



Review of 'Women Engineers in Turkey: Gender, Technology, Education and Professional Life'. Author: Berna Zengin.

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REVIEW

Women are underrepresented in the field of engineering (Byko, 2005; Schaefer, 2006). While this is the case, it is necessary to understand why women engineers enter this field and what kind of experiences they have. This book, with a compact and easy to read format, summarises the historical issues related to women engineers around the world and specifically in Turkey, and reports on a research study on the experiences of engineering women in Turkey either working as academics or professionals. Encouraged by the idea that engineering is seen as basically a male dominated area and that it has been conceptualized as masculine, Zengin examined women in the engineering field, assessing the gendered distribution in engineering departments and illustrating how this distribution made an impact on women's experiences in this field. Based on a qualitative approach, Zengin interviewed women engineers in Turkey in order to capture how they construct their professional identity in the field of engineering, as well as the meaning of being an engineer; motives behind the choice of the field; and many other aspects of their experiences before and during their education and their professional life. Since qualitative research is highly useful when little quantitative data is available in certain areas, by providing a rich description of relevant concepts, the study tried to fill the gap observed in literature with respect to the experiences of women engineers.



Besides her research findings, Zengin provides statistical data in relation to the ratio of women represented in the engineering departments, and compares it with the data from other countries. One can be confounded by the fact that in Turkey, women's participation in engineering is relatively high when compared to some Western developed countries. Although the statistical data provided by the author is not up to date, more recent data suggests that the situation is similar (Higher Education Council of Turkey Statistics 2007a, 2007b; US National Science Foundation, 2006; 2008). While in the USA in 2007 women's representation in undergraduate engineering was 17.4%, it was 23% in Turkey. Additionally, the percentage of women as faculty in engineering in Turkey was approximately 30% whereas, in the USA, the proportion of engineering faculty members was less than 10%. In light of these data, the motive behind the research introduced in this book is relevant to anyone interested in the issue of women's participation in engineering, and Zengin provides the reader with insights on the experiences of these women.

In addition to the first author's interest in the area of women's studies, both authors of this review are graduates of the university (Middle East Technical University in Ankara) from which the sample of women engineers were drawn for this study. Blake has been an undergraduate and postgraduate student and also worked as an instructor in the same university and it has been quite interesting to learn about the views of other female academics regarding professional life in the university and specific challenges of being an engineer.

Chapters are organized clearly, informing the readers about the relevant framework for the research, aims of the study, methodology, findings and conclusion. Chapter 1 summarises the aims of the research; research questions formulated; and a brief summary of the possible reasons for the relatively high representation of women in the fields of science and technology in Turkey, and this issue is discussed in a more detailed fashion in the second chapter.

Although one could benefit from a more thorough background and discussion, Chapter 2 is informative in the sense that different views on the explicit and implicit meanings of technology are discussed, as well as how existing definitions of technology can be viewed as gendered. Zengin discusses how feminist perspectives tend to approach the issue of unequal distribution of labour that led women to be oriented around less secure and unskilled jobs, unlike engineering which is regarded as incompatible with the typical women's work. The basic starting point of the author, based on several scholars of feminist approaches, is the 'masculinity-femininity' ideology, which is also evident in the development of the gender-based professions. Specifically, the discussion focuses on the supposed incompatibility of femininity with the intellectual ability and competitiveness on the one hand, and the relationship between masculinity and power on the other. One of the important points in this respect is the existence of the highly gendered occupations that can still be found at the beginning of this century; thus, pinpointing the low percentage of women represented in the technical fields, especially engineering – one of the masculine fields. This chapter also focuses on some of the feminist approaches that attempt to explain why women are low in numbers in the production field of technology, and seems to support the notion that technology has a masculine culture. The evidence Zengin provides for this notion is based on arguments made by theorists such as Cockburn (1988), and Wajcman (1991) who focus on the role of socialization

practices in imposing certain constructions of self related to professions and roles.

Chapter 3 aims to fill a gap in literature by presenting organized data on the position and identity of women engineers in Turkey, beginning from the establishment of the Republic until late 1990s. The author presents the possible reasons for the distinct status of Turkey in terms of the relatively high representation of engineering women compared to other countries. She outlines many possible factors, including the positivist view of Kemalism ideology (See Mango, 2002 for more on Kemalism) which encouraged especially elite women to become professionals in the early Republic period; the lack of financial resources for science at the early years of modernization which prevented the need for protecting the field from women; the need for women in almost every area of production; and the possibility of women to become teachers as a result of having a degree in science. The author also discusses the issue that the representation of women in the engineering field in Turkey starting from the early Republic years did not guarantee the absence of discrimination toward women, although not sufficient data is provided to support this. However, a more recent study by Tuzel (2004) examined the narratives of women professionals in the early Republic period, concluding that women in male-dominated professions did face discrimination.

Another point in Chapter 3 which draws attention is the perception that some professions that have been viewed as 'masculine' in the West, such as medicine, have been embedded with feminine values in Turkey; thus, putting them in quite a different position compared to Western countries. There are also some data, though not recent, that show that professional women in Turkey are expected to fulfill their domestic duties as well, and thus their professional identities have evolved accordingly. Zengin presents the argument that Kemalism has been the practice which has determined the nature of the professions in Turkey, as well as the conditions of women's entry into the professional life. Similarly, and more recently, Tuzel (2004) also reported that patriarchy has been manifested within the practices of professionalism and Kemalism, and the identity of professional women has developed according to these practices. By providing some statistical data, Zengin demonstrates that female students choose certain engineering departments over others. The author attributes these choices to the gendered differentiation in the field of engineering; and then she categorizes the engineering departments as masculine (such as mechanical), feminine (such as food) and mixed sex (such as industrial) departments. This categorization is also revealed within the themes of the data presented as part of the interviews. We believe that this categorization of engineering fields is one of the main driving forces behind this research.

This presentation, in the first three chapters of the book, of historical and current issues helps one better understand how the motive for such a research study has developed. Based on the literature and arguments relating to these issues, the author presents her methodology in Chapter 4. One of the strengths of the study is the data collection method, with the in-depth interviews providing many details of the interviewee's experiences. Although leading questions may have the drawback of limiting objectivity, it seems to us that the theoretical framework and related methodology made it necessary for the researcher to proceed in this way. Zengin considered herself as the 16th participant, since she

is also a graduate of engineering, and thus it is not possible for the researcher to detach herself from the study and the experiences. We also think that the choice of questions and the semi-structured method have been helpful in arriving at a rich description of the concepts.

The findings represent the reports of different age groups of women engineers who are affiliated with a variety of sub-departments in a single university. The demographic information on the participants reveals that these women come from educated and democratic families who supported the educational attainment of their daughters by encouraging them to pursue a university degree and reinforcing professional identity despite economical problems they experienced. Zengin discusses the contradiction that despite the restrictions Turkish middle-class families place on the behaviour of their daughters in relation to socializing, they have also placed a great emphasis on their education. Interviewees report that they have always been ambitious in terms of being successful in the education arena and highly motivated to enter the disciplines that require considerable effort. There also seems to be a relationship between how they begin identifying themselves from the early socialization period onwards as different from other girls. That is, they always had 'masculine interests'. Zengin also emphasizes that although the interviewees performed their household duties well, in their professional lives they were detached from femininity and acted in a more masculine way, which led them to feel some sort of contradiction between being an engineer and a woman. In fact, some of them expressed a dislike of the feminine outlook and interests. The conclusion was that these women internalized the norm of engineering as a masculine field and thus adapted to the professional life by adhering to these values.

The findings of a recent study (Koydemir, 2009) conducted with women engineers demonstrated that these women were highly motivated to be successful throughout their educational lives and that they were supported by their parents, who were also educated people, to have higher education in a challenging and respected major. It seems that the same trend still continues; that is, women engineers represent middle-upper class families and value success. Similar findings were reported in another recent research study by Smith and Dengiz (2010). They found that women engineers were influenced by their ability in mathematics and technical areas. Other factors identified were influence of family members and teachers, prestige and income of the profession.

One of the most important themes that came up in this study is related to the gendered images of different engineering departments. According to the activities and working conditions, departments gained a gendered character. Zengin presents evidence that the choices were associated with the typical roles and responsibilities of women. That is, women tend to choose departments that are more comfortable, safe and that do not require bodily strength, such as chemical engineering and food engineering. The author further discusses how the images of different areas of study are formed ideologically and are categorized as feminine or masculine. For instance, food engineering is commonly chosen by girls since the activities regarded in the realm of this field are closer to the activities women are expected to perform at home. Zengin concludes that the perception of women in society as not being good at technical but social issues has led women to internalize this norm and making choices

accordingly. Another issue is the preference of women for disciplines that would require laboratory work rather than field work. The reason is that women are expected to be clean and neat, and not to spend much time outside, and that they are too weak to be out there – which is basically seen as a male area.

In Chapter 4 Zengin discusses the discrimination experienced by women engineers. While the author mentions that interviewees did not experience discrimination during their school education, she also argues that as university students, the women engineers experienced covert discrimination. Zengin bases her argument on the report of one participant, however, and we believe that more data is needed on this issue in order to reach a more reliable conclusion and to explore whether or not the experiences of girls in school are as free of discrimination as Zengin suggests. Unfortunately, little new data is available and thus it would be speculative to make any generalizations. A recent study by one of the authors of this review (Koydemir, 2009) however, reports that women engineering graduate students perceive themselves as equal with the male students and did not report discriminative practices from men as one of the problems they experienced.

As already mentioned, the interviewees in Zengin's study also reported not being exposed to any discrimination during university education which was evaluated by the author as denial. Zengin argues that the identity of the particular university in which the study is based as an egalitarian institution, also the perception of the whole higher education system as approaching men and women equally, and the likelihood of discriminative attitudes to be practised covertly rather than overtly, may have contributed to the reports of women. Again this argument is based on very limited evidence and, although the argument she makes seems reasonable, we believe there is a need to have access to more data to generalize such an argument beyond the sample of the study. We believe that these arguments relating to the perceived and actual discrimination practices among educated women professionals would be a fruitful topic for researchers to focus on in the future.

In Chapter 5 Zengin presents the data in relation to the housework and family responsibilities of the engineering women interviewed. In the light of earlier and current research, she discusses how women in academia are expected to fulfil their female roles as wives, mothers and housekeepers. Especially after marriage, women started to carry more responsibilities since they performed almost all the housework and child care duties. We can understand from the experiences of interviewees how difficult it is to balance challenging work and family responsibilities. This situation seems to still exist for the current women engineers working in academia as a recent study (Koydemir, 2009) revealed that women engineers experience a high level of stress and health problems as a result of the double burden they have.

This chapter also focuses on the findings related to the problems experienced by women engineers working in the private or public sector. Women working in the state institutions complained about the boredom associated with high bureaucracy, limited production and tasks which are not challenging. The most important point, however, seems to be the discrimination that young professionals experienced in the workplace, which is different from the experiences of academics who reported absence of such discrimination. These practices were observed mostly in such ways as men excluding women from

their groups; different standards set for women in terms of success; and not being listened to. The strategies of women to deal with such attitudes and behaviours were concentrated on detachment from femininity through behaviours and dressing styles.

In the final chapter Zengin provides a brief summary of the research findings and conclusions. One of the inspiring recommendations the author makes for future research is focusing on the young generation of women engineers who may have been affected by the recent transformations that Turkey has gone through with the economical and cultural transformations after the 1980s which included exposure to global market economy, promotion of entrepreneurship, advances in technology, and democratic and constitutional reforms with an aim to be a member of European Union. The lack of data relating to gender distribution in engineering fields as well as data relating to female students who studied engineering but did not join the work force, are also highlighted as two areas that need further research. This is also related to if and how the situation is different now, as Turkey is changing rapidly and the policies of the present government are bringing in new perspectives for women's education. This point is also highlighted by Zengin's observation that the new generation of young professionals in the study sample reported different experiences when compared to the older generation women in terms of their family background and their selection of sector for starting their professional life. We agree with the author that her initial findings about the new generation of professional women engineers may inspire further research.

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