped to construct a theoretical model (Figure 1) containing four variables: (1) TEC and (2) TEB as independent variables, (3) CCS as a mediating variable, and (4) MSEE as a dependent variable. The model incorporated all four of these hypotheses simultaneously. In addition, our theoretical model validated and extended the application of symbolic interactionism in entrepreneurship education.

![Figure 1. Theoretical model of MSEE.](image)

5. **Method**

5.1. **Sample and Data Source**

We adopted a random sampling method and invited 744 teachers in entrepreneurship education from Chinese medical universities to participate in our survey in September and October of 2018 through an electronic questionnaire. After eliminating invalid questionnaires, a final valid sample of 714 (effective rate of 95.97%) was harvested. It should be noted that the types of teachers in entrepreneurship education in Chinese medical universities are diverse and that they have backgrounds in different disciplines, such as education, sociology, management, and economics. Therefore, the objects of this survey were those teachers who taught entrepreneurship courses, guided innovation and entrepreneurship programs, and engaged in entrepreneurship education research and organizational management, and the teachers had a common feature: all of them delivered entrepreneurship courses or practice for medical students. The first page of the questionnaire introduced the purpose and content of the survey and promised to keep the content of the data confidential. The survey was anonymous, did not include sensitive questions, and was conducted in accordance with the Declaration of Helsinki. All the participants...
were informed and gave their consent to participate in the study. All the teachers participated voluntarily and had the right to withdraw from the survey at any time.

5.2. Measurement

A self-designed questionnaire was used in this study. The questionnaire was developed on the basis of existing domestic and international literature and methods. After evaluation by more than 20 experts in the field and online pilot testing, it was distributed to different medical universities. In addition to investigating the demographic information of the teachers, such as gender, age, title, and years of work experience, the questionnaire included four scales: TEC, TEB, CCS, and MSEE. These four scales included 21 questions to measure the teachers’ entrepreneurial competence, the teachers’ entrepreneurial behaviors, the co-creation strategy, and the medical students’ entrepreneurship education. The teachers were asked to assess how accurately these items described them on a five-point Likert scale (from “I totally disagree” to “I totally agree”).

Using 8 items, the TEC scale examined three main components of entrepreneurial competence based on personality and intelligence typology: attitudes (affective component), self-beliefs (conative component), and knowledge and skills (cognitive component) [19]. On the basis of existing research, according to which TEB is related to the discipline, the classroom, or entrepreneurship [23,89,102,103], the TEB scale measured the teachers’ pedagogy and entrepreneurial practices using 7 items. On the basis of the analysis of co-creation by Cook-Sather et al. and Bovill et al. in education [60,62], the CCS scale measured teacher–student co-creation in academic entrepreneurship (experiments, papers, patents, etc.), innovative and entrepreneurial activities, and entrepreneurship programs using 3 items. The MSEE scale measured the promotion and enhancement of medical student entrepreneurship in 3 dimensions: entrepreneurship program effectiveness [73], academic entrepreneurship achievements [104], and innovative and entrepreneurial competence [83]. Table 1 displays the items in each scale and their sources.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Indicators</th>
<th>Mean (SD)</th>
<th>Factor Load</th>
<th>Cum. Interpretation Rate (After Rotation)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC</td>
<td>I generally agree to entrepreneurship education</td>
<td>3.88 (0.032)</td>
<td>0.702</td>
<td>[19,76,77]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have tough entrepreneurial will</td>
<td>3.98 (0.031)</td>
<td>0.818</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have strong entrepreneurial spirit</td>
<td>4.06 (0.032)</td>
<td>0.839</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have strong teaching knowledge and skills</td>
<td>4.01 (0.032)</td>
<td>0.610</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have strong entrepreneurial knowledge and practical skills</td>
<td>4.13 (0.031)</td>
<td>0.785</td>
<td>36.370</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have strong entrepreneurial opportunity identification skills</td>
<td>4.12 (0.031)</td>
<td>0.795</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I have strong entrepreneurial opportunity development skills</td>
<td>4.07 (0.032)</td>
<td>0.801</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I’m knowledgeable and skilled in risk management and program operations</td>
<td>4.11 (0.031)</td>
<td>0.776</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I take initiatives to integrate entrepreneurship into teaching processes</td>
<td>4.15 (0.030)</td>
<td>0.654</td>
<td>65.628</td>
<td>[89,102,103,105,106]</td>
</tr>
<tr>
<td></td>
<td>I focus on active learning and experiential learning teaching methods</td>
<td>4.15 (0.029)</td>
<td>0.712</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEB</td>
<td>I take initiatives to integrate entrepreneurship into teaching processes</td>
<td>4.15 (0.030)</td>
<td>0.654</td>
<td>65.628</td>
<td>[89,102,103,105,106]</td>
</tr>
</tbody>
</table>
I place emphasis on theoretical and practical research on innovation and entrepreneurship education 4.14 (0.029) 0.771
I carry out temporary training in SMEs 3.94 (0.032) 0.712
I have experience in entrepreneurship 3.95 (0.029) 0.759
I join in a province-wide or national community network of entrepreneurial teachers 3.98 (0.029) 0.781
I participate in various off-campus entrepreneurial mentor training projects 3.78 (0.033) 0.546
Co-creation strategy in innovative academic entrepreneurship (experiments, papers and patents, etc.) 3.88 (0.033) 0.925

<table>
<thead>
<tr>
<th>CCS</th>
<th>Co-creation strategy in innovative and entrepreneurial activities</th>
<th>3.82 (0.034)</th>
<th>0.878</th>
<th>82.787</th>
<th>[60,62]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Co-creation strategy in research and entrepreneurial programs</td>
<td>3.87 (0.033)</td>
<td>0.926</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I can help in the promotion and enhancement of students’ entrepreneurship programs</td>
<td>3.95 (0.029)</td>
<td>0.923</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSEE</td>
<td>I can help in the promotion and enhancement of students’ academic entrepreneurship achievements</td>
<td>3.98 (0.029)</td>
<td>0.926</td>
<td>83.720</td>
<td>[73,83,104]</td>
</tr>
<tr>
<td></td>
<td>I can help in the promotion and enhancement of students’ innovative and entrepreneurial competence</td>
<td>4.11 (0.029)</td>
<td>0.895</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3. Descriptive Statistical Analysis

The study sample consisted of 258 male teachers and 456 female teachers. Among them, 273 (38.2%) were teachers aged 30 or younger, 193 (27.0%) were aged 31 to 35, 144 (20.1%) were aged 36 to 40, and 104 (14.5%) were aged 41 or older. The age structure of the teachers reflected the youthfulness of the faculty engaged in entrepreneurship education in China. At the same time, more than half of these teachers had a master’s degree (57.8%), 17.9% had a PhD degree, and 14.7% had a bachelor’s degree. In terms of titles, the most significant number of teachers had intermediate titles (37.9%), only a few had senior titles (8.4%), and the others had junior titles (17.2%) and associate professor titles (16.9%). Nearly 20% of them had no titles. This suggested that faculty members with higher titles are less likely to be involved in entrepreneurship education. Finally, we also examined their years of work experience and found that the overall length of service of the faculty involved in entrepreneurship education was low. In all, 42.8% had been working for 2 years or less, 25.2% had been working for 3 to 5 years, and 15.4% had been working for 6 to 9 years. The percentage of them with 10 years or more of work experience in entrepreneurship education was only 16.5%. Through the above data analysis, we found that a weak faculty was one of the severe problems in current entrepreneurship education at Chinese medical universities.

We conducted descriptive statistics on four scales. The statistical results showed that the mean value of the TEC scale ranged between 3.88 and 4.13, with the lowest score for the item “I generally agree to entrepreneurship education” and the highest score for the item “I have strong entrepreneurial knowledge and practical skills”. The mean value of the TEB scale ranged from 3.78 to 4.15, and the item “I participate in various off-campus entrepreneurial mentor training projects” had the lowest score, while the items “I take initiatives to integrate entrepreneurship into teaching processes” and “I focus on active learning and experiential learning teaching methods” had the highest scores. The mean value of the CCS scale ranged from 3.82 to 3.88, with the lowest score for the item “Co-
creation strategy in innovative and entrepreneurial activities” and the highest score for the item “Co-creation strategy in innovative academic entrepreneurship (experiments, papers and patents, etc.)”. The mean value of the MSEE scale ranged from 3.95 to 4.11, and the item “I can help in promotion and enhancement of students’ entrepreneurship programs” had the lowest score. In contrast, the item “I can help in promotion and enhancement of students’ innovative and entrepreneurial competence” scored the highest. Overall, the mean scores for each scale were not significantly different, while the scale of CCS had the lowest score, indicating that teacher–student co-creation in innovation and entrepreneurship underperformed at Chinese medical universities. In contrast, the scale of TEB had an enormous disparity among the items, reflecting uneven entrepreneurial behaviors among Chinese teachers.

6. Results
6.1. Validity and Reliability

To test the reliability and validity of the scales involved in this study, we used SPSS 26.0 software (Table 2). The reliability test results showed that the Cronbach’s alpha values for all the variables were more significant than 0.8, which indicated that the scales were reliable. For the validity testing, we conducted exploratory factor analysis and confirmatory factor analysis. Different variables reflect different dimensions of the theoretical model; so, we conducted factor analysis for the independent, mediating, and dependent variables, respectively. The results showed that the Kaiser–Meyer–Olkin (KMO) of each variable was more significant than 0.7. The independent variables can be divided into two variables, TEC and TEB, with a cumulative variance interpretation rate of 36.370% and 65.628%, respectively. The cumulative variance interpretation rate of the mediating variable CCS was 82.787%, and the cumulative variance interpretation rate of the dependent variable MSEE was 83.720%. Composite reliability (CR) and average variance extracted (AVE) were calculated by factor loading, and the results showed that the CR values were more significant than 0.8 and the AVE values were greater than 0.5, which showed that the scales had good convergent validity. The above analysis indicated that the validity of the scales used in this study was good and that the variable dimensions were reasonably divided.

Table 2. Reliability and validity test results.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach’s Alpha</th>
<th>KMO</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC</td>
<td>0.936</td>
<td>0.909</td>
<td>0.9198</td>
<td>0.5912</td>
</tr>
<tr>
<td>TEB</td>
<td>0.882</td>
<td>0.906</td>
<td>0.875</td>
<td>0.5029</td>
</tr>
<tr>
<td>CCS</td>
<td>0.896</td>
<td>0.733</td>
<td>0.9352</td>
<td>0.828</td>
</tr>
<tr>
<td>MSEE</td>
<td>0.903</td>
<td>0.746</td>
<td>0.9389</td>
<td>0.8368</td>
</tr>
</tbody>
</table>

6.2. Correlation

Before conducting the model test, we performed a Pearson correlation analysis for each variable (Table 3). The analysis results showed there was no correlation between TEC and TEB, indicating that TEC and TEB were two independent variables. CCS and TEB (p < 0.01) and TEC (p < 0.01) showed positive correlations, while MSEE and all the other variables (p < 0.01) were positively correlated, which formed the basis for further analysis.

Table 3. Pearson correlation between the variables (n = 714).

<table>
<thead>
<tr>
<th></th>
<th>TEC</th>
<th>TEB</th>
<th>CCS</th>
<th>MSEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC</td>
<td>-</td>
<td>-0.011</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TEB</td>
<td>0.196 ***</td>
<td>0.511 ***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CCS</td>
<td>0.297 ***</td>
<td>0.550 ***</td>
<td>0.657 ***</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Double-tailed significance. * p < 0.1, ** p < 0.05, *** p < 0.01.
6.3. Model testing

According to Baron and Kenny’s mediation model testing process [107], we tested three models: (1) the relationship between TEC, TEB, and MSEE, namely the direct effects model (Model 1); (2) the relationship between TEC, TEB, and CCS (Model 2); and (3) the relationship between TEC, TEB, and MSEE, based on the mediating role of CCS (Model 3). Table 4 displays the model test results. On the basis of the model test results, we calculated the proportion of mediating effects of the two independent variables on the dependent variable under the influence of CCS (Table 4).

### Table 4. Mediating effect of CCS (n = 714).

<table>
<thead>
<tr>
<th></th>
<th>MSEE Model 1</th>
<th>CCS Model 2</th>
<th>MSEE Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC</td>
<td>0.298 (10.247 ***)</td>
<td>0.192 (6.134 ***)</td>
<td>0.211 (8.095 ***)</td>
</tr>
<tr>
<td>TEB</td>
<td>0.555 (19.066 ***)</td>
<td>0.517 (16.528 ***)</td>
<td>0.321 (10.713 ***)</td>
</tr>
<tr>
<td>CCS</td>
<td></td>
<td></td>
<td>0.453 (14.858 ***)</td>
</tr>
<tr>
<td>R²</td>
<td>0.397</td>
<td>0.304</td>
<td>0.540</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.396</td>
<td>0.302</td>
<td>0.538</td>
</tr>
<tr>
<td>F</td>
<td>234.256 ***</td>
<td>155.405 ***</td>
<td>128.383 ***</td>
</tr>
</tbody>
</table>

Note: Double-tailed significance. * p < 0.1, ** p < 0.05, *** p < 0.01.

Firstly, we identified the direct effect of the two independent variables (TEC and TEB) on the dependent variable (MSEE) by Equation (1). As per the results, both TEC and TEB had a significant direct effect on MSEE. The significant coefficient of TEC on MSEE was 0.298 (p < 0.01), and the significant coefficient of TEB on MSEE was 0.555 (p < 0.01). This provided a basis for calculating the proportion of the mediating effects. Therefore, hypotheses 1 and 2 were supported.

\[
Y = cX + e_1
\]  

(1)

Then, we tested the effect of the two independent variables (TEC and TEB) on the mediating variable (CCS) according to Equation (2). The results showed that the effects of both TEC and TEB on CCS were significant. The significant coefficient of TEC on CCS was 0.192 (p < 0.01), and the significant coefficient of TEB on CCS was 0.517 (p < 0.01). In Model 2, if an independent variable is not significant for the dependent variable, there is no mediating path for that variable. Therefore, the result provided the basis for conducting the final mediating model test.

\[
M = aX + e_2
\]  

(2)

Finally, we tested the mediating model of this study (Model 3) according to Equation (3). Specifically, we tested the effect of the two independent variables (TEC and TEB) on the dependent variable (MSEE) under the effect of the mediating variable (CCS). The mediating model showed that the effects of both independent variables (TEC and TEB) and the mediating variable (CCS) on the dependent variable (MSEE) were significant. In particular, the path coefficient of TEC on MSEE (c') was 0.211 (p < 0.01); the path coefficient of TEB on MSEE (c') was 0.321 (p < 0.01); and the path coefficient of CCS on MSEE (b) was 0.453 (p < 0.01). It can be concluded that a mediation effect exists and that the model was a partial mediation model. Therefore, hypotheses 3 and 4 were supported. Figure 2 presents the model.

\[
Y = c'X + bM + e_3
\]  

(3)
As demonstrated in Table 5, we derived the proportion of the mediating effects for the two mediated paths. Specifically, the mediating effect of the CCS on TEC to MSEE path accounted for 29.195%. Furthermore, on the path of TEB to MSEE, the mediating effect of CCS accounted for 42.162%.

### Table 5. Mediating effect size of CCS.

<table>
<thead>
<tr>
<th>Inspection Conclusion</th>
<th>c Total Effect</th>
<th>a × b Mediating Effect</th>
<th>c’ Direct Effect</th>
<th>Formula for Proportion of Effect</th>
<th>Proportion of Mediating Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEC→CCS→MSEE</td>
<td>0.298</td>
<td>0.087</td>
<td>0.211</td>
<td>a × b/c</td>
<td>29.195%</td>
</tr>
<tr>
<td>TEB→CCS→MSEE</td>
<td>0.555</td>
<td>0.234</td>
<td>0.321</td>
<td>a × b/c</td>
<td>42.162%</td>
</tr>
</tbody>
</table>

7. Discussion

The findings verified a statistically direct effect of TEC and TEB on MSEE, as indicated by the teacher self-reports. This is in line with recent findings regarding the driving effect of teacher creativity on student creativity [108,109]. The findings are consistent with Kirkley’s [110], whose semi-structured interviews in 10 secondary schools in New Zealand revealed that teachers who practice “entrepreneurship” in their teaching as entrepreneurial coaches, mentors, and facilitators have a positive impact on students’ learning engagement (including achievement, behavior, and attitude). Furthermore, Halberstadt et al. found that the teachers’ competence and behaviors are essential enablers of sustainable entrepreneurship and the development of future sustainable entrepreneurs [111].

Edokpolor asserted that entrepreneurship education in universities makes a contribution to sustainable development and is a driving force for future achievements of human well-being, resilience, and freedom [112]. Audretsch and Caiazza supported the assertion arguing that entrepreneurial education is a way to achieve sustainable development by making entrepreneurial skills acquisition a requirement of the individual [113]. We therefore assert that MSEE contributes to the achievement of the future sustainable development goals by fostering the entrepreneurial competence of medical students. In this study, it was shown that TEC and TEB can be important means for developing the entrepreneurial competence of medical students which is from MSEE. The findings align with those of San-Martin et al. [114], who demonstrated the role of teachers as role models in improving students’ entrepreneurial competence. It is worth noting that their study was conducted with students from a Spanish university specializing in economics and management, while our study focused on medical students. In the medical field, the influence of teachers as role models on students has been shown to exist [115]. As argued
by Van Dam et al. [23], TEB is effective for entrepreneurship among students because, on the one hand, they are expected to play the role of entrepreneurs in the classroom. When teachers play the role of entrepreneurs, they become more than mere transmitters of knowledge and are also role models who encourage students to implement entrepreneurial behaviors [19]. On the other hand, they proactively scan the environment for new developments in designing classroom projects to meet the students’ present and future needs [46].

This study confirmed a mediating role of CCS between TEC, TEB, and MSEE, and the findings extended the application of symbolic interactionism in entrepreneurship education. Our findings echo the results of previous research, according to which interactive teaching and learning methods, such as collaborative learning, experiential learning, interdisciplinary learning, and active learning, can meet the competence-based needs of student entrepreneurship for sustainable development [84,111]. We believe that a student-centered experiential learning approach is not the antithesis of the traditional didactic learning approach, and in that regard, we cannot agree with Ismail et al. and Hytti and O’Gorman [116,117]. They argued that a teacher-centered approach contributes to a better understanding of entrepreneurship education compared to a student-centered approach. Symbolic interactionists have pointed to conflicting role expectations between teachers and students in the traditional entrepreneurship education model. On the one hand, students do not take the student-centered approach for granted and they urgently need theoretical guidance, but they should also be active entrepreneurial participants rather than passive recipients. On the other hand, teachers consider students as fully independent entrepreneurial agents. In this conflict, students expect educators to impart theoretical knowledge by means of a collaborative approach based on entrepreneurial programs.

Harima et al. found that the ambiguous roles shaped by the expectation gap between teachers and students (i.e., a mismatch between teachers and students in terms of orientation and expectations of each other) would cause adverse effects [118]. As a discussion for future research, they argued that rather than emphasizing a single perspective, a collaborative perspective on entrepreneurship education research is necessary. In contrast, in the existing studies, the traditional teacher-centered and student-centered approaches are both single-perspective, which would tend to create adverse effects under ambiguous roles. Our study complements the view of Harima et al. [118]. We found that the impact under the collaborative perspective is favorable and that teacher–student co-creation positively impacts medical student entrepreneurship. Therefore, we concluded that teachers and students are in a collaborative rather than an adversarial relationship. Furthermore, the study of Li et al. on entrepreneurial competitions also demonstrated the importance of teacher–student collaboration in the same program [119]. Thus, we assert that CCS in entrepreneurship education is a key element for medical students to achieve future sustainable development goals. As Lindner stated, the entrepreneurial competence that individuals possess to face social challenges develops over time, in a process that begins long before they embark on their professional careers [120]. In short, citizens who achieve future sustainable development goals are shaped by today’s learning.

8. Conclusion

In this study, MSEE prepares medical students to meet individual and social sustainable development goals through innovation and entrepreneurship teaching and practice. To test our four hypotheses, we surveyed 714 teachers involved in entrepreneurship education in Chinese medical universities. We focused on the impact of two significant elements of teacher entrepreneurship (TEC and TEB) on MSEE in a teaching context. The results proved our hypotheses that TEC and TEB have a positive and statistically significant direct impact on MSEE. In addition, on the basis of the symbolic interactionism perspective, we hypothesized that CCS could act as a critical variable with a facilitative effect on MSEE. Therefore, we investigated CCS and its relationship with TEC, TEB, and MSEE. The results showed that TEC and TEB have a statistically significant indirect effect on MSEE when CCS is added as a mediating
variable. As a result, all four hypotheses of this study are supported, which provides an essential basis for promoting the sustainable development of medical student entrepreneurship. The findings are expected to provide theoretical and practical references for promoting the sustainable development of medical student entrepreneurship in other countries, especially in developing countries.

Firstly, the findings of this study contribute to the theory. This study provides the first empirical evidence of the impact of TEC and TEB on MSEE and provides new perspectives to deepen the research on MSEE. The integration of medical student entrepreneurship and sustainability is a new research field. According to Edmondson and McManus [121], the development of a new field will be accompanied by some empirical studies based on variance models, hypothesis testing, and field investigations. This study not only provides new empirical evidence for the further development of entrepreneurship education and research but also contributes to the interdisciplinary study of entrepreneurship education and medical education. For the first time, a study, i.e., our study, has explored the vital role of teacher entrepreneurship in medical education, filling a gap in the field of teacher entrepreneurship in medical education. The findings may lay the foundation for studying how teacher entrepreneurship can contribute to the sustainability of medical education. Moreover, this study confirms that CCS is a crucial mediator between TEC, TEB, and MSEE; it verifies and expands the application of symbolic interactionism in entrepreneurship education and enriches the theoretical foundation of entrepreneurship education research.

Secondly, this study provides practical implications for entrepreneurial learning and pedagogical practices in medical education in order to improve the sustainable development of medical students. All stakeholders, particularly those within the faculties of the medical universities, must be aware of and agree that integrating innovation and entrepreneurship into medical education offers a promising approach to educating future physicians to do more in addressing public health and social issues [122]. They need to be thinking about what entrepreneurship education in medical education should look like and how it should be taught. This study will guide teachers in entrepreneurship education at medical universities to reflect on and update their pedagogical practices.

On the one hand, the findings reveal that both TEC and TEB are important factors affecting MSEE. Therefore, we strongly recommend that, based on the teacher entrepreneurship perspective, teachers should have a comprehensive understanding of and a positive attitude toward entrepreneurship education [19] and develop their entrepreneurial competence [77] and related entrepreneurial behaviors [33] in the teaching process, such as committing to a sustainable entrepreneurial teaching approach [74], encouraging students to actively embrace experience-based sustainable entrepreneurship [87] in their preparations for becoming physicians in the future, and addressing sustainability challenges in society and the healthcare system. At the same time, the administrators of medical universities should encourage and create conditions for teachers to participate in off-campus training and member networks, through which they can share entrepreneurial practice, find a role identity, and develop ownership of and deliver sustainable innovation in entrepreneurship education [123].

On the other hand, the study shows that MSEE is closely related to CCS. Our study empirically demonstrates that TEC and TEB can directly promote MSEE but CCS plays a significant mediating role. According to the symbolic interactionism, teaching and learning are complementary and CCS is a new entrepreneurial pedagogy. In the entrepreneurial learning process, teachers should link theoretical and practical meanings, recognize that theory is an important part of what is taught, and enhance creativity and interaction through relevant means. As Berliner advocated: “effective teaching is a dynamic blend in which instructional strategies are integrated with students and their needs at a given time” [124]. Therefore, teachers should not only focus on the self-development of entrepreneurial competence and entrepreneurial behaviors but also reposition their role to encourage students to engage actively and seek new learning opportunities through learning by doing and to hold students accountable for learning outcomes through such interactive and experiential learning [125]. In short, CCS is student-centered, and they are seen as self-regulated, active, creative, and responsible actors [33].
9. Limitations and Possible Research for the Future

In conclusion, this study has succeeded in achieving its objectives. However, there were some limitations that must be acknowledged and should be considered and verified in future studies. First, on the basis of the wave of “mass entrepreneurship and innovation” and the strategic need for medical innovation development in China, this study focused on medical universities, which has made the study credible but has limited its universality in the context of different nations. Therefore, we suggest that similar studies and cross-country comparisons be conducted at medical universities in other countries. Second, this study focused on the perspective of teacher entrepreneurship and presented the results through teacher-reported data. We suggest that more comprehensive studies be conducted and involve external interactions with agencies (e.g., government, enterprise, and research institutions), which are also vital forces driving MSEE. Mixed methods, such as classroom observation, student self-assessment, and experimental teaching methods, should also be considered to ensure more convincing research results. Third, the study used the aggregate variables of TEC and TEB to examine their relationship with MSEE. Indeed, more detailed studies could be conducted, including the further design of the MSEE scale. It would be exciting and meaningful to include the antecedent variables (first-order variables, such as experiential learning and interdisciplinary teaching related to sustainability) that affect MSEE for in-depth analysis.

Author Contributions: Conceptualization, G.Z. and Y.J.; data curation, G.Z. and G.L.; formal analysis, G.Z. and L.G.; methodology, G.L. and Y.H.; software, G.L. and L.G.; writing—original draft, G.Z., G.L., and Y.J.; writing—review and editing, Y.J., L.G., and Y.H.; visualization, G.Z., Y.H., and Z.H.; project administration, Z.H.; funding acquisition, Z.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the key project of the National Social Science Fund of China. (21ASH008).

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Wenzhou Medical University.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: The authors acknowledge all the participants in this study and would like to thank the editors and reviewers for their comments.

Conflicts of Interest: The authors declare no conflict of interest.

References


