Abstract:

This literature review aims to contribute towards the building of a knowledge base for the European SIGIS project. It will primarily focus on the review of Dutch studies related to the inclusion of women in the information society. The second objective is to support the Dutch case-studies. For this reason, the review will focus on knowledge and insights in the domains of the chosen case-studies.

Keyword list: Gender, ICT, strategies, inclusion, Information Society, statistics, literature, The Netherlands
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1. Introduction

Objective

This literature review aims to contribute towards the building of a knowledge base for the European SIGIS project. It will primarily focus on the review of Dutch studies related to the inclusion of women in the information society. The second objective is to support the Dutch case-studies. For this reason, the review will focus on knowledge and insights in the domains of the chosen case-studies.

Theoretical perspective

The Netherlands has a relatively strong tradition of studies in the domain of gender and technology that build on the "mutual shaping" approach. In this approach neither ICT nor gender is perceived as existing ‘a priori’ but as socio-cultural products of processes in which they are constitutive elements of each others shaping: gender relations influence the shaping of ICT and simultaneously ICT contributes to the shaping of gender and gender relations. This review aims to start from a “mutual shaping” perspective. This implies that information and insights for strategies for gender inclusion will not be confined to the domain of the use situation, but should also be directed at the design - and developmental process of new ICTs.

General research questions

What are the gender patterns in ICT use and ICT production in the Netherlands?

What enabling and constraining factors/processes for inclusion of the heterogeneous group of women in ICT-use and –production can be found in the Dutch academic literature?

What conclusions can be drawn aiming at the inclusion of (diversity of) women into the production and the use of ICTs.

Methodology

This review is confined to statistics and scientific literature based on research conducted in the Netherlands. As the ICTs themselves as well as the societal embedment of these technologies evolve fast, the study focuses primarily on literature of the last five years.

Methods:

Searches in information databases (Content Online/ NCC Nederlandse Centrale Catalogus): keywords (in English and Dutch) gender, women + internet, computer, new media, information- and communication technology.

Web searches (Google) on Dutch webpages: gender, women + internet, computer, new media information- and communication technology. From the websearch only electronically available research reports of official and reliable organisations were used as reference.

Snowball method: Selection of Dutch references in the literature used until no new publication were found. This method gave a good indication for the coverage of the most important studies as at the end only little new references came up.

2. Setting the stage: an overview of socio-historical gender patterns in the Netherlands

2.1 Gender patterns in the labour force

Since the Second World War the Netherlands has persistently occupied one of the lowest positions in the European ranking concerning the participation of women in paid labour. In the 1950s and 1960s the ideology and practice of the nuclear family – male
breadwinner and female homemaker and mother - was firmly rooted in Dutch society, despite a severe shortage on the labour market at that time. According to the Dutch economist Plantenga, this specificity of the Netherlands was not caused by a particularly strong ideology. On the contrary, when comparing the Netherlands with Germany, no differences were found in this respect. Plantenga explains by pointing at the relatively high labour productivity in the Netherlands combined with strong labour unions, which resulted in a relatively high wage for male workers allowing them to generate sufficient income to support their families (Plantenga 1993). This meant that in the Netherlands relatively mild ideology could easily become practice on a wide scale.

Since the 1970s the labour force participation of women increased steadily, but the number of hours spent on paid labour remained relatively low. The contemporary expression of traditional family ideology is seen in the very high rate of women working in part-time jobs (less than 35 working hours a week). In 1998, 67% of all women participating in the labour market occupied part-time jobs (compared to a ranging of 10% to 44% in other European countries [Eurostat 1998 in/ Keuzenkamp, 2000 #27:75]. Dutch part-time working men also score high internationally with a 17% share, other countries ranging from 2 to 10%. The dominance of the traditional breadwinner model has disappeared and has been replaced by the "one-and-a-half-earners-model", with the male working fulltime and the female part-time. The differences in labour force participation between women and men are smallest among the highly educated. Lower educated women, especially those with small children, most often stay at home or do little paid work (less than 12 hours a week).

In the last two decades, the large number of part time working women improved the Dutch position in the European ranking of labour participation of women. However, when comparing the number of hours worked by women compared to men, the Netherlands still occupies the lowest position. The Netherlands have a ratio .39 of hours paid labour of women compared to that of men, meaning that for one hour working in paid labour of an average man, an average women works 24 minutes (that is 39%) [ECE 2000 in/ Keuzenkamp, 2000 #27:82]1. To compare this ratio with some other countries: Finland had the highest .70; Norway .58 and Italy .41 In the category of persons with small children (1-4 years) this ratio for the Netherlands is as low as .22 (Finland .49, Norway .29 and Italy .33).

When children are born, the woman only usually alters her working hours. Only 9% of the male partners change their working time (Keuzenkamp and Hooghiemstra 2000). Clearly, this is a present-day reflection of the above mentioned ideology that still perceives an incompatibility between motherhood and career. Another reason frequently mentioned in the literature is the late age at which women get their first child. Dutch women tend to postpone childbearing more than other European women (Keuzenkamp and Oudhof 2000). The average age at which women give birth to their first child has risen above 30. The lack of adequate childcare facilities also contributes to this behaviour. Although the government policy is to increase the number of child-places, the growth is by far not big enough to meet the demand. In 2000, there were still 22,000 children on the waiting lists (Keuzenkamp and Hooghiemstra 2000:98). An important factor for parents to opt for large-scale jobs for both, are the childcare facilities (opportunities for paid parental leave, working part-time and funding childcare) of the firm where the male partner works (Keuzenkamp and Hooghiemstra 2000: 150).

2.2 Gender patterns in education

In the early nineties girls caught up with the males at an educational level. Nowadays they perform even better and choose more often a higher level of education than boys do. In Dutch society this implies that in the age-group of 25-44 women and men have virtually the same level of education (Keuzenkamp and Oudhof 2000). However, the horizontal segregation patterns has persisted. The Netherlands has a very small percentage of girls choosing vocational education in the technical domains, varying form

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1 The ratio was constructed as indicator allowing an international comparison despite strong variations in definitions of working hours.
3-5% in lower vocational training to 10-15% in the higher levels of education. Despite intensive information campaigns in the last two decades, only a scant growth in girls’ interest in engineering (computer science included) has been realized.

### 2.3 Diversity in Dutch ethnic minorities

The Netherlands has two substantial groups of ethnic minorities that have different historical roots and also differ in cultural characteristics. The first is a relatively large community of Turkish and Moroccan people. This group came to the Netherlands at first in the nineteen sixties as immigrant workers – often only the males from economically deprived areas - to relieve the shortage on the labour market at that time. Many women and children joined their husbands in the early 1970s. Nowadays, the third generation is entering school and the labour market. This group is still expanding substantially with new immigrants as a large majority of the young people marry inhabitants of their parents’ native country and bring them to the Netherlands (Hooghiemstra and Merens 1999:16). The second community are the Surinamese and Antilleans, both inhabitants of (former) Dutch colonies. Suriname gained independence in 1975. This caused a massive migration in the years before 1975 from all layers of the Surinamese population, as the possibilities for migration were drastically limited after independence. The Antilles are still part of the Dutch kingdom but function fully autonomously. However, the absence of formal barriers for migration leads to a much more dynamic migration pattern of Antillean coming and returning.

The educational level of Turkish and Moroccan women is significantly lower than the Surinamese/Antillean group and the indigenous women. Although the differences are less marked for the second generation born in The Netherlands, the educational level of Turkish and Moroccan girls is far lower than the other groups of girls. In all ethnic groups, girls perform better in the Dutch educational system than boys do.

The labour market participation of women from the various ethnic groups differs greatly. The participation of the Turkish and Moroccan women is very low, whereas the Surinamese women exhibit an even higher labour participation than native Dutch women (Hooghiemstra and Merens 1999:48). Unmarried Turkish women have a relatively good chance of finding work, irrespective of their educational background. However, most Turkish women marry and have their first child at a young age, and leave the labour market - also irrespective of their educational level. Turkish and Moroccan women who arrive newly in the Netherlands to join their marital partner have the lowest chance of finding paid labour. The Surinamese women show quite a different attitude towards combining work and family/children. Their independence is illustrated by a Surinamese women’s wisdom: “a good education is your husband”, (Hooghiemstra and Merens 1999:92). They see an education as a better guarantee for a good life than having a husband. Their domestic situation hardly influences their labour market participation. Although they relatively often form single-parent families, Surinamese women more likely to have a paid job than indigenous women. Surinamese girls relatively often attend the highest level of education (higher vocational training and university).

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2 The 1998 labour participation rates of women aged 15-64 over the various ethnic groups were: Turks:22%, Moroccans: 17%, Surinamese: 57%, Antillean: 48%, native Dutch: 55%.

3. Gender and ICT use

3.1 Gender patterns in ICT use in everyday life

3.1.1 PC and Internet possession

Since 1975, the Social and Cultural Planning Office (SCP) has been conducting a large scale Time Budget Survey every five years. From 1985 onwards, these surveys have included the availability and use of computers at home. During the 1990s, the diffusion of PCs in the home was significant. Whereas in 1990 30% of all persons above 12 years old had access to a computer at home, this rate increased to 70% in the year 2000 (Huysmans and Haan 2001:89). Over the years there has been a persistent ‘gender gap’ of about ten percent-points. In 1990 and 2000, respectively 25% and 65% of the women had access to a computer at home. As most females above the age of 12 live in a household which includes males, this persistent gender gap can be attributed to differences among the single-person households. Indeed, single women have significantly less often a computer in their home.

The likelihood of having a PC and Internet connection at home still varies along traditional stratification lines of age, income, education, and gender. The better one’s educational level, the higher one’s income and the younger one is, the greater the chance that one owns a computer ((Dijk 2000:214). The Time Budget Survey in the year 2000 shows the older age groups are catching up. In the period 1995-2000 PC-ownership among those older than 65 years leaped from 9% to 24%. In the age group of 50-64 years many also acquired a computer, their access rate increasing from 40% to almost 70% in that same period (Huysmans and Haan 2001:89).

A survey conducted in autumn 1998 found the lowest PC-ownership among those aged above 65 (13%), and with the lowest educational level (21%). Single women formed the third group with 39%. (Dijk 2000:107). This pattern has persisted from 1985 onwards, with the exception of single women who have made a relatively strong leap in the last three years. The rate doubled for this group of women, whereas for the other two vulnerable groups the growth was only half that size. Unfortunately the last statistics from 2000 did not details the gender split of PC-ownership for individuals in a single household. With 41% PC ownership, however, this group clearly lags behind the average of 70% (Huysmans and Haan 2001:89). As in the years before the ownership rate of single males followed the average trend, this low rate most likely can be attributed to the single female households.1

Certainly, a large group of women (one third of adult women live as a couple with children (Keuzenkamp and Oudhof 2000:22) has access to a computer at home. Families with school children most often have a computer at home (84% in 2000). However, a PC in a family does not necessarily imply that all family members actually use it.

PC-quality

The figures on ownership also hide crucial differences in computer quality. The developments of computer technology still manage to conform to “Moore’s Law”: capacity and speed double every one-and-a-half years. A computer becomes ‘obsolete’ long before it breaks down, as software and applications development commonly follow the technical possibilities of PCs.

Graphical interfaces and multimedia Internet applications put high demands on the computers capacity and speed. For those who possess older computers, these applications are often not accessible. Rommes found that the shift from textual to the graphical interface of DDS had a negative impact on women’s use of DDS (Rommes 2002). Dutch statistics confirm the hypothesis that women own cheaper and older PC’s. In 1998 21% of the female computer owners acquired their computer for free (in most cases

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1 One has to take into account that the age structure of single women and men differ. As men die younger there is a substantially larger proportion of elderly single women.
second hand ones) compared to 13% of the male owners (Dijk 2000:113). The group of single women computer owners had by far the lowest rate of Pentium computers at their disposal (24% compared to 65% for single men and 52% for all computer possessors) (Dijk 2000:114). Combined with the figures of computer possession of this group, the following picture arises. In 1998 only 9% of single women had a Pentium computer compared to 39% of the single men. For the other variables of age, income and educational level, the differences in PC quality were much less significant.

**School age children and PCs**
Secondary school children form the group which most often has access to a computer at home. In 2000, among 12-19 years old, 90% had a computer at home (Huysmans and Haan 2001). The most recent statistics from 2001 even point at a very high diffusion rate of 97% among families with children that attend secondary school (Haan, Huysmans et al. 2002). Of those pupils attending the highest level of education (VWO) 99% have a computer at home, whereas at the lowest level of education, 95% of pupils have a computer. One can conclude that for the indigenous Dutch school age children with 99% the diffusion of PCs is almost complete. The ethnic minority groups still lag behind a little, with the Turkish and Moroccan communities having the lowest rate (85%). Clearly this rate is significantly lower compared to indigenous families, but the differences among stratification lines of educational level (and income) are clearly less in families with schoolchildren than the overall statistics show. Teenage children themselves and their parents see the possession of a computer at home as rather important.

As the PC most often is seen as a household attribute these figures show hardly any differences for female and male pupils (only a very small difference of 1 percent point in favour of boys). However, school boys more often report having two or more PCs at home and more often have a PC in their own room; 50% compared to 34% of the girls (Haan, Huysmans et al. 2002:64). This implies that on average schoolboys have easier access to a PC than girls.

**School age children and Internet**
Internet growth has been fast in the last three years. This was particularly marked among school aged children in higher level education (VWO), where Internet access levels reached 98% in 2001 (Haan, Huysmans et al. 2002:67). In particular the change from 1999 to 2000 shows a remarkable growth. Within a one year period, Internet access rose for pupils in secondary education from 55% to 90%. In 2001, 84% of all households with children in secondary schools and lower vocational training had Internet access. Here again the Turkish and Moroccan minorities lag behind most with only 49% having Internet access. Four out of five pupils have their own email-address, distributed equally between boys and girls. Pupils in lower vocational training clearly are less likely to have an email address than pupils in secondary education (59% compared to 90%). The same holds true for ethnic minorities compared to the native Dutch population (60% compared to 85%).

### 3.1.2 ICT Use

Having a computer at home does not automatically imply the use of it. The time use survey in 2000 found that 40% of PC owners did not use their PC during the research week, which indicates a rather limited use pattern (Huysmans and Haan 2001:91). About half of this group (that is 20% owners) indicated that they never use their PC at home. Indeed, a study on ICT use and the elderly shows a significant difference between ownership and actual use of PCs in the home, for both for men and women (see table 1).

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2 To assess the impact: in 1998 The Netherlands had 1.2 million women with a single household, that is 20% of all adult women.
Table 1. Presence and use of the PC at home by age and gender, 1999, in percentages.

<table>
<thead>
<tr>
<th>Age</th>
<th>35-54 years</th>
<th>55-64 years</th>
<th>65-74 years</th>
<th>&gt; 75 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td><strong>PC presence</strong></td>
<td>78</td>
<td>54</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td><strong>PC use</strong></td>
<td>63</td>
<td>41</td>
<td>18</td>
</tr>
<tr>
<td>Women</td>
<td><strong>PC presence</strong></td>
<td>75</td>
<td>41</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td><strong>PC use</strong></td>
<td>48</td>
<td>21</td>
<td>7</td>
</tr>
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</table>

Source: (Haan 2001: 232/235)

Among men aged between 35-65, 20% do not use the computer in their home. For men above 65, this rate rises to 30%. For women, the rate of non-users is significantly higher; 35% of 35-54 years old and 50% for women above 55 do not use the computer available in their home. No data is available for the younger age groups, however the expectation is that the ownership-use gap will be smaller for both men and women. The researchers do not suggest reasons for this non-use. However, it seems plausible – especially for the younger people - that the computer is used by children. The older group might own a relatively old computer that they stopped using. There indeed seems to be a substantial group of ‘rejecters’ (see further in this section). This pattern of non-use is not unique to computers. Other technical home appliances, like Teletext and the VCR have also seen a substantial rate of non-use (Dijk 2000:61).

The amount of time spent on the computer also shows significant gender differences. In 2000, women spent on average 2.5 less time on a PC at home compared to men. This is a significant difference, although ten years earlier this gender difference in use was 8 times less for women. Measured in absolute hours, the gender gap in computer use has grown. Whereas men spent one hour more a week behind the PC in 1995, by 2000 this difference had increased to one-and-a-half hours (Huysmans and Haan 2001:91). Also among the young, the absolute growth in hours of PC-use at home has increased significantly more than for adults and the elderly. However, a comment must be made on the interpretation of these differences in time investment. As these statistics refer to the whole group of computer owners, the gender differences will be smaller for the group of computer users.

**Gender patterns in the use of PC applications.**

PCs are used for rather different types of activities. Word-processing is by far the most used application, with 85% of users among the computer owners (Dijk 2000:120). If this rate is combined with the data on non-use, one can conclude that virtually all computer-users use word-processing. The use of word-processing shows few gender differences at an aggregate level, although housewives use word-processing significantly less (57%). This is probably compensated by single women, who score high with 94%. These rates point at a relatively high percentage of non-use among housewives (as their children or husband are the users), and little non-use among single women (see also next section). This is an example that gender differences can be masked at an aggregate level, but become visible when diversity is taken into account.

The second most popular PC-activity is playing games (60%). Interestingly, playing computer games is a widely spread activity. Clearly young people, boys more than girls, score highly. But other groups that are commonly seen as ‘laggards’- housewives, elderly people and lower educated - play computer games relatively often. Seniors living in old people’s homes, who learn to use computers, with the growing number of Internet facilities, are mostly interested in playing games – aside from communicating with their children and grandchildren by email. Apparently, many elderly experience game-playing as an interesting and meaningful computer-application, more than word-processing.

Spreadsheets and databases are used relatively less often by women and the less educated. Interestingly, age is not a determining factor: computer owners above 65 years use these applications as much as the other age groups. This age independence also holds for using digital versions of information services, like the telephone directory on CD-
ROM (CD-foon) and the train travel planner. Women, on the other hand, use these services significantly less (32% compared to 55% of the men).

Among adults, offline PC applications are still more often used than online Internet activities. In 2000, half of the PC owners used the Internet (WWW) and email, most of them daily or a few days a week (Huysmans and Haan 2001:92). This is substantially higher than the 35% in 1998. Single women, elderly, and lower educated users used these applications significantly less.

PC and Internet use by school aged children

Young people show a different pattern of use. Secondary school pupils perform more online activities than offline programmes. With respect to offline computer use, boys and girls use their computer to do their homework to the same extent (see table 2). Programming is a typical boys activity. Playing games is also done twice as much by boys.

Table 2. Weekly use of PC and Internet among secondary school youth age 14-17, 2001, by gender in %

<table>
<thead>
<tr>
<th>Activity</th>
<th>Turkish/Moroccans</th>
<th>Surinamese/Antillean</th>
<th>Native Dutch</th>
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<tbody>
<tr>
<td>Email</td>
<td>20</td>
<td>40</td>
<td>63</td>
</tr>
<tr>
<td>Chatting</td>
<td>27</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>Surfing WWW</td>
<td>22</td>
<td>28</td>
<td>61</td>
</tr>
<tr>
<td>Looking for information</td>
<td>15</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>E-commerce</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Downloading music</td>
<td>19</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>News/discussion groups</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Keeping own webpage</td>
<td>6</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: (Haan, Huysmans et al. 2002:71)

There are some remarkable outcomes. First, the Turkish/Moroccan youths prefer chatting above email for communication. Second, having a personal website shows a rather different distribution pattern among the different school groups. There is a clear gender gap, as 28% of boys have built their own website compared to 16% of girls. Remarkably, there is no correlation with the educational level. Pupils in lower vocational training have a webpage as often as those in the highest educational level (VWO). Third, there is a significant diversity within the ethnic minorities. Whereas the Turkish/Moroccan young people have significantly less often a website than the Surinamese/Antillean youths, and other non western groups equal or outnumber the native youngsters (Haan, Huysmans et al. 2002). The fact that this occurs irrespective of the educational level surprised the authors, since they considered building a website to require some digital skills (Haan, Huysmans et al. 2002:69). Although the authors give no explanation, one might pose the question in how far ‘digital skills’ correlate with traditional ‘intellectual’ skills. Having and keeping up a website can be a constitutive element of a subculture, of performing an identity (Frissen and Mul 2000). In this respect it is an interesting finding that weekly upkeep of a personal website scored significantly high among the Surinamese/Antillean youths, a group whose educational level is lower than that of the indigenous young people. This too questions the relation between ‘digital skills’ and more general ‘intellectual’ skills that are reflected in the educational level of pupils.

Location of use
Homes are by far the most important location for PC use, both for adults as well as school-aged children. In 2000, about 60% of all individuals aged over 12 used a computer at home (compared to 35% at work and 14% at school). Computer use in public spaces is much more limited. Only 10% use computers in libraries, mainly for consulting the catalogue, and to a lesser extent for surfing the Internet. Computers in community centres and Internet cafés are used by 4%, of which half reports frequent use - that is one or more times a week (Huysmans and Haan 2001:93). Although these percentages seem small, they involve a significant group of in between 250,000 – 300,000 people who use these public facilities weekly. For seniors living in old people’s homes – with women being a large majority - the PC and Internet facilities and courses offered there, clearly contribute to including part of them into digital activities (Haan 2001).

Reasons for non-use

When non-users are asked why they do not use Internet/email, three arguments score high. For 20% of the non-users the main reason was because they deemed these applications ‘not useful’ for themselves (20.4%). But the barriers in terms of costs and skills also scored high: 20% felt the main barrier was that the cost was too high and 15% mentioned lack of skills as their main reason (ISCOC 2000). Steyaert (2000: 70) sees the lack of an official support infrastructure as an important reason for PC-owners to quit PC- and Internet use. The technology – hardware as well as software - itself still is very immature, causing problems that are difficult to solve for a lay user. Especially the group of single women with on the average low instrumental skills, without a social network that possesses computer-knowledge, is vulnerable in this respect.

With the increase of age, the interest in purchasing a computer among the non-owners strongly declines. In the group of people above 55 years, less than 20% intended to buy a computer in the future. Among those aged 75 and over, only 2% planned to do so. The main reason mentioned by people above 55 years is lack of interest. For the younger group of non-owners (aged 35-54) cost was the highest barrier (Haan 2001:233). The lack of interest in PCs and Internet among the 55+ is linked to the perceived possibilities for use (Gilligan 1999). Although the perception probably will differ from the actual possibilities, this strongly indicates that the elderly do not miss the possibilities for use in their daily life situation. This argument is strengthened by the fact that a significant part of the non-owners in 1998 actually were ‘rejecters’, people who decided to discard their computer (Wyatt forthcoming). Among non-owners, 31% of the 35-54 year olds have had a computer (Haan 2001:234). For the 55-65 and 65-74 age groups, these percentages were respectively 20% and 6%.

The substantial group of rejecters indicates that PC-ownership and –use is all but a linear process. Use and usefulness is not a priori given or located in either the technology or in the user, but are constructed and acquire meaning in the interaction processes. In this process of mutual shaping, both the user and the technology are shaped.

3.1.3 ICT skills

The spread of technological innovations throughout society makes demands on the skills of citizens. Steyaert elucidates various aspects of digital skills (Steyaert 2000). A threefold categorization of digital skills has been developed: instrumental skills, structural skills and strategic skills. Instrumental skills indicate the operational manipulation, dealing with the technology as such, the keyboard knowledge. The concept of structural skills indicates those skills that have immediate relevance to the (new) structure in which information is contained (e.g. use of index in a book). In the new media old skills are complemented, e.g. using hypertext to look for dynamic information (discussion lists). Strategic skills include pro-actively searching for information, taking decisions based on information relevant to work or personal life. At present, policies are mainly oriented towards first type of skill, but in the long run the last type of skill will be the most relevant. Steyaert expects that transference of instrumental skills will be taken over by education, business and industry, and the family environment (personal network). The even distribution of structural and strategic information skills across the population of the Netherlands, however, seem to fall short and needs more attention from policy makers (Steyaert 2000).
Several SCP studies on the digitalisation of the Dutch society attempt to measure the "digital skills". In their SCP 2000 study computer skills were defined as the mean control over ten different computer programs (Dijk 2000) Of those who had ever worked with a computer (so the statistics do not include the non-users) women clearly assessed themselves as less skilled. 45% of them said to have no or little skills in using these computer programs compared to 28% of the male computer users (Van Dijk 2000: 124). Only 6% of all women above 18 years qualify themselves as highly skilled, compared to 17% of all men.

**Explanatory factors for differences in digital skills for youth.**

The SCP developed three different hypotheses to explain differences in digital skills among teenage pupils (Haan, Huysmans et al. 2002). The first hypothesis is that school factors (such as facilities available at school and education in PC use) influenced digital skills. Although they found considerable differences between schools, they concluded that the influence of schools in acquiring digital skills proved to be a very limited one (Haan, Huysmans et al. 2002:172). Also the second hypothesis, namely that differences in computer skills can be explained by general intellectual capabilities, had to be rejected after controlling for the influence of the home environment (p.173). Interestingly, having computer skills showed no correlation with having an interest in technology nor with attending a technically oriented training (p.130). This finding may hint at a development that young people are discarding the one-sided technological image of computers, that feminist researchers have criticized for a long time. The third hypothesis, the social background hypothesis, according to De Haan and Huysmans offers the best explanation for differences in digital skills. The presence of one or more computers in the home was a particularly strong indicator, especially the ownership of a PC in their own room, as well as the number of years of computer experience. The influence of characteristics of parent (that is, a father at home and a mother who uses a PC in her work) was less significant. The main conclusion of the report is that the digital skills as measured in the research were almost all acquired in the home setting. Computer use and courses in school did not contribute to gaining computer skills. This conclusion however induced fierce criticism, which mainly focussed on the way ‘digital skills’ were defined. In the research a rather technical, instrumental definition was used. More strategic skills, like assessing the quality of the information found and applying the information for one’s own purposes were not studied.

The three variables De Haan and Huysmans used, can very well explain the ethnic gap in computer skills but not the gender gap. After controlling for the differences in the home and school situation, no significant differences remained between indigenous pupils and non-western pupils (Haan, Huysmans et al. 2002:173). The gender gap, on the other hand, is only partially explained by differences in social background and schools. However, the ‘gender gap’ may be (partly) a result of the methods used and the way ‘digital skills’ were operationalised.

First, as the authors remark themselves, the skills were not observed by giving pupils assignments, but were constructed from answers on questionnaires. This self-assessment of computer skills may work in the advantage of boys. Boys might be more inclined towards saying that they master a specific skills, whereas in reality the differences might be smaller. Second, the operationalisation may be biased towards computer activities and skills that boys prefer, and thus downplay the activities and skills girls prefer. The tool to construct and to quantify digital skills consisted of five items: 1. move sentences in a text, 2. insert an existing picture in a text, 3. rotate a picture, 4. make an email sending list, and 5. make a website. Especially one might question the 3rd and 4th item. Rotating pictures seems a technicality rather than an useful application. Girls might also make less use of an email-list, not because they don’t know how to use it but because they might not have needed it yet as they possibly prefer one-to-one email communication. Their

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1 These computer programs are: Windows, word-processing in DOS, Word-processing in Windows, spreadsheets, drawing programs, use of keyboard, Internet, programming, email and statistical programs.

2 The critics were formulated at the presentation of the report at 11 April 2002 by the Minister of Education, the director of the School Inspection and a staff member of the WRR (Scientific Council for Governmental Policy).
digital skills might very well be expressed in other digital activities that are not articulated in the instrument to measure ‘digital skills’.

Gendered images of ICT technologies influence the gendered perception of computer skills (Oost 1994, Zoonen 2001). Van Zoonen concludes in her review study that the image of the artefacts needed to access Internet are male (computer) as well as mixed (telephone, television). The gendered image of Internet leans to a male one. Here women tend to play down their Internet skills. There is a public discussion on the problematic gendered perception of Internet (e.g. (child) pornography, sexual intimidation in communicative settings), but hardly any empirical study.

3.2 Gender patterns in ICT use in labour situation

3.2.1 ICT use in female and male jobs

The workplace is an important location where employees learn to use computers applications like word-processing and Internet applications such as email and searching for information. More than half of employees, male as well as female, above 35 use a PC daily in their work activities (Haan 2001:237). 45% of employees report having Internet access and possessing a personal email address. However, the daily use of these facilities is rather limited. The majority of employees with Internet access (70%) use this medium never or less than once a month. For female employees this rate even reaches 80%. The same pattern is visible for email use. 60% of employees hardly or never use it (65% of female employees). As in the domestic setting, in the labour setting one can observe a significant gap between ICT-availability and ICT use.

The existing gender segregation in the labour market does not seem to cause gender differences in opportunities to learn to work with computers and the Internet (Steijn 2001). The main gender differences are caused by the lower participation of women in the labour market. Women are a marked minority, especially among older employees. Therefore many women in this age group have missed the opportunity to acquire computer skills at work. The optimism of De Haan (2001:237) that a large part of those who will retire in the coming years will possess computer experiences has to be dimmed when speaking about women in this age group.

3.2.2 Telecommuting

In the Netherlands, many women have re-entered the labour market in the last two decades. Task-combination has caused serious time pressure and co-ordination problems among double income families with children. The Dutch communication scientist Frissen calls this stage of life the ‘rush hour of life’ (Frissen 2000). The objective of Frissen’s study was to describe and analyse patterns of acceptance and use of ICTs in the context of individuals’ lives in these households. The outcome is paradoxical in the sense that ICTs were not perceived as solutions for co-ordination problems, although they were used in that way. One of the ways ICTs were used, was telecommuting. Several European statistics indicate that the Netherlands scores one of the highest in Europe with regards to the diffusion of telecommuting. 9.1% of all Dutch employees are part-time telecommuters (NRC 1 May 1999). Only Denmark scores higher with 9.7%. The same research indicates that Dutch workers need the longest travel time from home to work (daily 45 minutes with the European average at 37 minutes).

Casimir (2001) has studied the impact of telecommuting on the gendered division of labour in households (Casimir 2001). The phenomenon of telecommuting itself is diverse and heterogeneous and is difficult to reduce to one definition. Casimir based her research on the following definition: employees who work at least one day a week in their domestic environment, for which they use modern ICTs in order to have the same facilities as they have in the office of their employer.

In her research Casimir interviewed 171 telecommuters (100 male and 71 female) about the impact on the gender division of domestic labour. The hypothesis was that in
asymmetric, family-oriented households telecommuting would enhance asymmetry, both in households with female and with male telecommuters. She found similar motives among male and female telecommuters. Both mentioned family-oriented motives (e.g. taking care of children) and career-oriented motives (e.g. working at home for better concentration/higher quality of work). The internal division of labour was influenced by telecommuting. On the ‘tele-work’-day, the telecommuters, men as well as women, spent more time on all the diverse household tasks. The relative increase was the largest for the male telecommuters, as is clear in table 4.

Table 3. Increase in household tasks during the telecommuting-day compared to days working in the office.

<table>
<thead>
<tr>
<th>Task</th>
<th>children from school</th>
<th>childcare</th>
<th>cooking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male telecommuter</td>
<td>7 x more</td>
<td>4,6 x more</td>
<td>2,4 x more</td>
</tr>
<tr>
<td>Female telecommuter</td>
<td>1,8 x more</td>
<td>2,3 x more</td>
<td>1,6 x more</td>
</tr>
</tbody>
</table>

Source: (Casimir 2001)

However, Casimir also concluded that in absolute terms women still spend more time on domestic tasks. In half of the households of male telecommuters the division of domestic labour changed towards more gender symmetry. In about 1/3 of household of female telecommuters the burden of domestic labour increased for these women.

Telecommuting thus is an ambivalent strategy for female workers. On the one hand it simplifies the combination of paid labour and domestic tasks, especially childcare. On the other hand, there is a severe danger that they are confronted with a heavier burden in domestic work. An interesting strategy for equalizing the division of domestic tasks, however, is to stimulate the telecommuting for male employees. Needless to say in this context, that telecommuting certainly is an opportunity that is in principle only available for a limited segment of the labour force - that is, only those employees who perform their main working tasks at a computer.

3.3 Discussions on the ‘digital divide’

Van Dijk et. al (2000) do not want to speak of a "digital divide", although they found significant differences in PC and Internet use among population groups. Their arguments are threefold. First, they argue that a "divide" supposes a barrier that is difficult to cross. As the differences are the largest for the newest ICT products (Internet), they expect that these will continue to diffuse rather rapidly. So differences in ownership will diminish. They expect that future differences will be more prominent on the level of ICT-skills. Second, they do not see the ownership of ICT products as necessary for all population groups nor instrumental for gaining income and status, e.g. the retired elderly do not move in the labour market. So the impact of non-ownership does not necessarily contribute that much to a “divide” in terms of equal opportunities. Their third argument is that in most situations there is an accessible alternative (e.g. phone, newspapers, TV). So they do not expect that non-owners of new ICT products will become excluded from society. However, they do remark that the maintenance of these traditional channels is important as long as social groups exist that do not possess or are not skilled enough to use the new ICT products. In this respect it is important to remark that this maintenance of traditional services is not obvious. On the contrary, there is a clear tendency that diverse organizations (e.g. government, banks, railway) aim to or are already realising the diminishing of traditional services in favour of electronic counters.

In their assessment of the development of ICT use in everyday life most authors are very positive. Van Dijk et al. (2000) conclude that ownership is the most important factor. Once ICT products are in one’s possession, according to them the difference in use and skills are relatively minor. However, they also emphasize that women, seniors and lower educated people use ICTs less and feel less competent, compared to men, youth and
the higher educated users. Despite the actual interests elderly show in acquiring a PC and Internet, half of this group report a fear that they are not able to keep up with the modern technological developments [Lammerts van Bueren, 2000 #53]. De Haan (2001) adheres to the diffusion hypotheses. He expects the lagging groups, especially the elderly, to follow the existing users based on the ‘logic of diffusion processes’ [Haan, 2001 #47:244]. The second argument De Haan uses is the generation perspective. This perspective presupposes that a generation sticks to their behaviours, attitudes and skills. Since younger generations possess and use computers more often, the problem of non-use will eventually ‘die out’.

Based on our previous analysis of patterns of use, the working of the above mentioned mechanisms can be seriously questioned. The optimism about the generation perspective is dimmed. The findings in table 1 show that these hypotheses would imply that in 30 years only half of females above 65 years will be included into ICT use. The ‘logic of diffusion’ presupposes a kind of universal benefit that construct the computer as a ‘commodity wanted by everybody’. The above analysis showed that the way computers are used is correlated with the specific groups, their activities and interests. If individuals cannot link computer use with their own daily practice in a positive way, there is no ‘logic’ for them to acquire and use computers. The substantial group of rejecters supports the thesis that this ‘logic’ does not work.

The review study of Brouns et al. (1999) on the social impact of new ICT aiming to support a new social policy on ICT, too criticise ‘logic’ of diffusion processes [Brouns, 1999 #15]. According to them, social policy should not confine itself to measures for vulnerable groups in the domain of the use situation, but should also be directed at the design- en developmental process of new ICTs. The authors adhere the mutual shaping perspective on society and ICT, implying that impacts of ICTs do not appear only in the phase of diffusion and use, but are already “pre-structured” in the phase of design and development (see also section 4.2). The study concludes that design practices as well as governmental policies are strongly dominated by an economic and technical discourse. Social and cultural perspectives lack both in design as well as in policy, and are in need of development.

Gender in the digital divide

The two Dutch review studies on gender and ICT assess their findings in different directions. In the first study, commissioned by the Department of Emancipation of the Ministry of Social Affairs, Frissen aimed to assess the impact of new ICT on gender relations [Frissen, 1999 #18]. In her study, she aims to balance between the doom scenario’s of ICTs – ICTs as toys for the boys - increasing the gender gap, and the optimistic scenario’s of the liberating and revolutionary potential of ICTs – ICTs as gender benders. She found that both in EU policies as well as in Dutch national policy gender hardly is an issue. Vice versa, emancipation policies tend to neglect ICT developments. The conclusions of report, however, are rather optimistically. Frissen assesses the under-representation of women on the Internet as a transitional stage, implying an adherence of the diffusion theory. Only specific vulnerable groups should be stimulated by special policy measures.

The conclusions Van Zoonen (2001a) draws in her recent study –mainly based on the anglo-saksian literature - are more shaded. According to her "big" stories on gender and ICT tend to diminish after 1995, probably due to the rise and diversification of the Internet. However, in the area’s of production, scripts and representation Information Technology is still male coded. Van Zoonen assesses IT as a constitutive element of the traditional gender relations. The literature on gender and Internet provides a more complex and diverse outcome. The Internet itself provides room for both traditional as well as feminist and experimental gender representations [Zoonen, 2001 #6].
4. Gender and ICT production

4.1 ICT education and ICT professions

As in most western countries ICT education and ICT professions in the Netherlands are marked by a strong and persistent under-representation of women. The entrance of girls into technically oriented computer science studies has been limited in the last decade to 3-5%. More interdisciplinary studies such as Business Information Systems attracts somewhat more girls, but with 15% here too the limit seems to have been reached. The ICT professions show, not surprisingly, similar gender patterns. In 1998 only 11% of the ICT workers were female; 9% of system analysts and 13% of programmers (Brekel, Klaveren et al. 1999).

A study commissioned by one of the largest Dutch unions (FNV) examined the reasons why so few women are employed in the ICT sector (Brekel, Klaveren et al. 1999). This study reviewed the current position of women in the ICT labour market and evaluated twelve ICT companies on their female-friendliness. They analysed the Collective Labour Agreements (CLA’s), the recruitment campaigns, and affirmative action programs. The research concluded that the barriers they found in the international literature (long working hours, much over-time working, technical and nerdy image) were applicable for the Dutch ICT sector. Working part-time still has a negative impact on careers (Brekel, et al. 1999:7). Women too had stereotypical images of the ICT sector, including ideas such as: a technical world, associated with mathematics; a world of fast guys, nerds, etc; status is important; long working days, high workload; no possibilities for part-time work; difficult to reconcile work and private life; necessity to constantly prove yourself; and, when seconded, you have to invest in new surroundings over and over again. The recruitment campaigns mirrored these images in the eyes of many women.

The Netherlands has a dual system of worker representation: trade unions and work councils. Most ICT companies had no structures for embedding workers’ interests. Only 8 out of the 12 ICT companies had a CLA (Central Labor Agreement) and most companies lacked a work council where workers’ interests can be negotiated. About 50% of the companies had facilities for childcare and part time work. Paid parental leave was absent in most companies. Only 3 out of the 12 companies had some kind of policy regarding female employees. These companies, however, did not have a larger percentage of female ICT workers.

Types of skills demanded in advertisements for ICT professionals are biased towards male skills, although the female communication skills also scored highly: technical skills were mentioned in 86% of the advertisements, communicative skills in 64%, executive skills in 15% and organisational skills only in 5% (Brekel, Klaveren et al. 1999:28-30).

We can conclude that the ICT sector still has all the features of a male profession, in terms of the division of labour as well as the work culture. The dominance of masculine values and practices is seen as the most important reason for the lack of women in ICT education and ICT professions. (Oost, 1994, Zoonen 2001a). Many researchers have concluded that the persistent under-representation of women in ICT education and ICT professions is a serious point of concern (Frissen 1999, Zoonen 2001, Brouns et al. 1999). Measures to make these professions more attractive for women should have high priority. However, the realisation will not be easy as this will require a fundamental restructuring of educational curricula and work practices towards meeting the interests of girls and women.

4.2 Gender scripts in ICT design

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1 These numbers are based on the situation at the University of Twente.
Quite often, designers implicitly or explicitly have male users or male use patterns in their mind when designing, resulting in a gender-bias in design. They design applications based on their own preferences, interests and skills, that is those of young, well-educated white men, although they explicitly claim to design for “everybody” (Rommes et.al. 1999, Freudenthal 1999, (Zoonen 2001a, Rommes 2002, Oudshoorn et al. forthcoming). As such it is argued that many ICTs (and other technical artefacts too) carry a ‘script’. A script of a technology is defined as the assumptions about the envisioned user and the use-context that are materialized in the shape of the technology. Designers inscribe their -often unconscious – visions of the future users into the technology. As most designer are male, these scripts often are biased towards masculine oriented values and attitudes. In this case, one can speak of a ‘genrescript’ (Oost 1995, Oudshoorn 1996, Rommes 2002). The concept of genrescripts enable us to see technologies not as neutral but as active agents, influencing processes of attribution and actual situations of use, non use or partial use. It actively portrays design and use of technologies as closely linked. Problems or changes in the use context can only be solved in a satisfactory and complete way by including a critical assessment of the design activities.

Van Zoonen (2001) expects that the commercialisation of the Internet will lead to more diverse scripts and user images, to meet the variation in demands, use patterns, etc., of the diverse target groups. However, Rommes (2002) has shown that neither commercialisation nor the presence of women in the design process are sufficient conditions to avoid masculine genrescripts. A more fundamental integration of awareness of user diversity in the design practices as well as the actual involvement of concrete, diverse users in the early phases of design is needed.

5. Gender in the Information Society: conclusions and reflections

5.1 Gender patterns in ICT use and production

The review of statistics has illuminated systematic gendered patterns of computer/Internet ownership and use. On the one hand the data showed a rapid growth in the possession and use of computers and the Internet, both for men and women in all age groups. On the other hand, one can conclude that there still is a persistent gender gap in computer use, especially for those aged over 35. The non-use among women is systematically significant higher than the non-use among men, even among those with access to a computer at home. This outcome also teaches us that one has to be careful with using data on PC- and Internet access as indication for the actual integration of these technologies in daily activities, as the underlying gendered pattern of use remains invisible. Next to gender, also age, educational level and ethnicity are relevant dimensions of differences. Unfortunately, most publicized statistics do not provide insight into the crossings of these dimensions, e.g. illuminate ICT use by older, ethnic women. This lack of focus on diversity may hamper adequate inclusion strategies.

Gender differences in computer use in educational and labour contexts are much less articulated than in daily life. Although there is a persistent gender segregation of jobs, this does not imply significant structural differences between male and female workers in computer and Internet access and use. The same applies for the access and use of computers in the educational setting.

There is a persistently strong under-representation of women in ICT education and production. Computer science university studies attracts very few girls. Information campaigns directed at girls had no impact on weakening the masculine image of these studies. In the ICT sector most organizations have a masculine professional culture, implying male norms (long working days, high workload) that make the ICT professions unattractive to women. Organizations also had little interest in developing facilities to meet the specific needs and wishes of female employees.
5.2 Enabling and constraining factors for inclusion

The translation of statistical differences towards the problem of a potential ‘digital divide’, or - in other words - the problem of exclusion from the Information Society, is not an easy one to make. How to assess diversity in use-patterns, how to assess non-use? There are no simple answers to these questions. Are housewives “lagging behind” when only 57% use word-processing applications? Or do we understand this as a phenomenon resulting from the specific activities of housewives that hardly ask for written text? Here too, shortcomings of statistics become clear. First, they no not take the context in which the use of ICT becomes meaningful (or not) into account. Reasons for non-use of little use among specific groups cannot be adequately explained by a ‘lack’ of access, knowledge or skills. These groups might very well assess the usefulness of ICT different from their specific situation. Second, statistics strongly support the inclination to create norms. Statistical differences are used to show a ‘gap’, to identify groups that are lagging behind, groups that are labelled as ‘vulnerable’. This implies that the behaviour and activities of groups that score high – in this case consistently the young, white, highly educated males – are taken as norm. The current uncritical adherence to the diffusion theory among Dutch policy oriented researchers (cf. Van Dijk 2000, de Haan & Huysmans 2002) may support this implicit reinforcement of dominant masculine norms. In this way gender inequality will be constructed rather than deconstructed.

Clearly, ICT too have the potential of demolishing barriers for changing traditional gender relations as the section of telecommuting has shown. However, it is important that complex processes by which gender and ICTs are mutually constituted, are unravelled. In Dutch society today, ICTs still are too often linked with masculine/male domain at a symbolic, structural and individual level. Policies and activities that positively connect ICTs with the female/ feminine domains needs to be located and stimulated.

5.3 Locations of inclusion strategies

Inclusion strategies have to reflect critically on the question “in what society do we want to include?” They must not be based on activities of ‘early adopters’, but should take account of and do justice to the diversity in users’ situations. Therefore, it seems to be important to gain more knowledge about the actual practice of ICT-use, the way different people do (not) integrate computer use into their own lives. What reasons are important for individuals to decide to perform inclusion work, that is to invest money (for the purchase), time and energy in acquiring skills? In one of the few Dutch studies on domestication processes of Internet applications, Rommes (2002) found that the perceived usefulness, benefit and expected gains in terms of pleasure were important elements in the deliberations of people to decide to invest money, time and energy in Internet use. This, however, was not a matter only of individual characteristics. Rommes (2002) highlighted that the way interfaces and content were designed also formed an important reason in deciding to stop performing inclusion work. Design thus is an important location for inclusion strategies. Taking into account the diversity of user groups and the diverse situations of use, should be considered as a crucial aspect to include women in ICTs.

It is also relevant to acknowledge that the concept of the ‘Information Society’ does not imply an exclusive focus on digital ICTs only as a mean of communication and information (cf. Friissen 1999 and Van Zoonen 2001a). The solution for ‘vulnerable’ social groups asks for multiform means. When multiformity is and remains a starting point for designing in the information society, exclusion of specific groups is much less likely to occur.

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