

Example of research paper on women in the sciences and engineering

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Women with their fight for suffrage welcomed the last century. The feminist movement was on its peak. A few women began earning their education. However, they were confined to school teaching and manual labor in terms pursuing careers (Women's Work, PowerPoint). Over a century later, women became indispensable in the work force. Jenna Goudreau of Forbes even says that women now beat men in achieving bachelor's and master's degree. More and more women land high-paying jobs and are narrowing the gender gap across sectors. The field of science, technology, engineering, and mathematics (STEM) shows growth in participation of women, though it remains hard to be pursued. To have these changes over the century required hard work and perseverance from women. Emphases were put on those who broke grounds and from the men and women around them who gave belief and support. It will be fascinating to observe the progress of women in the STEM field, how it came to their status in the field, and how can they move forward so that the STEM field will not remain " a man's profession," but a field where women can make significant contributions (Women of Profession in the 20th Century).

Before 1940, women scientists were extremely few and stood alone in their ventures and career journey. They lacked the ability and the will challenge the employment pattern of women then. They reached an impasse in all areas of science by 1940, aided by the fact that men were in war and opened positions for women in every field. Doctoral educations become possible for them, though they would be greatly hindered to advance in employment (Women's Work, PowerPoint, p. 2). Such was the case of Christine Ladd-Franklin, best for her with vision, and her theory of color

vision, who often lectured in prestigious universities such as Harvard University and University of Chicago without pay (Women's Work, PowerPoint). During the World War II in 1943, women scientists and engineers were recruited for industry and technological advancement due to serious shortage of work force.

The decade of 1940 to 1950 witnessed a sharp rising of commitment from women in science and technology. The percentage of women from the total personnel rose from 24. 1 to 26. 3 in the natural and social sciences, from 3. 1 to 10. 2 in chemistry, and 0. 3 to 1. 3 in engineering (from 945 to 6700 women engineers). Sadly, this decade was unique, and 1960 saw women employment declined from here (Women's Work, PowerPoint, p. 4).

Returning GIs were prioritized in occupations and women were pushed back again to taking care of their homes (Entry in Science, pdf file, p. 35).

Throughout the years participation, women grew slowly and steadily. 1973 to 1995 records show substantial growth in women representation in all fields of engineering and science (Entry in Science, pdf file, p. 29). By 2003, 172, 300 women engineers were reported employed compared to the 950 women engineers of 1946. Men engineers in 2003 were reported 1, 382, 500, still about 8 times more compared to women (Women's Work, PowerPoint, p. 12).

Women tend to pursue the behavioral, social and life sciences, in which traditionally neither are nor employed much by the industry (NAP, p. 105).

The Academe and Federal Undertakings

Taking a closer look at the academe, where one is hailed competent in the participation of significant scientific efforts by a doctorate, the rise of women

participation can be traced and indicators as to the factors that affect their participation can be examined. An account called "Entry into Science" details this study. Lucy Stone was the first woman awarded with a baccalaureate degree in the United States. That was in 1847. Fifteen years after the first doctorate was achieved in Yale University in 1862, Boston University produced the first woman PhD holder. Since then, the presence of women enrolled in colleges and universities were changed dramatically: from 11, 000 in 1870, to 601, 000 in 1940, hitting nearly 7 million by 1995 (Entry into Science, pdf file, p. 32). However, before the 1972 Higher Education Amendments, women discriminations were rampant throughout higher education particularly in research universities.

Thousands of women with abilities of qualified men were excluded in professional schools and universities as these institutions practice the requirement of higher test scores and grades for the admission of women (P. 30). The duration between 1920s to mid 1930s, at the time of the Depression, women obtaining degrees in the field of physical sciences fluctuated between 10% and 15% of the total number of degree awardees. A sharp rise of the number of degrees that women obtained in the course of World War II followed the depression, which was reversed as quickly as GIs returned to school were. A law known as GI Bill was passed in 1944 that caused universities deliberately to lessen the admission of women to accommodating the war veterans (p. 31). The Massachusetts Institute of Technology (MIT) formed a committee to decide on whether female students should continue to be admitted. Women were forced into the developing state colleges where science and engineering trainings at the undergraduate

level are inadequate, if they were at all existent. It is remarkable that the percentage of baccalaureate degrees awarded to women did not match the level achieved in the 1920s ever again until the mid-1970s (p. 35). By the 1980s, the number of women obtaining a baccalaureate degree exceeded that of men. This did not lead, however, to the same proportion of women in the advanced degrees. They represent a rather small proportion in the doctorate programs, even fewer in the fields of science and engineering (P. 30).

The launch of Sputnik in 1957 initiated federal support to start programs for graduates that would cause in a dramatic rise in the number of PhD's in science and engineering from 1963 to 1970. By this time, the growth in the number of women obtaining doctorate degrees in the same field was still stunted by a number of factors. The women faced a tide of competition from the veterans of Korean conflict who used the GI Bill to return to school (p. 35). There were also the social pressures to marry early and have children. The discrimination against women in university admissions and financial aids persisted (p. 36). The first part of the 1970s saw the decline in PhD takers due to poor academics and federal cutbacks. PhD programs universities capacities rose with male enrollment was declining, resulting to more positive reception to women applicants. Feminist movement and the Title IX antidiscrimination law finally contributed to the steady rise of women pursuing PhD from this time (p. 36). By 1996, 33% of science and engineering PhD's were women (Training Preferences of Graduate Programs, pg. 33).

Financial support systems available to PhD aspirants are considered vital, if not crucial to the ability of a student produce quality research and complete a doctorate in a timely manner. The scientific fields offer research assistantships to students as an ideal form of support as they allow students to work with his mentor side by side. The student receives focused and training to enable gathering of material important for successful completion of thesis or dissertations. Teaching assistantship is another and is superior to student loans, but has limited contact with the mentor and limits research hour (Entry into Science, p. 51). Women are given less priority for department support through teaching assistantship (TA) in universities and thus are also more likely to use loans instead of being funded with a Research Assistant (RA) position. In the department of Mathematics particularly, gender difference in obtaining RA positions are increasing. Women are likely to have TA positions in engineering but men are inclined to do so in the life sciences. (This study claimed to be limited but also merits further studies, Entry into Science, p. 56). At the MIT, women without mentors tend to be less likely to receive more grants compared to their male counterpart who do not enjoy mentorship (MIT, p. 17).

Family Influence

Until recently, parental encouragement seemed to have been an influential factor motivating women to participate in the discipline of science and engineering, especially at the time when female doctorates were an oddity and the societal support for them was rather weak. Women that have doctorate degrees in science and engineering were more likely to achieve

academic excellence compared to men whose fathers had college degrees. Female doctorates with college graduate fathers are 47% of the total female doctorate holders while the male doctorates were 29% of the total male PhDs. (Entry into Science, p. 41)

Women are also more likely to interrupt their studies or to attend school part-time than men. The most likely reasons that make women postpone their education are raising a family or following a spouse to his job that would require a change of institutions. This is considered a primary reason other than the aforementioned possibility that women interrupt their studies due to the gender differences in support for the available graduate education (P. 51).

Considering the demanding careers of scientists and the likelihood that women will most likely take charge of the responsibilities of raising children, it is expected that men in the scientific world are more likely to have children. As time went by, men and women have become increasingly similar in their life patterns regarding marriage and having children. This may be a reflection of an improved childcare system that enable women to balance between pursuing a career and raising a family. (P. 59) This may also show that men are becoming more willing to share responsibilities of raising children while the employers are accommodating the demands of parenting (p. 60). For the professors, gender is still a significant factor in determining salaries as of 2009. Men earn about 8% more than women do (The National Academies, p. 16).

Women speak of the factors that hinder their success. Most obvious is the educational and work opportunities available to them. More often than not, they make do with what is available to them, even if they are paid less or have to choose a second choice of educational degree. An important factor that supported women in their pursuits in a career in, MSE, are the people around them who supported them, fathers, mothers, husbands, relatives, and social circle. Statistics show that these supportive relationships were more vital to women compared to men (Entry into Science, pdf file, p. 43). All the women above one way or the other have this kind of support, with some opposed to it. As years go by, the numbers have helped encourage women to participate more in the MSE field. When women are few in the field, there are treated more as representative of the women rather than as compatriots (Entry into Science, pdf file, p. 37). This is still true today in most MSE field, but the increasing number of participating women helps minimize this form of discrimination at present.

Today, the women have moved " from scarcity to visibility". Women are welcome now to pursue careers. There is no educational field that is restricted to them, and everywhere in the US women are active in all areas of the profession. The basic civil rights of women in the US have improved significantly resulting to gender equality in the work force. Sheryl Sandberg, COO of the Facebook, gave a talk on the status of women in the workforce (TED, 2010) and her views are interesting. She says that although women are visible in every profession, they are not on top of the profession. Women today still lack the self-confidence that they can " raise their hands" and " sit at the corner table" and if ever they do, they are not liked for it. She

encourages that there is lot more room for women to exhibit their capabilities and that these capabilities are by no means second rate to that of men.

Conclusion

Over the last hundred years or so, the western world had witnessed activism in women that demanded that they not be confined to keeping the house, raising children, and cooking dinner, but ultimately, they be allowed to access to opportunities afforded to men. They demanded that they have a say of how the world will be run, be able to be whatever they want to be, and have the opportunity to make a difference. They have gone off conquer what used to be known as the world of men. One triumph at a time, they showed men that they have what it takes to make a difference and to equal them. After over a century women have progressed from being assigned to just the home, to being relied on for the family income - while still being in charge of the home. As the world changes, we are beginning to see just what are the capabilities that the generations before us has repressed and boxed by stereotyping them at home and with the children. Even worse is saying that these capabilities lacked quality compared to that of men. If women are allowed to grow and excel as they want to be, who knows it the world will not be a much better place because it. From women who have done it already, it does not seem to be an unrealistic projection of the future.

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