



## Technology as a Woman's Call: The Efforts of the Fredrika Bremer Association to Promote Women's Education in Technology 1978–1999

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**Abstract** • In 1978, Sweden's oldest women's organisation, the Fredrika Bremer Association (FBF), organised an event on women and technology. This was the first event of its kind in Sweden and it was met with great interest. Consequently, it became a recurring annual event until the late 1990s. At a time when the computerisation of society precipitated a response from the Swedish state, labour market parties and civil society, the FBF became an authority in the area of technology and gender equality. Framed within the field of history of knowledge, this article claims that the FBF sought to redefine the concept of technology to include what they considered to be female features. They circulated this new definition in the school system and among the broader society. The FBF has been overlooked as a relevant actor in the circulation of technology knowledge, even though it played a significant role in the discussion of women and computer technology in Sweden from the late 1970s to the late 1990s.

**Keywords** • gender; women in STEM; women in technology education; gender and technology; history of knowledge; Fredrika Bremer Association

### Introduction

The Fredrika Bremer Association (*Fredrika Bremer Förbundet*) (FBF), the first women's organisation founded in Sweden, showed great interest in promoting women's technical education in the context of the so-called micro-electronics revolution from the late 1970s onwards. The FBF, established in 1884 as an apolitical association, had 6,854 members by the end of the 1970s, and was spread across eight districts and 63 local departments.<sup>1</sup> Their goal was to achieve equal rights for women in work, the elimination of a gender-segregated labour market and the recruitment of an even number of men and women to all occupations.<sup>2</sup> Moreover, this organisation conceived education as an instrument to facilitate equality between men and women.<sup>3</sup>

The FBF were active in promoting women's technical education on several fronts. On the one hand, they participated in a debate on the meaning of technology, the role of computers in the emerging digital society and the positioning of women in this process. On the other hand, they took a hands-on approach and organised

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1 "Vittnesseminarium: 1968 och den nya kvinnoradikaliseringen," in *Kvinnorörelsen och '68 – aspekter och vittnesbörd*, ed. Elisabeth Elgán (Stockholm: Samtidshistoriska institutet. Södertörns högskola, 2002), 79.

2 Inger Hultgren, *Kvinnors organisation och samhällets beslutprocess. Fredrika-Bremerförbundet och Husmodersförbundet Hem och Samhälle på riksplanet och lokalt i Jämtlands län 1925–1975*, PhD diss. (Umeå: Umeå University, 1982), 60.

3 SOU 1980:44, *Betänkande om statsbidrag till kvinnoorganisationer* (Stockholm: LiberFörlag, 1980), 78.

information events in educational institutions and public venues, targeting pupils and students at different levels, as well as education providers and the general public. Moreover, the FBF's signature event, the Women and Technology Days (*Kvinnor och Teknik-dagar*, WTD) included courses and instructive components that linked girls and young women to technology, in order to spark their interest in this area.

In this article, I show that the FBF sought to challenge a notion of technology in an order of knowledge that excluded women. By doing so, they gained a cognitive authority that was called upon in the coming years. The FBF included so-called "soft" or "feminine" features in the definition of skill within the context of (computer) technology. The FBF disseminated arguments relating to women and technology in a way that transcended institutional, social and political boundaries.<sup>4</sup> I use the concept of the circulation of knowledge in the empirical analysis, instead of using terms such as "spread" or "dissemination", as I am placing the FBF's communicative actions within the framework of the history of knowledge approach. This means that I bring awareness to the materiality and mediality of knowledge and take cognisance of the social context and the cultural elements surrounding this process.<sup>5</sup>

The knowledge that the FBF created was embodied in practices and objects, from publications and leaflets, to talks, exhibitions and networking sessions. These objects or practices are what Christian Jacob would call places of knowledge, as it is through these that knowledge is materialised.<sup>6</sup> This article focuses on the variety of practices that the FBF performed, all linked to two goals: to advance a new definition of technology and to promote women's participation in technology education.

Although the presence of the FBF in the public debate was distinctive, it is unfeasible to ascertain a discernible influence on curricular changes, the labour market structure, or women's educational choices within the scope of this article. However, the FBF's participation in the exchange of ideas in diverse social settings in which education in technology was delineated, discussed and conducted, suggests that they were a relevant, although frequently overlooked actor, in the process of knowledge production. This article focuses on both the production of knowledge relating to technology in which the FBF engaged and the way in which this knowledge was circulated.

The role of women's organisations in education has not been thoroughly researched in Swedish scholarship. A relevant study in this area is Johanna Ringarp and Karin Carlsson's investigation of the women's association *Tolfterna*, which had a popular educational programme, aimed at bringing together women from different social classes around the turn of the twentieth century, and in which working class women sought to obtain the literacy knowledge they missed from formal education.<sup>7</sup> The

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4 Borrowing Sarrasin's formulation of the historical phenomenon that knowledge and its circulation represent: Philipp Sarasin, "Was ist Wissensgeschichte?" *Internationales Archiv für Sozialgeschichte der deutschen Literatur* 36, no. 1 (2011), 164.

5 For more on the concept of circulation of knowledge see: Johan Östling et al., "The history of knowledge and the circulation of knowledge: an introduction," in Johan Östling et al. *Circulation of Knowledge. Explorations in the History of Knowledge* (Lund: Nordic Academic Press, 2018), 18.

6 Jacob claims that knowledge is invisible unless it is materialised in books, libraries, or people. Christian Jacob, "Lieux de savoir: A comparative approach to the tools and techniques of scholarly work" (paper presented at the Royal Library, Copenhagen, Denmark, 24 September, 2009).

7 Karin Carlsson and Johanna Ringarp, "Tolfterna: Ett bildningsprojekt inför kvinnors fullständiga

American case has received more attention. In a volume on the history of American women's associations and their influence in education, the contributors explore the variety of ways in which organised women attempted to bring more women into formal education, particularly higher education.<sup>8</sup> Anne Ruggles has studied the way in which women's clubs in the United States acted as shaping forces in the understanding of concepts such as nationhood, economy, gender and culture, often through (informal) educational practices.<sup>9</sup> The efforts of the FBF had parallels in both the international and transnational contexts. Christine von Oerzen has studied the strategies of a transnational network of female academics (1917–1955), who managed to further the position of women in science and society through friendships, close personal bonds and professional contacts.<sup>10</sup> Amy Bix has studied two organisations, dedicated to advancing women's status in computing. By examining two associations, active in the United States in different decades, Bix shows that while the movement started out as the efforts of a few "outsiders struggling to win attention," it grew into a high-profile international movement that understood the challenges women faced in technical work.<sup>11</sup> Although works like these have stressed the importance of women's organisations in advancing professional women's work in the area of technology, and the changing the practices of educational institutions, they did not focus on whether these organisations conceptualised technology knowledge differently or whether they attempted to bring a new perspective to the broader view of knowledge circulation within educational and professional arenas.

Unlike the aforementioned examples, the focus of this article is on the FBF's efforts to create a definition of technology that differed from mainstream views circulating in society. The redefinition of technology and its associated skills, which I claim were promoted by the FBF, were used in their campaigns, undertakings and communication. This redefinition of technological knowledge took place through practices, such as writing and speaking to various audiences during events or participating in political debates; consequently, this knowledge circulated through diverse channels in different arenas, through the FBF's publications, annual reports, meeting protocols, internal correspondence, conferences, seminar minutes, event advertisements, material from the Women and Technology group (*Kvinnor och Teknik*, W&T) within the association, as well as press articles.

I reconstruct the two decades of work conducted by the association regarding the question of women and technology and examine the attempts of the W&T group to shape a definition of technology. One of the central sources of this article is FBF's

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medborgarskap," in *Historie – didaktik, dannelse og bevidsthed: Rapporter til det 29. Nordiske Historikermøde* ed. Duedahl Poul, vol. 1 (2017), 9–39.

- 8 Anne Meis Knupfer & Christine Woyshner ed. *Educational Work of Women's Organizations, 1890–1960* (Basingstoke: Palgrave Macmillan, 2007).
- 9 Anne Ruggles Gere, *Intimate Practices: Literacy and Cultural Work in U.S. Women's Clubs, 1880–1920* (Urbana: University of Illinois Press, 1997).
- 10 Christine von Oerzen, *Science, Gender and Internationalism: Women's Academic Networks 1917–1955* (New York: Palgrave Macmillan, 2012).
- 11 Amy Bix, "Organized Advocacy for Professional Women in Computing: Comparing Histories of the Association for Women in Computing and the Association of Computing Machinery-Women's Council," in *Communities of Computing: Computer Science and Society in the ACM*, ed. Thomas Misa (New York: Morgan & Claypool Publishers-ACM Books, 2016).

journal *Hertha*, a publication with articles relating to current social, cultural and economic issues. I selected the articles published from 1975 to 2000, which dealt with the question of technology and women's education and work. The authors were FBF members or guest writers, and the articles featured were often discussed in the meetings of the W&T group. The published articles reflect the collective view of the organisation. *Hertha's* editors were present in the FBF working committee meetings, during which they informed and discussed with members the journal's articles, special issues, content and economic matters. Articles regarding the discrimination of women in technical professions, for example, were sought after and calls were made to the various sections of the FBF requesting article submissions or narrations of experiences.<sup>12</sup>

In the first section of this article, I explore the definition of technology that the FBF promoted and analyse its publications, in particular the journal *Hertha*. I took note of the ideas, criticism, role models and examples provided, to outline the way in which they understood the mainstream notion of technology and how they considered this understanding should be modified. In the following sections I explore how the FBF circulated their core ideas and examine the channels and strategies used. I divide this analysis into two parts, one related to formal education, in which I explain the role assigned to schools by the FBF and how school premises were used as a place of knowledge; the second section relates to informal education, in which I mention all other practices not directly associated with the formal education system.

In this article, technology refers to a set of devices and processes that came about as a result of the so-called microelectronics revolution in the 1970s, which had a social impact on many fields and led, among other things, to the computerisation of workplaces and other areas of society, including public administration, healthcare and industry, as well as an increased use of personal computers. This article investigates the reaction of the FBF to these types of technologies. While the focus is on the work of the FBF in relation to women's education in computer technology, the broader notion of technology occasionally forms part of the analysis. In many cases, and particularly in the earlier documents, the FBF reflects on the notion of technology (*teknik*), namely, the more general phenomena resulting from technical change, such as questions of transportation, nuclear power and military artefacts. I decided to include some of these reflections on technology *in general*, as they constitute the basis of the reasoning of the FBF regarding computer technology. When the word technology is used to refer to studies at different educational levels, however, it does not only refer to computers, but to science, technology, engineering and mathematics, the so-called STEM field. Thus, the concept of technology in this paper encompasses computer knowledge but not always exclusively.

### **Changes in the labour market affecting women and state initiatives**

The growth of the Swedish public sector in the 1960s, as a result of the strengthening of the welfare state, heralded a breakthrough in the participation of women in the labour market, characterised by a highly productive, capital intensive, service-oriented industrial sector and expanding service industries in the public sector.

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12 Kvinnor och Teknik group meeting minutes 1981-09-15, Fredrika Bremerförbundet B4:5, National Archives (*Riksarkivet*, hereafter RA).

Following a decentralisation process, municipalities and counties were in charge of welfare services by the 1970s, which further increased women's paid work. In parallel, between 60,000 and 90,000 jobs disappeared as a result of technological development until 1975. Most of the jobs lost were in positions occupied predominately by female workers (retail, banking, office work).<sup>13</sup>

Women have dominated the public sector except in two occupations, namely, programming and sales, and this pattern has remained, despite changes in the economy and the labour market, such as the dismantling of the public sector and the expansion of the industrial sector.<sup>14</sup>

The gender segregation in the labour market was accentuated during these years. A restructuring of the labour market, due to the process of computerisation resulted in a gender division of work, with men employed in electronic data processing and women in data entry. Thus, in the gender hierarchy of the new computerised workplace, women were located at the bottom.<sup>15</sup>

A national microelectronics programme, proposed in the early 1980s, stressed the role of education in spearheading computer development in Sweden. The proposal noted the lower participation of women in the area of technology and called for specific measures to address this issue.<sup>16</sup> The problem of uneven gender distribution in these areas was regarded as a social and economic problem in the 1960s, but by the 1980s, this had also become a gender equality matter.<sup>17</sup>

In 1978, the Computing and Electronics Committee mapped the use of the new technology in society and industry and the Computer Impact Assessment Committee (*Dataeffektutredningen*) investigated the changes in the workplace as a result of computerisation.<sup>18</sup> Their conclusion was that the increased use of computers would require more clerks and professional workers and fewer unqualified workers, rendering low skilled workers, many of whom were women, jobless.<sup>19</sup> The state response was to allocate resources to the Labour Market Ministry to tackle the education, training and recruitment needs of the qualified workforce for the industry. Part of these funds were earmarked for increasing women's interest in work and training in the industrial sector, with the More Women to Industry campaign (*Fler kvinnor till industrin*) (1983/84). By widening the labour market for women, the demand for a technical workforce in Sweden would be met.<sup>20</sup>

In the 1980s, the Swedish parliament allocated funds for the training of the population in computer-related issues, as part of the Broad Computer Education

13 Maria Bergom-Larsson, *Kvinnor och teknologi* (Stockholm: Fredrika-Bremer-Förbundet, 1980), 28.

14 Lena Andersson-Skog, "In the Shadow of the Swedish Welfare State: Women and the Service Sector," *The Business History Review* 81, no. 3 (Autumn, 2007), 465.

15 Bergom-Larsson (1980), 29.

16 Motion Christer Eirefelt, *Ett nationellt mikroelektronikprogram*, prop. 1983/84: 8.

17 Daniel Lövheim, *Naturvetarna, ingenjörerna och valfrihetens samhälle: rekrytering till teknik och naturvetenskap under svensk efterkrigstid* (Lund: Nordic Academic Press, 2016), 81, 119–120.

18 SOU 1984:20, *Datorer och arbetslivets förändring. Betänkande av Dataeffektutredningen* (Stockholm: Liber/ Allmänna förl., 1984).

19 SOU 1981:17, *Industrins datorisering: Effekter på sysselsättning och arbetsmiljö. Delbetänkande av Dataeffektutredningen* (Stockholm: LiberFörlag, 1981).

20 Arbetsmarknadsdepartementet, *Proposition om kvinnornas villkor på arbetsmarknad*, Prop. 1984/85:130

project (*Bred datautbildning*). This initiative emphasised the role of education for the development and use of computer technology under democratic rule.<sup>21</sup> Women and the poorly educated were identified as the groups with the greatest need for computer education.<sup>22</sup> However, the women's associations of the Centre Party and the Social Democratic Party were the only organisations that received funding from the Computer Delegation (*Datadelegationen*), even though five other organisations, including the FBF also applied for funding.<sup>23</sup> Nonetheless, the Computer Delegation asked the FBF to carry out an evaluation of the material used in study associations in the field of computing from a gender equality perspective.<sup>24</sup> The FBF concluded that the educational material did not promote gender equality and that, in fact, women had been made invisible. The FBF demanded an amendment to the literature to naturalise women's work with computers and increase their potential to influence computer development. The work of this group in educational issues continued further, as will be discussed in the next section.

### Women in technology education

The question of gender roles was debated within formal education. Here, the state sought to resolve an economic problem. In the 1970s, there was a lack of technical professionals that could support the country's economic and technological development, but the shortage was expected to be even more pronounced in the future. The need to attract women into technical areas was, even from the perspective of the National Board of Education (*Skolöverstyrelsen*) (NBE), vital for a healthy Swedish labour market and necessary in achieving technical development. The state's view was that the problem was associated with women's lack of self-confidence and the inability of teachers to convey the subject in a way that engaged female students.<sup>25</sup>

In 1974, the FBF participated in a debate on gender roles in schools, together with representatives of industry, labour unions, the employment office and the delegation for equality, among others, and it was noted that while 46% of boys in secondary education selected technical pathways, only 1% of girls chose this option. From the perspective of the FBF, it was necessary to fight gender stereotypes in society, as these affected women's educational choices.<sup>26</sup> The following year, the NBE published a report where gender imbalances in relation to technology education were stressed, which formed the basis of a series of state-sponsored projects to counter gender stereotypes in schools.<sup>27</sup>

Minister of education, Lena Hjelm-Wallén, argued in 1984 that many of the jobs women held in industry, offices and commerce were threatened by a rationalisation

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21 SOU 1985:50, *Bred Datautbildning. Betänkande av datadelegationen* (Stockholm: Liber/Allmänna förl., 1985), 13.

22 SOU 1985:50, 15.

23 Datadelegationen meeting minutes 1982-12-22, Dnr 182:31a, Datadelegationen B4:5, RA; Sammanställning över inkomna ansökningar beträffande Bred utbildning i datafrågor till allmänheten, 1982-12-01 DNR 982:31a, Datadelegationen B4:5, RA.

24 SOU 1985:50, 62.

25 Hedlin (2009), 167.

26 Hultgren (1982), 114.

27 *Ett friare val: Jämställdhetsprogram för skolan* (Stockholm: Liber, 1978).



wave, therefore, it was important for them to enter the male-dominated sector.<sup>28</sup> She argued that by increasing the participation of women in technical programmes, industry and society would have a wider base from which to recruit technical professionals. The situation was such, she claimed, that there was only one girl to 10 boys in technical upper secondary programmes and higher education.<sup>29</sup> In the 1980s, various regional and local efforts within formal education, vocational education, and the labour market to attract women to technology were carried out within the framework of the More Women to Industry campaign.<sup>30</sup>

In the mid-1990s the IT-Commission (*IT-kommissionen*), a group established to give IT-related advice to various state bodies, argued that schools had a vital role in eliminating gender differences in this area. A pilot study, carried out in the late 1990s as a response to this directive revealed that women tended to become interested in computers only when they viewed them as a tool for better communication, whereas men could become interested in the computer itself and could then integrate it more easily into different areas of their lives.<sup>31</sup>

While women were already considered an important target of the state's efforts to democratise knowledge relating to technology, in general, and computer technology, in particular<sup>32</sup>, the FBF's main objective was to encourage the participation of women in technical studies. In this way, women could challenge established social norms and ideas that related technology to male expertise.

### The FBF takes an interest in technology

The FBF experienced significant growth during the 1970s. It was the second largest of the non-political women's associations (surpassed by a large margin, however, by the Housewives Home and Society Association (*Husmodersförbundet Hem och Samhälle*) (HHSA) with 30,347 members<sup>33</sup>) and considered one of the 10 most influential opinion builders during this period.<sup>34</sup> Its journal, *Hertha*, was published six times per year. While the HHSA stressed women's domestic role, the FBF was mainly concerned with women's professional and political roles.<sup>35</sup>

By 1975, the FBF reformulated their goals and strengthened their labour market focus. Their mission was to achieve equal rights for women in work, the elimination of the gender-divided labour market and to ensure the recruitment of an equal number of men and women across all occupations.<sup>36</sup>

28 Lövheim (2016), 121.

29 Lena Hjelm-Wallén, "Nya och fler utbildningar kommer," *Svenska Dagbladet*, June 6, 1984.

30 Lena Näslund, *Säg Ja! Till tekniken: om kvinnor i tekniska yrken och utbildningar* (Malmö: Liber, 1985); Birgitta Åseskog, *Kvinnor och teknik: en tipskatalog med idéer om hur flickor och kvinnor kan stimuleras till intresse för tekniskt arbete* (Stockholm: Liber, 1984).

31 Hallerdt (1999).

32 Women were targeted in state campaigns, such as the Broad Computer Education Project. See Motion till Riksdagen by Berit Oscarsson and Hans Rosengren on Broad Computer Education, Mot. 1987/88 A220, 2.

33 SOU 1980:44, 81.

34 Elgán (2002), 79.

35 Hultgren (1982), 178.

36 Hultgren (1982), 60.

The FBF's interest in education was present from the time of their establishment, as one of their first actions was to grant scholarships to young women to help them attain economic independence through education. Moreover, one of their specific goals in the late 1970s was that "all education shall aim at reaching equality between women and men,"<sup>37</sup> leading the organisation to engage in the question of gender roles in school.<sup>38</sup>

The position of the FBF in the areas of education and work was acknowledged by the Equality Council of the Civil Engineers Association, the first organised group in Sweden to become involved in the question of women and technology. This council contacted the FBF and proposed cooperation. When this group dissolved, some of their former members turned to the FBF, requesting that they take up the question of women and technology in their agenda.

Partly as a result of this request, the W&T group was formed within the FBF in 1978. In January 1979, the FBF organised a seminar to assess the situation and map the state of knowledge in relation to women and technology. Subsequently, the W&T group decided to take on the task of promoting women's involvement in technology and to target all categories of women at all levels.<sup>39</sup>

The interest of FBF can be explained by the dramatic change of computer technology and its status in Swedish society throughout the 20-year period of this analysis. According to state statistics, computer use in Sweden increased from the 1960s and in an explosive manner since the late 1970s. According to a 1984 survey of the population between the ages of 16 and 64, 35 percent of the population had knowledge of computer technology and work was the most common way for individuals to encounter computers. Almost one in every four workers used computers in their jobs and around three percent of the population was believed to have some kind of computer equipment at home. It was twice as common for men to have home computer equipment than women. Around 3.5 times more men than women had extensive knowledge of programming, systemisation and automatic data processing. The majority of computer workers were men, but women dominated among terminal and administrative workers.<sup>40</sup>

This state of affairs led different organisations become involved with the question of women and technology. In a meeting with labour union representatives, organised by the FBF in 1981, the question of computerisation was raised. Representatives were worried about a gender division of the computer-oriented labour market, that would give men the most qualified programming tasks and women the low-status and least qualified positions.<sup>41</sup>

The interest in technology questions also came from within the FBF. The W&T was formed by FBF members with a technical background, such as civil engineer, Eva Fåhrens and mathematician, Elsa-Karin Boestad-Nilsson, who worked at the

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37 SOU 1980:44, 78.

38 Hultgren (1982), 114.

39 Elsa-Karin Boestad-Nilsson, "Här står vi idag," in Monika Westman ed., *Gnistor* (Stockholm: Ingenjörsförl., 1982), 8; Protocol of the FBF Board Meeting 13-14/10/1979, FBF Main archive, B4:5, RA.

40 *Folkets datorvanor. Datoranvändningsundersökningen Juni 1984*, Information i prognosfrågor 1984:5. Sveriges officiella statistik (Örebro: Statistiska centralbyrån, 1985).

41 Minutes of the representation committee meeting with representatives of the main labour unions at the FBF's office. 1981-11-06. FBF Main archive, B4:5, RA.



Swedish Defence Research Agency (FOA) and is considered Sweden's first female programmer. The latter also promoted the creation of the group *Women and Computers (Kvinnor och data)* within the FBF, which aimed at monitoring the developments of computer technology in society from a gender equality perspective.<sup>42</sup>

The group carried out different activities such as debates, exhibitions and demonstrations of technology, as well as responding to political enquiries, creating reports and organising nationwide activities through their WTD, the first events of its kind in Sweden in relation to this topic.<sup>43</sup> In the second half of the 1990s, the W&T group separated from the FBF and became part of the Swedish National Museum of Science and Technology (hereafter Technological Museum). A few years later, the group became independent and established contact with a branch from Örebro University, called QTeknik.<sup>44</sup>

### The FBF's creation of technology knowledge

Prior to the formation of the W&T group, the FBF had dealt with the question of technology in some of its publications. Their basic assumption was that technology, instead of contributing to gender equality, had mirrored predominant social conditions and reflected men's dominant status in society.<sup>45</sup> Socialisation upheld this state of affairs: boys were given vehicles and guns to play with and boys were asked by teachers to start the audio player or set up cables in the classroom; by comparison, girls were given dolls and tea sets and were expected to comfort the upset child in school.<sup>46</sup> The FBF stated that technology had often been associated with war purposes; it threatened life on earth and had been the cause of life hazards, such as birth defects, genetic damage and cancer. In a world full of man-made technology, super jets and micro-computers existed but not sun-heated houses or effective lifts for patients in long-term care.<sup>47</sup> These ideas had also been expressed in the public debate. Liberal politician, Marit Paulsen, stated that men regarded themselves as gods but their lack of respect for nature was leading to the eradication and pollution of all biologic life. These ideas resonated among FBF members, who discussed Paulsen's ideas in *Hertha*.<sup>48</sup>

Man-made technology could not only be dangerous but could also be inefficient and impractical. Kitchen technology, for instance, had developed too slowly. A curator from the Technological Museum argued in *Hertha* that "vacuum cleaners are still heavy and cumbersome, and we are still kneeling in front of the oven door and trying to balance the oven dish when taking it out of the oven".<sup>49</sup> Therefore, women had to participate in technology development, not only within the domestic realm, but also in other male-dominated areas.

42 Minutes of the FBF's board meeting, 1980-06-01, FBF Main archive, B4:5, RA.

43 Märta Fritz, "Fredrika-Bremer-Förbundets 100 års jubileum," *Hertha*, no. 4 (1984).

44 Märta Fritz, "När tekniker inte kunde vara kvinnliga," *Hertha*, no. 1 (2004).

45 Svante Lindqvist, "Nappflaskor, barnvagnar och kondomer – är det Teknik," *Hertha* no. 2 (1982), 13.

46 Vilma Bergman, "Två barndoms-världar i samma rum," *Hertha*, no. 6 (1978), 21.

47 Bergom-Larsson, 1980 p. 15–20.

48 Maj Wechsleman, "Manlig Teknik till döds," *Hertha*, no. 6 (1978).

49 Gunilla Englund, "Ska hushållsrobotarna ta över?" *Hertha*, no. 6 (1978), 13–15.

Articles about computers appeared more frequently in *Hertha* from the late 1970s. The journal editor wrote that computers should not be regarded as almighty machines that dominate us. On the contrary, their purpose should be to make life better for people. The only thing computers could do was to add two numbers and compare them. Nobody should need to know the internal processes of computers to judge whether they are useful, too expensive, whether they force people into an inhumane work pace or whether they are a good or a bad tool. Computers, she continued, tend to give more power to already powerful elites, so women should not be impressed by them, instead they should see through their objectives.<sup>50</sup> In a similar vein, a female physicist argued in *Hertha* that women should set demands on technology, even without fully understanding it. Her means of inspiring women to influence technology was to encourage them to join political parties or create new ones, to educate themselves and to ensure that their children received education in technology and natural sciences.<sup>51</sup>

The voices of highly educated women often had a place in FBF's channels. Eva Boestad, engineer at the Swedish Space Corporation argued that having more women in these types of workplaces would lead to a fairer work environment. She also mentioned that contrary to many other (male) engineers, she did not see her occupation as her main source of identity. She stressed that to be able to see a wider perspective at work, it was necessary to also be a humanist.<sup>52</sup> Boestad herself embodied the argument that women tended to be more people-oriented and were able to put their technical knowledge in context, to see its usefulness for society.

In the 1990s, women's role as consumers was highlighted. The construction manager of the Volvo 200-series mentioned in an interview that her organisation had realised the value of recruiting women for the construction and development unit. She emphasised that the company's view of women had changed. They had come to recognise that women were consumers and demanded certain features in the cars that men had not prioritised to date; that the working environment was better with gender mixed groups and that work was less one-sidedly, technocratically oriented. Thus, the participation of women in the car industry was presented as an example of how women's abilities and experience could be and were used to make profitable technology.<sup>53</sup>

A journalist wrote in *Hertha* that the Internet was often described as an emotionless male toy. However, she continued, "in order to get women to use the internet and learn about technology, it is necessary, unfortunately, that they understand the practical benefits that they can get from it."<sup>54</sup> A year later, *Hertha* published an article about *NetWorking Women*, a network created to help women learn about computer technology. The author argued that women needed to be able to put computer technology in a larger context, to be able to make sense of it and

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50 Vera Nordin, "Med kvinnorna mot en ny Teknik," *Hertha*, no. 6 (1978), 33.

51 Vera Nordin, "Dagens pascha," *Hertha*, no. 2 (1982), 4–5.

52 Stina Andersson, "Eva Boestad: En tekniker måste vara lite humanist," *Hertha* no. 3 (1987), 12.

53 Eva Dahlgren, "Kvinnliga konstruktören. Säkerheten främst," *Hertha*, no. 4 (1990), 24–25.

54 Kajsa Wilhelmsson, "Cyberspace för den framåtsyftande kvinnan!" *Hertha*, no. 3 (1995), 23–24.

become interested.<sup>55</sup> In 1997, the W&T group organised an event on women and the Internet for their Autumn programme.<sup>56</sup> The strategy they had used to date, namely, to encourage women to learn about the latest technologies and to find ways to use them to achieve their goals and fulfil their own interests remained, even though the technology had changed.

The goal that the W&T group set from the time of their establishment was to encourage more women to study and work in the technology field. The key to achieve this goal was to find ways to make technology a tool in the service of society, as only then women would stream into technical education, wrote an academic from the Royal Institute of Technology, in the magazine *Ny Teknik*, which was discussed in one of the FBF meetings.<sup>57</sup>

These examples show that for the FBF, women's social inclination, their interests and abilities were somehow tied to their sex, and this governed their relationship with technology. The idea that men and women had different incentives to use technology was also commonly expressed in relation to computer technology. Society was missing women's ideas, perceptions and demands with regard to technology, which were different from those of men, and women should be involved in the creation of technology, as well as the decision-making process regarding its uses.<sup>58</sup>

While in the early 1970s, concern focused on the uses of technology for war purposes, atomic weapons, pollution and the dangers of computerisation, in the 1980s, concern turned to the broader use of microcomputers and the gendering of the computer-oriented labour market; in the 1990s, attention turned to the Internet. The technologies changed but the strategy remained: women should learn about technology and participate in its creation and evaluation, so as to attach "female" features to it.

The knowledge that the FBF attempted to advance was that men's dominant role in technology had been the result of an active exclusion of women. Women had not been regarded as capable of creating technology because they were considered to be "too interested in people and were not cut out for other aspects of life, therefore, should dedicate themselves to their areas of expertise."<sup>59</sup> Thus, one of the problems identified by the FBF was that society labelled women as unsuitable for technology because of the abilities and interests associated with their gender. Another problem was that many women were reluctant to engage with technology because their limited professional knowledge created powerlessness and hostility.<sup>60</sup>

The idea that men and women were inherently different, which had consequences for the way in which they approached technology, was not rejected by FBF. Instead, FBF used this discourse of difference to promote women's participation in the

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55 Anita Boberg, "NetWorking Women avlivar myten om att män kan mer om datorer," *Hertha*, no. 3-4 (1996), 32.

56 Minutes of the W&T group meeting 15-01-1997, FBF Helsingborgskrets F2:4, Helsingborg Stadsarkiv (hereafter HS).

57 Maria Hammarén, "Den kvinnliga frågan till tekniken," *Ny Teknik*, no. 30, July (1990).

58 *Tekniken - kvinnans vän eller fiende?* Leaflet on Women and Technology Week March 1982, F2:4, FBF Helsingborgskrets, HS.

59 Kerstin Anér, "Lagom teknik kvinnoteknik," *Hertha*, no. 6 (1978), 9.

60 *Tekniken - kvinnans vän eller fiende?* 1982, HS.

area of technology. The modern industrial society that FBF described was formed by polar opposites: on the one hand were male qualities of rationality, effectivity, impersonality, competition and economic gain, in which the objectives of criteria and profit dominated; on the other hand, was the female perspective, characterised by human consideration, feelings, proximity and experiences. The male value system governed work life and society, while the female system of values governed private life and family.<sup>61</sup> These differences that had hitherto resulted in men's dominance over technology could be used to improve technology and women's status in society. FBF argued that women's interests and abilities did not prevent them from understanding or engaging with technology. On the contrary, women's particular way of thinking could make technology more humane and socially useful. Only by adding feminine features to the definition of technology, could benefits be tangible for the whole of society. Sociologist Rita Liljeström, a popular scholar among FBF members, argued that highly educated men in the area of technology were often unable to deal with simple contexts because they were subject-oriented, whereas women were able to comprehend society, from an individual perspective and in terms of social relations.<sup>62</sup>

Technology had been male-oriented but the time had come to ensure that technological development was no longer life-threatening but also life-preserving. For this purpose, women needed to be involved and needed to acquire both technical knowledge and political power to make decisions on the use of technology.

### **Circulation of technology knowledge in formal education**

In the following sections, I demonstrate the materiality and mediality of knowledge, by empirically observing the places of knowledge and forms of circulation that the FBF used to communicate and disseminate their definition of technology as widely as possible. The places of knowledge described here are linked to formal and informal educational settings. The forms of circulation are related to educational, academic and, in some cases, recreational practices.

According to the FBF, the shortage of women in technology could be mitigated by changes in the educational system. In 1970, the theme of the Congress of the International Alliance of Women was "*Education in the Technological Age*," the same year that FBF member, Edith Anrep, was elected president of the international organisation. The FBF presented their agenda in the international forum and encouraged their sister organisations to work for an education system that questioned society's demands and guaranteed basic rights for women in the technological age.<sup>63</sup> Moreover, the FBF promoted computer education regionally. At the seminar of the Nordic women's organisations, in which the question of new technologies received special attention, a debate was held regarding the consequences of women opting out of education in technical areas. For the FBF, the problem was that in highly industrialised countries, such as Sweden, the best-remunerated jobs were in the area of new technologies or computer technology, and a gender balance in salaries would

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61 Bergom-Larsson (1980), 6–10.

62 Notes on Rita Liljeström's talk at the Women's Work Seminar 1978, FBF Main archive F3a: 8, RA.

63 Vilma Bergman, "Utbildning i teknikens tidsålder," *Hertha*, no. 5 (1970), 21–23.

never be achieved if women were not trained in this area. Moreover, for gender equality to be attained, women needed a broader range of occupations from which to choose.<sup>64</sup>

The disadvantages of girls in technical education in schools was exemplified in a series of articles in *Hertha*. Certain secondary school pupils were interviewed for the journal in 1978. The girls shared their experiences and affirmed that they did not receive any support from their school or the career counsellors, when they showed interest in technical studies. On the contrary, they were advised against choosing a technical study area. Despite the obstacles, they followed their preferred career path and were thriving, although their choices were not without challenges.<sup>65</sup> The FBF claimed in these articles that the problems encountered were not necessarily the girls' choices, but those of the adverse school environment.

Career counsellors in schools were often a target group for FBF activities and were considered key actors in creating a responsive environment for girls with technical interests. Moreover, they were considered essential in changing attitudes towards traditional gender roles in educational choices. However, an interview in *Hertha* shows that the view of a career counsellor on the question of women in technical studies was not always helpful in changing selection patterns. These views were considered typical of their time and were shared by many career counsellors across the country. The interviewed counsellor claimed to be supportive of girls who wanted to take a non-traditional career path. He also stated that this was not an easy job as girls cared too much about their appearance and did not want to get dirty. The technology and workshop career paths, he added, were noisy, dusty and troublesome, and girls had a lesser technical interest. The author concluded that a change in attitudes needed to occur among the career counsellors before they could form part of the change.<sup>66</sup>

In the 1990s, the FBF carried out a campaign to achieve equality in schools, which began with a study on the distribution of resources, time and attention among boys and girls in schools. Additionally, gender representations in natural sciences and technology teaching materials were also studied. The FBF reported that boys cost on average 8,400 kronor more per year than girls, received more instruction time and were given more attention by teachers; moreover, women were clearly underrepresented in the area of technology in teaching material. The FBF advised that teachers be educated in gender equality and that such studies be disseminated in other municipalities, in order to make the problem known by the authorities.<sup>67</sup>

The FBF considered schools an important platform for spreading knowledge among pupils and staff regarding the benefits of the participation of women in the field of technology. The participation of the FBF in the public debate through their publications in *Hertha*, their statements in state enquiries and their inputs in state-sponsored projects, school campaigns and conferences, were complemented with the organisation of events on school premises.

64 Notes on Rita Liljeström's talk, 1978, RA.

65 Berti, Bergendahl, "Är Teknik något för dig 'grabben'?" *Hertha*, no. 6 (1978).

66 Mari, "Yrkesvalsläraren som han tror sig vara – och som han är," *Hertha*, no. 6. (1978), 40.

67 Karin Nordström, "Läroböckers bildmaterial ojämnt," *Hertha* no. 3–4 (1996), 27; Karin Thorsell, "Nytt hopp för skolan," *Hertha* no. 3–4 (1996), 30.

The FBF organised talks in schools, as well as women and technology-themed workdays during which pupils could listen to FBF members and female professionals in the field of technology talk about prospects for girls in this area. They promoted contact between women in technical occupations and students on the technology pathway in secondary school, as well as pupils about to choose their study subjects. The FBF rejected strategies of using rewards for students or school staff when making non-traditional choices. Instead, they believed in the power of role models and brought female managers, engineers and computer experts to schools.<sup>68</sup> These types of activities were common in the work of the FBF in informal education settings, such as their WTD event, during which they also targeted pupils, students and educational staff outside formal education settings.

### Circulation of technology knowledge outside schools

Seminars, conferences, talks and forums brought FBF members, scholars and professionals together to offer a message to the audience. A large part of these activities took place outside of the realm of formal education but aimed at creating and circulating computer knowledge primarily through a process of dissemination of information from (mostly female) experts in different areas of computer technology to the general public.

The annual WTD event hosted most of the activities that the FBF organised within the area of technology education. This event was organised since 1979 by the W&T group, the members of which viewed themselves as an informal network and ranged from technology experts to those wishing to influence and make demands on technology.<sup>69</sup> The objective of the group was to engage both men and women in this issue, as well as investigate and analyse the situation of women in the area of technology in education and the labour market, and discuss women's attitudes towards technology. More concretely, the W&T group aimed at proposing measures to increase women's participation in and influence on technological development.<sup>70</sup>

The WTD event had different durations and focuses over the years, but notably, the same purpose: to disseminate an image of women as being creative and technically capable and to inform the general public of women's significant role in the history of technology. The main event was organised in the premises of the Technological Museum, which remained a partner until the group left the FBF in the late 1990s and became a separate organisation linked to the museum. Together, they organised exhibitions that would be hosted at the museum for several months and they often toured around the country.

The first event, which the FBF referred to as *The Big Happening: More Women in Technical Occupations* took place in 1979 and was considered the founding event of the FBF's work with regard to women and technology. The week-long event included exhibitions, competitions, theatre, debates, music and dance, as well as the exhibition *Technology at Home*. In this event, the two engineering associations

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68 Notes on the organisation of a theme day in Olympia School by FBF Helsingborgskrets, Nov. 1982, F2:4 FBF Helsingborgskrets, HS.

69 Kvinnor och Teknik-Gruppen flyer, 1988. F2:4 FBF Helsingborgskrets, HS.

70 Letter from the coordinators of the W&T group to its members, September 15, 1981, FBF Main archive, B4:5, RA.



presented an assessment of the situation of women in technology education. Of the 155,000 engineers in Sweden, only 7500 were women, and 76 per cent of female engineers considered that employers chose men as a first option.<sup>71</sup> While the situation appeared dismal, women already working in the technological industry and education could provide some much-needed insights. A sociologist talked about the situation for women in the new labour market and urged women to educate themselves as programmers or computer operators to compete with men for jobs. Two Volvo employees talked about their experiences and the gender equality work that was taking place at the traditionally male-dominated company.<sup>72</sup>

In 1982, the FBF received funding from the Swedish Board for Technical Development (STU) to organise a conference on women and technology. The two-day conference, which preceded the WTD had 400 participants, including women with a technical education background, students in the area of technology, teachers, career counsellors, people from industry, personnel from the employment service and members of engineering associations. The presentations and discussions from this conference were published in the book *Gnistor*, which served as a constant reference in the continuing work of the FBF in the coming years.<sup>73</sup> This event was described in their annual account as the greatest endeavour of the spring.<sup>74</sup>

In 1983, the WTD event was smaller than that of the previous year, but it was followed by the conference *Women and Computers*, in which around 200 women and a handful of men learned about the computerisation of society, computers and their effects on the labour market, especially in the case of women. According to the FBF, the participants were interested both in the theoretical and practical aspects of computers, and it became clear that women needed to receive computer knowledge, to be able to follow computer developments.<sup>75</sup> The conference was organised in cooperation with the study association, *Studieförbundet*. Although the conference had a participation fee, as it was carried out without any funding, attendance was high and the FBF even reported profit. The conference was advertised in the largest national newspapers and smaller journals.<sup>76</sup> Conference participants came to the conclusion that women needed to keep up with computer knowledge and computer development. Computerisation entailed many unknown possibilities and risks; therefore, it was necessary for women to be prepared.<sup>77</sup>

This year, formal education was at the centre of the debates. The introductory debate in Stockholm's *Kulturhuset*, called *Technology at School*, was about boys' and girls' chances and attitudes in school. The activities organised at the Technological Museum, which in one day received 300 visitors, gave girls the opportunity to conduct technical experiments independently and to listen to women who worked in technical positions. The concluding debate at the Royal Institute of Technology in

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71 Christina Ramberg, "Report from Kvinnor och Teknik-veckan in Stockholm 15–16 March, 1982," Annex to *På väg...: information från FBF Göteborgskretsen*, no. 2 (1982), Royal Library (hereafter KB)

72 Christina Ramberg, "Kvinnor och Teknik- kväll i Gbg," Flyer Göteborgskretsen. (1982), KB.

73 FBF Annual Report 1983, B1:4, FBF- Main Archive, Blekinge Archive (hereafter BA).

74 FBF Annual Report 1982, 2, KB.

75 FBF Annual Report 1983, 2,6, KB.

76 FBF Annual Report 1983, 9, KB.

77 FBF Annual Report 1983, KB.

Stockholm centred on the question of whether more women in the technical field would change technology.

The W&T group and their annual activities inspired events all over the country. In 1985, an exhibition took place in Västervik, in which visitors could observe women demonstrating technological tools, such as a home-made computer or the software used in libraries, the employment office or shops. The main organiser of the event claimed to have been inspired by the W&T group and their event *Technology in Practice* the previous year.<sup>78</sup> In 1987, the state-owned telecommunications company, Televerket, helped sponsor the event and exhibited their products. Televerket also set up practical stations, where visitors could learn how to build a telephone, search in the Videotex databases and gain information regarding aids for people with communication disabilities.<sup>79</sup>

The main event of the WTD was organised by the Stockholm branch of the FBF. However, an early invitation was sent out to all branches in the country, asking them to participate and contribute ideas to the content and planning of the activities. Some of the themes of the debates, lectures and seminars were the role of women in the history of technology, visions of the future, women and interest in technology, women in technical programmes, women in research, women in technological occupations, women as inventors, women in the computer society, women in medical technology, women's attitudes towards technology, the advantages and disadvantages of computers for women and women's need for technology.<sup>80</sup>

Many of the WTD activities had a practical orientation and addressed the general public, in particular, young women. In 1982, for example, the FBF set up a computer cabin where girls could try out computers with the help of a guide from a study association.<sup>81</sup> In 1984, The *Technology in Practice* activity showed visitors how to build their own circuit boards and make electrical connections, carry out simple car repairs and chemical experiments and how to make a call on a mobile phone. The event was complemented with talks relating to women in technical occupations and with school counsellors promoting technical education for girls.<sup>82</sup>

In 1993, the programme included mini courses in computer technology and domestic electronics. A national newspaper quoted one of the course leaders as saying that many girls believed that computers would explode if they experimented with them, however, it was not until they dared to play with them that they understood how this technology worked.<sup>83</sup> In 1999, the W&T group organised an event on everyday encounters with technical problems, in which visitors could, among other things, drive an electric car, surf the internet, repair cables and film with a digital camera. Young girls could try out different computer games and act as juries in deciding on the

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78 Märta Fritz, "Teknik i Västervik," *Hertha*, no. 6, (1985), 11.

79 Anna-Greta Johansson, "Kvinnor och Teknik – sponsrade temadagar," *Dialogen* 4 (1987), 9.

80 Kvinnor och Teknik group meeting minutes, 1981-09-15, RA.

81 FBF Annual Report 1982, KB.

82 "Tekniken i praktiken. Kvinnor och Teknik 1984," Organised by the Museum of Technology and FBF, programme sheet, F1:138B.18, Telemuseums historiska arkiv (hereafter Telemuseum), National Museum of Science and Technology (hereafter TM).

83 Anna-Lena Haverdahl, "Teknik lockar kvinnor," *Svenska Dagbladet*, October 23, 1993.

best game; they also experimented with making their own homepages.<sup>84</sup>

The interest in computers, which had been particularly high in the second half of the 1980s, dwindled in the 1990s. State funding had by this time disappeared, but the FBF was able to ask private donors for special contributions. The FBF received a donation from the Industry Association for their 1990 event.<sup>85</sup> In the second half of the 1990s, the themes discussed ranged from city planning technology to car mechanics, with a greater emphasis on technical higher education and practical examples from work life, encompassing the computer industry, astrophysics and product development. The speakers and discussants talked about the interesting aspects of their jobs and the social implications of technology.<sup>86</sup>

By the late 1990s the group had created a solid network of groups and organisations from industry, education and civil society, as well as state institutions, that were ready to collaborate with the FBF's activities and sponsor some of their projects.<sup>87</sup> This response shows that the FBF's position on the training of women in technology had become well-accepted and the new knowledge on the role of women in the technological society<sup>88</sup> had gained a foothold in some areas, not least in education and other official domains.

Other activities took place outside the framework of the WTD, as activities relating to women and technology education were spread throughout the year. One example was the *TUFF* (Technology, Education, Girls, Parents) project, which started in 1983 and aimed at encouraging parents to support their daughters in choosing occupations in technology. It was implemented by five different sections in six different Swedish counties in the spring of 1984.<sup>89</sup> The targeted actors were expected to function as a bridge to the general society and the new "converts" from a variety of areas and levels in society, would do their job to attract more women to technology studies and careers. The speakers provided hard facts regarding the current situation of women in the areas of education and the labour market in technology, as well as their vision on the advantages of having more women in technology education, both from the perspective of women and the wider society.

The presentation of role models and networking were two of the preferred strategies to spread knowledge used by the FBF. The events that targeted the general public, many of which addressed young women, in particular, often used women in technical occupations and higher technical studies as role models. They would teach participants how to use computers or specific programmes, as well as how to

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84 Kvinnor och teknikgruppen 1979–1999 firar de första 20 åren, anniversary party invitation, F2:4 FBF Helsingborgskrets, HS.

85 Women and Technology group meeting protocols 06.09.1990, and 19.09.1990, F2:4 FBF Helsingborgskrets, HS.

86 Kvinnor och teknikdagar 9–10 november 1996, programme sheet, F2:4 FBF Helsingborgskrets, HS.

87 Letter from Annemarie Skeppare on behalf of the W&T to the participants of the WTD, November 12, 1996, F2:4 FBF Helsingborgskrets, HS.

88 A technological society is one in which "specific technologies dominate our sense of the kinds of problems that government and politics must address, and the solutions that we must adopt." Andrew Barry, *Political machines: Governing a Technological Society* (London & New York: The Athlone Press, 2001), 2. For FBF, computers and IT technology were the dominant technology women needed to grapple with for most of the studied period.

89 FBF Annual Report 1983, B1:4, FBF- Main Archive, BA.

build computers. By doing so, new gender roles in the area of computer technology were showcased. The FBF aimed at normalising the view that women's participation in technical areas was possible and desirable. Seminars, talks, exhibitions and other similar activities contributed to building a network of like-minded professionals and workers. The WTD often held specific networking events and talks regarding the importance of cooperation.<sup>90</sup>

Women in technical occupations functioned as a bridge between the FBF and the industry; Volvo and Tetra Laval were two of several companies that sponsored FBF activities and the latter also had connections with Vattenfall Södertörn AB and Lidingö Energi AB. Employees from these companies often participated in the capacity of speakers at FBF events. Every year the FBF invited professional women to talk about their work and the situation regarding women in their workplace and to give advice to women in the audience on how to succeed professionally. The advice ranged from choosing suitable studies in the area of technology to choosing the right marriage partner that would support a woman's ambitions.<sup>91</sup>

In the 1990s, the network initiated by the FBF had grown larger and new organisations joined. In 1992, the *Kvinnor Kan* association organised an event with a similar set-up to the WTD. It included talks and workshops relating to computer technology, and technology companies were present to recruit female professionals. The W&T group helped with ideas and support.<sup>92</sup> Similarly, innovation institutes and organisations, such as NUTEK, WiTEC and the Swedish Inventor Association collaborated with the W&T group in activities designed to promote innovation and creativity, such as the technical invention competition of 1997 to design a product that would be beneficial for Swedish society.<sup>93</sup> Thus, by the 1990s, the FBF had positioned itself as an expert and a crucial collaborator partner for other organisations, interested in promoting women's participation in technological development.

## Conclusion

The question of technology became a priority for the FBF in the mid-1970s. The problem associated with technology was, in the view of the FBF, the result of men's domination of knowledge. Men had the monopoly of technological knowledge and decided on its uses. Moreover, the decisions they made were often counterproductive for society. Therefore, it was imperative that women contributed to the creation of technological knowledge. Thus, their aim was to create a new view of technology that included women, so that women could appreciate its potential and take on a more active role in its creation and use.

This reflection on technology took place at a time when the process of computerisation of industry, public administration and social life was taking place. The Swedish state, worried about the likelihood of women's unemployment, took measures to train the population and women, in particular, in computer technology.

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90 "Späckade dagar om Teknik," *Dagens Nyheter*, March 21, 1987.

91 Skeppare (1996).

92 Project description of the Technology Square- Kvinnor Kan fair, 28 May, 1991; Letter from Annemarie Skeppare to the Women and Technology group", June 24, 1991, F2:4 FBF Helsingborgskrets, HS.

93 "High lowtech idéer som lyfter," Competition advertisement March 1997, F2:4 FBF Helsingborgskrets, HS.

The FBF followed the state's initiative but made sure to promote the participation of women in the creation of technological knowledge through higher level education. This group was not only interested in women's computer literacy but in women's participation in innovation, research, decision making and managerial positions in the industry.

By the mid-1990s, the total number of personal computers was estimated to be 1.25 million, making Sweden one of the world's most computer-dense countries. Around 15 percent of Swedish homes had personal computers and the proportion of computer users varied in different sectors of the labour market. In 1990, only 10 percent of people employed in agriculture and forestry used computers, by comparison with 90 percent of people employed in the banking and insurance sector. Computers were used by 58 percent of state employees, compared to 14 percent of those employed in municipalities and county councils. Among male state employees, 54 percent used computers, compared with 64 percent of female employees; among private employees, 36 percent of men used computers compared with 46 percent of women. One in three workers used IT in their work.<sup>94</sup>

In light of these changes, the FBF aimed at establishing a network of women, who were already part of the male-dominated area of technology, either as students, teachers, professionals or politicians. These women constituted a source of new knowledge and by bringing a female aspect to their technology-oriented settings, they were already making an impact on technology. Thus, in their view, by normalising the idea that technology also belonged to women, they were changing old, pre-conceived notions.

During the 1980s, the FBF's ideas relating to technology became increasingly focused on computer technology, although these often included the broader science, technology, engineering and mathematics field. Women could be programmers, gamers or efficient computer users, and this view was circulated in publications, conferences, talks, exhibitions, workshops and all the activities organised within the WTD.

Most of the activities were aimed at guiding women towards university level education, which would lead to a key position in the labour market. However, in order to establish a long-term change, the FBF affirmed that efforts were needed from pre-school education onwards. The FBF targeted all levels of education with their publications, declarations in state enquiries, school campaigns and activities on the premises of educational institutions, as well as conferences addressing teachers, career counsellors and politicians. However, they were also interested in reaching a social consensus by addressing the general public. Their WTD, which took place in museums and other public spaces, such as cultural centres and auditoriums, etc. were open to everyone, although certain activities addressed specific groups, such as the youth, parents, journalists, etc.

Assessing whether the work of the FBF regarding the question of women and technology significantly changed the pattern of women's choices, leading to a more gender-equal distribution of students and workers in the area of computer technology, is beyond the scope of this article and would require further analysis of

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94 SOU 1994:118, *Informationsteknologin. Vingar år människans förmåga* (Stockholm: Fritze, 1994).

a different range of sources. However, this analysis shows that the FBF played a role in directing attention towards the gendering of technology and the role of women in technology in the Swedish context. The FBF was attributed a major role by the state in questions related to the education of women in technology and was, therefore, consulted in the capacity of an expert, whenever a change in the curriculum or a project relating to education in technology was being developed.

Moreover, new groups, organisations and networks, including the civil society and educational actors, were formed in the area of education in technology, and these had close connections to the FBF and their W&T group. New and more inclusive knowledge relating to technology and the role of women in the technological society was created and circulated in Sweden, which opposed the notion of technology as an exclusively male endeavour, even though in practice, this was mostly still the case.

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