Article

The Impact of Entrepreneurship Curriculum with Teaching Models on Sustainable Development of Entrepreneurial Mindset among Higher Education Students in China: The Moderating Role of the Entrepreneurial Climate at the Institution

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Abstract: There has been considerable attention on the role of entrepreneurship education and outcomes from students' sustainable development, predominantly entrepreneurial intentions. However, research has tended to overlook novel and promising, yet under-examined areas, such as the entrepreneurial mindset (EM), its link with entrepreneurship education, and the contextual factor. Drawing on social cognitive and teaching model theory, we aimed at addressing these gaps by examining the impact of entrepreneurship curriculum (EC) with different teaching models (supply, demand, competence) on EM, as well as the moderating role of the entrepreneurial climate of the higher education institution. Using a cross-sectional survey design, data were collected in 15 higher education institutions in China. A sample of 739 students were used to test our hypotheses. The results suggest that all the entrepreneurial teaching models and mindset are positively related (though the demand model is the strongest predictor). Furthermore, the results establish that the entrepreneurial climate at the institution plays a moderating role between EC and EM, though it is the strongest for the competence teaching model. This paper contributes to the theoretical conceptualization of the EC–EM relationship and the deep understanding on “how” and “when” the teaching models in EC influence EM. Our study also expanded social cognitive theory (SCT) application in the context of higher entrepreneurship education by combining and confirming educational (specific teaching models), cognitive (EM), and institutional factors (entrepreneurial climate). Our research implies that universities and entrepreneurial program developers should pay attention to the selection of the right teaching models and provide a supportive entrepreneurial climate to optimize students' EM, thus promoting their sustainable development.

Keywords: entrepreneurship education; entrepreneurship curriculum; teaching models; entrepreneurial mindset; entrepreneurial climate

1. Introduction

There has been a global growth in the field of entrepreneurship education (EE) in higher education with increasing focus on the design, development, and delivery of EE programs. The broad premise here is that university-based EE programs have the potential for facilitating a range of entrepreneurial outcomes including subjective ones, such as entrepreneurial attitudes, skills and knowledge, feasibility, and entrepreneurial intentions, and objective ones like entrepreneurial start-up behavior and business performance [1].

Despite numerous calls to advance the field [1,2], a number of research gaps persist. Firstly, while there is a huge preponderance of research on one outcome, namely entrepreneurial intentions, there is a lack of research examining the relationship between EE and other novel entrepreneurial outcomes such as the entrepreneurial mindset (EM). Indeed, following a major systematic review, Nabi et al. [1] p. 290, concluded that a ‘key knowledge gap centres on impact measures focusing on the development of the
entrepreneurial mind-set’. Generally, EM refers to cognitive structures deeper than entrepreneurial intent and different from surface-level learning of knowledge [3,4]. The foundation of EM lies in cognitive adaptability defined as the ability to be flexible and self-regulating in one’s cognitions given dynamic and uncertain task environments [5]. Adaptive cognitions are vital in the process of entrepreneurial action to achieve desirable outcomes [6]. Cui et al. [7] have recently recognized EM as a new impact indicator of EE in China. Therefore, EM is important because it would provide a more nuanced insight into how EE impacts under-examined outcomes.

Secondly, repeated EE reviews suggest the majority of past research has not specified the teaching model in sufficient detail, so it is unclear about the nature of the EE, or entrepreneurship curriculum (EC), which is claimed to be having an impact [8,9]. Moreover, in a higher education context, Nabi et al. [1] strongly argue that different types of EE teaching models or pedagogical methods provide another substantive avenue—beyond methodological reasons—to understand the contradictory findings in EE impact research. These tend to suggest that EE has a positive, negative, or neutral impact on entrepreneurial outcomes [10]. Therefore, the nature of teaching models in the EC plays an important role in understanding the differential impact on EM.

Finally, there is a distinct lack of research examining contextual reasons for contradictory findings about the impact of entrepreneurship education [1]. Although methodological designs may partially explain such findings, other substantial reasons, such as context-specific factors, may explain the impact of education on EM. For example, the entrepreneurial climate at higher education institutions—defined as ‘students’ individual perceptions of university characteristics associated with entrepreneurial activities’ [11] p. 702. This suggests a climate perspective is relevant to investigating contextual factors related to the formation of EM. An entrepreneurial climate is important because it reflects the organizational culture associated with how organization members perceive their environment [11], and it represents social context in terms of individual-perception variations of the environment, which have been shown to explain regional differences in entrepreneurial activity [12]. Thus, the entrepreneurial climate at the institution could explain the differences in students’ EM and is likely to play a significant moderating role in the EE–EM link [13].

Addressing these research gaps, the aim of our research is to examine the relationship between EE in higher education and students’ EM. In particular, this study focused on the entrepreneurship curriculum (EC), or formal entrepreneurship courses, because of our interest in different teaching models in the higher education context. Drawing on social cognitive theory [14] and a teaching model framework [1,15], we specifically focused on the direct link between EC with teaching models and EM. Secondly, we examined the extent to which this link is moderated by the entrepreneurial climate of higher education institutions. While the former examines the predictive role of EC (including different teaching models) for EM, the latter investigates the moderating role of the institutional context. Therefore, the main benefit of our conceptual framework (Figure 1) is that, for the first time, it incorporates EC and its teaching models with EM, addressing previous research calls to examine educational factors, novel impact indicators, and context-specific moderators in the impact research in entrepreneurship education [1].

This study draws on data collected from a range of higher education institutions in China. Introduced in 1989 and piloted in 2002, entrepreneurship education in China is greatly promoted by the Ministry of Education in response to a changing economic structure and unemployment [16] and to support economic development and growth [17]. However, entrepreneurship programs are not always integrated into a coherent framework in higher education, regardless of size or ranking of universities and colleges, often due to variability in the quality of curriculum design and the lack of curriculum responsiveness to local community [18]. Therefore, examining the role of entrepreneurship curriculum with teaching models and the entrepreneurial climate in the Chinese context is both timely and relevant.
2.1.1. Entrepreneurial Curriculum (EC) with Teaching Models

at higher education institutions as a broader contextual factor in the relationship between more, we then considered the additional moderating factor of the entrepreneurial climate at higher education institutions, as well as having a strong theoretical grounding in terms of philosophical and operational levels [21]. Further, Béchar and Grégoire’s [15] classification incorporates three archetypical teaching models, that is, the supply model, demand model, and competence model, which we adopted in the present study to explore the EC–EM link in more depth.

Figure 1. Conceptual framework and hypotheses.

This paper begins with a theoretical framework and hypothesis development, followed by a survey sample and measures in the Section 3. Thereafter, the analysis results of hypothesis testing are presented. In the Section 5, we explain our findings, state theoretical contributions and practical implications, and then discuss the limitations with a conclusion in the end.

2. Theoretical Hypotheses

In our research, types of teaching models [1,15] have been integrated into a broader social cognitive theory framework [14], where entrepreneurship curriculum (EC) and its teaching models are considered environmental (educational) factors, and EM is conceptualized as a personal cognitive factor (Figure 1). Central to our framework are two theoretical premises: First, that EM can be considered a key part of the process of new firm creation and a valuable impact indicator of entrepreneurship education in its own right [1]; and second, that EC in the academic learning environment can influence students’ cognition (EM) and is associated with entrepreneurial behavior [14]. In this study, however, we focused specifically on the link between EC and EM, because of our interest in the proximal perspective (the extent to which EM is related to students’ mindset towards entrepreneurship), rather than the distal perspective of starting up a business. Furthermore, we then considered the additional moderating factor of the entrepreneurial climate at higher education institutions as a broader contextual factor in the relationship between educational environment (EC) and cognition (EM).

2.1. Concepts of Entrepreneurial Curriculum and Entrepreneurial Mindset

2.1.1. Entrepreneurial Curriculum (EC) with Teaching Models

Entrepreneurship curriculum reflects any teaching or pedagogical method infusing entrepreneurship into education to facilitate students’ knowledge, skills, attitudes, and competencies [19,20]. In this sense, EC can be looked at as a generic overarching concept. However, on the other hand, given the paucity of EC research on EM, and even less on the link to specific types of EC, it becomes critical to examine different types of teaching models in entrepreneurial curricula to understand the nature and role of different models.

Although a range of different classifications exist in the literature, we adopted [15] classification of teaching models because it is widely accepted as one of the most comprehensive approaches in the area of entrepreneurship, with particular relevance to curriculum in higher education, as well as having a strong theoretical grounding in terms of philosophical and operational levels [21]. Further, Béchar and Grégoire’s [15] classification incorporates three archetypical teaching models, that is, the supply model, demand model, and competence model, which we adopted in the present study to explore the EC–EM link in more depth.
The supply model relates to the behaviorist paradigm, emphasizing the facilitator imparting entrepreneurship knowledge and information to the learner. The demand model relates to the subjectivist paradigm in relation to meeting the personal knowledge needs of students through individual exploration, reflection, and portfolios to develop relevant skills and knowledge. The competence model emphasizes an interactionist paradigm where the focus is on higher order thinking to solve problems in real life entrepreneurship scenarios [15].

2.1.2. Entrepreneurial Mindset (EM)

McGrath and MacMillan [22] (p. 32) define EM as ‘the ability to sense, act, and mobilize under uncertain conditions’, whereas Ireland, Hitt, and Sirmon’s [23] (p. 968) define it as ‘a growth-oriented perspective through which individuals promote flexibility, creativity, continuous innovation, and renewal’. Although different definitions exist, Naumann’s [24] comparison of eight EM definitions suggests that they were more or less similar to each other in terms of emphasizing a cognitive perspective being strongly associated with the ways of thinking or acting.

Moreover, whilst some scholars conceive EM as a single dimension [25], others divide EM into multiple dimensions. For example, McMullen and Kier [26] proposed four distinct mindset dimensions (regulatory focus, action phase mindset, deliberative mindset, and implemental mindset) and found their joint influence was associated with goal pursuit. In addition, Davis et al. [27] developed the entrepreneurial mindset scale with two broad areas (personality traits and skills) constituted of 14 dimensions with 72 items. Further, based on previous literature, Cui et al. [7] proposed four cognitive elements of EM such as alertness to opportunities, risk propensity, ambiguity tolerance, and dispositional optimism that are internally connected, and verified that these key components of EM are impacted by entrepreneurial education.

The cognitive aspect is one of the important dimensions in Kuratko et al.’s [28] classification of EM aspects. Since this study focused on the cognitive perspective rather than other perspectives of EM, and since we wanted to use less dimensions and items in the measurement of EM, the present research adopted a multidimensional approach to EM with four subdimensions based on Cui et al.’s [7] work.

2.1.3. Relevance of EM as an Impact Indicator of Entrepreneurship Curriculum

Although research into the impact of entrepreneurship education including curriculum examines various types of impact, such as entrepreneurial attitude, knowledge and skills, and feasibility, impact indicators are still dominated by entrepreneurial intention based on Ajzen’s [29] theory of planned behavior and Shapero and Sokol’s [30] entrepreneurial event model. As indicated earlier, there is a case for investigating alternative impact indicators [1]. Theoretically, EM can be enhanced through training, learning, and practice due to its metacognitive nature [31,32], and can be moved from a novice mindset toward a more expert mindset changing through transformative learning and critical developmental experiences [3], which are often present in university-based entrepreneurship programs. Therefore, EM is malleable and reflects cognitive structures that can be taught and shaped through education and training, hence its utilization as an impact indicator of entrepreneurship curriculum in higher education in this study.

The practical importance of EM in higher education has also recently increased because instilling an EM has several potential benefits, such as benefits at the individual level (e.g., student cognitive development), pedagogic level (e.g., driving pedagogic changes to be more mindset orientated), social level (e.g., start-ups), and national level (e.g., economic development) [4,33]. Therefore, EM is a theoretically and practically relevant impact indicator of entrepreneurship curriculum in higher education.
2.2. Social Cognitive Theory Underpinning the Impact of Entrepreneurship Curriculum on EM

Bandura’s [34,35] social cognitive theory (SCT) suggests human functioning as the interaction between environmental factors, personal factors, and behavior. While environmental factors reflect external environments that affect individual cognition and further produce behavior, personal factors refer to cognitive or other internal characteristics that can cause individual perception, cognition, and thinking. SCT is relevant to understanding the impact of entrepreneurship curriculum because it explains the relationship between educational environments and personal characteristics from the perspective of cognitive psychology. Grounded by SCT, Winkler’s [14] framework incorporates the triadic relationship in human functioning within entrepreneurship education between the environment, cognition, and behavior. Winkler identifies academic curricula and related pedagogical methods as educational environment variables; and entrepreneurial self-efficacy, intent, and self-regulation as cognitive variables. Similarly, other recent work also uses SCT to study the impact of entrepreneurial education or curriculum [36,37].

Following Winkler’s SCT framework, this study examined entrepreneurship curriculum, which we define in terms of formal courses in entrepreneurship and specific teaching models reflecting educational environment variables. Furthermore, we incorporated EM as a new and pivotal cognitive variable which contributes to Winkler’s set of cognitive variables. The reasons are that the development of EM is a process of cognitive adaptability and metacognition that can be enhanced through education and training [5], and that EM can evolve by an individual’s interaction with the environment [38]. Thus, SCT provides a theoretical lens for the relationship between pedagogical teaching models and EM.

There is only limited empirical research linking entrepreneurship curriculum with teaching models and EM, but the available research does suggest that entrepreneurial programs can be related to EM. For example, Neneh [39] suggests that education and training influence personal factors related to EM, such as risk taking, motivation, and creativity. Sánchez [40] reports that after entrepreneurship programs, students’ level of self-efficacy, proactiveness and risk taking, which can be perceived as related elements of EM, are significantly higher than those in the pre-test. Similarly, a few other studies report a positive link between entrepreneurship programs and EM [7,41,42]. Therefore, we suggested:

Hypothesis 1a (H1a). Entrepreneurship curriculum (EC) (incorporating all the teaching models) is positively related to entrepreneurial mindset (EM).

2.3. The Relationship between Entrepreneurship Curriculum with Teaching Models and EM

In the context of our research, we addressed Nabi et al.’s [1] call for more research on the link between specific teaching models and entrepreneurial outcomes in higher education, with particular reference to EM. While the supply model can help with the transmission of knowledge about EM, and the demand model can personalize meaning and exploration of that mindset based on students’ needs, Nabi et al.’s [1] review tentatively implies that—although further corroboration is required—the competence model may be superior to other methods because of the depth of learning. This is because ‘the competence model assumes that in real-life, tasks and problems are often ambiguous, divergent, or ill-defined’ [15] p. 9, which is very similar with the entrepreneurial situation. The competence teaching model focuses on solving real-world problems in entrepreneurial situations, and it is a form of active learning through action-in-practice combined with experience. It also reflects action learning pedagogy which is superior to traditional classroom pedagogy [43]. In the context of EC, such competence-based experiential learning (deep learning) is likely to produce a deeper cognitive change in terms of the EM, such as alertness to opportunities, risk-taking propensity, and tolerating ambiguity, than surface learning here referring to the supply or demand teaching models. It is therefore important to investigate whether the competence model really has a stronger link with EM than the supply and demand models. We proposed:
Hypothesis 1b (H1b). The positive relationship between EC and EM is stronger for the competence teaching model (rather than supply or demand models).

2.4. The Moderating Role of the Entrepreneurial Climate at the Institution

Apart from educational and cognitive factors, the broader external (institutional) context has been recognized as important in affecting entrepreneurial attitude, intention, and action [44] and can thus influence the EC–EM link by implication. The institutional entrepreneurial environment is particularly salient here because it reflects a collection of norms, perceptions, and regulation about the importance of entrepreneurship by the institution [45]. Within the higher education context, the entrepreneurial climate relates to the perceived environment to promote creativity, and the perceived atmosphere and active support to foster students’ inclination toward starting new businesses [11,46].

This study focused on the environmental characteristic—the entrepreneurial climate at the institution—because it is likely to affect the relationship between EC and EM. Due to contradictory findings of entrepreneurship education impact studies, researchers have highlighted there is a strong need to explore different contextual factors because they can act as potential moderating factors that may influence learning outcomes [1]. Empirical studies also suggest the moderating role of the university environment in entrepreneurship research. For example, Shirokova et al. [13] suggest that the university entrepreneurial environment plays a moderating role in the link of intentions and start-up activities. Franke and Lüthje [44] also report similar findings.

The synthesis of existing research therefore suggests that the university entrepreneurial climate may operate as a moderating variable between entrepreneurship curriculum and entrepreneurial outcomes, which in our case relates to EM. As students of entrepreneurial learning in a university context are likely to be exposed to a day-to-day environment on campus, the climate for entrepreneurship at the institution can moderate their entrepreneurial thinking and mindset. Although the entrepreneurial climate is likely to be a significant moderator in the EC–EM link, there is a paucity of research in this area which we seek address in the present research. In this vein, we can assume that the relationship between EC and students’ EM may be moderated by the different strength of the entrepreneurial climate at the institution. Some institutions may offer a stronger entrepreneurial climate, whereas some may offer a weaker climate because of different institutional contexts [1,44]. Therefore, we hypothesized:

Hypothesis 2a (H2a). Entrepreneurial climate at the institution (ECI) plays a moderating role between entrepreneurship curriculum (EC) and entrepreneurial mindset (EM).

Furthermore, because of the lack of research in this area, we also wanted to explore whether there are differences in the moderating role of the entrepreneurial climate in the relationship between different teaching models and students’ EM models. Nabi et al. [1] suggest that it is worth examining the potential superiority of the competence model. The competence model may be where the moderator effect for the entrepreneurial climate between EC and EM is most pronounced because it is likely to depend on extent to which entrepreneurial activity is ‘encouraged, rewarded and supported in the university setting’ [11]. When students perceive a positive atmosphere and active support, then it is likely to allow more development of competencies related to dealing with real-life entrepreneurial problems and situations, thus helping the development of EM, such as dealing with risk, being alert to opportunities, and so forth. However, when students perceive a negative atmosphere and less institutional support, for example in providing real-life entrepreneurial simulations or scenarios, then this psychological climate is likely to mean that there is a weaker link between the competence teaching model and EM [12,13]. Therefore, we hypothesized:
Hypothesis 2b (H2b). The moderating role of ECI in the relationship between EC and EM is stronger for the competence teaching model and EM.

Figure 1 summarizes all the hypothesized relationships.

3. Methods

3.1. Survey Design and Procedure

The aim of this research was to test the relationship between entrepreneurship curriculum with teaching models and entrepreneurial mindset of the students. To match the research aim, we used survey data in order to measure our latent constructs through multi-item scales in a natural situation in education, an approach noted by Maula and Stam [47] especially when examining individuals as the units of analysis [48]. Before the survey, we pilot-tested the questionnaire on students from different institutions and then revised parts of the questionnaire based on feedback.

The survey used non-probability convenience samples of university students that are appropriate subjects in certain situation when students represent a population of interest [49]. Data were collected in 2017 from students at 15 higher education institutions in Jiangsu Province, China, in view of regional variations and contextual differences in entrepreneurial cognitions [12,17], and considering that Jiangsu is one of the highly developed economies in China, and has implemented a strategy of innovation and entrepreneurship education to boost the regional economy and to prepare more entrepreneurial students in higher education [50]. The institutional samples were chosen so that a range of students from different majors and years of study were sampled. Students who participated in the survey were voluntary and anonymous.

The sample comprised 15 institutions including 6 universities, 3 colleges, and 6 vocational institutes. We included 60 respondents in each institution who had attended at least one module or course on entrepreneurship education. These courses are either compulsory or elective with regular 2 credits, lasting at least 16 weeks (32 contact hours). The common objectives of these courses were to explain theories about entrepreneurship, develop tools to help in devising a business plan, and cultivate soft skills by teamwork in a simulated entrepreneurial situation.

The total population of students was about 30,000 for all 15 institutions and the target sample for this study was 900 students. The final sample comprised 739 respondents (response rate 82.1%). The breakdown of the sample demographics follows by gender (51% male, 49% female); age (96.3% aged between 18 to 23); and year of study (30.9% first year, 37.5% second year, 26.4% third year, 5.3% fourth year). The distribution of majors is as follows: 34.1% art, humanity and social science; 56.2% science, technology, and engineering; and 9.7% others. There were no significant differences between students across the 15 higher education institutions in terms of gender, age, grade, or major.

3.2. Measures

All self-report measures used in this study were adapted from existing scales or grounded in theoretical concepts. Unless otherwise indicated, all items were measured using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). All items from the English survey were translated into Chinese, and then two English–Chinese bio-linguistic experts confirmed the translation.

3.2.1. Entrepreneurship Curriculum and Teaching Models

Entrepreneurship curriculum (EC) was measured to capture student’s perceived overall teaching in the entrepreneurship curricula based around five elements: teaching objectives, teaching contents, teaching methods, teacher–student roles, and assessment approaches [21]. These elements can be classified into three archetypical teaching models in higher education (the supply model, the demand model, and the competence model) [1,15]. Therefore, three sub-independent variables are supply teaching model (STM), demand
teaching model (DTM), and competence teaching model (CTM), which were extracted from the composite variable EC of total 15 items. A sample item is ‘The entrepreneurship course aims at imparting entrepreneurship knowledge’. According to confirmatory factor analysis in this study, EC’s Cronbach’s alpha (α) was 0.954, composite reliability (CR) was 0.954, average variance extracted (AVE) was 0.619. For STM, α = 0.810, CR = 0.809, AVE = 0.586; for DTM, α = 0.810, CR = 0.809, AVE = 0.586; and for CTM, α = 0.930, CR = 0.930, AVE = 0.727. These suggest that the reliability and the convergent validity of these independent variables are excellent.

3.2.2. Entrepreneurial Mindset

EM has been tested by Cui et al. [7] based on previous studies with such four dimensions as alertness to opportunity, risk propensity, ambiguity tolerance, and dispositional optimism. Following this, four dimensions were utilized to measure the construct of EM with 14 items. The construct of EM was analyzed at a composite level instead of individual sub-scale levels, because our hypothesis focus was on the relationship between EC and the overall level of EM. A sample item was ‘I have frequent interactions with others to acquire new information’. In the present study, EM’s α = 0.948, CR = 0.949, AVE = 0.571, indicating that the measure of the independent variable had high reliable and convergent validity.

3.2.3. Entrepreneurial Climate at the Institution

We used Bergmann et al.’s [11] definition of entrepreneurial climate from a student perspective to capture students’ perceptions of university characteristics related to entrepreneurial activities. This student self-report perspective is a widely used approach in entrepreneurship studies [11,13,51]. In line with Bergmann et al.’s [11] definition and measurement based on Franke and Lüthje [44], we used 3 items to assess the entrepreneurial climate of university on supporting and rewarding entrepreneurial activity. Furthermore, since the notion of promoting creativity is a key issue to the entrepreneurial climate of universities, we also used Zampetakis and Moustakis’s [46] 3-item scale in our survey. This emphasizes the encouragement and promotion of creativity in the university environment. The final scale therefore consists of 6 items. A sample item is ‘In my institution, I learn that there is more than one solution to a problem’. In this study, ECI’s α = 0.954, CR = 0.955, AVE = 0.780, which shows high reliability and convergent validity in the current study.

3.2.4. Control Variables

We controlled for gender and age as demographic variables because they may account for variation in entrepreneurial learning outcomes including intention and mindset [52]. Gender was a categorical variable (1 = male, 2 = female), and age was an approximately continuous variable (1 = below 18, 2 = 18–20, 3 = 21–23, 4 = above 23).

We also considered educational factors as potential control variables because the year of study, major, course type, and institution type is often controlled in studies of entrepreneurship education [53]. Grade is an approximately continuous variable with the value from 1 to 5; major is a categorical variable (1 = science and engineering, 2 = humanity and social science); institution type is a dichotomous variable (1 = vocational oriented institution, 2 = general institution); compulsory course and optional course are also dichotomous variables (0 = have not attended, 1 = have attended).

In addition, previous studies have indicated that prior entrepreneurial exposure or prior experience plays a role in the entrepreneurial process or the formation of entrepreneurial intention [54], which is why we controlled for ‘prior entrepreneurial exposure’. This dummy variable was coded as 1 for students who had entrepreneurial experiences before, and 0 for students without such experiences.

Finally, given that previous research advocates controlling for initial entrepreneurial intentions in this field (e.g., [55]) and that initial entrepreneurial mindset may affect the outcome mindset of students (e.g., [7]) we use initial level of entrepreneurial intention and mindset as two control variables to isolate the effect of our independent variables in this
study. We asked the participants to assess their initial level of entrepreneurial intention and mindset (before enrolling to university) on a 7-point Likert scale (1 = extremely low, 7 = extremely high).

3.2.5. The Measurement Model and Common Method Bias

Before conducting analysis, confirmatory factor analysis was used to verify the measurement model. The overall model fit indices ($CFI = 0.914$, $TLI = 0.906$, $RMSEA = 0.072$ [0.069, 0.075], $SRMR = 0.036$) indicate adequate discriminant validity between latent variables representing five different constructs. In particular, for the construct of EM consisting of four subdimensions, the fit indices ($CFI = 0.951$, $TLI = 0.937$, $RMSEA = 0.085$ [0.078, 0.093], $SRMR = 0.032$), showed a good fit of this latent variable.

Moreover, to test common method variance (CMV), we adopted a single unmeasured latent method factor suggested by Podsakoff et al. [56]. The results show that the variables involved in this study do not have serious CMV problems because the fitting index of the model after control was not obviously better than that before control (Table 1).

| Model          | $\chi^2$ | df  | $\chi^2$/df | $\Delta\chi^2$/df | CFI  | TLI  | IFI  | RMSEA | SRMR |
|----------------|----------|-----|-------------|-------------------|------|------|------|-------|------|
| One factor     | 7898.653 | 495 | 15.957      | —                 | 0.656| 0.633| 0.656| 0.142 | 0.1017|
| Two factors A  | 7674.675 | 494 | 15.536      | 0.421             | 0.666| 0.643| 0.667| 0.140 | 0.1011|
| Two factors B  | 7122.598 | 494 | 14.418      | 1.539             | 0.692| 0.670| 0.692| 0.135 | 0.1028|
| Three factors A| 6567.544 | 492 | 13.349      | 2.608             | 0.717| 0.697| 0.718| 0.129 | 0.0990|
| Three factors B| 4447.538 | 492 | 9.040       | 6.917             | 0.816| 0.803| 0.816| 0.104 | 0.0589|
| Four factors A | 4358.476 | 489 | 8.913       | 7.044             | 0.820| 0.806| 0.820| 0.104 | 0.0585|
| Four factors B | 2420.689 | 488 | 4.960       | 10.997            | 0.910| 0.903| 0.910| 0.073 | 0.0382|
| Five factors   | 2332.163 | 485 | 4.809       | 11.148            | 0.914| 0.906| 0.914| 0.072 | 0.0375|
| Six factors    | 1864.429 | 453 | 4.116       | 11.841            | 0.934| 0.923| 0.935| 0.065 | 0.068 |

Note: $n = 739$; STM: supply teaching model, DTM: demand teaching model, CTM: competence teaching model, EM: entrepreneurial mindset, ECI: entrepreneurial climate at the institution; CMV: Common method variance. One factor = STM + DTM + CTM + EM + ECI; two factors A = STM, DTM + CTM + EM + ECI; two factors B = DTM, STM + CTM + EM + ECI; three factors A = STM, DTM, CTM + EM + ECI; three factors B = STM + DTM, CTM, EM + ECI; four factors A = STM, DTM, CTM, EM + ECI; four factors B = STM + DTM, CTM, EM, ECI; five factors = STM, DTM, CTM, EM, ECI; six factors = STM, DTM, CTM, EM, ECI, CMV.

4. Results

4.1. Descriptive Statistics and Correlations

Exploratory factor analysis and confirmatory factor analysis were adopted to test reliability and validity. Regression analysis was used to explore the direct effects of entrepreneurial curriculum (EC) with teaching models and entrepreneurial mindset (EM) and the moderating effect of entrepreneurial climate. Table 2 presents the descriptive statistics and correlations between the variables. EC (composite and independent teaching models) were significantly positively related to EM, thus providing some preliminary evidence for the results to follow.

| Variables | M      | SD    | 1     | 2     | 3     | 4     | 5     | 6     |
|-----------|--------|-------|-------|-------|-------|-------|-------|-------|
| 1. EC     | 4.457  | 1.327 |       | 0.863 | **    |       |       |       |
| 2. STM    | 4.482  | 1.272 | 0.863 |       | **    |       |       |       |
| 3. DTM    | 4.412  | 1.295 | 0.959 | 0.777 | **    |       |       |       |
| 4. CTM    | 4.488  | 1.351 | 0.948 | 0.722 | **    | 0.860 | **    |       |
| 5. EM     | 4.517  | 1.116 | 0.622 | 0.555 | ***   | 0.606 | 0.570 | **    |
| 6. ECI    | 4.581  | 1.761 | 0.613 | 0.515 | **    | 0.580 | 0.597 | 0.700 | **

Notes: $n = 739$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. EC: entrepreneurial curriculum, STM: supply teaching model, DTM: demand teaching model, CTM: competence teaching model, EM: entrepreneurial mindset, ECI: entrepreneurial climate at the institution.
4.2. Hypothesis Testing Results

4.2.1. Hypothesis 1a

We established model 1 to test the direct link between EC and EM. The regression analyses are seen in Table 3. All variance inflation factors (VIF) were below 2 (and this is the case in all our direct and moderator analyses), indicating that there were no multi-collinearity problems. The results showed a positive and significant standardized relationship between EC and EM ($\beta = 0.532$, $p < 0.001$). Therefore, H1a was accepted.

| Table 3. The direct effect of EC with teaching models on EM in regression models. |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Independent Variables | Model 1  | Model 2  | Model 3  | Model 4  |
| EC  | 0.532 *** | 1.166 | 0.464 *** | 1.106 | 0.517 *** | 1.157 | 0.473 *** | 1.156 |
| STM | 0.014 | 1.174 | 0.039 | 1.170 | 0.013 | 1.175 | 0.011 | 1.176 |
| DTM | 0.035 | 1.689 | 0.052 | 1.687 | 0.037 | 1.688 | 0.030 | 1.690 |
| CTM | −0.039 | 1.024 | −0.041 | 1.025 | −0.042 | 1.025 | −0.029 | 1.023 |
| Gender | 0.031 | 1.261 | 0.004 | 1.266 | 0.040 | 1.260 | 0.042 | 1.261 |
| Age | 0.003 | 1.476 | 0.011 | 1.474 | 0.006 | 1.475 | 0.005 | 1.476 |
| Grade | 0.035 | 1.689 | 0.052 | 1.687 | 0.037 | 1.688 | 0.030 | 1.690 |
| Major | −0.039 | 1.024 | −0.041 | 1.025 | −0.042 | 1.025 | −0.029 | 1.023 |
| Institution | 0.031 | 1.261 | 0.004 | 1.266 | 0.040 | 1.260 | 0.042 | 1.261 |
| PEX | 0.040 | 1.035 | 0.044 | 1.035 | 0.046 | 1.035 | 0.036 | 1.036 |
| IEM | 0.100 ** | 1.950 | 0.151 *** | 1.908 | 0.102 ** | 1.951 | 0.120 ** | 1.943 |
| IEI | 0.174 *** | 1.913 | 0.182 *** | 1.912 | 0.183 *** | 1.909 | 0.181 *** | 1.913 |
| Compulsory course | 0.073 * | 1.282 | 0.087 ** | 1.278 | 0.076 * | 1.281 | 0.088 ** | 1.278 |
| Optional course | 0.072 * | 1.261 | 0.059 | 1.265 | 0.076 * | 1.260 | 0.083 ** | 1.260 |
| R² | 0.452 | 0.404 | 0.440 | 0.403 |
| F | 55.558 | 44.848 | 52.006 | 44.608 |
| Significance | 0.000 | 0.000 | 0.000 | 0.000 |

Notes: $n = 739$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Model 1 includes EC and EM; model 2 includes STM and EM; model 3 includes DTM and EM; model 4 includes CTM and EM. The meanings of variables are as same as in Table 2. Std. C.: standardized coefficients.

4.2.2. Hypothesis 1b

We established models 2–4 to test the direct effects of the supply teaching model (STM), demand teaching model (DTM), and competence teaching model (CTM), respectively, on EM. The standard coefficients from STM ($\beta = 0.464$, $p < 0.001$), DTM ($\beta = 0.517$, $p < 0.001$), and CTM ($\beta = 0.473$, $p < 0.001$) to EM were significant, respectively (Table 3). This suggests that the three teaching models were significant positive predictors of students’ entrepreneurial mindset. Comparatively, as the coefficient of the DTM is the largest among the three teaching models, it suggests that DTM is the strongest predictor of EM, followed by CTM, and then STM. Therefore, H1b was not supported.

4.2.3. Hypothesis 2a

To test the moderating effect of entrepreneurial climate at the institution (ECI) in the relationship between EC and EM, the regression analysis showed significant EC–ECI interaction item ($\beta = 0.074$, $p < 0.01$), and significant F change ($\Delta F = 9.017$, $p < 0.01$) (see Table 4). This suggests the moderating effect of the entrepreneurial climate existed in the relationship between EC and EM. Therefore, H2a was accepted.
Table 4. The moderating effect of ECI in the EC–EM link in a regression model.

| Independent Variables | Step 1 | Step 2 |
|-----------------------|--------|--------|
|                       | Standardized Coefficients | VIF    | Standardized Coefficients | VIF    |
| EC                    | 0.308 *** | 1.603  | 0.306 *** | 1.604  |
| ECI                   | 0.512 *** | 1.603  | 0.511 *** | 1.603  |
| EC–ECI                | 0.074 **  | 1.002  |        |        |

| R²                    | 0.550  |        | 0.555  |        |
| △R²                  | 0.005 ** |        |        |        |
| F                    | 449.551 *** |        | 305.971 *** |        |
| △F                  | 9.017 **  |        |        |        |

Notes: n = 739; * p < 0.05; ** p < 0.01; *** p < 0.001. Step 1 is the first regression equation without interaction item, and step 2 is the second regression equation with the interaction item (EC*ECI). The meanings of variables are the same as in Table 2.

4.2.4. Hypothesis 2b

Table 5 is the result of testing the moderating role of ECI in three separate regression models. We can see that the coefficient of interaction item STM–ECI was not significant (β = 0.044, p = 0.079), but the interaction items DTM–ECI (β = 0.064, p < 0.01) and CTM–ECI (β = 0.086, p < 0.001) were significant. Meanwhile, the F change of model 1 was not significant (p = 0.079) while those of model 2 (p < 0.01) and model 3 (p < 0.001) were significant. Further, the coefficient of DTM*ECI (β = 0.064) was smaller than that of CTM–ECI (β = 0.086). The results suggest the moderating effect of ECI on CTM was the strongest according to the coefficients and significances in three different models. Thus, H2b was accepted.

Table 5. The moderating effect of ECI on the relationship between different teaching models and EM in regression models.

| Independent Variables | Model 1 | Model 2 | Model 3 |
|-----------------------|---------|---------|---------|
|                       | Step 1  | Step 2  | Step 1  | Step 2  | Step 1  | Step 2  |
|                       | Std. C. | VIF     | Std. C. | VIF     | Std. C. | VIF     |
| STM                   | 0.265 *** | 1.362   | 0.263 *** | 1.363   |        |        |
| DTM                   | 0.300 *** | 1.507   | 0.297 *** | 1.510   |        |        |
| CTM                   | 0.564 *** | 1.362   | 0.563 *** | 1.362   | 0.562 *** | 1.507   |
| ECI                   | 0.044   | 1.003   | 0.044   | 1.003   | 0.064 ** | 1.003   |
| STM–ECI               | 0.002   |        | 0.002   |        | 0.004 ** |        |
| CTM–ECI               | 3.084   |        | 6.834 ** |        | 11.629 *** |        |

Note: n = 739; * p < 0.05; ** p < 0.01; *** p < 0.001. Model 1 includes STM, ECI, and EM; model 2 includes DTM, ECI, and EM; model 3 includes CTM, ECI, and EM. Step 1 is the first regression equation without interaction item in each model, and step 2 is the second regression equation with the interaction item in each model. The meanings of variables are the same as in Table 2. Std. C.: standardized coefficients.

5. Discussion and Conclusions

Drawing on social cognitive theory and a teaching model framework, this study suggested a significant link between EC and EM. However, from the three teaching models (supply, demand, competence), the demand model proved to be the strongest predictor of EM, rather than the competence model. Further, the entrepreneurial climate of the higher education institution was a significant moderator in the EC–EM link, and was the most pronounced regarding the link of the competence model with EM.

Consistent with our SCT framework of EC as an environmental education factor and EM as a personal cognition factor, the results confirmed that EC (including the supply, demand, and competence teaching models) were important predictors of EM. However,
unexpectedly, the demand teaching model, instead of the competence teaching model, was more strongly related to EM than the other two models. This result was not in line with the notion that competence model pedagogy may have the most potential for impact of entrepreneurship education across a range of entrepreneurial outcomes [1]. A possible interpretation here is that Nabi et al.’s impact framework with different teaching models is very new and the impact of the competence teaching model depends on different outcomes of entrepreneurial learning. The competence model is a more interactionist pedagogy focusing on real life entrepreneurship scenarios and problems, and it might develop some levels of impact, such as entrepreneurial skills, intentions, and start-ups [1]. However, this is not necessarily applicable to EM as this reflects a different kind of cognitive outcome that is deeper than other traditional measures such as entrepreneurial intent [3,4], and one which did not really feature in Nabi et al.’s review given the lack of empirical research in this field.

Another possible explanation is the contextual aspects of Chinese entrepreneurial education. In China, the teaching model of EC is being transformed from supply to demand-oriented pedagogy; that is, a shift from transmitting knowledge about entrepreneurship from the facilitator to focusing on student’s needs and interests related to their personal entrepreneurial development using explorative methods such as literature reading, group discussions, experimenting, and portfolios to reflect on personal development. Although the demand teaching model is probably not better than the competence teaching model for EC impact across a broad range of entrepreneurial outcomes, it seems to be better to develop students’ EM in the Chinese higher education context. This is because it responds to students’ inspiration and desire for entrepreneurial learning via stimulating their extrinsic motivation, which is more practical toward their employability and career path.

The results also suggest that entrepreneurial climate at the institution moderated the relationship between EC and EM. Moreover, after a further examination of different teaching models, the results illustrate that the moderating role of the entrepreneurial climate was the strongest between the competence teaching model and EM, rather than the supply and demand models. In nature, the competence teaching model in entrepreneurship aims at developing EM and orientation in terms of actively applying their knowledge to deal with vague or undefined problems in real-life situations, rather than passively receiving entrepreneurship knowledge (supply model) or focusing on personalizing meaning, through exploring or participating in seminars based on their interests (demand model) [15]. Thus, our findings support the idea that the competence teaching model has the maximum effect when a favorable entrepreneurial climate can be provided by the institution.

5.1. Theoretical Contributions

Based on the results and findings, our study has four theoretical contributions to the literature on entrepreneurship education. Firstly, this research contributes to the theoretical conceptualization of the relationship between entrepreneurship curriculum (EC) and entrepreneurial mindset (EM) in the higher education context by providing and testing a coherent conceptual framework based on the theory of teaching models and SCT. Our model explains how EC and different teaching models relate to EM, with a moderating factor of ECI. Further, our research tested this model by the data from students of higher education in China, which supports the application of the model in terms of ‘who’ and ‘where’. Thus, this research conceptually and empirically contributes to revealing the relationship mechanism between teaching models in EC and EM.

Secondly, this study contributes to the literature by highlighting an under-researched impact indicator of entrepreneurship curriculum, namely EM, providing an alternative to the over-saturated literature on entrepreneurial intentions as the dominant outcome of entrepreneurship education. EM is still nascent in the literature which should be included because of its self-regulatory, cognitive, and emotional focus [1,4]. By this, our research enriches, to a certain extent, the set of impact indicators of entrepreneurship education, and deepens our understanding on the diverse impact types of entrepreneurship education.
beyond intention. In turn, it also partly explains why teaching models in entrepreneurship curriculum is so important—for EM.

Thirdly, this study also contributes by elaborating three-dimensional nature of teaching models in entrepreneurship and reveals their divergent effects on EM. This may partly explain the equivocal impact outcomes of entrepreneurship education as extant reviews have pointed out the inconsistent findings on the impact of entrepreneurship education might in part due to the lack of insight into the inner part of education, for example, teaching models [1,8]. Moreover, this study suggests that the demand teaching model has the strongest influence on students’ EM compared with supply and competence teaching models in the Chinese context. Identifying varying teaching models and unpacking their different links with students’ EM helps us, in a nuanced manner, to better understand the multi-faceted nature of entrepreneurship curriculum, the underlying teaching models, and their predictive role in the formation of EM.

Finally, our study contributes to SCT not only by providing an integrated conceptual framework that combines educational environments (i.e., specific teaching models) and entrepreneurial cognition (i.e., EM) and confirming that three teaching models are all positively linked to EM, but also by confirming the moderating role of entrepreneurial climate at institutions in the relationship between EC and EM. This addresses the call by Nabi et al. [1] to examine contextual moderators that might explain contradictory findings in entrepreneurship education impact research. The entrepreneurial climate at institutions is rarely tested in existing research but it is a significant factor related to the outcomes of entrepreneurship education such as mindset [11]. As indicated in our research, the institutional environment is critical because it helps to shed light on what condition (or when) the link between different teaching models and EM is stronger or weaker, thus enriching and expanding SCT application in the context of higher entrepreneurship education.

5.2. Practical Implications

At a practical level, the main implication of our findings for the design of EC is that it confirms the demand model was the strongest predictor. This suggests that entrepreneurial program developers, especially in the Chinese context of our sample, should pay attention to the selection of the right teaching models to optimize students’ EM. Particularly, curriculum designers may consider the application of the demand teaching model focusing on individual exploration and reflection to meet student needs and interests. Since we also found that the entrepreneurial climate was a significant moderator between EC and EM, we suggest that it is imperative for universities to introduce policies that provide a supportive entrepreneurial climate, beyond just focusing on individual teaching models, to stimulate entrepreneurial learning of students.

5.3. Limitations and Directions for Future Research

As with all research, this study has limitations that provide opportunities for further research. First, we used a self-report approach to measure entrepreneurship curriculum and teaching models. Although the fact that the self-report scale is widely used in entrepreneurship education research and is suitable to capture the students’ perceived dynamic teaching models rather than the designed static teaching models, future study may consider to use objective approach to measure teaching models based on the actual curriculum.

Second, we only focused on the cognitive, rather than emotional or behavioral, perspective of EM [28]. Exploring such other EM dimensions in future research would allow us to better understand different angles of EM, and the link with the EC and underpinning teaching models.

Third, our research only examined one moderator (entrepreneurial climate at the institution) as the environmental factor in the link between EC and EM. However, future research could expand to other context-specific factors (e.g., national or regional culture), which may play a significant role in moderating the impact of entrepreneurship education on entrepreneurial outcomes [12].
Last, although the use of cross-sectional designs and samples of college students with different characteristics from multiple institutions are, to some extent, generalizable and representative for the findings in certain situation, further research could conduct experimental design research to rule out self-selecting concerns and may generate more causal claims.

In conclusion, the present research confirmed the importance of the link between entrepreneurship curriculum with teaching models and an entrepreneurial mindset in higher education, as well as established the importance of the moderating effect of the entrepreneurial climate at the institution. Furthermore, by developing and testing these links, we have contributed not only to the entrepreneurship education literature on both social cognitive theory and teaching models, but also provided a meaningful conceptual framework to inform future practice and research in higher education in both the Chinese context and beyond.

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