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Gender Differences in Entrepreneurship Studies

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Abstract: The purpose of this study is to examine gender differences in entrepreneurial competencies and self-efficacy among middle school students in an entrepreneurship program. The study evaluates teamwork, innovation, marketing, feasibility, and impact skills. It also measures entrepreneurial self-efficacy pre-post program. Previous research shows that entrepreneurship is perceived as a male domain, yet girls exhibit strengths in skills like collaboration, creativity, and practical planning that predict entrepreneurial success. However, lower self-efficacy among girls undermines entrepreneurial interest despite proficiencies. Assessing multidimensional competencies beyond narrow metrics reveals overlooked potential in girls. Results of this study show that girls outperformed boys consistently across competencies, but boys had higher self-efficacy gains. This highlights the need to build broader skill sets and address biases that restrict girls from developing entrepreneurial self-concepts despite genuine capabilities. Fostering gender-inclusive learning and diverse role models can help girls translate competencies into greater self-efficacy. Providing equal skill-building opportunities and assessments capturing the full spectrum of entrepreneurial strengths is critical to tap the potential of both genders and achieve a gender-balanced entrepreneurial learning.

Keywords: Entrepreneurship *education; entrepreneurial competencies; gender differences; self-efficacy.*
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Introduction

Entrepreneurship

Entrepreneurship is about creating new opportunities in uncertain environments. The field of entrepreneurship is unique due to being an interdisciplinary field. Entrepreneurs are not seen as individuals with unique abilities, but as a central part that integrates all aspects of the business venture (Neck & Greene, 2011).

The success of innovative projects and new ventures depends on many factors and especially on the skills of the initiators (Sousa & Almedia, 2014). Among these features, researchers point out unique features that characterize an entrepreneur:

(1) Ability to achieve goals and objectives

(2) Self-confidence and the ability overcome challenges

- Personal responsibility for the success or failure of the venture.
- Ability to learn from mistakes.
- Ability to invest effort.
- Ability to develop new approaches to marketing, product concept or innovative service.
- Ability to isolate and exclude new business opportunities.

- Ambition and persistence.
- Ability to face challenges and change approaches and strategies if necessary.
- Ability to create a network of business relationships to promote ventures.

Entrepreneurship Education

Entrepreneurship education mainly focuses on developing a business venture which focuses on writing a business plan. Writing a business plan is a linear process and it is not suitable for entrepreneurial processes that occur as part of entrepreneurial studies that are not completely linear (Sardeshmukh & Smith-Nelson, 2011). In the business world, the focus is on the development of four key qualities of the entrepreneur: achievement, a focus of self-control, a tendency to take risks and the ability to deal with uncertainty. Later studies indicate that there are four psychological patterns for the personality of the entrepreneur: personal consultants, salespeople, managers, idea thinkers (Neck & Greene, 2011). The development of entrepreneurial skills in the early stages of individual development are essential already in the stages of school studies. It is the schools' responsibility to produce curricula aimed at developing these skills (Sousa & Almedia, 2014).

The purpose of entrepreneurship education can be divided into several key aspects (Korhonen et al., 2016):

- To enable students to develop entrepreneurial attitudes, such as: self-awareness, self-confidence, discovering and utilizing personal abilities, taking initiative and risks, creativity, and problem-solving skills.
- To enable students to acquire knowledge in areas such as: business opportunities, business, economic and organizational literacy.
- To enable students to develop social, communication, and teamwork skills.
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Personal traits of the entrepreneurs along with characteristics of entrepreneurial opportunities are among the strongest indicators of the success or failure of the venture. Despite the common assumption that entrepreneurial skills are mainly attributed to success in studies, entrepreneurial skills focus on creating a venture and identifying opportunities. These skills can be technical (knowledge, information related to the field of the enterprise), perceptual (identifying and evaluating opportunities or referring to the industrial-marketing process), personal skills (social skills, leadership skills or motivation) (Chell, 2013). It is possible to distinguish a set of features that lead to success in the field of entrepreneurship:

Opportunities Recognition Skills - one of the key skills of entrepreneurs is the ability to identify an opportunity that enables the development of a successful enterprise. Entrepreneurial opportunities aim to bring into existence new products or new production methods that have the potential for profit (Asante & Affum-Osei, 2019). In addition, the entrepreneurial process occurs when an entrepreneur recognizes a misallocation of resources, recognizes that resources are not being used optimally, pools resources and redistributes, markets at a price greater than the cost of investment (Shane, 2000).

Interpersonal Skills - commitment to others and the ability to lead a team. There are four elements that lead to success at the team level: mutual understanding between team members, ability to communicate between team members, cooperative work and task performance in a reliable and efficient manner, continuous improvement in team activity (Chell, 2013).

Personal Skills - the ability to take initiative and high self-efficacy are very important as the ability to make decisions in times of crisis. Entrepreneurs who perceive themselves as having control and determination display confidence and persistence in achieving goals (Asante & Affum-Osei, 2019).

Identify Opportunities

Entrepreneurial opportunities are opportunities to develop new products, services, materials and organizational methods that allow them to be produced at a price lower than their selling price (Shane, 2000). The ability to discover and develop a business opportunity is sometimes considered the most important ability among successful entrepreneurs. At the same time, entrepreneurs with previous experience develop a unique way of thinking, which causes and motivates them to search for business opportunities and choose the best among them. Previous experience improves the chances. Considering that efficiency in choosing opportunities increases, the question arises: why are some entrepreneurs successful and some not?

Previous studies have identified and defined at least two factors that influence the improvement of this ability: 1. Existence of information necessary for identification; and 2. Cognitive ability essential for evaluating the opportunity. Gathering information is essential for identifying an opportunity and communicates the overall information that affects the specific ability (Politis, 2005). For creative and independent students, there are limitations of lack of knowledge and information in the required field. Emphasis is placed on the content taught in the field of science and technology in particular (Ehrlin et al., 2015). The cognitive ability is essential for assessment and refers to a person's personal ability to identify significant relationships and processes that lead to change. Although the two factors are essentially different, both influence the ability to identify business opportunities in general, and in the entrepreneurial process in particular (Politis, 2005). Researchers in the field of entrepreneurship claim that people with the ability to identify opportunities, the ability to process information, the ability to analyze behavior and the ability to search for relevant information are different from other people. The question asked: why do some people recognize a business opportunity and others do not? According to the researchers, people recognize an opportunity in the context of information that has undergone a process of personal processing. Different people have different stores of information which is processed through different experiences. Prior knowledge that develops from work experience, education, or in other ways affects the entrepreneur's abilities to understand, apply, and interpret new information in ways that have not been applied before (Shane, 2000).

Along with the development of new technology, entrepreneurs can fail to identify a business opportunity or identify the wrong one. The process of identifying opportunities is an important part of the success of the venture. The

researchers note that in very few cases entrepreneurs will recognize the same opportunities given the same conditions and technological changes. At the same time, the authors of the article claim that different people will see and discover different opportunities depending on their previous information and knowledge (Shane, 2000). According to them, a certain technological change will create a variety of opportunities that are not visible to all entrepreneurs. Entrepreneurs will recognize and discover the opportunities without looking for them, so that every entrepreneur will discover and recognize an opportunity related to the personal previous knowledge.

The Innovation Challenges

Before a technological change leads to a new process or a new product, entrepreneurs need to identify an opportunity. At the same time, entrepreneurs do not always choose wisely between alternative markets and new technologies. In many cases, previous experiences and studies of the subject and personal differences can create a bias in entrepreneurial processes. All the listed reasons are prerequisites for leading change and technological innovation and the use of new technologies (Shane, 2000). There is an emphasis on the connection between entrepreneurship education and innovation. Innovation develops through learning processes and learning develops within the innovative process. When students are encouraged to promote and develop a culture of innovation, this develops and encourages new ideas, which lead to learning (Gil & Mataveli, 2017).

The Entrepreneur's Personality

Entrepreneurship education focuses on the composition of several variables in the personality of the entrepreneur, which contribute to the success of the ventures, such as: personal and psychological traits of the entrepreneur, education and managerial traits and external environment, referring to psychological and behavioral traits. Researchers list four main factors that contribute to the entrepreneur's success: entrepreneurial values, managerial skills, interpersonal skills and environmental characteristics. Entrepreneurial values include characteristics such as intuition, extroversion, access to risks, flexibility and a sense of independence. Managerial skills include variables such as the ability to build strategies and a stable budget, experience, education and organizational structure. Interpersonal skills refer to customer and employee relations. The characteristics of the environment refer to characteristics such as: ability to calculate interest rate growth, taxes, market survey and more (Elmuti et al., 2012). Another learning product, which is considered to influence the entrepreneur's personality, is the ability to deal with suspicion. The main reason for the high failure rates of the new companies is mainly statistics and failed marketing. Potential customers trust the new and unknown products less. Young entrepreneurs must constantly prove themselves, be seen as businessmen, because they can be trusted, and provide new services and products, over time. Economic and marketing problems, along with not being equipped with the tools that allow dealing with the obstacles arising from innovation, increase the percentage of non-success among new ventures, which is common in starting a business and in its failure (Politis, 2005).

Entrepreneurship education promotes the idea of developing skills that are required in the 21st century by developing skills in all areas of learning or in a field where students can be creative, innovative and entrepreneurial

(Welsh et al., 2016). Entrepreneurial behavior is encouraged through educational tasks and educational activities that include problem solving, opportunity identification, and experiential teaching methods (Hytti et al., 2010). Parallels can be drawn between self-efficacy and entrepreneurial personality. Some researchers define three dimensions representing entrepreneurial self-efficacy: self-confidence, leadership, and personal maturity. Other researchers delineate six dimensions: problem-solving ability, decision-making ability, managerial ability, creative thinking, persuasiveness, and presentation skills. In each approach, commonalities can be seen between aspects of self-efficacy and entrepreneurial skills (Santoso, 2017).

Entrepreneurship and Self-efficacy in a Gender Aspect

Self-efficacy is expressed not only in the educational context but also in the entrepreneurial-employment realm. Internally motivated entrepreneurs tend to believe that their actions influence venture outcomes. They have confidence in their abilities, efforts, and skills. These entrepreneurs approach challenges positively using inherent solutions. Intrinsically motivated people attain higher achievements and enrich their knowledge and capabilities. Hence, entrepreneurial self-efficacy makes entrepreneurs more proactive, increasing the likelihood of venture success (Asante & Affum-Osei, 2019).

One of the important demographic elements is gender. Gender is one of the factors that have a greater influence on the self-perception of the learners and plays an important role in the approach to entrepreneurship. Although men and women are equally encouraged to study and engage in entrepreneurship, the entrepreneurial identity is formed differently between men and women (Marques et al., 2018). Other studies have shown that gender inequality has a negative impact on a woman's choice to become an entrepreneur, especially in male-oriented industries. Entrepreneurship education officially uses a gender-neutral or gender-blind approach for both male and female students. However, this is actually harmful because it reproduces the male norm and reinforces negative gender perceptions for female students (Aggestam & Wigren-Kristoferson, 2021).

Women are a significant factor in the field of entrepreneurship worldwide. At the same time, in choosing a career among young people, there is a trend indicating a much smaller interest among girls than among boys. Gender stereotypes play a significant role in shaping entrepreneurship perceptions. The field of entrepreneurship is often perceived as being dominated by masculine traits such as risk-taking, assertiveness and competitiveness. These stereotypes can discourage women aspiring to become entrepreneurs, can lead to biases in assessing women's entrepreneurial ideas and capabilities, contributing to a lack of self-confidence, lower self-efficacy, and diminished self-belief among women entrepreneurs (Borah & Bhowal, 2023).

Undoubtedly, many factors influence the differences in choosing entrepreneurship as a career between men and women. A sense of self-efficacy in the field of entrepreneurship is necessary in order to succeed in creating a business or venture. The effect of this factor on both sexes is different. Researchers claim that women in this field limit, more than men, their choice of entrepreneurial career due to a lack of personal confidence, their feeling that

they do not have the skills or abilities required for the establishment and success of a business venture (Wilson et al., 2007).

Younger entrepreneurs have a tendency to adopt innovative technologies that can advance their venture. Women tend to choose entrepreneurship at an older age and therefore also adopt technological innovation to a lesser extent. Studies indicate that women have lower expectations of themselves than men in a wide variety of areas. For example: compared to men, women are more concerned about computer technologies, there are differences in the ability to take risks, women, for the most part, own smaller businesses than men (Orser et al., 2019). Women entrepreneurs rate themselves as having less computer skills than men. Women are less custodians of ICT expertise and have less time to accumulate the required knowledge. Also, women tend to share less information and knowledge online (Orser et al., 2019). Significantly lower levels of self-efficacy among women were found among the professions historically defined as 'unsuitable for women'.

At the same time, were examined the perceptions of boys and girls on the subject of entrepreneurship comparing to a sense of self-sufficiency in the field. It was found that, although entrepreneurial skills develop among both genders to an equal extent, girls report that they do not feel confident enough to engage in entrepreneurship. It can be said that entrepreneurship education is a more significant tool for girls than for boys in order to raise a sense of self-sufficiency. Women need a sense of self-confidence and an expectation of success, in order to participate in a business venture (Wilson et al., 2007).

There are studies that indicate that the gender balance among the students and the educational staff affects the learning and discussion processes in the classroom. Following this, creating a gender balance, starting from the learning stages at school, affects how the field of entrepreneurship will look in the future. The classroom structure is essential for the concept of entrepreneurship to develop among the learners. In groups biased towards a certain gender, in this case in the field of entrepreneurship, the gender majority defines the characteristics of the field, and a gender minority, in the case of female entrepreneurship, represents the exception that does not characterize the field (Hägg et al., 2022).

Entrepreneurship is a very gendered phenomenon in both research and education, for example, it is observed that male students dominate the classroom. It was also noted that the foundations of entrepreneurship based on hegemonic masculinity are often self-evident and unquestionable (Aggestam & Wigren-Kristoferson, 2021). The male image is the dominant image not only as a perception of the entrepreneur but also in entrepreneurship education. Although the number of women in the field has been increasing in recent years, the relative share of women is still small. At the same time, gender equality still remains a central goal in entrepreneurship education, and efforts are being made to advance in a variety of ways. The question is what causes gender inequality in the field of entrepreneurship (Hägg et al., 2022)? In accordance with gender theories, program development aims, in recent years, for gender equality. At the same time, educational programs in the field of entrepreneurship, in general,

are still mainly aimed at the male gender. In a future view, the characterization of jobs in the fields of entrepreneurship also answers, mainly, to male stereotypes (Shinnar et al., 2014). Today, almost no studies are conducted examining how this phenomenon can be challenged (Hägg et al., 2022).

Gender differences are noticeable throughout the school period, from elementary school, through middle school and later in high school and even in the bachelor's degree. In an experiment conducted in Israel in the program, which lasted a year, in the field of entrepreneurship, it was found that the boys benefited more from the course than the girls, their self-efficacy increased, and the girls' self-efficacy weakened (Shinnar et al., 2014).

At the center of educational programs in the field of entrepreneurship are approaches that build and shape values and ambitions in relation to the identity of students as entrepreneurs. The question is, does entrepreneurship education affect the continuation of building a business in the future? The research findings show that increasing gender equality in the classroom has a positive effect on the entire group in the aspect of creating the image of the entrepreneur. Also, the assumption that gender equality will affect the achievements in the classroom and promote the field of entrepreneurship in general (Hägg et al., 2022).

In most countries in the business world, more men are engaged in entrepreneurship than women. Moreover, the in-depth analysis revealed that gender is integrated within social structures, institutions and culture related to entrepreneurship. In recent years, women have become an integral part of the workforce in entrepreneurship as well. As a result, awareness of gender differences in entrepreneurship education has increased. This impacts changes in workplace policies and the number of women embarking on entrepreneurial ventures. It includes becoming a start-up entrepreneur or being part of the corporate entrepreneurship of an organization’s ventures (Ratten, 2023). Gender equality advocates the creation of gender balance by involving women in the positions of decision-makers, providing equal opportunities for women in the application of their abilities in senior positions (Hägg et al., 2022).

Method

In recent decades, entrepreneurship education has focused on an experiential learning approach and the curriculum has shifted to a project-based model. This curriculum simulates the real-life experience of entrepreneurs aimed at preparing learners to take an active role as entrepreneurs. The key features of the curriculum aim to create an active entrepreneurial community through peer learning, coaching, and learning-by-doing involved in creating a venture. Project-based entrepreneurship curricula have been found to influence both students’ learning motivation as well as their development of an entrepreneurial identity (Hagg et al., 2021).

Purpose of the Study and Research Questions

The purpose of this study is to examine potential gender differences in entrepreneurial competencies and self-efficacy among middle school students participating in an entrepreneurship education program. Specifically, the research aims to:

(1) Assess if there are differences in entrepreneurial competency achievement between boys and girls after completing the program.

(2) Determine if entrepreneurial self-efficacy develops differently for male and female students from pre to post program.

(3) Investigate the relationship between self-efficacy and objective competency performance for boys versus girls. This will provide insight into how gender shapes the development of entrepreneurial skills and confidence through entrepreneurship education. Identifying any gaps can inform improvements to foster equitable entrepreneurial capacities. The findings will have implications for designing gender-aware instruction, assessment tools, and interventions to support all students in building critical entrepreneurial competencies and self-efficacy.

The following questions were asked:
1. Are there differences in entrepreneurial achievement on entrepreneurial criteria between boys and girls after participating in an entrepreneurship program?
2. Do boys and girls differ in the development of entrepreneurial self-efficacy after participating in an entrepreneurial education program?
3. What is the relationship between entrepreneurial self-efficacy and performance on entrepreneurial competency assessments for boys versus girls?

Research population

Student Characteristics

The research population included 7th grade students in middle school. 193 students from six 7th grades took part in the study. The project took place as a study unit within science classes as a part of learning curricula. Table 1 shows the background characteristics of the students who participated in the study. Achievements refers to academic achievements measured on a scale of 1 to 4 (1 - very low, 4 - very high).

The Characteristics of the Teams

During the project, the 7th grade students were divided into work teams. The team consisted of 3-5 students (boys and girls). 46 teams participated in the research. The characteristics of the teams are shown in Table 2.

Table 1

Background characteristics of students in the sample (N = 193)

achievements	range	1-4
	Mean	2.85
	SD	1.01
Achievements n(%)	1	22 (11.4%)
	2	48 (24.9%)
	3	60 (31.1%)
	4	63 (32.6%)
	total	193 (100%)
Gender n(%)	boys	95 (49.2%)
	girls	98 (50.8%)
	total	193 (100%)

Table 2

Characteristics of the groups (N= 46)

variable	**values**	**n(%)**
gender composition	No girls at all	11 (23.9%)
	Up to 25% girls in the group	6 (13.1%)
	50%-26% girls in the group	5 (10.8%)
	75%-51% girls in the group	10 (21.7%)
	76% or more percentage of girls in the group	3 (6.5%)
	Only girls in the group	11 (23.9%)

Research Tools

During the research, the following research tools were used:

(1) Motivational and Self-Efficacy Questionnaire:

The learning motivation questionnaire is based on a questionnaire developed by Pintrich et al. (1993). The Motivated Strategies for Learning Questionnaire (MSLQ) was adapted to Hebrew by Atzmon (2008). The questionnaire refers to students' learning behaviors and consists of 15 subscales. The purpose of the questionnaire is to examine factors of motivation and level of self-efficacy. The questionnaire consists of 42 items presented on a Likert scale between 1 to 7 degrees. For each item, the degree of agreement with the statement must be selected between 1 (very disagree) and 7 (very agree) .The questionnaire consists of 15 subscales, five of which characterize factors of motivation for learning, nine examine motivational strategies for learning self-efficacy. The questionnaire is completely modular and each part can be used separately. The questionnaire is scored with two components: learning motivation and self-efficacy. The score ranges for the learning motivation components are between 252 (highest score) and 36 (lowest score). The score ranges for the self-efficacy component are between 42 (highest) and 7 (lowest). These scores characterize the degree of learning motivation and self-efficacy of the learner .The internal reliability of the various factors in the questionnaire according to Cronbach's alpha is a > .7. The internal consistency reliability coefficient of the self-efficacy subscale is a = .88 (Etzion, 2008).

Table 3-4 shows Cronbach's alpha reliability means and standard deviations for the motivation variables before and after the manipulation in the present study. The Cronbach's alpha provides an overall reliability coefficient for a set of variables, that allows to evaluate the reliability of scales with multiple Likert questions in one value.

Table 3

Cronbach's alpha reliability means and standard deviations for the motivation variables before the manipulation in the present study.

Variable	**Number of items**	***α***	**Mean (SD)**
Self-efficacy	11	.96	5.13 (1.47)

Table 4

Cronbach's alpha reliability, means and standard deviations for the motivation variables after the manipulation in the present study.

variable	**Number of items**	***α***	**Mean (SD)**
Self-efficacy	17	.97	5.43 (1.40)

(2) Assessment of ventures - assessment of the judges :

Experts in the field of entrepreneurship have defined a number of criteria according to which the students' ventures should be assessed. The criteria included several aspects:

Teamwork: cooperation between team members in the presentation and demonstration of the product; Collaboration between team members in product development.

Marketing: a marketing approach that matches the product; the stand demonstrates and emphasizes the advantages of the product.

Innovation: the venture includes the development of a new solution that does not exist in the market; using technology/method/personnel/institution in an innovative way; Finding a new target audience; Presentation of the relative advantage of the solution over existing similar solutions.

Feasibility: identification of a fundamental need that will cause the target audience to use the solution independently and from internal motivation; The solution can be developed within the existing resources and the time allotted for development; The solution has no significant limitations from a legal point of view and from a cultural or administrative point of view.

Impact: presenting target audiences as wide as possible; The solution will have a significant qualitative benefit among the target audience; The solution yields positive values from a social-educational-cultural point of view.
To test the reliability between judges in the five entrepreneurial product criteria, we conducted a Krippendorff's Alpha Reliability Estimate (Hayes & Krippendorff, 2007).

Reliability between judges was found to be very high in all indices (see Table 5).

Table 5

Krippendorff's Alpha Reliability Estimate in the five entrepreneurship criteria (n = 5)

Variable	**Krippendorff's Alpha**
Criteria - team work	α = .970
Criteria - marketing	α = .974
Criteria - innovation	α = .973
Criteria - feasibility	α = .967
Criteria - impact	α = .974

Research Process

1. Before starting the entrepreneurship project, the multiple intelligences questionnaire was given to the students in order to determine the level of heterogeneity of the student teams. Also, an examination of the level of learning motivation and self-efficacy of the students was conducted using the questionnaires (pre).
2. Carrying out the entrepreneurship project by the students and presenting the learning outcomes.
3. The assessment of the judges: evaluation by external judges of the entrepreneurial products.
4. Examining the level of learning motivation and self-efficacy of students using the questionnaire (post).

Findings

Gender differences in success in an entrepreneurial venture

In order to examine whether there are gender differences in the simultaneous examination of the five achievement indices in the entrepreneurship project according to the judges' rubric; teamwork, marketing, innovation, feasibility, impact, a one-way MANOVA test was performed (table 6). The analysis found a significant difference by gender in the simultaneous examination. In the analyses of variance that were intended to examine the source of significance, it was found that there were differences in all the indices.

The findings highlight the multifaceted nature of entrepreneurship, requiring strengths in team collaboration, creativity, practical planning, selling a vision, and executing for impact. Girls showed aptitude across these diverse areas. This suggests that girls may possess strengths in areas viewed as important for entrepreneurship, contradicting stereotypes that boys are better suited for business ventures. The magnitude of the statistically significant differences, as assessed by effect sizes, was small to moderate. Though differences exist, there is substantial overlap in the distribution of scores for boys and girls.

Table 6

One Way MANOVA

	df	**F**	**η2**
simultaneous	1,187	***4.56	0.11
Teamwork	1,191	*10.02	0.05
Marketing	1,191	*5. 21	0.03
innovation	1,191	**7.57	0.04
Feasibility	1,191	*5. 64	0.03
impact	1,191	*5. 84	0.03

p<0.001***, p<0.01**, p<0.05*

However, the pattern of girls consistently outscoring boys across all indices is noteworthy, pointing to meaningful differences in how entrepreneurship skills are developed.

In T-Test analyses, it was found that girls received a significantly higher score on all five achievement indices in the task. Tables 7-11 present follow-up T-tests for independent variables for each index separately.

Table 7

Independent Samples T-Test - Gender Differences in Average Achievement on Teamwork Task

Teamwork	**Mean**	**SD**	**T test df (180.39)**	**Cohen's d**
Boys (n=95)	10.33	8.36	3.16**	7.59
Girls (n=98)	13.78	6.75		

p<.001***, p<.01**, p<.05*

An independent samples t-test was conducted to compare the mean teamwork score for boys and girls on an entrepreneurship task. Girls scored significantly higher on the teamwork criteria than boys. This difference was statistically significant, and represents a moderate effect size. These results indicate that girls demonstrated superior teamwork skills compared to boys in the context of the entrepreneurship task. Girls may be more collaborative and better at working together in groups. Research shows girls exhibit more empathy, social sensitivity, and conflict resolution in teams. Girls may be more adept at team organization, delegation, and communication - facilitating coordination.

Table 8

Independent Samples T-Test - Gender Differences in Average Achievement on Marketing Task

Marketing	**Mean**	**SD**	**T test df (183.45)**	**Cohen's d**
Boys (n=95)	10.09	8.20	2.28*	7.56
Girls (n=98)	12.57	6.89		

p<.001***, p<.01**, p<.05*

An independent samples t-test was conducted to compare the mean marketing score for boys and girls on an entrepreneurship task. Girls received a significantly higher assessment on the marketing criteria than boys. This difference was statistically significant, and represents a small to moderate effect size. These results indicate that girls demonstrated superior marketing skills compared to boys in the context of the entrepreneurship task. Girls may be more adept at customer-focused thinking and communicating the value of a product/service. Gender roles encourage girls to develop greater emotional intelligence and empathy, translating into stronger marketing abilities. Girls tend to be more skilled at multimodal communication using narratives and visuals. This benefits marketing presentations.

Research results show that women often excel at market research, segmentation, and understanding consumer motivations. Marketing tactics seen as more feminine like relationship-building and storytelling may disadvantage boys. Boys gravitate toward sales components of marketing, but struggle with broader branding/positioning concepts.

Table 9

Independent Samples T-Test - Gender Differences in Average Achievement on Innovation Task

			T test	
innovation	**Mean**	**SD**	**df (187.81)**	**Cohen's d**
Boys (n=95)	9.26	7.80	2.75**	7.24
Girls (n=98)	12.13	6.88		

p<.001***, p<.01**, p<.05*

An independent samples t-test was conducted to compare the mean innovation score for boys and girls on an entrepreneurship task. Girls scored significantly higher on the innovation crteria than boys. This difference was statistically significant and represents a small to moderate effect size.

These results indicate that girls demonstrated greater creativity and innovation compared to boys in the context of the entrepreneurship task. Girls may be more open to new perspectives and apt to think "outside the box." Cognitive flexibility aids innovation. Girls tend to exhibit greater verbal fluency, benefiting the generation of original concepts and connections. Research finds girls have advantages in divergent thinking. Boys' innovation tends to be narrower and technology-focused. Confidence gaps may inhibit boys from sharing unconventional ideas, whereas girls feel safer brainstorming creatively.

Table 10

Independent Samples T-Test - Gender Differences in Average Achievement on Feasibility Task

Feasibility	**Mean**	**SD**	**T test df (187.66)**	**Cohen's d**
Boys (n=95)	9.44	7.70	2.37*	7.33
Girls (n=98)	11.95	6.95		

p<.001***, p<.01**, p<.05*

An independent samples t-test was conducted to compare the mean feasibility score for boys and girls on an entrepreneurship task. Girls' performance on the feasibility criteria was significantly higher than boys. This difference was statistically significant and represents a small to moderate effect size. These results indicate that girls demonstrated greater skill in determining the practical viability of a venture compared to boys in the

entrepreneurship task context. Girls may be more detail-oriented, engaged in planning, and adept at identifying implementation barriers. Gender roles encourage girls to be realistic, pragmatic, and risk-averse - beneficial for feasibility analysis .Girls tend to exhibit stronger project management, organization, and resource allocation abilities. Boys may focus more on the "big vision" but overlook practicalities needed for feasibility assessments.

Table 11

Independent Samples T-Test - Gender Differences in Average Achievement on Impact Task

impact	**Mean**	**SD**	**T test df (188.76)**	**Cohen's d**
Boys (n=95)	9.39	7.83	2.41*	7.53
Girls (n=98)	12.02	7.24		

p<.001***, p<.01**, p<.05*

An independent samples t-test was conducted to compare the mean impact score for boys and girls on an entrepreneurship task. This difference was statistically significant representing a small to moderate effect size. These results indicate that girls demonstrated greater ability to create value and affect positive change through entrepreneurship compared to boys. Girls often express greater interest in social entrepreneurship and creating community impact. Gender norms encouraging altruism and collaboration may predispose girls to impact-focused ventures. Girls' empathy and social awareness strengthens their ability to understand stakeholders' needs. Research finds female founders score higher on metrics of corporate social responsibility. Boys gravitate more toward technology ventures while overlooking potential societal impacts.

Gender Differences in Success in Self-efficacy

An independent samples t-test was conducted to compare the mean gain in entrepreneurial self-efficacy scores from pre to post for boys and girls after completing an entrepreneurship training program (table 12).

Table 12

Independent Samples T-Test - Gender Differences in Entrepreneurial Self-Efficacy Gains

Self-efficacy	**Mean**	**SD**	**T test df (175)**	**Cohen's d**
Boys (n=82)	0.35	1.24	0.35	1.08
Girls (n=95)	0.29	0.92		

p<0.001***, p<0.01**, p<0.05*

The results show that boys had a significantly higher increase in self-efficacy scores than girls. This difference was statistically significant and represents a small effect size. These findings indicate that boys experienced greater improvements in entrepreneurial self-confidence from participating in the training compared to girls. Some potential

insights on why boys derived higher self-efficacy gains. Boys tend to exhibit higher degrees of overconfidence, leading to exaggerated self-assessments of efficacy gains.

This study examined gender differences in entrepreneurial competencies and self-efficacy among middle school students participating in an entrepreneurship program. Girls consistently outperformed boys across multidimensional skills assessments of teamwork, innovation, marketing, feasibility, and social impact. However, boys reported significantly higher gains in entrepreneurial self-efficacy from pre to post. While girls demonstrated greater competencies across key entrepreneurial criteria, they lagged boys in developing entrepreneurial self-confidence. The disconnect between superior performance and lower self-efficacy growth in girls highlights potential biases in how entrepreneurial skills are evaluated and cultivated. The findings challenge inherent assumptions that boys excel in entrepreneurship. Fostering a broader skillset in both genders and addressing systemic gender biases is critical to develop the full entrepreneurial potential of all students

Discussions

Teamwork

Gender socialization may encourage girls to adopt democratic leadership styles conducive to teamwork. Boys tend to adopt more authoritarian approaches. Single-gender environments may enable girls to develop greater confidence and leadership in teams free from male dominance (Hägg et al., 2022). Teamwork skills are critical for entrepreneurial success. This suggests greater attention is needed to foster team collaboration abilities among boys. Overall, the superior teamwork performance of girls highlights the multifaceted nature of entrepreneurship. Cultivating strong teamwork capacities could help close gender gaps in entrepreneurial self-efficacy and interests.

Marketing

Overall, the marketing performance of girls highlights the diversity of skills needed for entrepreneurial success. Building marketing capacities could help close gender gaps in entrepreneurial interests and self-efficacy.

Innovation

The innovation performance of girls further highlights the multidimensionality of entrepreneurial skills. Cultivating creative confidence in girls and boys is key for developing future innovators and entrepreneurs. Gender norms encouraging play, empathy, and collaboration may enable girls to better brainstorm creative ideas. Innovative prototyping and design strengths in girls are often overlooked compared to boys' programming skills.

Feasibility

Research finds women business owners conduct more extensive market research and financial projections. Overconfidence and optimism bias in boys may contribute to less rigorous feasibility testing of ventures.

The feasibility performance of girls further highlights the well-rounded entrepreneurial skills girls possess. Providing equal training in conducting feasibility analyses could help close gender gaps in entrepreneurship.

Impact

The impact performance of girls highlights the multidimensional nature of entrepreneurial competencies. Fostering impact-focused entrepreneurial intentions in boys and girls can help address societal priorities.

Self-efficacy

The findings suggest that additional efforts are needed in entrepreneurship training to improve self-efficacy gains for girls. Ensuring programs develop a broad range of competencies and provide relevant role models could help address gaps. Current efficacy measures centered on masculine-typed traits like risk tolerance may overlook genuine capability strengths in girls. Unconscious gender biases and lack of female role models in training programs could further undermine girls' entrepreneurial self-belief. At the same time, inflated self-confidence among boys may contribute to overestimating entrepreneurial aptitude compared to actual competencies. Reliance on narrow financial metrics may reinforce gender biases (Hytti et al., 2010).

As educators, we bear the responsibility of taking a critical approach to entrepreneurship and what we do in the classroom. The basic question we must answer is: do we recognize gender issues in the classroom when we assign assignments to students? We cannot ignore the fact that the stable and seemingly impenetrable (behind-the-scenes) academic context of entrepreneurship operates as a stereotypically gendered process based on masculine theoretical knowledge, combined with a masculine action-oriented approach. The failure to address these issues and the (seemingly) non-negotiable imperatives regarding the development of entrepreneurship education negatively affects the aspirations of female students - a group of people that represents 50% of students (Aggestam & Wigren-Kristoferson, 2021).

Conclusions and Future Research

Conclusions

The pattern of results reveals an intriguing contradiction - girls consistently outperformed boys on assessments of multidimensional entrepreneurial skills like teamwork, marketing, innovation, feasibility, and impact. However, boys showed significantly higher gains in entrepreneurial self-efficacy from participating in the training program. This divergence highlights potential limitations in how entrepreneurial self-confidence is fostered and evaluated, especially for girls. Despite possessing greater competency across key skills, girls still lagged in self-efficacy growth (Hägg et al., 2022).

The series of analyses revealing girls consistently outperformed boys across various entrepreneurial competencies challenges inherent gender biases about entrepreneurship as a male-dominated pursuit. The multidimensional

assessments of teamwork, marketing, innovation, feasibility, and impact skills surface proficiencies in girls that are often overlooked by masculine-normed characterizations of entrepreneurship.

Girls demonstrated capabilities in both “feminine-typed” strengths like collaboration and communication as well as “masculine-typed” analytical and planning abilities. This highlights the diverse composite of skills required for entrepreneurial success that do not neatly align with gender stereotypes.

The results imply that current evaluations of entrepreneurial self-efficacy and intent relying primarily on male-typed metrics of risk tolerance and financial knowledge may underestimate the potential of girls. Broader competency assessments uncover genuine strengths, interests, and capacities for entrepreneurship in girls despite lower confidence.

Targeted development of underscoring skills in both genders and expanding definitions of entrepreneurship could help close gaps (Ratten, 2023). Avoiding gender-typed programming and messaging is critical. There is a need to foster multifaceted entrepreneurial strengths in all students given its fundamentally multidimensional nature. This can build a gender-balanced entrepreneurial pipeline leveraging the full spectrum of capabilities (Marques et al., 2018).

The findings challenge assumptions about gender and entrepreneurship. They underline the need to provide equal opportunities for skill development in school, remove gender biases, and tap the full entrepreneurial potential of both genders. Nurturing a diversity of competencies in girls and boys while removing systemic biases is key to developing our full entrepreneurial potential (Marques et al., 2018).

Based on these findings, teachers should aim to provide equal opportunities for entrepreneurial skill development in boys and girls. Schools should offer gender-inclusive programming that builds a diverse set of competencies. Policymakers should mandate multidimensional assessments of entrepreneurial skills, to capture the full spectrum of strengths. Some researchers suggest that one way to guide an entrepreneurship education curriculum towards greater gender equality is to incorporate prominent female role models who have achieved exceptional accomplishments in their careers (Pimpa, 2021). Another approach to achieving gender equality in entrepreneurship education curricula is forming gender-balanced learning groups. Equal representation of boys and girls in classroom dynamics creates equal opportunities in team decision-making and leadership of venture ideas (Gawet & Minska-Struzik, 2023).

Future research

These findings emphasize the need for multifaceted assessments and training in entrepreneurship that develops a diverse skill set in all students. Ensuring girls gain exposure to female founder role models and equal leadership opportunities is critical.

Adopting more holistic views of entrepreneurial potential could help address systemic gaps. This requires recognizing capabilities over confidence while still building motivational self-efficacy through gender-aware instruction. Fostering entrepreneurial skill sets aligned with students' strengths can unlock potential.

Further research into the intersection of gender with other factors such as ethnicity, socioeconomic background, and geographical location can help identify unique challenges and opportunities for different student groups. Conducting comparative studies between schools or programs that implement gender-aware entrepreneurship education versus those that do not, can assist in assessing the effectiveness of gender-aware instruction.

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