

## **Women in Entrepreneurship Education in U.S. Higher Education**

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*Recent literature in business education acknowledges the gender gap is diminishing. This study formulated and tested four hypotheses concerning the gender gap in entrepreneurship degrees and certificates awarded in the United States between 1996 and 2008. Integrated Research findings indicate that although female students outnumbered male students in general business education, fewer female students than male students were awarded entrepreneurship degrees and certificates. Interestingly, the majority of female students who pursued entrepreneurship degrees and certificates did so through associate colleges, while a higher percentage of male students pursued entrepreneurship degrees and certificates through doctoral and research universities. The authors provide possible explanations based on theories of schooling and society.*

### **INTRODUCTION**

In U.S. society, women are considered a “significant population in the entrepreneurial world” (Kuratko, 2004, p. 677). Over the past two decades, the number of women entrepreneurs starting a business with more than 50 percent ownership has grown dramatically. The number of businesses owned by women entrepreneurs more than doubled between 1987 and 1999 in the United States (Gundry & Welsch, 2001). However, women entrepreneurs face unique challenges compared to male entrepreneurs: tension between work and home roles, difficulty obtaining outside financing, lack of entrepreneurial knowledge and skills, and a tendency to limit themselves to the service industry (Kuratko, 2004). ILO (2002) addressed the lack of entrepreneurial skills and knowledge, including access to legal property rights and intellectual property.

In line with this, a current report on the Global Entrepreneurship Monitor (GEM) data during a nine-year span (from 2002-2010) shows that women are just as likely as men to see entrepreneurship as attractive, but they are less likely to believe there are many opportunities for starting businesses in their area. In fact, women are more likely to be dissuaded from entrepreneurship due to fear of failure, and they are less likely than men to display the intention to start businesses. Additionally, in societies where women believe they have the capacity for entrepreneurship, women are more likely to believe that

entrepreneurial opportunities exist. However, fewer women than men (47.7 percent versus 62.1 percent) believe they have the capacity to start and run businesses, and these women expect half the growth that men do. We ascribe this behavioral limitation of female entrepreneurship to the gendered education of entrepreneurship degrees and certificates.

Cadieux, Lorrain, and Hugron (2002) claimed that women entrepreneurs are proactive in their education to prepare themselves for their own businesses, seeking more formal training and learning in both practical business settings and educational institutions. In general, entrepreneurship education in colleges and universities enhances participants' perception of entrepreneurial opportunity (Levie & Autio, 2008). Especially for women, entrepreneurship education in MBA programs significantly improves entrepreneurial self-efficacy (Wilson, Kickul, Marlino, Barbosa, & Griffiths, 2009). Thus, providing access to entrepreneurship education in colleges and universities is important in fueling the pipeline of aspiring future women entrepreneurs.

However, there has been no empirical analysis of the history and trends of entrepreneurship education in U.S. colleges and universities from the perspective of gender difference even though experts acknowledge that entrepreneurship education is important for women entrepreneurs.

The purpose of this study is to examine gender differences in entrepreneurship education in U.S. colleges and universities, focusing on degrees and certificates awarded between the 1996 and 2008 academic years. To interpret the significant gender gap in entrepreneurship education, we adopted social theories of higher education.

## **CONCEPTUAL FRAMEWORK**

Research on gender differences in entrepreneurial characteristics and performance has received a considerable amount of attention, but the relevance of this research and its relation to feminist theories are still debated (Fischer, Reuber, & Dyke, 1993). In our literature review, we present a general overview of applicable feminist theories, try to evaluate how comprehensively these theories can explain the gender gap in entrepreneurship education, and seek out supplementary or alternative social theories of relevance. The authors propose four hypotheses guided by Fisher's 1993 study on women entrepreneurs and the role of education.

### **Feminist Theories**

Feminist theories vary in nature, content, and consequence like any other set of theories in academic disciplines, yet the term "feminist" has not achieved a consensus definition, despite its wide use in social science (Elliot & Mandell, 1995). Despite definitional differences and difficulties, feminist theories generally share four major interests (Jaggar & Rothenberg, 1984):

- Interest in gendered nature of social and institutional relations;
- Interest in gender inequities and contradictions in social life;
- Interest in historical and sociocultural production and reconstitution of gender relations;
- Interest in political advocacy of social change.

These interests can be grouped into several categories based on broader philosophical and political perspectives. Elliot and Mandell (1995) group feminist theories into six different categories: liberal feminism, socialist feminism, radical feminism, anti-racist feminism, psychoanalytic feminism, and postmodernist feminism. Adapting liberal feminism and social feminism to the business field, Fischer (1993) developed theoretical frames for studying women entrepreneurs. Since our study is based on Fischer's frameworks of liberal and social feminism, we will review liberal feminism and social feminism theory and their relevance to the study of women entrepreneurs in more detail here.

Liberal feminism assumes that the inequality of women stems from unequal rights and the learned reluctance to exercise such rights—even though women are as capable as men (Elliot & Mandell, 1995; Fischer et al., 1993). However, the inequalities facing women entrepreneurs in terms of financing,

representation, and market presence have almost diminished in business fields since 1990s as Kuratko (2004) argues.

Social feminism views gender difference and discrimination as socially constructed (Fischer et al., 1993). Socialist feminists, for example, argue that women's oppression is formulated and structured by social, political, ideological, and economic categories. For example, wives, regardless of their paid labor commitments, are generally responsible for household management, childcare, and the emotional nurturing and general well-being of the family. Socialist feminists see these unpaid and underappreciated socioeconomic domestic structures as domestic slavery and believe they should be abolished to guarantee women's freedom and rights. In contrast, liberal feminists focus on increasing opportunities and public consciousness for women (Elliot & Mandell, 1995). The oppressive domestic structure decried by social feminism cannot explain the origins and persistence of gender difference in the labor market, especially in regard to starting new businesses. Knowledge, skills, and the development of entrepreneurial competency are highly dependent on one's history of occupation and education rather than the limits placed on women's time and energy (Elliot & Mandell, 1995). Therefore, liberal feminism provides a better understanding of gender difference in the business field and guides possible solutions.

Guided by liberal feminism, Fischer (1993) hypothesizes that women have less entrepreneurially relevant formal education than men, and their firms will therefore be less successful because women are systematically less likely to have access to education that would help them in running their own businesses. However, the Fischer's study results indicate that there are few significant gender differences in education—except in production education such as technology development and engineering, at the level of .05 percent. The irrelevance of formal business education for entrepreneurial performance shown in Fischer's study is compatible with other studies (Birley, Moss, & Saunders, 1987; Kalleberg & Leicht, 1991). The limitation of the study by Fischer, Birley, and Kalleberg (1993) on the role of formal education in entrepreneurship is that they investigated general business education, not including entrepreneurship-specific education. General business education may not be directly increasing women's skills and knowledge in entrepreneurship. Strikingly, Mintzberg (2004) argues that business education, such as MBA programs in the United States, commonly discourages entrepreneurship for its controlling and administration orientation. In light of these studies, we argue that examination of entrepreneurship education in formal educational settings—colleges and universities—might shed a new perspective on our understanding of the gender gap in entrepreneurship, regardless of its positive or negative impact on entrepreneurship.

### **Research Questions and Hypotheses**

Studies on entrepreneurship education in U.S. colleges and universities have flourished in the past decade (Greene & Rice, 2007; Katz, 2003, 2008; Kuratko, 2005; Pena, 2010; Solomon, 2007; Vesper & Gartner, 1997). However, research concerning gender differences in entrepreneurship education at higher education institutions is lacking. This study addresses the gender gap in entrepreneurship education in U.S. colleges and universities. We raise three important research questions.

1. To what extent do women, compared to men, complete entrepreneurship education in U.S. colleges and universities?
  - Number of entrepreneurship degrees and certificates by gender
  - Proportion of entrepreneurship degrees and certificates by gender
  - Levels of entrepreneurship degrees and certificates by gender
2. Do gender differences exist in entrepreneurship education?
3. Are those gender differences in entrepreneurship education, if any, distinguishable from business and non-business education?

According to previous research on women entrepreneurship and education (Birley et al., 1987; Fischer et al., 1993; Kalleberg & Leicht, 1991), there should be no gender difference between women and men entrepreneurs. In relation to those findings and the increased number of women entrepreneurs in the

U.S. (Kuratko, 2004), four hypotheses are formulated in order to examine gender differences in entrepreneurship education in U.S. colleges and universities.

- H1: The number of women who received entrepreneurship degrees and certificates in U.S. higher educational institutions is increasing.
- H2: The proportion of female to male in entrepreneurship education is even.
- H3: The proportion of female to male in entrepreneurship education is not different from business education or non-business education.
- H4: The level of educational degrees and certificates pursued by women and men is the same.

First, the authors hypothesize that the number of women in entrepreneurship education is increasing. Kuratko (2004) describes rapid growth in the number of women entrepreneurs in the United States. Second, the numbers of female and male students pursuing entrepreneurship education in U.S. colleges and universities are not different if there is no gender difference. Third, if there is no gender difference in entrepreneurship education, the proportion of women to men in entrepreneurship education should be similar to the proportion of women to men in business education and general education. Finally, in order to support the absence of gender difference in entrepreneurship education, we should be able to observe that the level of educational degrees and certificates pursued by women is not differentiable from that of men. With these hypotheses, this study examines gender differences in entrepreneurship education in U.S. colleges and universities during academic years 1996–2008.

## RESEARCH METHOD

In order to identify gender difference in entrepreneurship education, a quantitative research design is employed as a primary research method. In this study, descriptive statistics are presented to examine the maturity stage of entrepreneurship education under the academic discipline growth model, using Integrated Postsecondary Education Data System (IPEDS) data for academic degrees and certificates awarded in U.S. colleges and universities from 1996 to 2008. Inferential statistics—t-test, analysis of variance (ANOVA), and post-hoc analysis—are used to test proposed hypotheses and to draw conclusions.

As stated earlier, previous research on entrepreneurship education indicated that the number of entrepreneurship courses (Katz, 2003), endowment and chairs (Katz, 1991, 1994), programs (Solomon, 2007; Solomon, Duffy, & Tarabishy, 2002), academic associations (Plaschka & Welsch, 1990), and journals and articles (Dos Santos, Holsapple, & Ye, 2010; Katz, 2003) rapidly increased from 1990 to 2005. But the numbers of academic degrees and certificates awarded in entrepreneurship education have not yet been investigated in order to test gender differences in the discipline. In addition, studies examining gender differences in education and seeking to explain the lower number of female entrepreneurs have only examined general business education, partly due to the lack of a comprehensive data set that includes entrepreneurship education. Using the IPEDS database maintained by the National Center for Education Science (NCES) provides two major advantages for our understanding of entrepreneurship education. First, investigating both academic degrees and certificates awarded at U.S. colleges and universities enables us to broaden our perspective on formal education in entrepreneurship. Most previous studies only address degree programs and four-year (or longer) university education. Second, this study enables us to use the most relevant approach for understanding gender differences in entrepreneurship education: directly analyzing entrepreneurship education and comparing this to general business education.

The IPEDS database provides the most representative and reliable educational information for examining changes in the awarding of degrees and certificates from U.S. colleges and universities (McBroom, 2008). The Higher Education Act in 1992 mandated the completion of IPEDS surveys for all U.S. colleges and universities accepting federal student financial aid. In 1993, NCES began collecting

information such as institutional characteristics, degree completion, twelve-month enrollment, human resources, financial aid, and graduation rates, and this data is available to the public (National Center for Education, 2011).

### **Data Mining and Screening**

IPEDS specializes in descriptive research to produce statistical information on the aspects of education that interest policymakers and educators (Gall, Gall, & Borg, 2007). This study mines data about institutional characteristics and completion of degrees and certificates from IPEDS because we are focusing primarily on examining gender differences in entrepreneurship education in U.S. colleges and universities.

The 1996 through 2008 academic years are analyzed. This period represents the data available at the time of this study that included data that were substantially similar over time. The data were screened and then aggregated using certain criteria in order to address research questions and test hypotheses for this study.

Only colleges and universities in the fifty United States and the District of Columbia are included. U.S. territories are included in the IPEDS data but are excluded from this analysis. Also excluded are institutions that are for-profit, non-degree granting, inactive, non-accredited, or less than two years. Although for-profit four-year colleges and universities have rapidly emerged in recent years in the United States (Breneman, 2005), they were not as prevalent in the earlier years covered by this data, and they may be less influenced by the educational policies and models of interest herein. These institutions deserve a separate focus.

To categorize academic degrees and certificates awarded in entrepreneurship, business, and non-business fields, the IPEDS instructional program (CIP) codes were used. Our focus is Entrepreneurial and Small Business Operations (CIP 52.07), which incorporates Entrepreneurship/Entrepreneurial Studies (52.0701); Franchising and Franchise Operations (52.0702); Small Business Administration Management (52.0703); and Other Entrepreneurial and Small Business Operations (52.0799). These labels were used for the 2010 CIP classification. This study uses the term “entrepreneurship” to refer to entrepreneurship and small business management. Although the CIP codes have undergone some revisions, we believe using this broader definition allowed comparisons over time. In 2002 and prior years, CIP 52.07 focused on small businesses, including franchising, and entrepreneurship was placed in another section of the classification, related to marketing. Both small business and entrepreneurship were included in this analysis for all years.

Institutional characteristics used in this analysis (e.g., level and sector of colleges and universities) were based on the U.S. Department of Education’s definitions. IPEDS also provides the Carnegie Classification of Institutions of Higher Education, the traditional framework developed by the Carnegie Commission on Higher Education and now published by the Carnegie Foundation for the Advancement of Teaching (Carnegie Commission on Higher Education, 2010). This classification identifies institutions by such categories as doctoral/research universities, master’s colleges and universities, baccalaureate colleges, and associate colleges. More details about the framework and definitions of institutional categories are available at the Carnegie Foundation website at [classifications.carnegiefoundation.org/summary/basic.php](http://classifications.carnegiefoundation.org/summary/basic.php).

A notable limitation of this study is missing data. IPEDS data was gathered for the academic years from 1996 to 2008, but 1999 and 2002 data were not included. The 1999 data was not available at IPEDS, and the 2002 data was significantly outlying from other data. Therefore, 2002 data was purposefully excluded from the hypothesis testing analysis. In addition, there were several minor code changes during the period studied, which varied the numbers of degrees/certificates in different levels and institutional types. These data fluctuations might limit the power of hypothesis testing for gender differences in entrepreneurship education.

## Quantitative Analysis

In this study, parametric and/or non-parametric t-test, ANOVA, and post-hoc analysis were applied to test the proposed hypotheses. Prior to conducting inferential analyses, the normality condition of the data is examined with the Kolmogorov-Smirnov and Shapiro-Wilk tests. Nonparametric analysis, such as the Mann-Whitney U test for two independent samples and the Kruskal-Wallis test for three or more independent samples which do not rely on an assumption of normality, is applied to test hypotheses for non-normal data sets (Myers & Well, 2003).

The homogeneity condition of data is evaluated using the Levene's test method before conducting the hypothesis test. If the homogeneity condition is significantly violated, we test mean differences between or among groups by applying robust ANOVA methods, the Welch and Brown-Forsythe methods, which do not assume equal variance of data in groups ("What statistical analysis should I use?," 2011). Dunnett T3 and Games-Howell post-hoc analysis techniques are applied to identify which means are different from the others if the data do not meet the homogeneity condition (Myers & Well, 2003).

In this study, Statistical Package for the Social Science (SPSS)™ software was used for testing the hypotheses because the software provided various statistical techniques for non-normal, non-homogeneous, and non-parametric data analysis (Gall et al., 2007). SPSS is widely used in the fields of education and social science.

## RESULTS AND FINDINGS

Figure 1 (See Appendix) shows the comparison of women and men with respect to entrepreneurship degrees and certificates awarded by U.S. colleges and universities. It indicates that the number of entrepreneurship degrees and certificates awarded to women and to men both increased with a similar pattern during the academic years from 1996 to 2008. Therefore, the first hypothesis—that the number of women in entrepreneurship education is increasing—is supported from the data.

Figure 2 (See Appendix) indicates changes in the proportion of academic degrees and certificates awarded to women and men in entrepreneurship, business education, and non-business education. As depicted in the figure, the proportion of women to men in entrepreneurship education is not even, and the proportion of female students in entrepreneurship education [M = 44.4%, SD = 2.936%] is much lower than male students [M = 55.6%, SD = 2.936%]. Therefore, the second hypothesis describing an even proportion of female to male enrollment in entrepreneurship education is not supported.

Parametric ANOVA and non-parametric Kruskal-Wallis tests were both applied because the non-business data set significantly violates the normality assumption [Kolmogorov-Smirnov (11, 0.340),  $p = .001$ ; Shapiro-Wilk (11, 0.798),  $p = .009$ ]. ANOVA results indicate that there is at least one different mean among mean proportions of entrepreneurship, business, and non-business [F (2, 30) = 107.524,  $p = .000$ ]. In addition, Kruskal-Wallis test results also indicate that there is at least one mean difference [K-W (2): Chi-square = 28471,  $p = .000$ ]. Post-hoc test results confirm that the proportion of entrepreneurship degrees and certificates awarded to women [M = 44.4%, SD = 2.936%] is significantly lower than in general business [M = 51.8%, SD = 0.915%] or in non-business degrees and certificates [M = 60.4%, SD = 3.201%]. Taking all results into consideration, the third hypothesis, that the proportion of women to men in entrepreneurship education is not different from in business education or general education, is not supported.

Figure 3 (See Appendix) and Table 1 show the proportion of entrepreneurship degrees and certificates awarded to women and men by degree level. More than half of women get less than two-year certificates [M = 54.4%, SD = 3.301%], while a majority of men get associate degrees [M = 44.6%, SD = 2.679%] or undergraduate degree [M = 23.1%, SD = 2.713]. Interestingly, more women [M = 2.3%, SD = 1.017%] than men [M = 1.2%, SD = 0.573%] get graduate degrees.

**TABLE 1**  
**COMPARISON OF THE MEAN PROPORTION OF ENTREPRENEURSHIP DEGREES AND**  
**CERTIFICATES AWARDED TO WOMEN AND MEN BY DEGREE LEVEL**  
**FOR THE 1996–2008 ACADEMIC YEARS**

<b>Degree/Certificate Level</b>	<b>Category</b>	<b>Mean (%)</b>	<b>S.D. (%)</b>	<b>t</b>	<b>p</b>
<b>Graduate Degree</b>	Women	2.3	1.017	3.120	.005
	Men	1.2	0.573		
<b>Undergraduate Degree</b>	Women	16.1	4.281	-4.532	.000
	Men	23.1	2.713		
<b>Associate Degree</b>	Women	27.2	2.642	-15.287	.000
	Men	44.5	2.679		
<b>&lt; 2-Year Certificate</b>	Women	54.4	3.301	20.545	.000
	Men	31.2	1.759		

Note: Graduate degree (Doctoral, Master's, Post-Master's); undergraduate degree (Bachelor's, Post-baccalaureate); associate degree (Associate, 2–4 years); < 2-year certificate (both less than 2 years and less than 1 year)

Figure 4 (See Appendix) and Table 2 illustrate the proportion of entrepreneurship degrees and certificates awarded to women and men by institutional types. Results in Figure 4 and Table 2 also indicate that women complete entrepreneurship education at associate colleges [M = 51.3%, SD =5.765%] more often than men [M = 29.0%, SD =4.166%]. More than half of men complete entrepreneurship education at doctoral/research universities [M = 44.2%, SD =7.959%] and master's universities [M = 12.0%, SD =3.888%]. In short, the fourth hypothesis—that the level of education does not differ by gender—is not supported.

**TABLE 2**  
**COMPARISON OF THE MEAN PROPORTION OF ENTREPRENEURSHIP DEGREES AND**  
**CERTIFICATES AWARDED TO WOMEN AND MEN BY INSTITUTION TYPE**  
**FOR THE 1996-2008 ACADEMIC YEARS**

<b>Degree/Certificate Level</b>	<b>Category</b>	<b>Mean (%)</b>	<b>S.D. (%)</b>	<b>t</b>	<b>p</b>
<b>Doctoral/Research University</b>	Women	24.6	5.296	-6.802	.000
	Men	44.2	7.959		
<b>Master's University</b>	Women	9.1	3.454	-1.800	.087
	Men	12.0	3.888		
<b>Baccalaureate College</b>	Women	8.3	3.440	1.438	.166
	Men	6.5	2.210		
<b>Associate College</b>	Women	51.3	5.765	10.384	.000
	Men	29.0	4.166		

Note 1: The types of college and university follow the Carnegie Classification.

Note 2: Academic degrees and certificates from special colleges are not included since there is limited information available for categorizing them into specific types of colleges and universities.

## DISCUSSION

As proven by empirical study of gender differences in entrepreneurship education, the results of this study support the claim that there are significant gender differences in entrepreneurship education in U.S. colleges and universities over the past decade. As the number of entrepreneurship degrees and certificate programs increased between 1996 and 2008, gender equality was not achieved. These findings contradict previous research on women entrepreneurs in business fields (Birley et al., 1987; Fischer et al., 1993; Kalleberg & Leicht, 1991), which claim there are no gender differences in higher education.

What might be possible explanations for the gender gap in entrepreneurship education? We make four propositions for interpreting our findings in light of theories of schooling and society.

Hurn (1985) classifies theories of schooling and society into two domains: the functional paradigm and the conflict paradigm. The functional paradigm sees schools as teaching the kind of cognitive skills and norms essential for the performance of most adult roles in a society increasingly dependent on “knowledge” for economic growth. Within the functional paradigm, education is an investment that will pay off in future earnings by increasing an individual’s human capital, knowledge, and expertise (Hurn, 1985). The functional paradigm assumes that those who do well in college should, other things being equal, obtain better jobs and make more money than those who did less well (Hurn, 1985). The idea that education and training are investments in the development of human capital is valid, and several scholars have adopted the functional paradigm of schooling by using return on investment (ROI) or cost-benefit analysis (Kuchinke, 2003; Swanson & Holton, 2001). In line with this approach, we offer the first to explain the increasing number of women achieving entrepreneurship degrees and certificates in U.S. colleges and universities.

*Proposition 1: Women complete entrepreneurship education in colleges and universities to expect gains of entrepreneurial knowledge, skills, and expertise for their future creation of businesses.*

But the lower proportion of women in entrepreneurship education indicates that women value this education less than men do. In addition, the high proportion of women in associate colleges and certificate programs of less than two years suggests that they expect lower payoffs from their education.

*Proposition 2: Women expect lower payoffs from entrepreneurship education in colleges and universities, so they value it less than men.*

In line with this, Collins (1979)'s notion that "largely unnecessary educational credentials determine access to a desirable job" can be relevant to our findings. Women's higher completion of entrepreneurship education in less prestigious higher education institutions might explain women's lower expectation of desirable jobs after achieving entrepreneurship degrees and certificates. Practical knowledge obtained from programs at associate colleges and certificate programs of less than two years might be considered more than enough to secure access to jobs that women see as desirable.

*Proposition 3: Women expect less in terms of their desirable jobs and avoid seeking unnecessary educational credentials to access desirable jobs. Thus, women tend to complete entrepreneurship degrees and certificates in practical but less prestigious entrepreneurship programs.*

John Meyer (1977; 2007), an institutional theorist in conflict paradigm, stresses individuals' and institutions' dependence on wider environmental meanings, definitions, rules, and models. Results showing a lower proportion of women in entrepreneurship and a higher proportion in business and non-business education suggest that the institutionalized value of business education is much higher than that of entrepreneurship education. In addition, women's higher completion of lower-prestige degrees and certificate programs in entrepreneurship education confirms that women choosing an academic discipline are highly influenced by social environments' reluctance to accept women entrepreneurs. In most Western cultures, including the United States, entrepreneurship is still associated with male characteristics (Butler, 2000).

*Proposition 4: Women are reluctant to choose entrepreneurship education in colleges and universities because of social environments' inhospitality toward women entrepreneurs.*

Finally, gender inequality at work and in job searches is well known (Jacobs, 1995; Jacobs & Gerson, 2004; Lesnick, 2005; Robeyns, 2001; Tomaskovic-Devey, 1993). As a consequence of this inequality, women tend to start small businesses in the search for "equal or higher" financial rewards instead of seeking a desirable job in formal economy sectors (Birley, 1989; Fielden & Davidson, 2006). Therefore, a higher number of females pursuing entrepreneurship education in lower-prestige institutions expect to start their own businesses.

*Proposition 5: Women choose educational institutions and programs where they can get pragmatic skills and knowledge for starting a business, rather than searching for a desirable job.*

## CONCLUSION

The increasing number of women pursuing higher education degrees and certificates, especially in general business education in the United States, shows that the gender gap in business education is diminishing significantly. However, this study proves that there are still significant gender differences in entrepreneurship education. While women are outnumbered than men in business and general education in colleges and universities, women are still minorities in entrepreneurship education at higher education. Women who seek entrepreneurship degrees and certificates gravitate toward less prestigious higher education institutions than men do. These gender differences are caused by 1) women's lower expectations of payoff from entrepreneurship education, 2) social environments' reluctance to accept women entrepreneurs, 3) women's lower expectations of career achievement, and 4) women's avoidance of unnecessary educational credentials.

Educational leaders and policymakers should be aware of gender differences in entrepreneurship education in U.S. colleges and universities. They also need to understand underlying assumptions and unconscious gender discrimination in entrepreneurship education. Gender-sensitive curriculum design and implementation in colleges and universities is necessary to nurture future women entrepreneurs in higher education. In addition, more practical and hands-on entrepreneurial experiences for women in entrepreneurship education are required in order to fuel the pipeline of women entrepreneurs who will help our future economy flourish.

For future research, the authors suggest an investigation of the influence of social environments on women who are choosing entrepreneurship education in colleges and universities.

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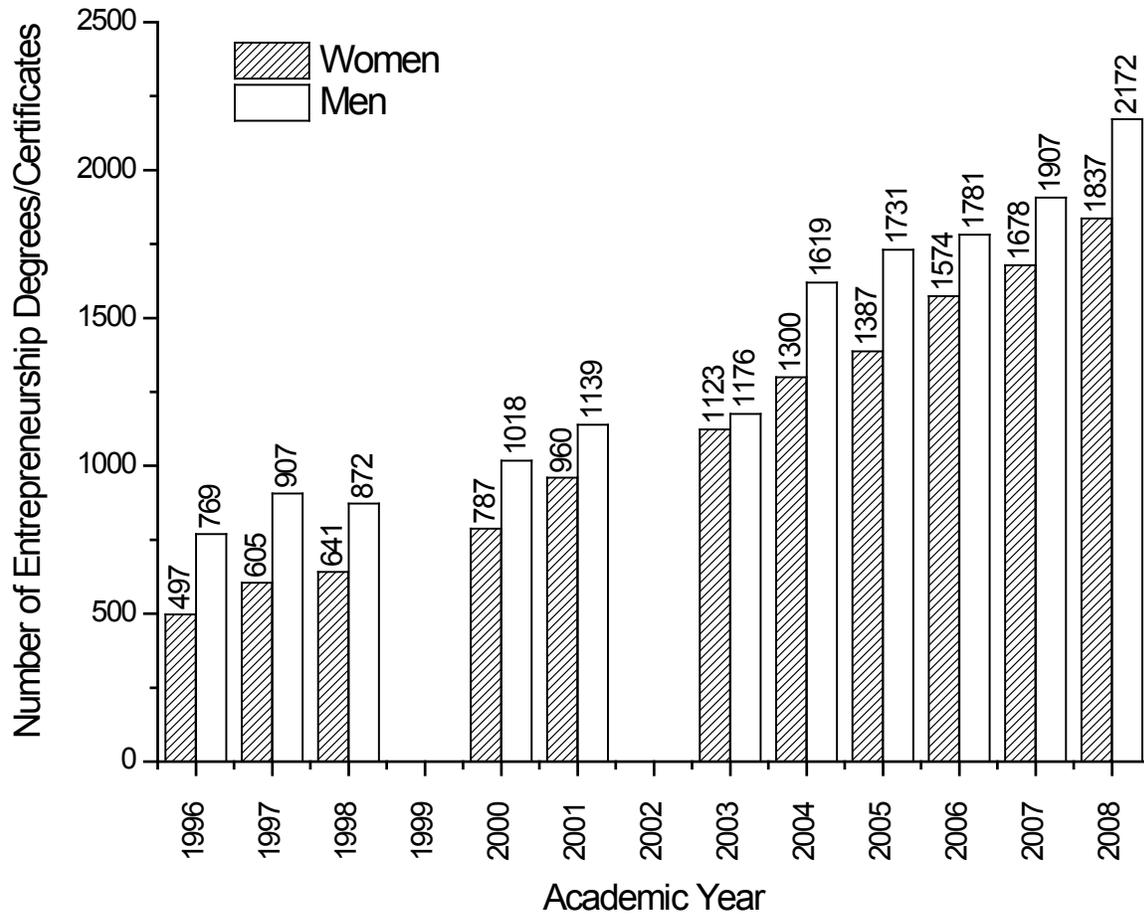
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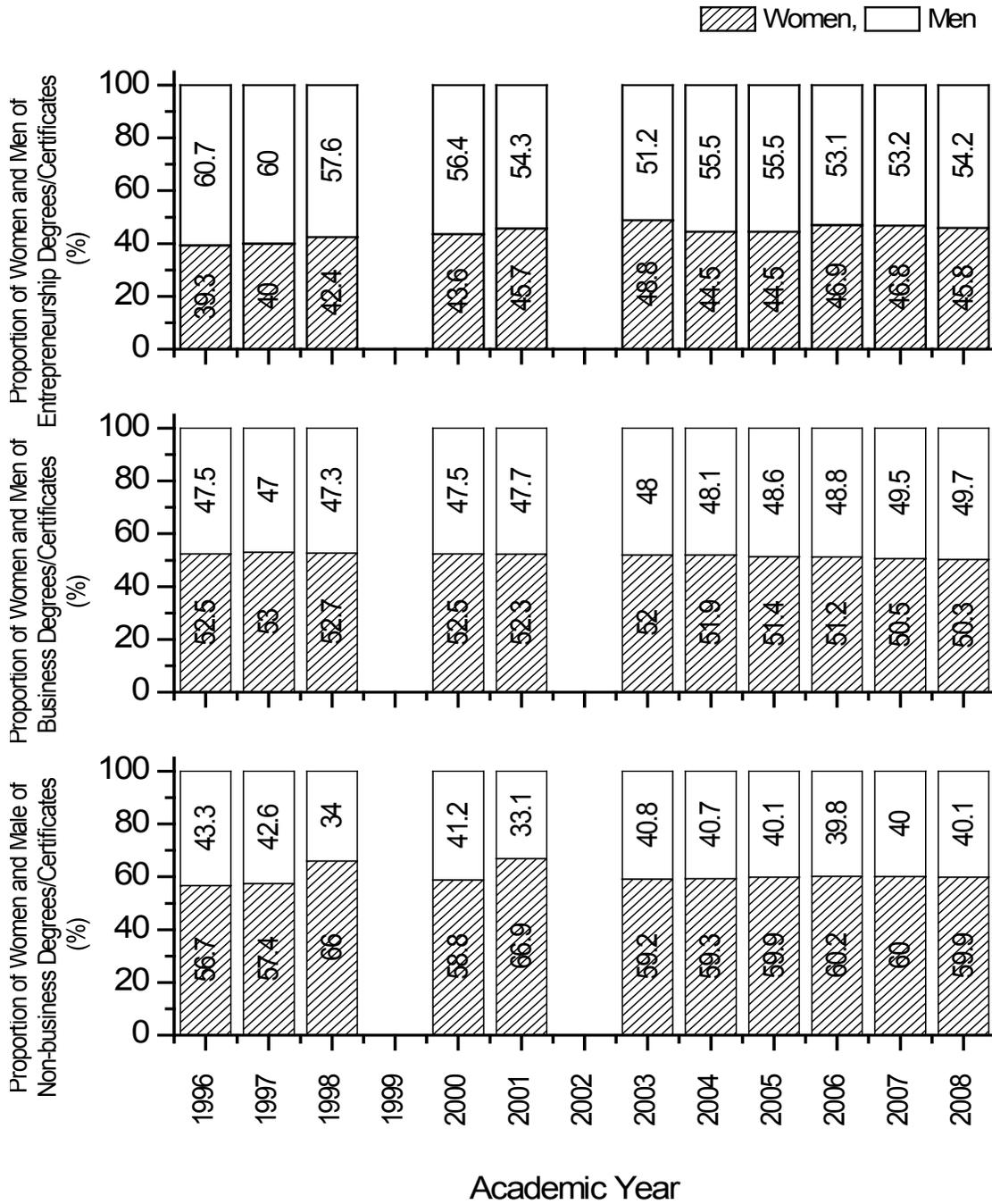
APPENDIX

**FIGURE 1**  
**NUMBER OF ENTREPRENEURSHIP DEGREES AND CERTIFICATES**  
**AWARDED TO WOMEN AND MEN**

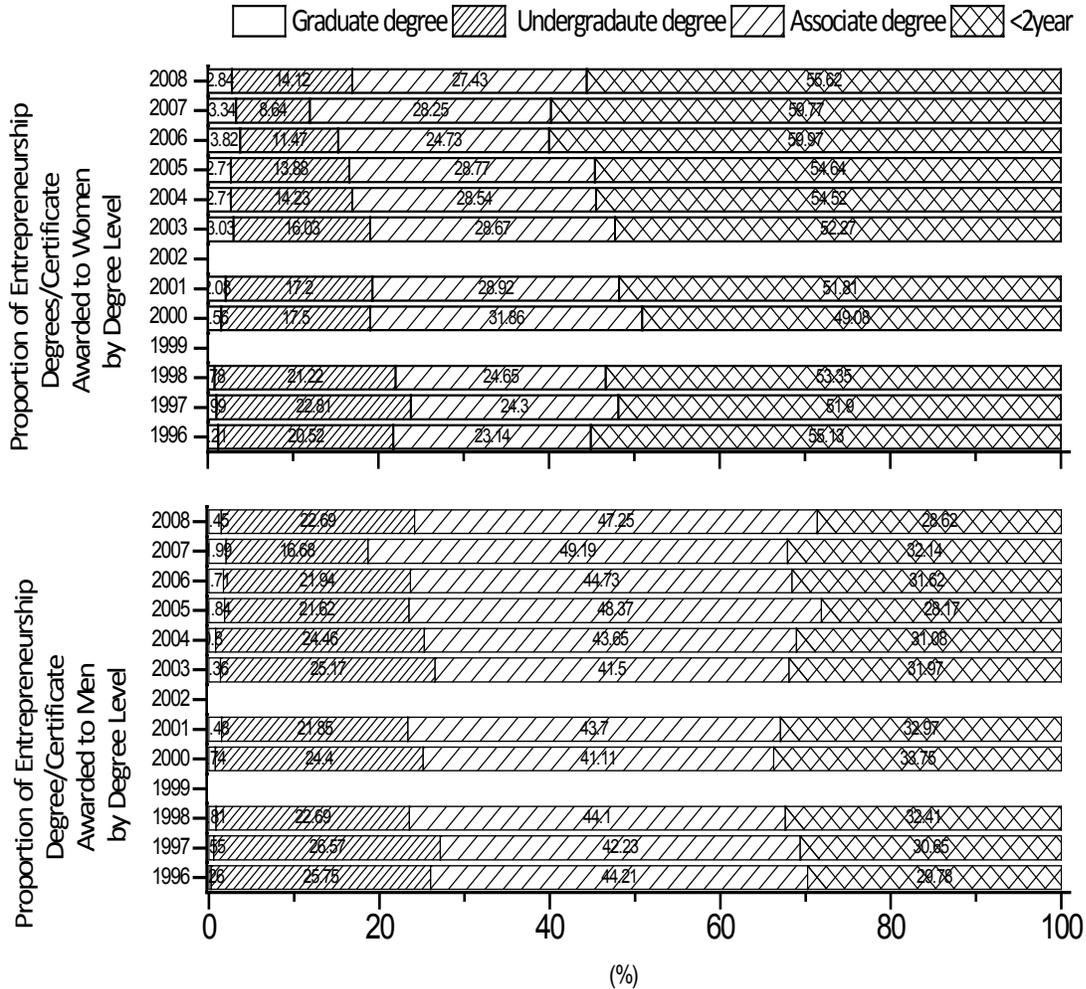


Note: 1999 and 2002 data are not included. The 1999 data are not available from IPEDS, and 2002 data have a significant data validity problem: the number of entrepreneurship degrees and certificates is 17,321, an extraordinary deviation from the overall pattern.

**FIGURE 2**  
**PROPORTION OF ACADEMIC DEGREES AND CERTIFICATES AWARDED TO WOMEN**  
**AND MEN IN ENTREPRENEURSHIP, BUSINESS, AND NON-BUSINESS**

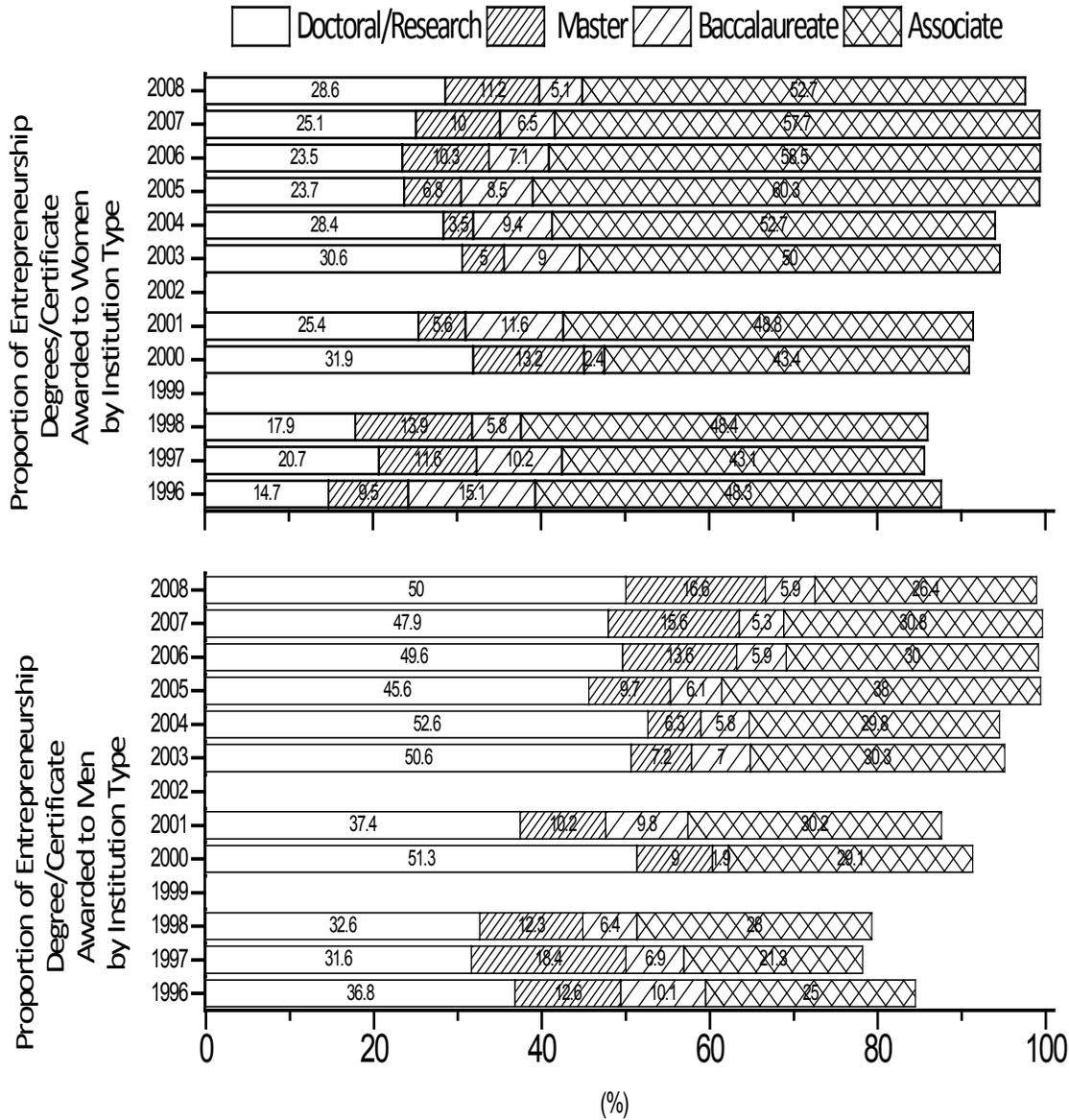


**FIGURE 3**  
**PROPORTION OF ENTREPRENEURSHIP DEGREES AND CERTIFICATES AWARDED TO WOMEN AND MEN BY DEGREE LEVEL**



Note: Graduate degree (Doctoral, Master's, Post-Master's); undergraduate degree (Bachelor's, Post-baccalaureate); associate degree (Associate, 2–4 years); < 2-year certificate (both less than 2 years and less than 1 year)

**FIGURE 4**  
**PROPORTION OF ENTREPRENEURSHIP DEGREES AND CERTIFICATES AWARDED TO WOMEN AND MEN BY INSTITUTION TYPE**



Note: Academic degrees and certificates from special colleges are not included since there is limited information available for categorizing them into specific types of colleges and universities.