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**Onjewu, A-KE, Haddoud, MY and Nowiński, W (2021) The effect of entrepreneurship education on nascent entrepreneurship. Industry and Higher Education. ISSN 0950-4222**

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**Article type: Article**

# **The effect of entrepreneurship education on nascent entrepreneurship**

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## **Abstract:**

The literature has been enriched by studies examining the effect of entrepreneurship education on entrepreneurial or goal intention. Yet, few articles have considered how entrepreneurship education affects nascent entrepreneurship as a more sought after outcome. Similarly, some scholars assess entrepreneurship education as an aggregate rather than a multidimensional construct comprised of alternative methods with peculiar characteristics yielding distinct student outcomes. Possibly, the present shortage of specificity in the investigation of methods in entrepreneurship education reduces empirical understanding of efficacious teaching and learning modes for optimising entrepreneurial behaviour. Hence, by way of contribution, this inquiry isolates and measures the direct effect of courses, workshops, guest speakers and simulations on new venture creation among UK students. It also measures indirect influence in the same relationships, with self-efficacy as a mediator. A structural equation analysis is performed and the findings show that discretely, in this order, simulations, workshops and courses stimulate nascent entrepreneurship. However, there is particular insignificance in the direct link between guest speakers and nascent entrepreneurship, and further dissociation in the indirect link between workshops and simulations leading to self-efficacy. Theoretical implications arise for future correlation and configurational studies, as well as practical ramifications for entrepreneurship education practitioners, simulation developers and public institutions.

**Keywords:** Entrepreneurship education, self-efficacy, nascent entrepreneurship, gender, structural equation modelling, UK

## **Introduction**

For the most part, studies in the nascent entrepreneurship domain aim to clarify the stimulating effect of new venture creation on economic development (Mueller, 2006; Acs, 2008; García-Pereiro & Dileo, 2015; Zhang et al., 2020). There is evidence that the aggregation of micro-level entrepreneurship elicits growth (Long et al., 2010), and nations with greater economic power are better placed to sustain such expansion (Carree et al., 2008). Hence, across the board, multi-level governments and public institutions have shown an interest in facilitating formal and informal education in entrepreneurship, as well as sponsoring entrepreneurial ecosystems or networks to augment the volume of nascent entrepreneurs (Motoyama & Knowlton, 2016; Mergemeier et al., 2018). If realised, some of the benefits of harbouring new ventures en masse are job creation and a rise in per capita income (Shane & Venkataraman, 2000; Teixeira et al., 2018). For these reasons, nascent entrepreneurship has risen to the top of the agenda of world bodies, not excluding the World Trade Organization (2016) and the Organization for Economic Co-operation and Development (2017).

Nascent entrepreneurs are ‘individuals who are actively taking steps towards the creation of a new business but who are not entrepreneurs yet’ (Tuazon et al., 2018:2). Thus, the empirical and practical disparity between individuals in the process of new venture creation versus individuals merely possessing a goal intention is well established (Arenius & Minniti, 2005; Wennekers et al., 2005; Lichtenstein et al., 2007; Renko et al., 2012; Yoon et al., 2018; Chadwick & Raver, 2020). Categorically, González-López et al. (2020:1) maintain that ‘entrepreneurial intention has been observed to be a necessary but insufficient condition for new venture creation’. For this reason, to understand the ingredients for attaining large-scale nascent entrepreneurship, scholars have sought to investigate, among other antecedents, the role played by personality characteristics (Shook et al., 2003; Hmieleski & Lerner, 2015), market demand (Van Gelderen et al., 2011), resources (Klyver & Schenkel, 2013), business

planning (Greene & Hopp, 2017), social capital (Romano et al., 2017) and ecosystems (Guerrero et al., 2020) in provoking business formation.

The current inquiry examines entrepreneurship education (EE) as a further antecedent, and what direct effect there is on nascent entrepreneurship (NE). Predominantly, prior studies exploring the relevance of EE to the entrepreneurial process have investigated entrepreneurial intention (EI) as an outcome (Fayolle et al., 2006; Jones & Iredale, 2010; Piperopoulos & Dimov, 2015; Nabi et al., 2017; Nabi et al., 2018). While EI remains the most commonly used proxy for assessing the likelihood that individuals will commit to entrepreneurship, both Kautonen et al. (2013) and Shirokova et al. (2016) indicate that its association with entrepreneurial behaviour is not perfect. Thus, of ultimate importance to policy-makers is the relationship between EE and actual entry into entrepreneurship. Recognising this, Nabi et al. (2017) have urged scholars to shift the focus of EE research in this direction. Yet, studies observing the consequence of EE on early-stage entrepreneurship remain rare (Cho & Lee, 2018), and fall short of specifying the tools employed to realise the intended outcome (Roberts et al., 2014).

Furthermore, it has also been observed that even studies linking EE with EI seldom compare the impact of diverse methods (Nabi et al., 2017). The only notable exceptions are, although with inconsistent findings, Walter and Dohse (2012) and Kassean et al. (2015). Therefore, this study fills this vacuum and contributes to our understanding of the link between EE and entry into entrepreneurship by focusing on NE instead of EI as the outcome variable, and by specifying different methods of delivering EE. Additionally, the inherent model is developed with entrepreneurial self-efficacy as a mediating variable. This acknowledges scholars' persistent recognition of self-efficacy as a critical EE outcome and EI predictor (Forbes, 2005; Zhao et al., 2005; McGee et al., 2009; Abaho et al., 2015; Farrukh et al., 2017, Şahin et al., 2019; Newman et al., 2019). Thus, insights from

operationalising the direct and indirect variance of EE, self-efficacy and NE in a structural model will extend existing theoretical boundaries in entrepreneurship research.

To proceed, the aim of this study is to determine the extent to which EE predicts NE. We also seek to identify and clarify the direct and indirect relationships between specific EE tools and nascent entrepreneurship because researchers ought to reflect on particular methods of delivery and the wider socio-economic value arising therein. This perspective is consistent with Higgins et al. (2013) and Seikkula-Leino et al.'s (2015) contention that teaching narratives and belief systems have a bearing on desired outcomes; be they goal intention, implementation intention or nascent entrepreneurship. Hence, with evidence from the UK, this paper isolates and sheds light on specific EE methods in order to raise empirical and practical understanding of 'what happens in the classroom'. We commence with an appraisal of entrepreneurship education, nascent entrepreneurship and self-efficacy by way of a literature review. Subsequently, the data collection method is described, followed by a presentation of findings, a discussion and the implications of the study.

### **Theoretical Background and Hypotheses Development**

A vast array of EE paradigms are cited in the literature (Mwasalwiba, 2010; Honig & Hopp, 2019). The range includes active versus passive (or reflective) methods (Bennett, 2006), demand versus supply techniques (Bécharde & Grégoire, 2005; Fayolle & Gailly, 2008), learner versus teacher centred instruction (Krueger, 2007), universalistic versus idiosyncratic styles (Blenker et al., 2012), didactic versus experiential approaches (Kolb & Kolb, 2009; Ismail et al., 2018) and theory versus practice instruments. However, it is debatable to what extent the aforementioned correlate with Hall et al.'s (1905: 375) timeless description of education as 'methods of teaching or imparting knowledge or instruction' including 'all those processes by which information is given'. In both practical and empirical terms, Fayolle and Gailly (2008) and Nabi et al.'s (2017) teaching model framework afford more discernible and measurable 'methods' and 'processes' in the form of (a) courses (also known as modules in

some settings) (Li et al., 2003; Rae et al., 2012; Nieuwenhuizen et al., 2016); (b) workshops (Garavan & O’Cinneide, 1994; Pruett, 2012; Bullough et al., 2015; Omotosho et al., 2020); (c) guest speakers (Solomon, 2007; Kirkwood et al., 2014; Daneshjoovash & Hosseini, 2019); and (d) simulations (Hindle, 2002; Bellotti et al., 2014; Zulfiqar et al., 2019). We now proceed to hypotheses development through a review of these methods.

### *EE and Nascent Entrepreneurship*

Interest in how courses, workshops, guest speakers and simulations help nascent entrepreneurs is prevalent in the contemporary literature (Games et al., 2019). Firstly, courses (or modules) are the smallest units of taught programmes, with activities designed to satisfy clearly predetermined outcomes (Hussey & Smith, 2008; Yulastri et al., 2017; Anderson et al., 2020). Common course titles are ‘Creativity’, ‘Entrepreneurial Finance’, ‘Introduction to Entrepreneurship’, ‘New Venture Creation’ and ‘Team Building’ (Hynes, 1996; Mustar, 2009; Turnbull & Eickoff, 2011; Lund et al., 2017; Li et al., 2018). The effectiveness of courses for nurturing entrepreneurial awareness has been extolled by Nieuwenhuizen et al. (2016). Nonetheless, there is reason to test Roberts’s (2012: 9) argument that ‘the modules approach is the best option we have as educators’ vis-à-vis nascent entrepreneurship as an outcome. Secondly, workshops are training and hands-on events that take a case-method or action approach to increase business ideation, encourage critical thinking and inspire creativity (Davey et al., 2011; Pruett, 2011; Cope, 2011; Hunter and Lean, 2018; Kurmanov et al., 2020). Workshops have been noted to increase participants’ confidence and willingness to collaborate (Pruett, 2011; Jäggle et al., 2018). Yet, how this activity impacts on nascent entrepreneurship is ill-defined. Thirdly, guest speakers, engaged as a reflective method (Bennett, 2006), are role models with the capacity to relay entrepreneurial experiences, listen and offer feedback (Kirkwood et al., 2014; Dakung et al., 2017; Jones and Liu, 2019, Nowiński & Haddoud, 2019). Scholars agree that guest speakers inspire, arouse positive emotions and increase motivation (Thrash & Elliott, 2003; Xie & Wang, 2014; Nowiński &

Haddoud, 2019). Still, Nabi et al. (2017) assert that the process by which guest speakers inspire remains under-researched. Lastly, simulations are physical or virtual games that model entrepreneurial reality in secure and risk-free environments (Shepherd, 2004; Ahmad et al., 2018; Zulfiqar et al., 2019). Examples are platforms such as Interpretive Solutions, GoVenture and SimVenture Classic (Fox et al., 2018). Their capacity to dramatise entrepreneurial events stirs interest, reduces stress and aids the retention of knowledge (Popil & Dillard-Thompson, 2015; Kriz & Auchter, 2016; Mawhrter & Garofalo, 2016). Nevertheless, Zulfiqar et al. (2019) suggest that training for educators and a reluctance to adopt technology may hinder the use of simulations as a tool.

To support development of our first hypothesis, Table 1 clarifies the unique attributes of the EE methods under consideration. Acknowledging peculiarities in the table, and to test how the respective methods distinctly inspire entrepreneurial behaviour, we hypothesise that:

**H1:** Entrepreneurship education in the form of (a) courses, (b) workshops, (c) guest speakers and (d) simulations is positively and directly related to nascent entrepreneurship.

Table 1 about here

### *EE and Self-efficacy*

There is recognition that other factors, such as individuals' perception of self-employability or self-efficacy (Bandura, 1977; Zhang et al., 2013), may be regulated by EE. Precisely, self-efficacy measures people's perception of the ease or difficulty of performing a behaviour (Ajzen, 2002). In other words, cognitive traits ought to be considered in the assessment of EE as they have a bearing on individuals' choices, motivation, goal-setting and eventual performance (Zhao et al., 2015), and perceptual variables matter in models analysing entrepreneurial behaviour (Arenius & Minniti, 2005). An optimum level of self-efficacy generates confidence and self-belief so individuals are intrinsically incentivised to persevere when challenges arise (Axelrod & Lehman, 1993; Bandura & Locke, 2003). In this manner, self-efficacy educes essential attributes for opportunity recognition, forecasting, marshalling,

managing people and finances (McGee et al., 2009). To clarify the relationship between individuals' self-perception and EE, we hypothesise that:

**H2:** Entrepreneurship education in the form of (a) courses, (b) workshops, (c) guest speakers and (d) simulations is positively associated with self-efficacy.

### *Self-efficacy and Nascent Entrepreneurship*

As entrepreneurial self-efficacy is said to be a significant trigger of EI (Austin & Nauta, 2016; Moriano et al., 2012; Nowiński et al., 2019), as well as an enabler of entrepreneurial exertion (Trevelyan, 2011), it is conceivable that it may also elicit NE. This is explained by the self-efficacy dimension being action-oriented and integrally compatible with entrepreneurial performance (Forbes, 2005; Carr & Sequeira, 2007; Sardeshmukh & Corbett, 2011; Newman et al., 2019). As an outcome, NE has been measured by a range of criteria. For example, McMullen & Dimov (2013) and Kim et al. (2015) identify positive cash flow from initial trading as evidence of venture creation. On the other hand, Davidsson & Gordon (2012) opine that the tracking of NE ought to capture individuals' activity in the attempt to achieve profitability. These activities have been alternately labelled as the pre-operational stage, the business creation process, starting-up, spinning-out and firm-founding (Davidsson et al., 2011). All things considered, NE can be observed through entrepreneur-based (Reynolds, 2017), firm-based (Arenius et al., 2017) and external criteria (Haltiwanger et al., 2017). Accordingly, inspired by McGee et al.'s (2009) correlation model, the third hypothesis aims to ascertain how much self-efficacy sparks NE in the current context:

**H3:** Self-efficacy is positively associated with nascent entrepreneurship.

### *EE, Self-efficacy and Nascent Entrepreneurship*

The crux of the current review, consistent with Honig & Hopp (2019: 30), is that 'nascent entrepreneurs have diverse innate preferred learning styles'. To this end, set orientations or individual preferences for transforming learning experiences into action (Mainemelis et al.,

2002) could, possibly, be attributed to the mediating effect of self-efficacy. Tsai et al. (2016) have since urged scholars to extend the links between self-efficacy and entrepreneurial outcomes. Previous research has shown that self-efficacy explains the relationship between formal learning and entrepreneurial intention (Zhao et al., 2005). Similarly, Darmanto and Yuliari (2018) claim that the mediating role of entrepreneurial self-efficacy has the greatest effect on entrepreneurial behaviour, while Dalborg and Wincent (2014) allude to self-efficacy as being fundamental to social learning. The basis of the ensuing hypothesis is to investigate whether the influence of self-efficacy is stronger than the direct effect of EE on NE:

**H4:** Self-efficacy mediates the link between (a) courses, (b) workshops, (c) guest speakers, (d) simulations and nascent entrepreneurship.

#### *Gender*

There is an argument that males and females accessing EE attain divergent outcomes (Shinnar et al., 2014). Both Oosterbeek et al. (2010) and Westhead & Solesvik (2016) have found that EE generates more positive entrepreneurial propensity among men than women, and Thébaud (2010) determined that women require more advanced education to express the situational competence needed for entrepreneurship. Despite or because of these findings, women have a greater perception of the benefits of EE than men (Packham et al., 2010), and Wilson et al. (2007) believe that EE produces stronger self-efficacy among women than men. Bönnte & Piegeler (2013) assert that there is a gender gap in nascent entrepreneurship induced by women being less competitive and less willing to take risks. On the whole, studies, including those by Maes et al. (2014) and Nowiński et al. (2019), have identified gender as a predictor of entrepreneurial behaviour, with the latter identifying a stronger link between EE and some of the dimensions of entrepreneurial self-efficacy for women. With this in mind a concluding hypothesis is contemplated:

**H5.** The association between entrepreneurship education in the form of (a) courses, (b) workshops, (c) guest speakers and (d) simulations on students' self-efficacy is moderated by gender.

## **Method**

To test the hypotheses, a total of 262 responses from students in the UK were obtained from SmartSurvey, a data collection agency. The data were generated from a panel using non-probability, convenience sampling. Notwithstanding the generalisability limitations of this approach, it is commonplace in entrepreneurship studies (for example Kautonen et al., 2015; Nowiński et al., 2019; Haddoud et al., 2020).

The choice of the UK is informed by a number of reasons. Firstly, the World Bank (2019) ranks the UK as 18th out of 190 countries in the ‘Starting a Business’ index, trailing behind less developed and low- to middle-income countries such as Armenia (10th), China (5th), Georgia (2nd), Jamaica (6th), Kosovo (12th), Togo (15th) and Uzbekistan (8th). Comparatively, the UK also lags behind developed counterparts, such as Australia (7th), Canada (3rd), New Zealand (1st) and Singapore (4th), notwithstanding a long-term industrial strategy to increase access to finance and self-employment within the population (Global Entrepreneurship Monitor, 2020). Secondly, in terms of the presence of supportive and constraining conditions for new venture creation, the UK has an aggregate score of 4.83/10 in the National Entrepreneurship Context Index in the observation of 54 countries. It falls behind India (5.8/10), Indonesia (5.69/10) and Thailand (4.99/10) on this measure (Global Entrepreneurship Monitor, 2019). Thirdly, in the league of high-income countries, the UK’s total early-stage entrepreneurial activity among adults aged 18–64 is a modest 9% and ranks 22nd out of 33 territories (Global Entrepreneurship Monitor, 2020). Lastly, considering the supportive and constraining conditions for venture creation, the Global Entrepreneurship Monitor (2020) has identified EE as being the least developed dimension, in comparison to physical infrastructure, knowledge transfer and favourable government policy. This is unanticipated, considering the wholesale provision of EE reported in the UK and other settings (Hannon, 2005; Matlay & Carey, 2007; Jones et al., 2017; Mei & Symaco, 2020).

The core variables in this study were measured using items sourced from extant studies. Nascent entrepreneurship was measured using items extracted from McGee et al. (2009). Here, we created a composite variable reflecting the number of steps taken by students in activities related to new business creation. The single item composite score ranged from 0 to 7. As for self-efficacy, 6 items were adopted from Seborá & Tantiukoskula (2011), which were in turn sourced from Luthans et al. (2007). The single items measuring EE methods were self-developed in order to reflect the main approaches familiar to students in the UK. Once more, these were courses/modules, guest speakers, workshops and simulations. As with all cross-sectional surveys, the likelihood of common method bias is present. To check this, a post-hoc Harman's one-factor test was undertaken (Mattila & Enz 2002; Lings et al. 2014). The single factor accounted for less than 50% of the total variance. Therefore, the results depict no major signs of common method bias. Table 2 presents the main features of the sample in terms of gender, age, field and level of study.

Table 2 about here

As shown in Table 2, the proportion of female students was slightly higher than that of male students. Moreover, 49.6% of students were less than 25 years old, while just over 50% were 26 or older. As for field of study, the vast majority of students were either enrolled in an economics or business major. Lastly, postgraduate students exceeded undergraduate students (64.4% vs. 35.6%). While this seems an unusual distribution, such proportions could be attributed to the nature of panel samples.

## **Analysis**

### *Reliability and validity of constructs*

In this study, all variables, bar the self-efficacy construct, were measured using single items. Therefore, reliability and validity assessment arises only for self-efficacy. Being a reflective variable, its individual item reliability can be examined through the outer loadings, while construct reliability is assessed through composite reliability (CR) and Cronbach's Alpha

coefficient. Lastly, validity is examined by inspecting the Average Variance Extracted (AVE). On the one hand, reliability refers to the consistency of a measure, or the extent to which a given measure produces consistent outcomes under consistent conditions. On the other hand, validity considers the extent to which a set of indicators jointly measures what it is expected to measure (Hair et al., 2016). The coefficients are depicted in Table 3 and the analysis is conducted using WarpPLS 7.0 (Kock, 2020).

Table 3 about here

The outer loadings for all items indicated good individual reliability. Table 3 illustrates that the remaining three indices met the required thresholds; that is, 0.7 and 0.5, for internal reliability and convergent validity of reflective variables respectively (Henseler et al., 2009; MacKenzie et al., 2011; Schmiedel et al., 2014). Finally, multicollinearity issues and common method bias were checked for both reflective and formative variables using the variance inflation factor (VIF). The VIF for each construct was below the 5 threshold, with the highest value being 2.988. Hence, there are no major collinearity issues nor suggestions of common method bias.

### *Hypothesis Testing*

Table 4 and Figure 1 present the path coefficients, significance levels and coefficient of determinations ( $R^2$ ) for the structural model in view of the hypothesis testing.

Table 4 and Figure 1 about here

As shown in Figure 1, both courses and guest speakers hold a positive and significant influence on students' self-efficacy, hence accepting H2a and H2c. In turn, students' self-efficacy does have a significant and positive influence on nascent entrepreneurship, therefore H3 is accepted. As for the direct effects of EE on nascent entrepreneurship, only the triad of courses, workshops and simulations has a positive and significant influence, accepting H1a,b,c. As for indirect influence, entrepreneurship courses were the only tool showing a significant (although at 10% and weak) indirect influence on nascent entrepreneurship

( $\beta=0.06$ ,  $p=0.08$ ). Hence, only H4a is accepted (partial mediation). Lastly, we can conclude that the model explains 26% of self-efficacy and 55% of nascent entrepreneurial behaviour.

### *Gender Comparison*

To assess the influence of gender on the proposed model, a multi-group analysis was performed. However, ab initio, measurement invariance ought to be assessed to ensure the equivalence of the construct across the two groups (Putnick & Bornstein, 2016). This was performed using the constrained latent growth with loadings option (Williams et al., 2009), which revealed no significant differences between male and female samples in all items, with  $p$  values ranging from 0.27 to 0.50.

The multi-group analysis (using the constrained latent growth approach) revealed that, when comparing the two genders, the relationship between courses and self-efficacy, as well as the link between simulations and self-efficacy, were the only associations showing significant differences ( $p$  value = 0.03 and 0.04, respectively). To be precise, courses have a greater positive influence on females' self-efficacy than on males' self-efficacy ( $b_{\text{females}} = 0.39$  vs.  $b_{\text{males}} = 0.23$ ). Furthermore, while the influence of simulations on females' self-efficacy was positive ( $b_{\text{females}} = 0.12$ ), for males, the relationship was negative ( $b_{\text{males}} = -0.21$ ). Hence H5a and H5d are accepted while 5b and 5c are rejected.

### **Discussion**

To summarise the results, a number of conclusions can be drawn. First, in terms of the strength of direct influence, the analysis showed that simulations, followed by workshops and then courses, have a significant and positive effect on NE. In the current context, this confutes the earlier claim by Roberts (2012: 59) that 'the modules approach is the best option we have as educators'. Second, courses and guest speakers have a largely positive and significant influence on enhancing self-efficacy, whereas workshops and simulations do not. In turn, self-efficacy also has a positive and significant influence on NE. Third, the gender

comparison showed that courses enhance self-efficacy in females more than in males. Similarly, fourth, simulations enhance females' self-efficacy but reduce it in males. These findings compel further comparison with extant work.

To begin with, only one EE method, guest speakers, shows a deficient positive relationship with NE and this is noteworthy. A possible explanation for this lack of direct effect could be the intermittent nature of guest speaker interactions, which could decrease impact. Nabi et al. (2018) also indicate that negative experiences with a tutor, or in this case with a guest speaker, might have an adverse effect on students' emotions, intentions and behavior. As it is justified to consider guest speakers as role models, we could have expected that entrepreneurial self-efficacy would mediate their link with nascent entrepreneurship, as it mediates the link between role models and entrepreneurial intention (BarNir et al., 2011). However, this is not the case. The lack of a direct or indirect effect on nascent entrepreneurship could be explained in light of Kirkwood et al.'s (2014) argument that guest speakers are often perceived by students as difficult lessons of entrepreneurial reality and the complexity of pursuing entrepreneurial opportunities. Thus, guest speakers may inadvertently deter students from entrepreneurial activity (Oosterbeek et al., 2010; Nabi et al., 2018). In this vein, we concur with Nabi et al. (2017) that there is need for further research into the process by which guest speakers affect students.

Furthermore, while courses as an EE method have a smaller direct contribution to NE than simulations, when the indirect effect through self-efficacy is considered, the contribution of both approaches is comparable. Thus, it is interesting to note that traditional EE methods like courses (Roberts, 2012) and novel alternatives like simulations (Kriz & Auchter, 2016; Zulfiqar et al., 2019) can both enhance NE. Still in terms of the indirect relationship, neither workshops nor simulations have any effect of NE through self-efficacy. This finding corresponds with Abaho et al. (2015) who found, similarly, a non-significant relationship between participation in business games and entrepreneurial self-efficacy. Nevertheless, the

finding opposes that of Kriz & Auchter (2016) who observed a positive influence of simulations on the business knowledge and skills of users. The insignificance in the relationship between simulation and workshops could be attributed to the multidimensionality of entrepreneurial self-efficacy (McGee et al., 2009). Essentially, participation in these EE activities probably has a diverse influence on different aspects of the compound entrepreneurial self-efficacy construct which produces insignificant relationships when the construct examined is unidimensional. It is also worth noting that the four EE methods could be expected to embody a diverse mix of reflective and active learning components (Bennett, 2006; Pittaway et al., 2011; Dohse & Walter, 2012). Accordingly, the guest speaker method can be expected to be dominated by reflective components that affect entrepreneurial self-efficacy but not nascent entrepreneurship. In turn, the course method can be expected to include both reflective (lecture) and active (case study) components that affect both entrepreneurial self-efficacy and nascent entrepreneurship. Then, in the two methods, workshops and simulations, where the active component plays a dominant role at the expense of being reflective, nascent entrepreneurship is affected but not entrepreneurial self-efficacy.

Moreover, it is found in this study that gender moderates the relationships between participation in courses and simulations and entrepreneurial self-efficacy. It is observed that entrepreneurship courses have a significantly higher positive influence on females' self-efficacy than on that of males. This is consistent with Wilson et al.'s (2007) assertion that EE produces stronger self-efficacy among women than men, and overlaps with Nowiński et al. (2019) who confirmed the same for certain dimensions of entrepreneurial self-efficacy. It also coheres with Packham et al.'s (2010) contention that women have a greater perception of the benefits of EE than men, and Pfeifer et al.'s (2016: 109) view that 'male students have higher entrepreneurial intentions, although they do not have higher self-efficacy'.

Finally, the finding that simulations increase females' self-efficacy but have the reverse effect in males is an intriguing one. Depending on the content, the value of

simulations for female and male students may vary. On the one hand, it has been observed that enhancing creativity, stirring interest and increasing knowledge retention (Popil and Dillard-Thompson, 2015; Mawhrter and Garofalo, 2016) seem to accrue mainly to females to the disadvantage of their male counterparts. Yet, on the other hand, business simulations have been found to be better perceived by males and to have a less negative outcome for their motivation (Kriz & Aucher, 2016) or entrepreneurial intent (Newbery et al., 2016). The observed difference between genders is especially mystifying as Achor et al. (2010) urged scholars to explore simulations as a method for mitigating gender-related differences in entrepreneurial performance. A possible explanation for the observed difference is that it may be linked to variance in learning styles among men and women, and consequently in the experience derived from participating in simulations (Garber et al., 2017). To press the point, Garber et al. (2017) have found that female students are drawn to the collaborative experience of simulations, while male students are attracted to the relative ease of navigating gaming software and the opportunity to assert their competitive nature. Even so, from a competitive perspective, losers would not naturally be expected to increase their self-efficacy, nor would winners who perceive simulations to be easy.

## **Conclusion**

To satisfy Roberts et al.'s (2014) urge for scholars to specify the EE methods being offered, this study has identified and measured courses/modules, guest speakers, workshops and simulations as definitive EE tools. In so doing, it has also addressed Swann et al.'s (2007) specificity matching principle as empirical research better informs practice when specific predictors are used to estimate specific behaviours (Marsh & O'Mara et al., 2008). Investigating multiple EE tools instead of a composite dimension also pre-empts empirical underestimation (Bracken, 1996; Craven et al., 2003; O'Mara et al., 2006). This is especially necessary considering the sizable public interest and investment in new venture creation in

the UK. We conclude by outlining the implications for practice, the limitations of the study and future research directions.

### *Implications for Practice*

Three obvious ramifications emerge from the findings for EE practitioners, simulation developers and key stakeholders in the UK to reflect on. First, considering the gender disparity in the effect of courses, and to evoke Bullough et al. (2015), there is a need for EE providers to proactively embed human and contextual factors into the design of courses. This could yield the benefit of optimising and equalising NE propensity across genders. Second, developers of simulation activities and games aimed at entrepreneurial performance will find it worthwhile to iterate content and adapt learning outcomes to cater for all genders. Third, to advance their spoken mission, public bodies such as the National Council for Graduate Entrepreneurship (NCGE), the Council for Industry and Higher Education (CIHE) and the National Endowment for Science, Technology and the Arts (NESTA) may embrace these findings to close gaps in the UK's 'Starting a Business', 'National Entrepreneurship Context' and 'Entrepreneurship Education' indices.

### *Limitations and Future Research*

A number of limitations are acknowledged that may also signpost and find redress in future research. The observed population is comprised only of students in the UK; therefore, the results may not be applicable in countries with dissimilar business, educational and environmental conditions. Relatedly, the representativeness of the current findings in non-student social groups is unclear, and this paves way for future studies to capture insights from other social populations. Furthermore, the reliance on panel data yielded a greater population of postgraduate over undergraduate respondents. As a remedy, new studies taking a knock-on-the-door approach will be welcomed. As far as the theoretical model is concerned, it is arguably parsimonious and could be enhanced in two ways. First, new studies could observe

the multidimensional constructs of self-efficacy to clarify the specific behaviours enhanced among females undertaking EE courses. Second, examining the relationship between active and reflective components embedded in the alternative EE methods would also increase our understanding of the ways education can enhance NE. Furthermore, the cross-sectional nature of the current data is recognised and should be considered when inferring causality, as the relationships determined here are not causal links but associations. Any reference to causality in the findings is upheld only by explanatory theory. Likewise, endogeneity problems cannot be ruled out. Hence, the study calls for further research using longitudinal data to validate the proposed conceptualisation. In this sense, pre-intervention and post-intervention comparisons could also be undertaken. Additionally, more studies are needed to untangle the types of entrepreneurial outcomes that are enhanced by simulation activities for respective genders. The current and erstwhile findings seem to suggest that simulations support entrepreneurial goal intention, implementation intention and nascent entrepreneurship in different ways. Also, to supplement the variance-based/net effects approach adopted here, future studies could explore a configurational approach using fuzzy-set qualitative comparative analysis (fsQCA). Such analyses will show what combinations of EE methods, rather than their alternation, are optimum for producing nascent entrepreneurs.

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**Table 1. Characterisation of EE methods.**

<b>EE methods</b>	<b>Attributes</b>
Courses (Modules)	Instructor-led lectures, case studies and group discussions that enable students' critical reflection and entrepreneurial self-discovery (Bennett, 2006).
Workshops (Training)	Technical, intermittent programmes that equip students with fundamental skills in, for example, accounting, budgeting, marketing, legal compliance and personnel management (Garavan & O'Cinneide, 1994).
Guest Speakers	Successful and/or practising entrepreneurs who act as inspiration and sounding boards for students' opportunity recognition and business ideation (Kirkwood et al., 2014).
Simulations (Games)	Computer-based role-playing that engages students in realistic activities designed to increase entrepreneurial knowledge and awareness (Prensky, 2001).

**Table 2. Sample characteristics.**

<b>Gender</b>		
	Frequency	Valid Percentage
Male	115	44.4
Female	144	55.6
Total	259	100.0
<b>Age</b>		
Less than 20	17	6.5
20–22	48	18.3
23–25	65	24.8
26–28	46	17.6
28–30	30	11.5
Over 30	56	21.4
Total	262	100.0
<b>Field of study</b>		
Humanities and Religious Studies	10	3.8
Social Sciences (excluding Economics and Business)	30	11.5
Economics and Business	181	69.6
Science (Mathematics, Physics, Chemistry, Theoretical Informatics)	12	4.6
Engineering and Technology	13	5.0
Life and Natural Sciences	3	1.2
Medical and Health Sciences	5	1.9
Art	6	2.3
Total	260	100.0
<b>Level of Study</b>		
Bachelor's	93	35.6
Diploma	36	13.8
Master's	103	39.5
PhD	29	11.1
Total	261	100.0

**Table 3. Measurement model indicators for reflective constructs.**

	<b>Item loadings</b>	<b>Cronbach's Alpha</b>	<b>CR</b>	<b>AVE</b>
Self-efficacy		0.917	0.936	0.708
Self-efficacy 1	0.823			
Self-efficacy 2	0.877			
Self-efficacy 3	0.816			
Self-efficacy 4	0.840			
Self-efficacy 5	0.834			
Self-efficacy 6	0.857			

**Table 4. Path coefficients and *p* values.**

<b>Relationships</b>	<b>Path Coefficients</b>	<b><i>p</i> values</b>
Course → ESE	0.32	<0.001
Workshops → ESE	0.01	0.39
Guest Lectures → ESE	0.22	<0.001
Simulation → ESE	0.01	0.38
Course → Nascent Entrepreneurship	0.21	<0.001
Workshops → Nascent Entrepreneurship	0.23	<0.001
Guest Lectures → Nascent Entrepreneurship	0.05	0.20
Simulation → Nascent Entrepreneurship	0.27	<0.001
ESE → Nascent Entrepreneurship	0.18	<0.001

**Figure 1.** Structural model.

