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Entrepreneurship Education for Women in Engineering: A Systematic Review of Entrepreneurship Assessment Literature with a Focus on Gender

Christina S. Morton, University of Michigan

Christina S. Morton is a doctoral student in the Center for the Study of Higher and Postsecondary Education at the University of Michigan. Christina has professional experience in Academic and Student Affairs, serving as an Academic Success Coach at Johnson C. Smith University and a Residential Director at North Carolina State University. Her primary research interests are in the motivation and persistence of underrepresented minorities in Science, Technology, Engineering, and Mathematics (STEM).

Dr. Aileen Huang-Saad, University of Michigan

Aileen is an Associate Professor of Practice in Entrepreneurship and Biomedical Engineering. Previously, Aileen was the Associate Director for Academics in the Center for Entrepreneurship and was responsible for building the Program in Entrepreneurship for UM undergraduates, co-developing the masters level entrepreneurship program, and launching the biomedical engineering graduate design program. Aileen has received a number of awards for her teaching, including the Thomas M. Sawyer, Jr. Teaching Award, the UM ASEE Outstanding Professor Award and the Teaching with Sakai Innovation Award. Prior to joining the University of Michigan faculty, she worked in the private sector gaining experience in biotech, defense, and medical device testing at large companies and start-ups. Aileen's current research areas include entrepreneurship engineering education, impact and engaged learning. Aileen has a Bachelor's of Science in Engineering from the University of Pennsylvania, a Doctorate of Philosophy from The Johns Hopkins University School of Medicine, and a Masters of Business Administration from the University of Michigan Ross School of Business. Aileen is also a member of Phi Kappa Phi and Beta Sigma Gamma.

Julie Libarkin, Michigan State University

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Abstract

The nation's economic vitality and global competitiveness depends on the creativity and innovation of its citizenship. While institutions of higher education nationwide are being pressured to train and produce a highly skilled technical workforce, engineering schools are especially challenged with preparing their students to anticipate societal needs and translate their technical expertise into commercializable solutions. In response to this challenge, engineering schools have begun incorporating entrepreneurship education programs within their curriculums. Regardless of differences in size, scope, and student participation, generally, these programs are intended to provide students with fundamental business skills and foster an entrepreneurial mindset[1].

While research has shown that entrepreneurship education programs do increase science and engineering students' entrepreneurial intent[2], potential differences in outcomes based on gender were not examined. Additionally, what is occurring within entrepreneurship education environments that might be influencing women's entrepreneurial outcomes and experiences? Curious about how gender has been addressed in entrepreneurship education scholarship with respect to assessment, a systematic literature review of entrepreneurship education research, to date, as found in two databases that cover engineering, business, and education literature and extracted articles that specifically focus on gender was conducted. After applying inclusion and exclusion criteria, the search yielded 24 articles for this review.

In addition to synthesizing current entrepreneurship education assessment research with an emphasis on gender, this review also provides recommendations for engineering education researchers who desire to examine how entrepreneurship education environments influence women. The purpose of this review is to guide future research on engineering entrepreneurship through a gendered lens. Further, this review serves to inform the development or improvement of existing engineering entrepreneurship education programs that seek to attract and retain more women.

Introduction

With the growing acceptance of an innovation economy, engineering universities and colleges are becoming more proactive in their role in the professional formation of tomorrow's innovation workforce. While maintaining the need to develop technically skilled and analytical engineers, students must also be prepared to be innovative and proactive professionals that can apply their technical expertise to problems yet to be identified or defined[2,3]. The importance of these 21st century skills has been seen as so critical that multiple calls to incorporate these teachings into engineering students' formal education have emerged [3,4].

Over the last 20 years, engineering colleges and universities have largely responded to these calls through the creation of technology specific entrepreneurship programs. In 2010, Shartrand et al.[5] reported that over 50% of ASEE affiliated schools offered an entrepreneurship option, such as courses or pitch competitions, for students, with 25% of theses programs formalized into academic specializations of degrees. To date, this number is likely to be

significantly higher given the national call for entrepreneurship and innovation[6], the launch of the 2011 National Science Foundation (NSF) funded Epicenter Program: National Center for Engineering Pathways to Innovation, and the 2011 NSF I-Corps Program. Over the past five years, the Epicenter Program has trained over 450 students at over 130 higher education institutions[7] through their University Innovation Fellows initiative and mentored faculty teams representing 50 institutions through the Pathways to Innovation program (personal communication, VentureWell). While the NSF I-Corps program was specifically created to help NSF funded scientists and engineers explore opportunities for their innovations beyond the lab, a secondary effect of the program has been the growth of university faculty exposed to entrepreneurship education, Lean Launch, who then incorporate these methods and pedagogies into their own classrooms and institutions. Currently, there are 18 research 1 (R-1) universities that are involved in teaching the Lean Launch curriculum to NSF funded engineers and scientists and 36 I-Corps sites[8].

The rapid rise of entrepreneurship programs in engineering is an example of an increased awareness and adoption of innovative pedagogical practices within engineering education[1,9]. Some of these practices include: student-active pedagogies, team learning, innovation pitch competitions, mentorship, and informal learning, to name a few[1,10,11]. The recent widespread adoption of these pedagogies and their perceived value offers a platform for studying the impact of specific aspects of entrepreneurship education and how they engage people differently, especially in regard to gender, socioeconomic status, ethnicity, and nationality. Findings from such studies could prove to be critical in ensuring the development of a truly diverse technology workforce through the current approach to entrepreneurship education. As engineering education seeks to recruit and retain diverse groups of students, it is important to consider the influence of entrepreneurship education environments on women.

To date, the few entrepreneurship education studies specific to engineering entrepreneurship programs are usually multi-institutional and focus on individual student participant characteristics, attitudes, outcomes,[12] and interests[13]. Individual characteristics, such as a person's sense of self-efficacy and agency, certainly contribute to one's interest and capability for success in entrepreneurship and innovation. Yet, the nature of the environment one chooses to participate in also plays a critical role in initial student engagement as shown by Celis and Huang-Saad[14]. They found that women were more likely to participate in formal entrepreneurship courses than co-curricular programs. The complexity of the entrepreneurship learning environment, as well as the role of individual characteristics on entrepreneurial success, warrant more detailed research on the impact of entrepreneurship education, particularly on underrepresented groups. The purpose of this study is to begin to explore the current state of entrepreneurship education assessment research from a gendered lens as well as propose future research opportunities and implications of findings.

Literature Review

Guided by the work of feminist standpoint theorists, this systematic literature review begins to examine the theoretical and methodological considerations of engineering education researchers whose work, with respect to assessment, focuses on gender. According to feminist standpoint theory, women and other oppressed groups are subjects rather than merely objects of knowledge[15]. In other words, these groups are sources and producers of knowledge and should be acknowledged as such. Applying this notion to entrepreneurship education research regarding assessment, this review examines how researchers approach their scholarship from a gendered perspective. To begin, a brief review of literature concerning the experiences of women in male-dominated fields, such as entrepreneurship, is offered to provide a foundation for this exploration of gender-related studies in entrepreneurship education assessment research.

Explanations for women's underrepresentation in male-dominated fields, such as engineering and entrepreneurship, have been subject to debate for decades [16,17]. However, upon closer examination of the literature, these explanations can be divided into two major categories: characteristics of the individual and characteristics of the environment. Individual characteristics such as a person's sense of self-efficacy and agency certainly contribute to one's interest and capability for success in a particular field. Yet, the nature of the environment in which one chooses to participate also plays a critical role in women's academic and career decision-making. Key arguments pertaining to individuals' characteristics and environmental conditions as they relate to women in male-dominated fields will be examined briefly in this literature review.

Taking an individualistic approach, Eccles' (1994)[17] Expectancy-Value Model of Achievement suggests that academic and occupation related decisions are guided by one's expectations for success and the value one places on a particular activity. Research has shown that women are less inclined to pursue male-dominated careers because they perceive those occupations to be misaligned with their values[18–20]. Frome, et al. (2007)[18] found that, 82% of their study participants with male-dominated career aspirations in their senior year of high school chose to change their career aspirations to either a gender neutral or female-dominated career path by age 25. Curious about women's reasons for changing career aspirations, the researchers discovered that a consistently strong and significant predictor for women changing careers was a desire for job flexibility, which would allow participants to raise a family.

In addition to valuing familial and communal relationships outside of work, women also typically pursue careers that allow them to interact with people and positively impact the lives of others[20]. In Su, Rounds, and Armstrong's (2009)[20] meta-analysis of vocational interest inventory results spanning over four decades, they discovered that men were more interested in working with things and women were more interested in working with people. While men gravitated towards careers in Science, Technology, Engineering, and Mathematics (STEM) along with other fields that involved working with things and gadgets, women were more interested in fields that involved helping others or benefitting society. To this point, industries that commonly attract female entrepreneurs are healthcare, social assistance, and educational services [21].

Aside from women's individual characteristics and values, women's perceptions of environmental conditions in male-dominated fields can play a role in their academic and career decisions. In entrepreneurial environments, specifically, women must be willing to undergo public scrutiny when pitching their ideas to potential customers and investors. Failure to successfully convey the value of one's product could ultimately ruin a business before it even gets off the ground. Moreover, business-minded individuals must be aware of their potential competitors and strive to consistently outperform them to ensure the vitality of their enterprise. Research indicates that competitive, high-risk environments such as entrepreneurship can discourage women's participation and hinder their performance[22,23].Additionally, the severe underrepresentation of women in male-dominated fields such as entrepreneurship may exacerbate feelings of isolation and lack of belonging, which could also influence women's performance in these settings[24–26].

As the extant literature indicates, women's perceptions of male-dominated environments, such as entrepreneurship, as misaligned with their values or potentially detrimental to their performance may discourage them from opting into these spaces. Furthermore, ideology critiques of entrepreneurship specifically suggest that discourses within the field reinforce dominant narratives concerning who qualifies to be an entrepreneur and what constitutes entrepreneurship[27]. Ogbor (2000) argues that gendered theorization and ethnocentric conceptualizations of entrepreneurship perpetuate the myth of entrepreneurs as European/North American, White men. Additionally, Ogbor contends that dominant ideologies influence entrepreneurship researchers' methodology by reifying myths that entrepreneurs' characteristics and traits can be objectively measured and codified, ultimately leading to causal explanations regarding the success of individuals that fit within the archetypical conception of entrepreneurs and the failure of those who do not (e.g. women and underrepresented minorities).

Curious about how gender has been addressed in entrepreneurship education scholarship, a purposeful subsample of gender-related entrepreneurship education research to date with respect to assessment was reviewed. Drawing upon literature from a larger systematic review investigating entrepreneurship education assessment and outcome measures, a particular interest was taken in the studies related to gender to better understand how researchers approach this work theoretically and methodologically.

Methods

For this review, a purposeful subsampling of articles was taken from a larger systematic review of assessment literature in entrepreneurship education. In this section, the searching strategies for the larger assessment study, along with inclusion and exclusion criteria, and the process for determining which articles would remain in the subsample is described. This work followed pre-established methods for systematic literature reviews[28,29].

Searching Strategies

Two databases, Scopus and Proquest, that represented business (Proquest: ABI/INFORM), engineering (Scopus), and education (Proquest: ERIC) were searched for

entrepreneurship education assessment literature. The search criteria used to identify these publications was the same for both databases: *("entrepreneurship education" OR "entrepreneurial education") AND ("measurement" OR "instrument" OR "assessment")* for all fields. No limitations were put on year of publication. However, papers published after the search date, September 3, 2015, were not included in the review. The initial search resulted in a total of 2,841 unique publications between the two databases. After applying the inclusion and exclusion criteria, the sample was reduced to 476 articles.

Inclusion and Exclusion Criteria

Studies included within the assessment review must have: 1) been related to entrepreneurship education outcomes for participants, or qualities and skills possessed by current entrepreneurs; 2) utilized data collected from human subjects directly; and 3) clearly delineated a research method. Documents analyzed for this review include peer reviewed journal articles and conference proceedings. Literature and book reviews were excluded from the analysis since data was not collected from human subjects firsthand.

Participants in the studies reviewed included entrepreneurship education faculty, entrepreneurs, and entrepreneurship students. Studies with participants that did not fall within the context of higher education or entrepreneurs (i.e. K-12 faculty and students, rural communities, tourism/hospitality industry, textile and fashion industry professionals) were excluded. Studies that utilized secondary databases were also excluded from the review. Furthermore, studies that did not include the words entrepreneurship or any of its variations within their abstracts were excluded from the review.

Studies examined for the assessment review were limited to individuals' perceptions of entrepreneurship and micro-entrepreneurial environments (a start-up or entrepreneurship course) rather than macro-entrepreneurial environments (a country or city). Studies that focused on small businesses were excluded, unless entrepreneurship was explicitly discussed within the study. Since the assessment review was focused specifically on entrepreneurship education research, papers describing anecdotal results or strictly offering program descriptions were also excluded.

Gender-related studies

In reviewing the 476 articles collected for the systematic assessment literature review, there was a clear paucity of studies that specifically related to gender. This realization motivated the investigation of gender-related papers to better understand how researchers approached their work from a gendered perspective. A purposeful subsample of articles that included the term "gender" in the title yielded 24 unique publications, which were investigated for the purpose of this paper.

Analysis

After identifying the articles that specifically pertained to gender, the following information was entered into an Excel spreadsheet for each publication: authors, article title, year of publication, country where data was collected, participants' information (student or entrepreneur), theoretical frameworks, methodology, measures, and findings. The data collected

from these articles was then aggregated to identify trends within this gender-related subsample of entrepreneurship education assessment literature.

Results

      Examining the 24 papers that met the inclusion and exclusion criteria of this review, fifteen studies (62.5%) were conducted internationally, with participants from countries including, but not limited to, China, Pakistan, Spain, Belgium, and Canada. Of the remaining papers, 25% of the studies were conducted solely in the United States (U.S.) and 12.5% were comparative studies between the U.S. and other countries. Additionally, 83.3% of the studies collected data from university students, as compared to the 16.7% that collected data from entrepreneurs. Among the studies with university student participants, 50% focused exclusively on Business majors either at the undergraduate or graduate level, and only 16.7 % mentioned including science, technology, engineering, and mathematics (STEM) majors within their sample.

      Further analysis was undertaken to investigate the use of theoretical frameworks, outcome measures, and research methodologies in the reviewed papers. Sixteen of the 24 studies (66.7%) used at least one theory to guide their research. The two most frequently cited theories were Ajzen's Theory of Planned Behavior[30] and Bandura's Social Cognitive Theory[31]. Each of these theories was referred to in approximately 33% of the articles. The popularity of these theories in entrepreneurship education could be due in large part to their predictive power of behavior and learning. The Theory of Planned Behavior asserts that behavioral intentions and actual behavior are shaped by an individual's attitude toward the behavior, subjective norms, and perceived behavioral control. Social Cognitive Theory posits that an individual's learning is positively influenced by the presence of role models and strong self-efficacy. Bandura[32] argues that individuals who are highly self-efficacious, or believe that they are capable of organizing and executing courses of action to reach desired outcomes, are more likely to adopt behaviors conducive to learning. Recognizing that several researchers in entrepreneurship education are interested in learning more about students' entrepreneurial intentions and entrepreneurial self-efficacy, it is not surprising that the Theory of Planned Behavior and Social Cognitive Theory are commonly used.

      Although all of the papers in this review placed an emphasis on gender within their studies, there appeared to be little consensus regarding which theoretical frameworks to use that pertain to gender. Three of the 24 papers (12.5%) used Eagly's Social Role Theory[33], which describes how beliefs concerning the different sexes are reflective of the sexual division of labor and gender hierarchy within society. Other theories pertaining to gender that were used to frame studies included Gender Schema Theory[34], Liberal Feminism Theory[35], Gender Role Theory[36], and Sex Role Socialization Theory[37]. Overall, 33.3% of the papers did not articulate a specific theory as a foundation to their study. Grounding empirical studies with a focus on gender in theories or constructs that address gender is essential in designing the study and interpreting the results. Attempting to investigate gender differences in student learning outcomes, or women's

behaviors in male-dominated environments without drawing on the work of gender scholars who have developed propositions concerning these topics is misguided.

Regarding methodology, the majority of studies under review were quantitative and appeared to use gender as an explanatory variable to predict entrepreneurship education learning outcomes such as entrepreneurial intentions, self-efficacy, orientation, and potential. For example, 87.5% of the papers included within this review were quantitative and among those studies 57% measured postsecondary education students' entrepreneurial intent as an outcome variable using gender as a predictor variable. The quantitative focus of these studies is likely due to the assessment-related keywords used for the review. However, while such work is useful in determining whether or not there are differences in learning outcomes for men and women in entrepreneurship education environments, these studies do not elucidate what is occurring in these environments that may influence men and women's educational outcomes differently. Although none of the studies investigated the characteristics of the learning environment in detail, one study in this review did attempt to investigate women's perceptions of an entrepreneurship education environment.

Ulvenblad, Blomkvist, and Hansson[38] conducted a qualitative study examining the ways in which entrepreneurship and innovation programs in Sweden are gendered. The authors facilitated focus groups with female participants in these learning environments to discover how women perceive the content, pedagogy, and overall experience of these entrepreneurship programs. In speaking with female participants, Ulvenblad et al. found that entrepreneurship education programs were not only male dominated in terms of the numerical representation of faculty members, students, and guest lecturers, but also in the examples of success stories that instructors used during classes and the literature students were expected read. Ulvenblad et al. assert that their findings suggest gender construction and segregation patterns are manifested within Swedish entrepreneurial learning environments. More empirical studies like Ulvenblad et al.'s work can help illuminate areas for improvement within entrepreneurship education programs and provide strategies for fostering constructive learning environments for women. Furthermore, utilizing qualitative methods to ascertain how female students are experiencing entrepreneurship education environments can provide explanations for the gender differences researchers are finding in the educational outcomes of students.

Findings from studies included in this review have shown that women have lower entrepreneurial intentions than their male counterparts[39–43]. Shinnar, Hsu, and Powell (2014)[42] found that among students in an entrepreneurship education course, entrepreneurial intention increases for men from the beginning to the end of the semester while it weakens for women. In contrast, Joensuu, Viljamaa, Varamaki, and Tornikoski's (2013)[44] results demonstrated that both women's and men's entrepreneurial intentions decreased from the beginning to the end of the semester. However, men had higher levels of entrepreneurial intentions initially and their intentions did not decrease as much as women's intentions did in the study. Cañizares and García[39] offer one possible explanation for women's lower entrepreneurial intentions in comparison to men. In Cañizares and García's exploration of gender differences among potential

entrepreneurs and women's perceived barriers to starting their own businesses, the authors found that women were more likely to view fear of failure as an obstacle than men. Relatedly, Shinnar, Giacomin, and Janssen's[45] findings showed that among their U.S. participants, perceived lack of competency had a stronger negative relationship with entrepreneurial intention for women than for men.

Additionally, research comparing the entrepreneurial self-efficacy between men and women has yielded mixed results. Although studies have shown that women have lower entrepreneurial self-efficacy than men[41,46], in two separate studies, Mueller and Dato-on[47,48] did not find statistically significant differences in entrepreneurial self-efficacy between women and men. However, the authors did notice interesting trends in gender-role performance among their participants.

In their 2013 study, Mueller and Dato-on found that American males were most likely to demonstrate perceived masculine orientations (e.g. assertiveness and competitiveness) and least likely to demonstrate perceived feminine orientations (e.g. nurturing, caring, and cooperation) as compared to American women, Spanish men, and Spanish women. Surprisingly, American women were equally divided between masculine and feminine orientations, indicating that American women demonstrate more gender-role heterogeneity than originally hypothesized by the authors. Lim and Envick's[49] findings regarding the entrepreneurial orientations among men and women in the U.S., Korea, Fiji, and Malaysia support Mueller and Dato-on's[48] results pertaining to men's behaviors in entrepreneurial settings. Lim and Envick[49] found that male participants regardless of national orientation preferred and were more likely to engage in high-risk ventures and were more competitively aggressive than female entrepreneurs.

Overall, these studies suggest that further research is needed to examine the ways in which entrepreneurial education environments' influence male and female students differently. Grounding this empirical work in theories and constructs that pertain to gender can inform not only the study design, but also the analysis and interpretation of results. Furthermore, more studies employing qualitative methods could be useful in illuminating how the differences in educational outcomes between men and women as documented in quantitative studies occur. In the discussion that follows, suggestions for theory and constructs that could be used to frame studies with a focus on gender and provide implications for practice and future research for engineering educators are offered.

Discussion

Since 2005, the discipline of engineering education has been in a period of "reinvention"[50]. The community has converged around more explicit measures of rigorous engineering education research, including following the six guiding principles of scientific inquiry (as delineated in the National Research Council 2002 Report on Scientific Research in Education[51]):

1. Pose significant questions that can be answered empirically
2. Link research to relevant theory

3. Use methods that permit direct investigation of the question
4. Provide a coherent and explicit chain of reasoning
5. Replicate and generalize across studies
6. Disclose research to encourage professional scrutiny and critique

In keeping with efforts to establish engineering education research as a rigorous research based discipline, the evolving field of engineering entrepreneurship research would be well served to also adhere to these guidelines as it becomes a sub discipline of engineering education. The nascent state of engineering entrepreneurship provides a fruitful opportunity for significant questions to be answered empirically through data collection from the start or early stages of many of these programs. One of the most significant challenges posed to engineering entrepreneurship faculty interested in rigorous research is linking research to relevant theory. While many engineering entrepreneurship faculty recognize the need to perform high quality rigorous research, faculty launching new programs in real time may not have the opportunity to meticulously review academic literature to identify relevant theories with respect to entrepreneurship and determine which variables to use and how to measure them. One way to overcome this challenge is to make theory more accessible for practitioners and engineering entrepreneurship researchers. In this paper, gender-related entrepreneurship education assessment literature is the focus. Results indicated that there is little empirical research specifically focused on gender in this particular body of literature. Of the research that does exist, the focus is more on the relationship between individual characteristics and entrepreneurial outcomes, and less so on the relationship between the environments influenced by pedagogical practices and gender. This area of research has the potential for a broad impact as more universities work to incorporate entrepreneurship education through informal settings and attempt to engage a diverse set of students for future innovation.

Considering the breadth and depth of literature in the social sciences pertaining to gender, a few theories and constructs that are particularly relevant to engineering educators with interests in how entrepreneurship education environments influence women and men differently are presented. The discussion begins with Eagly's Social Role Theory[33], and then delves into empirically tested constructs including Stereotype Threat[52], Solo Status[24], and Tokenism[26]. Implications for practice and research for engineering educators will be included after each description.

Social Role Theory

Social Role Theory argues that gendered beliefs arise from personal observation of the differing roles that men and women take on in society and reflect the sexual division of labor and power within society[53] (p. 124). This collection of beliefs about what women and men actually do and ought to do constitutes gender roles, which are posited to foster real differences in behavior between genders.

According to the theory, from childhood through adolescence, men and women are socialized into gender roles, which influences the performance of sex-typical work within

familial and occupational settings[33]. Over time, the activities carried out by individuals within their expected gender roles become stereotypic of men and women. Social Role Theory also asserts that both women and men adapt to expectations by seeking out specific skills and resources that align with societal roles and modifying behavior to meet societal requirements for their specific gender[53]. For example, women's accommodation of domestic roles, such as primary caregivers for children, cultivates interpersonal behaviors that could be considered as communal, whereas men's accommodation to the employment role facilitates assertive, independent behaviors that could be considered as agentic[53]. Although Social Role Theory predicts that gender differences manifested in behavior conform to gender roles and stereotypes, it also predicts that with increased gender equality gender differences may cease to exist.

Implications for Engineering Educators

Social Role Theory suggests that men and women may conform to sex-typical roles and behaviors within educational settings. Although researchers have shown that men tend to embrace sex-typical roles such as aggressiveness and competitiveness in entrepreneurial settings[48,49], women's roles within such environments merit further investigation. Mueller and Dato-on's[48] findings regarding the heterogeneity of American women's gender role adoption suggests that women in the U.S. may be transcending societally-imposed gender roles to achieve success in entrepreneurship education environments. Future research examining the roles that women and men take in entrepreneurial environments could serve to elucidate how sites of innovation, such as entrepreneurship education, might create opportunities for gender roles to shift and change (see Ridgeway, 2011[54]). Engineering education researchers might do well to ask female participants what they perceive their roles to be in entrepreneurial environments as compared to their male counterparts perceptions. Additionally, how might students' perceptions of their roles relate to observed patterns of behavior?

For practitioners who are engaged in entrepreneurship education programs for engineering students, it is important to consider the ways in which current pedagogical practices such as pitch competitions and public critique influence women differently than men. In a study examining gender differences in preference for competition, Niederle and Vesterlund[23] discovered that men are considerably more overconfident than women concerning their actual performance and women have a substantially lower propensity for competition than men. Relatedly, Larkin and Pines[22] found that women were more likely than their male counterparts to perceive public performance situations as personally risky and express concern regarding performing poorly in public. In developing entrepreneurship education programs for engineering students, practitioners should be mindful of how women may respond to certain tasks. One recommendation is to incorporate social entrepreneurship into entrepreneurship education programs. Deemphasizing the importance of competitiveness in the interest of besting an opponent, and instead focusing on the societal benefits of developing an innovative entrepreneurial endeavor could be more appealing to female students. Also, instructors can minimize women's apprehensions about risk and failure by reinforcing that their

entrepreneurship education experience is meant to be developmental. Reminding students that mistakes are expected and even encouraged as a part of the learning experience is key. Moreover, students should have multiple opportunities to achieve success within the learning environment. Finally, instructors should consider having their students engage in an exercise where they consider their implicit gender biases and consider how that might influence their present group dynamics and professional behavior moving forward.

Stereotype Threat, Solo-Status, and Tokenism

      Stereotype Threat. Empirically tested regarding its effects on the academic performance of African Americans, women in STEM fields, and other underrepresented groups, stereotype threat serves as a useful tool in considering how women might respond to entrepreneurship education environments. According to Steele and Aronson[55], stereotype threat is "the immediate situational threat that derives from the broad dissemination of negative stereotypes about one's group—the threat of possibly being judged and treated stereotypically, or of possibly self-fulfilling such a stereotype" (p.798). Steele[52] asserts that in order for a stereotype to be threatening, it must be self-relevant. In other words, the threat of stereotypes lies in its ability to diminish a domain that is self-definitional. Stereotype threat is hypothesized to have its greatest effect on members of stereotyped groups who have not internalized negative group stereotypes to the extent of experiencing self-doubt[52]. This hypothesis suggests that the threat of potentially performing poorly on an exam and thus fulfilling the negative stereotype that women are not as good at math as men should have a stronger effect on a woman who identifies herself as a strong math student, as opposed to woman that does not.

      Solo Status and Tokenism. In addition to stereotype threat, the severe underrepresentation of women in male-dominated fields such as entrepreneurship may exacerbate feelings of isolation and lack of belonging for women, which could also influence their performance in these settings[24–26]. Thompson and Sekaquaptewa[24] found that solo-status, or being the only member of one's social category (e.g. gender) within a group, can encourage differential treatment from those in the majority (e.g., men) and impair the performance of those in the minority (e.g. women). Sekaquaptewa and Thompson[25] also found that the public performance of solo-status women in stereotype threatening conditions is significantly impaired compared to women who were non-solos in environments absent of stereotype threat. Further, King et al.[26] found that women who experience solo status, or tokenism, in their professional roles often perceive their workplaces to have an inequitable psychological climate which ultimately influences women's job satisfaction and retention. Thus, being the only woman or one of few women in a male-dominated profession can have detrimental effects on one's performance and serve as a clear deterrent for pursuing or remaining in such occupations.

Implications for Engineering Educators

      Recognizing that engineering and entrepreneurship are both male-dominated fields, it is important to consider how the underrepresentation of women in these areas might hinder their

performance and likelihood of persisting in these areas. Research from this review demonstrates that women's entrepreneurial intentions are lower than their male counterparts[39–43]. Furthermore, studies examining how entrepreneurial intent changes from the beginning to the end of an entrepreneurship education course have shown that women's intentions decrease more drastically over time as compared to their male counterparts[44,45]. These findings call for future research to investigate what is occurring in entrepreneurship education environments that could be influencing women's decisions to pursue entrepreneurial ventures. Examining the possible relationships between stereotype threat, solo-status, or tokenism and entrepreneurial intent or entrepreneurial self-efficacy could be one direction for future research.

Although the underrepresentation of women in engineering and entrepreneurship will not be resolved overnight, practitioners in entrepreneurial education environments can help mitigate stereotype threatening conditions by incorporating examples of successful female entrepreneurs within the technology innovation sphere. Furthermore, Ulvenblad et al.'s[38] findings regarding women's experiences in Swedish entrepreneurship education programs suggest that inviting female guest lecturers and reading literature that includes women's perspectives are small acts that could potentially make a big impact on women's experiences within these environments. Additionally, Thompson and Sekaquaptewa (2002)[24] suggest that clear performance-evaluation processes could be useful in reducing the negative effects of solo-status for women in public performance situations. Providing explicit expectations along with objective evaluation criteria prior to a public performance task can help prevent evaluator bias and help women determine what is required of them to excel. Instructors can even consider using new approaches to public performance that establish more of a communal environment. For example, rather than having teams pitch to a large audience and panel, have teams pitch ideas seated, at a round table, directly addressing their panelists. Also, being thoughtful about the composition of groups for team-based tasks could also be a useful strategy in lessening the effects of solo-status and tokenism among women. If having a female solo in a group is unavoidable, publicly legitimizing the woman's ability to her peers is a tactic that instructors can use to help improve perceptions of the student's capability in the eyes of her group[24]. For example, intentionally drawing upon a solo student's subject-matter expertise on a particular topic in class can demonstrate confidence in the student's ability and encourage her peers to view her as a subject of knowledge. However, instructors should be mindful not to create situations where the solo is expected to become a representative of their social group. Having students submit bios or resumes prior to the entrepreneurship education experience could be one way of identifying student strengths and constructing groups.

Conclusion

The importance of entrepreneurship for economic vitality and growth, as well as setting directions for new initiatives, cannot be overstated. Ensuring that entrepreneurial activities incorporate diverse perspectives requires that training environments adapt to diverse needs and recognize the larger context from which learners are emerging. In the context of gender, existing

theoretical foundations provide important lenses through which women's success in entrepreneurship might be viewed. Social Role Theory, Stereotype Threat, Solo Status, and Tokenism are just a few ways to consider how and why students' experiences in entrepreneurship education may differ based on gender. Recognizing the significant existing work in gender studies, the value of that work for explaining gender differences in outcomes, and how that work might be of use for entrepreneurship is an important first step for researchers considering the relationship between gender and entrepreneurship.

This review indicates that much of the research that considers gender in entrepreneurship education utilizes quantitative approaches. The use of valid and reliable instruments that can be generalized to other groups is valuable and something researchers are encouraged to continue to use. At the same time, incorporating mixed and qualitative methods more fully into the research portfolio may elucidate underlying causes of gender differences in outcomes. The influence of gender on specific outcomes, such as entrepreneurial intent and self-efficacy, may become clearer with the collection of deeper data. Perhaps more exciting, qualitative data may offer insight into the relative importance of specific theories, such as Social Role Theory, across the diverse cultures that make up the modern economy.

Suggestions for Future Research

Overall, considerable opportunity exists for future research into the relationship of gender to entrepreneurial outcomes as well as research that seeks to unpack the causes of gender-defined outcomes. Researchers are encouraged to expand on the existing research, grounding their work in prior theories and studies, and using well-vetted methodologies. The community generally agrees that successful entrepreneurship training in engineering must provide access and opportunity for all students. Further investigation of the impact of these programs on people of differing genders can both level the playing field for women and men and open the door to other much needed studies for groups continuing to experience underrepresentation in engineering and entrepreneurship.

Appendix: Papers Included in the Literature Review

Author	Title	Journal	Year
Phipps S.T.A.[56]	*Contributors to an enterprising gender: Examining the influence of creativity on entrepreneurial intentions and the moderating role of political skill controlling for gender*	Academy of Entrepreneurship Journal	2012
Joensuu, S., et al.[44]	*Development of entrepreneurial intention in higher education and the effect of gender - a latent growth curve analysis*	Education & Training	2013
Shinnar R.S., et al.[45]	*Entrepreneurial Perceptions and Intentions: The Role of Gender and Culture*	Entrepreneurship: Theory and Practice	2012

Sánchez Cañizares, S. M., et al.[39]	*Gender differences in entrepreneurial attitudes*	Equality, Diversity and Inclusion: An International Journal	2010
Karimi S., et al.[57]	*Effects of role models and gender on students entrepreneurial intentions*	European Journal of Training and Development	2014
Maes J., et al.[58]	*Gender differences in entrepreneurial intentions: A TPB multi-group analysis at factor and indicator level*	European Management Journal	2014
Urban, B.[43]	*A gender perspective on career preferences and entrepreneurial self-efficacy*	ICSB World Conference Proceedings	2011
Ulvenblad, P., et al. [38]	*World-class entrepreneurship- and innovation programmes in Sweden - Focus on gender perceptions*	ICSB World Conference Proceedings	2011
Kariv, D.[59]	*Managing creativity and innovation and its effect on business performance: Cultural assessment of gender and nationality*	ICSB World Conference Proceedings	2008
Díaz-garcía, M. and Jimenez-morena, J.[60]	*Entrepreneurial intention: the role of gender*	International Entrepreneurship and Management Journal	2010
Lim, S. and Envick, B.[49]	*Gender and entrepreneurial orientation: a multi-country study*	International Entrepreneurship and Management Journal	2013
Mueller, S. L and Conway Dato-on, M.[48]	*A cross cultural study of gender-role orientation and entrepreneurial self-efficacy*	International Entrepreneurship and Management Journal	2013
Zeffane, R.[61]	*Gender and youth entrepreneurial potential: Evidence from the United Arab Emirates*	International Journal of Business and Management	2013
Dempsey, D. and Jennings, J.[46]	*Gender and entrepreneurial self-efficacy: a learning perspective*	International Journal of Gender and Entrepreneurship	2014
Dabic, M., et al.[40]	*Exploring gender differences in attitudes of university students towards entrepreneurship*	International Journal of Gender and Entrepreneurship	2012
Shinnar R.S., et al.[42]	*Self-efficacy, entrepreneurial intentions, and gender: Assessing the impact of entrepreneurship education longitudinally*	International Journal of Management Education	2014
BarNir A., et al.[62]	*Mediation and moderated mediation in the relationship among role models, self-efficacy, entrepreneurial career*	Journal of Applied Social Psychology	2011

	intention, and gender		
Scherer, R. et al.[41]	*Shaping the desire to become an entrepreneur: Parent and gender influences**	Journal of Business and Entrepreneurship	1991
Envick, B. R. and Langford, M.[63]	*Behaviors of entrepreneurs: A gender comparison*	Journal of Business and Entrepreneurship	1998
Mueller, S. L. and Dato-On, M. C.[47]	*Gender-role orientation as a determinant of entrepreneurial self-efficacy*	Journal of Developmental Entrepreneurship	2008
Lourenco F., et al.[64]	*Gender and business ethics of enterprise students and nascent entrepreneurs engaged in entrepreneurship education*	Journal of Entrepreneurship	2015
Rehman, S. and Roomi, M. A.[65]	*Gender and work-life balance: a phenomenological study of women entrepreneurs in Pakistan*	Journal of Small Business and Enterprise Development	2012
Esnard-Flavius, T.[66]	*Gender, entrepreneurial self-efficacy, and entrepreneurial attitude orientations: The case of the Caribbean*	The International Business & Economics Research Journal	2010
Brijlal, P., et al.[67]	*Education and SMME business growth: A gender perspective from South Africa*	The International Business & Economics Research Journal (Online)	2013

References

1. Gilmartin, S., Shartrand, A., Chen, H., Estrada, C. & Sheppard, S. U.S. Based Entrepreneurship Programs for Undergraduate Engineers. (2014).
2. Kriewall, T. . J. & Mekemson, K. Instilling the Entrepreneurial Mindset into Engineering Undergraduates. *J. Eng. Entrep.* **1,** 5–19 (2010).
3. National Academy of Engineering. *Educating the Engineer of 2020: Adapting Engineering Education to the New Century*. *... Engineering Systems Design and ...* (National Academy Press, 2005). at <http://books.google.com/books?hl=en&lr=&id=ZF5YAgAAQBAJ&oi=fnd&pg=PA1&dq=Educating+the +Engineer+of+2020:+Adapting+Engineering+Education+to+the+New+Century&ots=09YqHUBSoL&sig= y6Q-xSR4d9teuaGgwZGVl872ako>
4. Byers, T., Seelig, T., Sheppard, S. & Weilerstein, P. Entrepreneurship Its Role in Engineering Education. *Bridg.* (2005).
5. Shartrand, A., Weilerstein, P., Besterfield-Sacre, M. & Golding, K. Technology Entrepreneurship Programs in U.S. Engineering Schools: Course and Program Characteristics at the Undergraduate Level. in *American Society for Engineering Education* (2010).
6. National Economic Council, Council of Economic Advisers & Office of Science and Technology Policy. *A Strategy for American Innovation*. (2011). at <http://www.whitehouse.gov/innovation/strategy>
7. Epicenter. 150 Students Named University Innovation Fellows. (2015). at <http://epicenter.stanford.edu/page/150-students-named-university-innovation-fellows-by-nsf-funded-epicenter>
8. VentureWell. Directory of I-Corps[TM] Nodes and Sites. (2016). at <https://venturewell.org/i-corps/nodes-

and-sites/>

9.   Borrego, M., Froyd, J. & Hall, T. Diffusion of Engineering Education Innovations: A Survey of Awareness and Adoption Rates in U . S . Engineering Departments. *J. Eng. ...* 185–207 (2010). at <http://onlinelibrary.wiley.com/doi/10.1002/j.2168-9830.2010.tb01056.x/abstract>

10.   Duval-Couetil, N., Shartrand, A. & Reed-Rhoads, T. The Role of Entrepreneurship Program Models and Experiential Activities on Engineering Student Outcomes. *Adv. Eng. Educ.* at <https://uspfodc.us/resources/45/download/Duval_Shartrand_Program_Models_Approaches_and_Outcomes _Submitted.docx>

11.   Zappe, S. E., Hochstedt, K. S. & Kisenwether, E. C. Faculty beliefs of entrepreneurship and design education: An exploratory study comparing entrepreneurship and design faculty. *J. Eng. Entrep.* **4,** 55–78 (2013).

12.   Duval-Couetil, N., Reed-Rhoads, T. & Haghighi, S. Engineering students and entrepreneurship education: Involvement, attitudes and outcomes. in *International Journal of Engineering Education* **28,** 425–435 (2012).

13.   Jin, Q., Gilmartin, S. K., Sheppard, S. D. & Chen, H. L. Comparing engineering and business undergraduate students' entrepreneurial interests and characteristics. in *ASEE Annual Conference and Exposition, Conference Proceedings* (American Society for Engineering Education, 2014). at <http://www.scopus.com/inward/record.url?eid=2-s2.0-84905186870&partnerID=tZOtx3y1>

14.   Celis, S. & Huang-Saad, A. Students Seeking Different Paths to Entrepreneurial Education. *ASEE Annu. Conf. Expo. Conf. Proc.* (2015).

15.   Harding, S. G. The feminist standpoint theory reader: intellectual and political controversies. (2004). at <http://mirlyn.lib.umich.edu/Record/012110650 CN - HQ1190 .F46313 2004>

16.   Kanter, R. M. Men and women of the corporation. xv, 348 p. (1977). at <http://mirlyn.lib.umich.edu/Record/000169677 CN - HD58.7 .K361 CN - HD 58.7 .K361>

17.   Eccles, J. S. Understanding Women's Educational and Occupational Choices. *Psychol. Women* **18,** 585–609 (1994).

18.   Frome, P. M., Alfeld, C. J., Eccles, J. S. & Barber, B. L. Why don't they want a male-dominated job? An investigation of young women who changed their occupational aspirations. *Educ. Res. Eval.* **12,** 359–372 (2006).

19.   Ferriman, K., Lubinski, D. & Benbow, C. P. Work preferences, life values, and personal views of top math/science graduate students and the profoundly gifted: Developmental changes and gender differences during emerging adulthood and parenthood. *J. Pers. Soc. Psychol.* **97,** 517–532 (2009).

20.   Su, R., Rounds, J. & Armstrong, P. I. Men and things, women and people: a meta-analysis of sex differences in interests. *Psychol. Bull.* **135,** 859–884 (2009).

21.   National Women's Business Council. Women-owned businesses. (2012). at <https://www.nwbc.gov/sites/default/files/FS_Women-Owned_Businesses.pdf>

22.   Larkin, J. E. & Pines, H. A. Gender and Risk in Public Performance. *Sex Roles* **49,** 197–210 (2003).

23.   Niederle, M. & Vesterlund, L. Do Women Shy Away from Competition? Do Men Compete Too Much? *Q. J. Econ.* **122,** 1067–1101 (2007).

24.   Thompson, M. & Sekaquaptewa, D. When Being Different Is Detrimental: Solo Status and the Performance of Women and Racial Minorities. *Anal. Soc. Issues Public Policy* **2,** 183–203 (2002).

25.   Sekaquaptewa, D. & Thompson, M. Solo status , stereotype threat , and performance expectancies : Their effects on women's performance. **39,** 68–74 (2003).

26.   King, E. B., Hebl, M. R., George, J. M. & Matusik, S. F. Understanding Tokenism: Antecedents and Consequences of a Psychological Climate of Gender Inequity. *J. Manage.* **36,** 482–510 (2010).

27.   Ogbor, J. O. & Avenue, C. Mythicizing and reification in entrepreneurial discourse: Ideology-critique of entrepreneurial studies. *J. Manag. Stud.* **37,** 605–635 (2000).

28.   Borrego, M., Foster, M. J. & Froyd, J. E. Systematic literature reviews in engineering education and other developing interdisciplinary fields. *J. Eng. Educ.* **103,** 45–76 (2014).

29.   McGowan, J. & Sampson, M. Systematic reviews need systematic searchers. *J. Med. Libr. Assoc.* **93,** 74–80 (2005).

30.   Ajzen, I. The theory of planned behavior. *Orgnizational Behav. Hum. Decis. Process.* **50,** 179–211 (1991).

31.   Bandura, A. Human Agency in Social Cognitive Theory. *Am. Psychol.* **44,** 1175 (1989).

32.   Bandura, A. Self-efficacy: the exercise of control. ix, 604 p. (1997). at <http://mirlyn.lib.umich.edu/Record/003144478 CN - BF 637 .S38 B361 1997 CN - BF637 .S38 B36 1997>

33. Eagly, A. H. Sex differences in social behavior: a social-role interpretation. xii, 178 p. (1987). at <http://mirlyn.lib.umich.edu/Record/000828642 CN - HQ1075 .E241 1987>

34. Bem, S. L. Gender Schema Theory: A Cognitive Account of Sex Typing. *Psychol. Rev.* **88,** 354–364 (1981).

35. Carter, N. M. & Allen, K. R. Size determinants of women-owned businesses: Choice or barriers to resources? *Entrep. Reg. Dev.* **9,** 211–220 (1997).

36. Heilman, M. E. Sex bias in work settings: The Lack of Fit model. *Res. Organ. Behav.* **5,** 269–298 (1983).

37. Gilligan, C. In a different voice: psychological theory and women's development. vi, 184 p. (1982). at <http://mirlyn.lib.umich.edu/Record/004399487 CN - HQ1206 .G58>

38. Ulvenblad, P., Blomkvist, M. & Hansson, A. World-Class Entrepreneurship- and Innovation Programmes in Sweden - Focus on Gender Perceptions. *Icsb* 1–29 (2011).

39. Cañizares, S. M. S. & García, F. J. F. Gender differences in entrepreneurial attitudes. *Equal. Divers. Incl. An Int. J.* **29,** 766–786 (2010).

40. Dabic, M., Daim, T., Bayraktaroglu, E., Novak, I. & Basic, M. Exploring gender differences in attitudes of university students towards entrepreneurship: An international survey. *Int. J. Gend. Entrep.* **4,** 316–336 (2012).

41. Scherer, R. F., Brodzinski, J. D., Goyer, K. a & Wiebe, F. a. Shaping the Desire to Become an Entrepreneur: Parent and Gender Influences*. *J. Bus. Entrep.* **3,** 47–59 (1991).

42. Shinnar, R. S., Hsu, D. K. & Powell, B. C. Self-efficacy, entrepreneurial intentions, and gender: Assessing the impact of entrepreneurship education longitudinally. *Int. J. Manag. Educ.* **12,** 561–570 (2014).

43. Urban, B. A gender perspective on career preferences and entrepreneurial self-efficacy. in *2011 International Council for Small Business World Conference* (2011). doi:10.1017/CBO9781107415324.004

44. Joensuu, S., Viljamaa, A., Varamäki, E. & Tornikoski, E. Development of entrepreneurial intention in higher education and the effect of gender – a latent growth curve analysis. *Educ. + Train.* **55,** 781–803 (2013).

45. Shinnar, R. S., Giacomin, O. & Janssen, F. Entrepreneurial Perceptions and Intentions: The Role of Gender and Culture. *Entrep. Theory Pract.* **36,** 465–493 (2012).

46. Dempsey, D. & Jennings, J. Gender and entrepreneurial self-efficacy: a learning perspective. *Int. J. Gend. Entrep.* **6,** 28–49 (2014).

47. Mueller, S. L. & Dato-on, M. C. Gender-Role Orientation As a Determinant of Entrepreneurial Self-Efficacy. *J. Dev. Entrep.* **13,** 3–20 (2008).

48. Mueller, S. L. & Conway Dato-on, M. A cross cultural study of gender-role orientation and entrepreneurial self-efficacy. *Int. Entrep. Manag. J* **9,** 1–20 (2013).

49. Lim, S. & Envick, B. R. Gender and entrepreneurial orientation: a multi-country study. *Int. Entrep. Manag. J.* **7,** 1–15 (2011).

50. Streveler, R. A. & Smith, K. A. Conducting Rigorous Research in Engineering Education. *J. Eng. Educ.* 103–105 (2006).

51. Towne, L. & Shavelson, R. *Scientific Research in Education*. (National Academy Press, 2002). at <http://books.google.com/books?hl=en&lr=&id=OMKbAgAAQBAJ&oi=fnd&pg=PA1&dq=Scientific+Research+in+Education&ots=n-6PWQwxbU&sig=IE1TQ2T8AVk7GYM1hSOwTHtAksI>

52. Steele, C. M. A threat in the air: How stereotypes shape intellectual identity and performance. *Am. Psychol.* **52,** 613–629 (1997).

53. Eagly, A. H., Wood, W. & Diekman, A. B. in *The developmental social psychology of gender* (eds. Eckes, T. & Trautner, H. M.) 123–174 (Lawrence Erlbaum Associates, 2000). at <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=44644>

54. Ridgeway, C. L. Framed by gender: how gender inequality persists in the modern world. viii, 233 p. (2011). at <http://mirlyn.lib.umich.edu/Record/009750031 CN - HQ 1075.5 .U6 R54 2011>

55. Steele, C. M. & Aronson, J. Stereotype threat and the intellectual test performance of African Americans. *J. Pers. Soc. Psychol.* **69,** 797 (1995).

56. Phipps, S. T. a. Contributors to an enterprising gender: Examining the influence of creativity on entrepreneurial intentions and the moderating role of political skill controlling for gender. *Acad. Entrep. J.* **18,** 77–90 (2012).

57. Karimi, S., Biemans, H. J., Lans, T., Chizari, M. & Mulder, M. Effects of role models and gender on students' entrepreneurial intentions. *Eur. J. Train. Dev.* **38,** 694–727 (2014).

58. Maes, J., Leroy, H. & Sels, L. Gender differences in entrepreneurial intentions: A TPB multi-group analysis at factor and indicator level. *Eur. Manag. J.* **32,** 784–794 (2014).

59. Kariv, D. Managing creativity and innovation and its effect on business performance: Cultural assessment of

gender and nationality. in *2008 International Council for Small Business World Conference* 1–36 (2008).

60. Díaz-García, M. C. & Jiménez-Moreno, J. Entrepreneurial intention: the role of gender. *Int. Entrep. Manag. J.* **6,** 261–283 (2009).

61. Zeffane, R. Gender and Youth Entrepreneurial Potential: Evidence from the United Arab Emirates. *Int. J. Bus. Manag.* **8,** 60–72 (2012).

62. BarNir, A., Watson, W. E. & Hutchins, H. M. Mediation and Moderated Mediation in the Relationship Among Role Models, Self-Efficacy, Entrepreneurial Career Intention, and Gender. *J. Appl. Soc. Psychol.* **41,** 270–297 (2011).

63. Envick, B. R. & Langford, M. Behaviors of Entrepreneurs : a Gender Comparison. *J. Bus. Entrep.* **10,** 106–115 (1998).

64. Lourenco, F., Sappleton, N. & Cheng, R. Gender and Business Ethics of Enterprise Students and Nascent Entrepreneurs Engaged in Entrepreneurship Education. *J. Entrep.* **24,** 186–203 (2015).

65. Rehman, S. & Roomi, M. A. Gender and work-life balance: a phenomenological study of women entrepreneurs in Pakistan. *J. Small Bus. Enterp. Dev.* **19,** 209–228 (2012).

66. Esnard-Flavius, T. Gender, Entrepreneurial Self-Efficacy, And Entrepreneurial Attitude Orientations: The Case Of The Caribbean. *Int. Bus. Econ. Res. J.* **9,** 17–31 (2010).

67. Brijlal, P., Naicker, V. & Peters, R. Education And SMME Business Growth : A Gender Perspective From South Africa. *Int. Bus. Econ. Res. J.* **12,** 855–866 (2013).