Increasing teaching effectiveness in entrepreneurship education: Course characteristics and student needs differences

Maike Liu a, *, Marjan J. Gorgievski a, Jun Qi b, c, Fred Paas a, d

a Department of Psychology, Education and Child Studies, Erasmus University Rotterdam, Netherlands
b School of Management, University of Science and Technology of China, China
c School of Xinghi Management, Anhui Finance and Trade Vocational College, China
d School of Education/Early Start, University of Wollongong, Australia

A R T I C L E   I N F O
Keywords:
Challenging learning environment
Teacher-student relationships
Need for achievement
Need for affiliation
Entrepreneurial outcomes

A B S T R A C T
This study investigated the impact of entrepreneurship course characteristics on students’ entrepreneurial intentions through fostering entrepreneurial self-efficacy and study engagement. Furthermore, the moderating role of student needs differences was examined. Data were collected among 302 Chinese undergraduates who enrolled in an entrepreneurship course. Students filled in a questionnaire before and after the course. Results of structural equation modeling revealed that a challenging learning environment positively related to entrepreneurial self-efficacy and study engagement, which in turn related to entrepreneurial intentions. Teacher-student relationships only related to study engagement. In addition, a challenging learning environment related stronger to enhanced study engagement for the high need for achievement students, and teacher-student relationships significantly and positively related to entrepreneurial self-efficacy only among students with a high need for affiliation. The findings can be used to improve entrepreneurship education. Theoretical and practical implications will be discussed.

1. Introduction

Entrepreneurship education has been recognized as one of the crucial factors in developing students’ intentions to start a business (Karimi et al., 2016; Tantawy et al., 2021). However, the growing number of studies on the impact of entrepreneurship education offer contradictory and mixed results (Hahn et al., 2020). Nabi et al. (2017) systematically reviewed empirical evidence on the impact of entrepreneurship education in higher education on various entrepreneurial outcomes (e.g., attitude, skills and knowledge, feasibility, and entrepreneurial intentions). They concluded that the most common outcome studied is entrepreneurship, without considering the differential effects that different course characteristics may have (Yang et al., 2021). Therefore, it is important to answer the question of how specific characteristics of an entrepreneurship course influence students’ entrepreneurial intentions. Only a few studies have empirically examined the direct (Mayhew et al., 2012) and indirect (Mueller, 2011) effects of course characteristics on the development of students’ entrepreneurial intentions. Hence, the mechanism through which entrepreneurship courses may have their impacts has not been clearly articulated (Eesley & Lee, 2021).

Exposure to entrepreneurship education is essential for acquiring entrepreneurial knowledge and skills, as well as developing other attributes associated with becoming an entrepreneur. In entrepreneurship courses, these goals can be achieved using appropriate teaching strategies and supportive interpersonal relationships (Mayhew et al., 2012). Based on social cognitive theory (SCT; Bandura, 1986), which posits that
being exposed to learning within a particular social setting shapes personal cognitive processes and capacities (Tantawy et al., 2021; Zhao et al., 2005), we focused on two characteristics of an entrepreneurship course environment, which are a challenging learning environment and supportive teacher-student relationships. A challenging learning environment is one in which students are provided with daring and provocative assignments that encourage them to think outside the box, explore original ideas, and apply innovative approaches (Fast et al., 2010; Mayhew et al., 2012). Besides, entrepreneurship is taught in a social context, which involves the interaction between teachers and students (Otache, 2019). Supportive teacher-student relationships, conceptualized as the degree of closeness and supportiveness within these relationships, provide them with information, opportunities, and resources.

In addition, we investigated the role of both “cold” cognitive (i.e., entrepreneurial self-efficacy) and “hot” affective (i.e., study engagement) motives as the potential processes through which a challenging learning environment and supportive teacher-student relationships stimulate entrepreneurial intentions. Both “cold” cognitive and “hot” affective motives combine and function together to predict educational outcomes (Abelson, 1963; Simon et al., 2015). “Cold” motives are more cognitive and premeditated in nature, while “hot” motives refer to the state of affect and emotion, which is more affective and impulsive (Scott et al., 2014). Previous studies in Chinese or other cultural contexts that investigated the impact of a challenging learning environment and supportive teacher-student relationships (e.g., Gu et al., 2018) have shown their positive effects on self-efficacy and study engagement among university students in general (Brouwer et al., 2016; Fast et al., 2010; Xerri et al., 2018). However, to our knowledge, these links have not been widely investigated within entrepreneurship education.

While entrepreneurship courses have been shown to promote student entrepreneurial outcomes, existing research offers little insight into why some students may benefit more than others and do not focus on the moderating role of students' person-specific factors (Nabi et al., 2017). Students bring a variety of learning needs into an entrepreneurship course (Ilonen, 2021). Building on the person-environment fit theory (PE fit; Kristof-Brown et al., 2005), which suggests that attitudinal outcomes result from the fit between environmental characteristics and individual needs, we focused specifically on the need for achievement and the need for affiliation as individual components of PE fit. Need for achievement refers to the desire for high-performance goals, and the need to excel and improve past performance; need for affiliation refers to the need to develop interactions and friendships with others, and a desire for approval from others (McClelland, 1961). Need for achievement and need for affiliation are important entrepreneurial motives and personal needs (Hayton et al., 2002) that may qualify relationships among entrepreneurship course characteristics and entrepreneurial self-efficacy and study engagement. Yet, students may differ in the extent to which they exhibit a desire for achievement (Bartels & Magun-Jackson, 2009) and a desire for enhancing interpersonal relationships (Klein & Schnackenberg, 2000). To our knowledge, no studies to date have addressed the moderating role of need for achievement and need for affiliation on the relationships between entrepreneurship course characteristics and student outcomes.

2. Aims and hypotheses

We aim to deepen our understanding of the impact of entrepreneurship courses on students' entrepreneurial intentions (see the conceptual model in Fig. 1). The contribution of this study is threefold. First, this study adds to the current entrepreneurship education literature and practice by providing empirical insights into how entrepreneurship course characteristics relate to entrepreneurial self-efficacy and study engagement, which subsequently increase entrepreneurial intentions. While entrepreneurial self-efficacy has proven to be a key factor in determining entrepreneurial intentions (e.g., Gorgievski et al., 2018), research addressing the relationship between study engagement and entrepreneurial intentions is still scarce. Second, empirical studies on how course characteristics and individual needs interact are scant as well. Our study addresses the gap in entrepreneurship education research by introducing an interactive framework to investigate the effect of entrepreneurship course characteristics on different students. We explored whether the need for achievement and need for affiliation enhance the effects of course characteristics on students' entrepreneurial self-efficacy and study engagement, which advances our knowledge on how to teach entrepreneurship while taking individual differences into account. The third contribution is our specific focus on the impact of entrepreneurship education. Despite the increased emphasis on entrepreneurship education, debates about the effectiveness of teaching approaches continue to arise, raising the question of “How to teach in a more effective way?” (Bell, 2020; Liu et al., 2021). We sought to assess the impact of the entrepreneurship course characteristics on entrepreneurial intentions and to provide a better theoretical understanding of the mechanism between them. Besides the theoretical contributions, the findings were also expected to have practical implications for teaching methods and educational pedagogy.

2.1. Entrepreneurial self-efficacy

Self-efficacy is a cognitive motive defined by Bandura (1986) as the self-judgment of one's ability to perform a task in a specific domain. Specifically, entrepreneurial self-efficacy refers to a person's belief in their ability to successfully perform entrepreneurial roles and tasks (Zhao et al., 2005). An essential component of SCT concerns the process through which self-efficacy judgments are formed. SCT explains that self-efficacy can be influenced through enactive mastery, role modeling and vicarious experience, social persuasion, and psychological and mood states. These sources of self-efficacy should be reflected in an entrepreneurship course. Focusing on perceived entrepreneurship course characteristics is in line with Bandura's SCT (1986), which suggests that how individuals interpret relevant information can be related to self-efficacy development. Thus, we expect that students' perceptions of a challenging learning environment and teacher-student relationships relate positively to their entrepreneurial self-efficacy.

Although some students may perceive being challenged during a course as unpleasant, most students indicate that they enjoy learning when tasks are challenging (Zahorik, 1996). During an entrepreneurship course, students are typically provided with progressively more challenging tasks. Participating in these tasks promotes students to notice their incremental improvements in entrepreneurship, which can be expected to increase their entrepreneurial self-efficacy. Whilst research on the relationship between a challenging learning environment and entrepreneurial self-efficacy is absent, studies indicated that a challenging learning environment led to higher general self-efficacy (Gentry & Owen, 2004). Moreover, Fast et al. (2010) revealed that students who perceive their classroom environment as challenging had a higher level of math self-efficacy.

![Conceptual model](https://example.com/model.png)
In addition to a challenging learning environment, teacher-student relationships are important predictors of student learning outcomes and good interrelationships can enhance the quality of education (Brouwer et al., 2016). Students enter entrepreneurship courses with beliefs about their ability to complete assignments, which indicates their self-efficacy. These beliefs can be influenced by how they interact with teachers, through the forms of advice, information, feedback, guidance, and motivation. Being accessible to these valuable resources is essential for helping students develop positive perceptions and build confidence. Supportive teacher-student relationships may foster a warm course environment and enhance students' entrepreneurial self-efficacy by providing useful feedback or contributing to their knowledge and skills. Research has shown that teacher-student relationships positively relate to students' self-efficacy (Zhou et al., 2020). Accordingly, we formulate that:

**Hypothesis 1.** Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships relate positively to entrepreneurial self-efficacy.

### 2.2. Study engagement

Study engagement is another psychological dimension relevant to learning outcomes (Mardernach et al., 2011). According to Balwant (2018), a useful way to measure study engagement is to measure it analogous to the concept of work engagement, which refers to a positive, fulfilling, work-related affective motivational state consisting of vigor, dedication, and absorption (Schaufeli et al., 2006). Siu et al. (2021) explained that students' core activities, such as attending lectures, working on assignments, and studying, can be considered as "work". Besides, like employees, students work towards specific goals including completing courses, passing examinations, and academic performance. Hence, similar to work engagement, study engagement in this study is conceptualized as a positive and affective state of mind encompassing vigor, dedication, and absorption in learning (Siu et al., 2014). The Job Demands-Resources (JD-R) theory (Bakker & Demerouti, 2007, 2008), which proposes that both challenging job demands and job resources are the main predictors of engagement (Bakker & Demerouti, 2008; Tadić et al., 2015), may shed light on the effect of a challenging learning environment and supportive teacher-student relationships on study engagement.

The JD-R theory has been employed in educational settings (e.g., Gu et al., 2018; Siu et al., 2021). Also in the context of entrepreneurship education, we anticipate that a challenging learning environment (as a challenge demand) and teacher-student relationships (as resources) foster study engagement. Although empirical studies on the relationship between a challenging learning environment and study engagement in entrepreneurship courses are lacking, the finding of Hamari et al. (2016) that challenges in game-based learning increased student engagement provides tentative support for our premise. While working on challenging and complex problems instead of confronting topics superficially, students became more intrinsically motivated, paid more attention and concentrated much harder. Conversely, research has suggested that lack of challenge is a common explanation for study disengagement (Shernoff, 2013).

In addition, study engagement could be significantly enhanced through students’ relationships with teachers (Sadoughi & Hejazi, 2021). Given the frequent interactions between teachers and students in the entrepreneurship course, positive teacher-student relationships can foster an encouraging and supportive environment, which could increase study engagement. Students who perceived that their teaching staff understood their learning needs and developed a friendly relationship with teachers were more likely to ask more questions, get more feedback, and highly invest in their studies. Consequently, they become more engaged in the course. While empirical research addressing the positive effect of supportive teacher-student relationships on study engagement in entrepreneurship courses is lacking, some studies have already shown the association between teacher-student relationships and enhanced student engagement (e.g., Quin, 2017; Xerri et al., 2018). Accordingly, we expect that:

**Hypothesis 2.** Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships positively associate with study engagement.

### 2.3. Entrepreneurial intentions

We argue that entrepreneurial self-efficacy and study engagement can impact students' intentions to start a business. Building on SCT, self-efficacy represents the mechanism of personal agency, and it is expected to affect one's effort and persistence on a specific task, as well as the very choice of activities and behavioral settings. High self-efficacy regarding an entrepreneurial setting leads students to approach that setting, whereas low self-efficacy leads students to evade that setting (Zhao et al., 2005). In the field of student entrepreneurship, entrepreneurial self-efficacy has proven to be an important explanatory predictor in determining the strength of entrepreneurial intentions. For instance, Nowinska et al. (2019) found support for the role of entrepreneurial self-efficacy in enhancing entrepreneurial intentions among university students.

We also expect that study engagement in an entrepreneurship course increases students' entrepreneurial intentions. Engaged students often experience positive emotions, such as enjoyment, interest, and enthusiasm. These positive emotions broaden their awareness, encourage creative thoughts and actions, as well as increase their strength and motivation (Fredrickson, 2001), which ultimately could be applied to the entrepreneurship process and facilitate entrepreneurial intentions. Besides, the emotions experienced by highly engaged students are also high in energy, dedication, and mental resilience, which enables them to perform their best at entrepreneurial assignments. This may, in turn, lead to increased entrepreneurial intentions. Little is currently known about the relationships between study engagement during an entrepreneurship course and entrepreneurial intentions, but the notion that study engagement is positively associated with students’ academic performance, well-being, and behavioral conduct may provide support for our proposal (Siu et al., 2021). Therefore, we postulate that:

**Hypothesis 3.** Within the context of an entrepreneurship course, (a) entrepreneurial self-efficacy and (b) study engagement positively associate with entrepreneurial intentions.

Taken together, a challenging learning environment and teacher-student relationships positively relate to entrepreneurial self-efficacy and study engagement, and, in turn to students’ entrepreneurial intentions. Hence, to holistically address our framework we formulate the following hypotheses:

**Hypothesis 4.** Within the context of an entrepreneurship course, (a) a challenging learning environment and (b) supportive teacher-student relationships have a positive indirect effect on entrepreneurial intentions through (1) entrepreneurial self-efficacy and (2) study engagement.

### 2.4. PE fit and needs differences

The general conception is that higher education should provide a learning environment to fit the diverse needs of university students (Lockin & Richardson, 2013). McClelland's theory of needs (1961) identified three types of motivational needs, namely achievement, affiliation, and power, and individuals have different characteristics depending on their dominant motivator. The third need, need for power, relates to controlling and influencing others and falls outside the scope of this study. Students in entrepreneurship courses have an interest in entrepreneurship and seek out further entrepreneurial knowledge and
skills (Hahn et al., 2020). Compared with other motivational needs, need for achievement and need for affiliation are more common personal needs among students interested in entrepreneurship (Decker et al., 2012) and likewise, their need for achievement and/or need for affiliation might be different from each other. Therefore, in line with the PE fit premise regarding the congruence between personal needs and the external environment, we argue that a challenging learning environment and supportive teacher-student relationships may have differential impacts on students’ entrepreneurial self-efficacy and study engagement, depending on the degree of their need for achievement and need for affiliation separately.

Some empirical studies have investigated the moderating role of need for achievement and affiliation in work settings (e.g., Chou & Lopez-Rodriguez, 2013; Fatima et al., 2017), but to the best of our knowledge, the role of need for achievement and need for affiliation has not been examined in the relationships between entrepreneurship course characteristics and student entrepreneurial outcomes. Even though research on the moderating role of needs in entrepreneurship is absent, in their review paper, Hayton et al. (2002) proposed that the need for achievement and the need for affiliation would moderate the relationship between environmental factors and entrepreneurial outcomes. Similarly, Baluku et al. (2019) empirically revealed that entrepreneurial mentoring was highly associated with entrepreneurial intentions among individuals with a high need for autonomy.

Individuals with a high need for achievement constantly seek progress, improvements, growth, and responsibilities (Hart & Albarracin, 2009). We contend that students with a high need for achievement benefit more from challenging learning environments and experience higher entrepreneurial self-efficacy and study engagement. Individuals who are motivated by achievement need aim for high performance, strive for their targets through efforts, and tend to excel in their field (Embi et al., 2019; McClelland, 1961). Besides, they prefer challenging tasks and have a strong mindset towards accomplishing the given task. Therefore, students with a high need for achievement are expected to do their best at challenging entrepreneurial tasks and become more confident during task completion. While working on challenging tasks, students who are motivated by achievement may also appreciate accomplishments and perceive higher vigor, dedication, and absorption during the entrepreneurship course.

Individuals with a high need for affiliation seek for harmonious and close interpersonal interactions with others, which enable them to acquire more support and assistance (Decker et al., 2012). We postulate that supportive teacher-student relationships work best for students with a high need for affiliation, and they are more likely to develop higher entrepreneurial self-efficacy and study engagement. Individuals who are motivated by their affiliation need desire warm interpersonal relations, seek companionship, and have a strong desire for acceptance and approval from others (Arshad et al., 2019; McClelland, 1961). As compared to low need for affiliation students, students with a high need for affiliation are expected to experience more emotional appreciation and seek continued guidance and feedback from teachers. They would also make better use of these resources obtained from teachers to further develop their knowledge and skills, which contribute to higher entrepreneurial self-efficacy. In addition, students with a high need for affiliation may obtain the most benefit from actively interacting with teachers, investing more time and effort, and engaging more deeply in an entrepreneurship course. Accordingly, we expect that:

Hypothesis 5. Within the context of an entrepreneurship course, the positive effects of (a) a challenging learning environment on (1) entrepreneurial self-efficacy and (2) study engagement are stronger for students with high (vs. low) levels of need for achievement. The positive effects of (b) teacher-student relationships on (1) entrepreneurial self-efficacy and (2) study engagement are stronger for students with high (vs. low) levels of need for affiliation.

3. Methods

3.1. Sample and procedure

This study was conducted at the School of Management in two universities in China. Data were collected among undergraduate students who enrolled in an entrepreneurship course during the autumn semester of the 2019–2020 academic year. The entrepreneurship course was taught to undergraduate students in their last two years of university. It aimed to increase students’ knowledge and skills required for discovering business opportunities, carrying out entrepreneurial activities, analyzing and understanding the business market; foster students’ entrepreneurial self-efficacy, and encourage more students to pursue a career as an entrepreneur in the near future. The teaching methods most often employed in the current study were lectures, presentations, group discussions, writing business plans, case studies and guest speakers. Ex-ante and ex-post approaches were used. Students received and filled in the online pre-test questionnaire at the beginning of the first class of the entrepreneurship course (T0), comprising scales about demographic variables, need for achievement, need for affiliation, and entrepreneurial intentions. Approximately eight weeks later, students received and filled in the online post-test questionnaire at the beginning of the final class of the entrepreneurship course (T1), comprising scales about challenging learning environment, teacher-student relationships, entrepreneurial self-efficacy, study engagement, and entrepreneurial intentions. Students were informed about the study, in which they could voluntarily participate with guaranteed confidentiality. The ethical committee of a large university in the Netherlands has approved this study. Prior to analysis, the data were coded without directly identifiable information. In total, 568 students enrolled in the entrepreneurship course. Among them, 412 participated in the pre-test questionnaire and 422 participated in the post-test questionnaire. We were able to match the two questionnaires (at T0 and T1) for 302 students, with ages ranging from 18 to 25. Of these, 165 were female (54.60%) and most students (88.40%) had never started a business.

3.2. Measures

Measurement items were adapted from the existing scales to ensure validity. A back-to-back translation procedure (Brislin, 1970) was performed to translate the scales from English to Chinese. Two researchers translated the English scales into Chinese. Two other researchers translated the questionnaire back. Then six undergraduate students were selected to pilot test the survey and give feedback to increase clarity, based on which items were slightly modified. We contextualized the questionnaire to reflect the entrepreneurship classroom.

Five-point Likert scales were employed to measure course characteristics and needs. Answers ranged from 1 (strongly disagree) to 5 (strongly agree). Challenging learning environment (Cronbach’s alpha = .93) was assessed with the Perceptions of Learning Environment (Mayhew et al., 2012), which was adapted from the Wabash Student Experience Survey (Pascarella et al., 2004, 2005). Six items measured a challenging learning environment, and three items measured the assessments encouraging innovative approaches. Even though they are intended to measure two constructs, a factor analysis revealed that all nine items loaded on one underlying factor. Besides, both the “challenging learning environment” and the “assessment encouraging innovative approaches” scales are from the Perceptions of Learning Environment survey and fit the definition of a challenging learning environment as proposed in the introduction section. Sample items are “The teachers asked challenging questions in class” and “Assignments required me to create innovative solutions.”

Teacher-student
relationship quality (Cronbach’s α = .87) was assessed with a five-item scale based on the Course Evaluation Questionnaire (Kember & Leung, 2008). A sample item is “I felt that our teaching staff understood our learning needs”. Need for achievement (Cronbach’s α = .60) and need for affiliation (Cronbach’s α = .48) were measured with the scales of the Manifest Needs Questionnaire in work settings developed by Steers and Braunstein (1976). Example items are “I do my best when my course assignments are fairly difficult” and “I pay a good deal of attention to the feelings of others at the course”.

Study engagement was measured with the nine-item version of the Utrecht work engagement scale (UWES; Schaufeli et al., 2006), including three subscales of vigor, dedication, and absorption. Some example items are “When I study, I felt bursting with energy”, “I was enthusiastic about my study”, and “I was immersed in my study”. Answers range from 1 = not at all effective to 7 = very effective. Entrepreneurial intentions (Cronbach’s α = .93) was measured with a five-item likert type scale. Respondents answered the question: “If you were to create your own business, to what extent would you be able to complete the following tasks?” followed by for example: “Define your business idea and strategy of your company.” Answers ranged from 1 = definitely not to 7 = definitely yes.

Entrepreneurial self-efficacy and intentions were measured using the Entrepreneurial Intentions Questionnaire (EIQ; Moriano et al., 2012). Entrepreneurial self-efficacy (Cronbach’s α = .93) was measured with a five-item likert type scale. Respondents answered the question: “If you were to create your own business, to what extent would you be able to complete the following tasks?” followed by for example: “Define your business idea and strategy of your company.” Answers ranged from 1 = not at all effective to 7 = very effective. Entrepreneurial intentions (Cronbach’s α = .87) were measured with four items assessing the likelihood of an individual to start a new business (e.g., Do you think in the future you will create your own business?). Answers ranged from 1 = definitely not to 7 = definitely yes.

Control variables were students’ age, gender (1 = male, 0 = female), entrepreneurial experience (1 = ever started a business, 0 = not), and entrepreneurial intentions at the beginning of the course (T0, Cronbach’s α = .83).

4. Results

4.1. Descriptive statistics

Cronbach’s alpha of each construct was greater than the recommended acceptable level of .60 (Fornell & Larcker, 1981; Nunnally, 1978), except for the need for affiliation. The low Cronbach’s alpha value is consistent with the findings reported in Geiger and Cooper (1995) among students. Although exhibiting low Cronbach’s alphas, the composite reliability of the need for affiliation 2 scale was greater than .70, indicating adequate reliability. All composite reliability values ranged from .74 to .97, indicating a good construct reliability (Nunnally, 1978). All factor loadings exceed .50, and the Average Variance Extracted (AVE) scores of each construct were higher than .50, indicating adequate convergent validity (Fornell & Larcker, 1981). As shown in Table 1, the square roots of AVE scores for each construct were greater than the correlations between constructs, which confirmed the discriminant validity.

Table 1 presents the means, standard deviations, and correlations between the variables. All correlations were in the expected direction, providing initial support for our hypothesis. Paired t-Test showed a significant difference in the pre-test (M = 4.35) and post-test (M = 4.50) of entrepreneurial intentions, t(301) = −2.54, p < .01, which confirmed the expected role of the initial value of entrepreneurial intentions as the control variable.

4.2. Hypothesis testing

Data were analyzed in R (Lavaan package, R Core Team, 2015). We applied structural equation modeling to test our hypotheses (Little et al., 2007). Model fit was based on the chi-square (χ²/df), root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and standardized root mean square residuals (SRMR) (Marsh et al., 2004). To further reduce the bias, we controlled for age, gender, entrepreneurial experience, and initial entrepreneurial intentions (T0) in all our analyses. The latent variables, “challenging learning environment”, “teacher-student relationships”, “entrepreneurial self-efficacy”, and “entrepreneurial intentions” were indicated by their separate items. To decrease model complexity, study engagement was indicated by the three subscales representing vigor, dedication, and absorption. This formed Measurement Model 1. We mean-centered and multiplied the terms to create the interaction terms: challenging learning environment x need for achievement, teacher-student relationships x need for affiliation (CLE x ACH, TSR x AFF; Shihe, 2011). Then we added two interaction terms to Measurement Model 1, which formed Measurement Model 2. We applied the formula advanced by Bohrnstedt and Marwell (1978) to calculate the error variance of interaction terms and correct for measurement error. Confirmatory factor analysis of both Measurement Model 1 and Measurement Model 2 showed a good fit to the data (see Table 2 for model fit indices).

To test our hypothesis, we modelled the paths from challenging learning environment and teacher-student relationships to entrepreneurial self-efficacy, study engagement and entrepreneurial intentions. Additionally, we added paths from entrepreneurial self-efficacy and study engagement to entrepreneurial intentions. This formed the Structural Model, and it showed a good fit to the data. The results (see Fig. 2) indicated significant paths from challenging learning environment to entrepreneurial self-efficacy (β = .48, p < .001) and study engagement (β = .47, p < .001) and, subsequently, from entrepreneurial self-efficacy (β = .41, p < .001) and study engagement (β = .13, p < .01) to entrepreneurial intentions. The path from teacher-student relationships to entrepreneurial self-efficacy (β = −.13, ns) was not significant, but teacher-student relationships significantly related to study engagement (β = .19, p < .05). We also found that a challenging learning environment (β = −.04, ns) and teacher-student relationships (β = .08, ns) did no significantly relate to entrepreneurial intentions. Therefore, Hypothesis 1a, Hypothesis 2, and Hypothesis 3 were supported, only Hypothesis 1b was not supported.

To examine the significance of the indirect pathways (i.e., β indulge) between entrepreneurship course characteristics (i.e., challenging learning environment and teacher-student relationships) and entrepreneurial intentions through students motives (i.e., entrepreneurial self-efficacy and study engagement), we followed Shrout and Bolger (2002) and examined the strength of the product of the pathway from entrepreneurship course characteristics to student motives and the pathway from student motives to entrepreneurial intentions. The results support Hypothesis 4a and 4b, the indirect effect of challenging learning environment on entrepreneurial intentions via entrepreneurial self-efficacy (β indulge = .22, p < .001, 95% CI [.11, .32]) and study engagement (β indulge = .07, p < .05, 95% CI [.01,.14]) were significant. Thus, the results indicated a challenging learning environment positively and indirectly related to entrepreneurial intentions through entrepreneurial self-efficacy and study engagement. Hypothesis 4b was not supported, because no significant relationship was found between teacher-student relationships and entrepreneurial self-efficacy. Additionally, although teacher-student relationships related to study
engagement and study engagement in turn predicted entrepreneurial intentions, the indirect effect of teacher-student relationships on entrepreneurial intentions via study engagement ($\beta_{\text{indirect}} = .03, p = .09, 95\% \text{ CI} [:.01, .07]$) failed to reach significance (Hypothesis 4b).

To test the moderated effect of need for achievement and need for affiliation, we included two interaction terms in the structural model and added paths from both interaction terms to entrepreneurial self-efficacy and study engagement. This formed the Moderation Model, and it showed a good fit to the data. Results showed that the interaction effect of a challenging learning environment and need for achievement on study engagement was significant ($\beta = .18, p < .05$). As can be seen in Fig. 3, students with a high need for achievement significantly benefitted more from the challenging learning environment and experienced higher study engagement. The slope is .62 ($p < .001$) for high need for achievement group (+1SD) and .26 (ns) for low need for achievement group (-1SD).

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Fig. 3. The interaction between challenging learning environment and need for achievement for study engagement. The slope is .62 ($p < .001$) for high need for achievement group (+1SD) and .26 (ns) for low need for achievement group (-1SD).

Table 1
Means, standard deviations, and correlations ($N = 302$).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Construct</th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study variables</td>
<td>Challenging learning environment</td>
<td>3.88</td>
<td>.52</td>
<td>(.81)</td>
<td></td>
<td></td>
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<td></td>
<td>Teacher-student relationships</td>
<td>3.76</td>
<td>.57</td>
<td>(.72)**</td>
<td>(.82)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Need for achievement</td>
<td>3.59</td>
<td>.47</td>
<td>(.26)**</td>
<td>(.19)**</td>
<td>(.83)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Need for affiliation</td>
<td>3.66</td>
<td>.56</td>
<td>(.30)**</td>
<td>(.26)**</td>
<td>(.28)**</td>
<td>(.71)</td>
<td></td>
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<tr>
<td></td>
<td>Entrepreneurial self-efficacy</td>
<td>5.06</td>
<td>.90</td>
<td>(.60)**</td>
<td>(.53)</td>
<td>(.29)**</td>
<td>(.33)**</td>
<td>(.68)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Study engagement</td>
<td>4.88</td>
<td>1.03</td>
<td>(.63)**</td>
<td>(.57)**</td>
<td>(.38)**</td>
<td>(.31)**</td>
<td>(.56)**</td>
<td>(.95)</td>
<td></td>
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<tr>
<td></td>
<td>Entrepreneurial intentions (T1)</td>
<td>4.50</td>
<td>1.14</td>
<td>(.41)**</td>
<td>(.42)**</td>
<td>(.21)**</td>
<td>(.32)**</td>
<td>(.62)**</td>
<td>(.50)**</td>
<td>(.85)</td>
</tr>
</tbody>
</table>

Control variables

| | Age | 20.15 | 1.08 | (.13)** | (.15)** | (.10) | (.00) | (.05) | (.10) | (.14)* |
| | Gender | .45 | .50 | (.04) | (.05) | (.04) | (.06) | (.16)** | (.14)* | (.35)** |
| | Entrepreneurial experience | .12 | .32 | (.12)** | (.07) | (.07) | (.08) | (.10) | (.08) | (.21)** |
| | Entrepreneurial intentions (T0) | 4.35 | 1.23 | (.21)** | (.22)** | (.29)** | (.29)** | (.42)** | (.31)** | (.64)** |

Note. The diagonal elements are the square root of AVE. AVE = Average Variance Extracted.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2
Model fit indices for the research model ($N = 302$).

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement model 1</td>
<td>2.384</td>
<td>.068</td>
<td>.936</td>
<td>.928</td>
<td>.043</td>
</tr>
<tr>
<td>Measurement model 2</td>
<td>2.142</td>
<td>.061</td>
<td>.942</td>
<td>.933</td>
<td>.041</td>
</tr>
<tr>
<td>Structural model</td>
<td>2.120</td>
<td>.061</td>
<td>.925</td>
<td>.917</td>
<td>.065</td>
</tr>
<tr>
<td>Moderation model</td>
<td>1.975</td>
<td>.057</td>
<td>.929</td>
<td>.920</td>
<td>.062</td>
</tr>
</tbody>
</table>

Fig. 2. Standardized structural model. All paths were tested simultaneously.

*p < .05. **p < .01. ***p < .001.
5. Discussion

The current study investigated the relationships among entrepreneurship course characteristics (a challenging learning environment and teacher-student relationships), entrepreneurial self-efficacy, study engagement, and entrepreneurial intentions. Our findings show that a challenging learning environment relates positively to entrepreneurial self-efficacy and study engagement, which in turn significantly foster entrepreneurial intentions. Teacher-student relationships only relate significantly and positively to study engagement, but not entrepreneurial self-efficacy. The indirect effect of teacher-student relationships on entrepreneurial intentions through study engagement was not significant and above the indirect relationship between a challenging learning environment and entrepreneurial intentions through study engagement. Furthermore, our results show that need for achievement strengthens the positive relationship between a challenging learning environment and study engagement, and teacher-student relationships are significant in increasing entrepreneurial self-efficacy among students with a high need for affiliation. Taken together, these findings make several theoretical contributions.

5.1. Course characteristics

Our study enriches the research on entrepreneurship education effectiveness by empirically addressing the effects of a challenging learning environment and teacher-student relationships on entrepreneurial self-efficacy and study engagement in an entrepreneurship course. Nabi et al. (2017) concluded that novel ways of evaluating entrepreneurship course impact in higher education are needed, our study responses to their call and includes two aspects of an entrepreneurship course. The results indicate that a challenging learning environment fosters entrepreneurial self-efficacy and study engagement, whereas supportive teacher-student relationships only relate to study engagement. This extends results of previous studies, which showed that entrepreneurship courses can increase student entrepreneurship, but which had not shed light on the role of different teaching methods and interpersonal relationships (Iipinge & Shimpanda, 2021). Considering the importance of challenging learning environments and teacher-student relationships in higher education (Hagenauer & Volet, 2014), our findings partially corroborate the results of previous studies among university students in other educational settings (Brouwer et al., 2016; Fast et al., 2010; Xerri et al., 2018). Whereas we investigated the relationships between two course characteristics and self-efficacy and study engagement in the context of an entrepreneurship.

5.2. “Hot” and “cold” pathways

Second, our study adds to current insights by empirically unveiling the mechanisms explaining how entrepreneurship course characteristics foster entrepreneurial intentions through promoting entrepreneurial self-efficacy and study engagement. Building on the Theory of Planned Behavior, Mueller (2011) assessed the impact of entrepreneurship course characteristics on students' entrepreneurial intentions. However, they neglected the role of study engagement, a critical factor contributing to student outcomes in both higher education and entrepreneurship education. Entrepreneurship course characteristics can be expected to influence entrepreneurial intentions through different pathways, such as perceived behavioral control and/or attitudes towards entrepreneurship (Mueller, 2011). Previous studies largely described these pathways in terms of “cold” cognition, that is, cognitive processes that are free of affect. Affect related, or so-called hot process rarely enter the picture (Healey et al., 2017). In response to the call from Nabi et al. (2017) that more studies should address the importance of student affect in entrepreneurship education, our study showed two different pathways through which entrepreneurship education can impact students' entrepreneurial intentions: a cognitive pathway through impacting self-efficacy (a cold process) and an affective pathway through increasing engagement (a hot process). This is one of the first studies that proposed and tested the positive links between entrepreneurship course characteristics and study engagement, as well as the link between study engagement and entrepreneurial intentions.

5.3. Student needs differences

Third, building on PE fit theory, we have provided the first empirical evidence that individual differences in needs may explain why some students show more potential for and interest in entrepreneurship than others, after participating in an entrepreneurship course. While studies indicated that course characteristics influence student entrepreneurial outcomes (e.g., Mueller, 2011), these studies offer little insight on how to continuously improve teaching techniques and approaches for entrepreneurship education to meet the needs of students. Our findings provide new insights by introducing personal needs as moderators of the way the study environment relates to study outcomes. Results indicate that the positive effects of teacher-student relationships on entrepreneurial self-efficacy are significant among students with high need for affiliation. Part of these findings also respond to the call from Xerri et al. (2018) that future studies should consider a broader range of variables, and necessary to further explore the outcomes of teacher-student relationships and approaches to cultivating effective teacher-student interactions.

6. Limitations and future research

Despite its merits, some limitations of this study should be acknowledged. First, our study included a limited number of entrepreneurship course characteristics. There are several additional course variables, beyond these measured in this study, that might work together to increase students' entrepreneurial outcomes. Future investigation of a wider variety of entrepreneurship course characteristics (such as student-student relationships) and their influence on students' outcomes are necessary to substantially contribute to a fuller understanding of effective entrepreneurship course variables (Nabi et al., 2017). PE fit theory may provide an interesting framework, as it integrates both environmental characteristics and student individual differences. Educators in higher education institutions are teaching in an environment with diverse students and deciding on the appropriate teaching methods for such a diverse audience becomes important and challenging (Iipinge & Shimpanda, 2021).

Second, our study established the moderating role of need for achievement and need for affiliation. However, PE fit has several content dimensions and different types that deserve further investigation. For instance, future research could explore the fit of student entrepreneurship teams or teaching styles with students' attributes, goals, and learning styles. These variables could also be important, because some students may perceive poor fit and thus move away from entrepreneurship. Prior research suggested that entrepreneurship education should help students learn more about the person-side of the PE fit (Hsu et al., 2019) and educators should individualize entrepreneurship education to put different students into context (van Gelderen, 2012). In addition, the scales that were used to measure need for achievement and need for affiliation, which were taken from the Manifest Needs Questionnaire (Steers & Braamstein, 1976), had low Cronbach's alpha reliabilities. For future studies it is recommended to develop measures with a higher internal consistency.

Third, the generalizability of the current findings might be limited. Different entrepreneurship courses may include a wide range of aims, potential entrepreneurial outcomes, pedagogical designs, and methods; and educators are still struggling to find the most appropriate and effective teaching approaches for entrepreneurship education. Confusion regarding the impact of entrepreneurship education may result from the diversity of pedagogical methods employed in entrepreneurship courses, and pedagogy impact depends on an extent on the aims of
the entrepreneurship course. For instance, Morselli (2018) focused on an entrepreneurship course that was structured with constructive alignment principles and aimed to move beyond reflection on entrepreneurship towards action. Their findings suggested that students developed more enterprising attitudes because of participating in the course. Hahn et al. (2020) conducted a quasi-experiment to identify the effects caused by participation in entrepreneurship courses aiming to develop entrepreneurial skills and prepare students to engage in entrepreneurial activities. They indicated that entrepreneurial courses contributed to students' entrepreneurial skills. Besides, whether these teaching methods have differential effects for students with different needs still remains an open question.

In spite of these limitations, our framework provides a meaningful understanding of the topic that are expected to apply to a wide range of educational settings. The variables included in our study are typical for, but not specific to entrepreneurship courses. These variables are critical when teaching a wide range of topics in higher education and contribute to student outcomes in general. A recommendation for future research is to survey a larger and broader variety of (entrepreneurship) courses and programs to investigate the generalizability of our findings to different contexts. The majority of entrepreneurship education studies were undertaken in business schools (Ahmad et al., 2018), and future studies could be carried out outside of the business school perspectives (such as engineering and science, hospitality, and tourism). Besides, people are under the influence of contexts embedded in the broader cultural climate, and there likely exists variability in their basic psychological needs across cultures (Deci & Ryan, 2012). Individuals in a more collectivist-oriented Asian context, such as China, would benefit more from being involved in caring and supportive relationships, as they are in a more socialized and interpersonal context (Chen et al., 2015). Therefore, compared with students in individualist cultures, students in collectivist cultures may benefit more from the positive teacher-student relationships and then develop greater entrepreneurial potentials. Future studies could further investigate student needs differences in a more diverse sample that comes from different cultures.

7. Practical implications

Despite its limitations, our study has several practical implications for managers in higher education and educators who consistently aim to improve the effectiveness of entrepreneurship education. Knowledge of what specific entrepreneurship course characteristics and teaching methods influence student outcomes is important for educators to design the course in a more targeted manner (Mueller, 2011; Yang et al., 2021). Our results showed the importance of a challenging learning environment and teacher-student relationships in fostering students’ entrepreneurial potentials. Hence, providing a challenging learning environment should be the core element of an entrepreneurship course. Teachers should encourage students to explore their original ideas and think outside the box. Challenging and graded assignments are also essential to encourage students to think critically and innovatively (Mayhew et al., 2012). Participating in challenging assignments allows students to notice their incremental improvement in a subject, such as entrepreneurship, which increases their feelings of self-competence and leads to stronger beliefs in their abilities (Fast et al., 2010). A certain level of entrepreneurial potentials (e.g., competence, self-efficacy) is essential for starting a new business and better prepares young students for new labor market requirements (Deprez et al., 2021). In addition, teachers are advised to keep active and good relations with students, understand their learning needs and interests, and invest in their students by employing strategies that fit a deeper learning approach. Our study showed that this relates positively to students’ increased study engagement.

Our results also indicate that both individual differences and course characteristics interact with each other and influence students’ entrepreneurial outcomes. Teachers may need to use different teaching methods and establish a varied course environment to match different types of students (Iipinge & Shimpannda, 2021). Our findings reveal that for student with a high need for achievement, the positive effect of a challenging learning environment on study engagement is stronger. Thus, teachers could give these students more difficult assignments, challenge their ideas more frequently and deeply, as well as provide more feedback on their progress and achievements. For students with a high need for affiliation, teacher-student relationships fosters their entrepreneurial self-efficacy. Teachers should show their approval and acceptance and cultivate positive interactions with these students. Since they may learn and perform best in a more supportive environment, teachers could also provide more frequent guidance, opportunities, and resources to facilitate their learning and entrepreneurial self-efficacy.

Individuals low in needs differ from individuals high in these motives in many aspects (Chen et al., 2015). For example, students low in need for achievement may choose fewer challenging tasks and avoid receiving too much feedback about their progress and achievements. Thus, teachers need to assure that the tasks are not too challenging but preferably within the reach of these students and provide feedback on regular intervals. Extrinsic motivation should also be useful to stimulate learning of these students (Richardson, 2010). Students who have a low need for affiliation may struggle in the course if they are expected to actively interact with others and build close relationships. They have a less intrinsic desire for being a part of the course and are more independent than others. Teachers should consider their low affiliation need and identify what motivates those students to their enhanced learning outcomes.

8. Conclusion

To conclude, this study provides a fruitful framework to explain the potential mechanisms between entrepreneurship course characteristics and student entrepreneurial intentions, as well as how different students benefit differently from a challenging learning environment and supportive teacher-student relationships. Taking students' needs differences into account, we add valuable new insights into entrepreneurship education research, and the findings contribute to continuously evaluating and improving entrepreneurship education courses.

References


