

Gender in the Design of the Digital City of Amsterdam

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1. Introduction

On 15 January 1994, Amsterdam's alderman De Grave officially opened the virtual city gates of 'De Digitale Stad' (DDS) by sending an e-mail to Al Gore, who was vice-president of the USA at the time. Although DDS was to be an experiment of ten weeks, the publicity it generated, and the interest it aroused, was overwhelming. Within one week this new city comprised more than 3,500 residents and drew more than 2,000 visitors a day (NN 1994). In Amsterdam, modems were sold out within a few days, and the initial twenty modem lines providing access to DDS had to be doubled in order to cope with the queue outside the virtual city gates.

DDS was built in order to stimulate political discussion in Amsterdam and to make the relatively new Internet technology available to a wider public. To make DDS easier to use, it was built as a virtual analog to an actual city. Thus, for example, after passing the city gates, you had to go to the post office to send or receive electronic mail; in a kiosk you could read electronic newspapers; from the central station you could start your worldwide Internet trip; and the town hall provided citizens with information on local politics. Beyond making information available, DDS provided discussion platforms on various political issues. To improve the accessibility of DDS, free e-mail accounts and Internet access were offered. Moreover, several public terminals were installed in publically accessible locations in Amsterdam. One was even located in an old people's home, thus emphasizing the initiators' ideal of 'access for all.'

Despite the policy of accessibility, the residents of DDS were by no means representative of the population of Amsterdam. A survey of DDS users carried out in April 1994 (Schalken and Tops 1994) revealed that the city was primarily 'inhabited' by young, highly educated people of whom only 9% were femaleⁱ. Thus, although DDS was successful in attracting participants with no prior experience of using computer networks (33 per cent had no or little experience), it failed to attract a population which is more diverse than the traditional group of Internet users. This phenomenon of the lopsided resident group was known to the organizers of DDS. It was, however – especially with regard to gender – not defined as an urgent problem.

DDS was the first community network in the Netherlands, and one of the first in Europe (Bastelaer 1998). It set an example for many other digital cities and organizations of which there are

now hundreds in the Netherlands. A gender analysis of this pioneering project may thus reveal some of the roots of the gendered character that is still reflected in many of these kinds of Internet applications. Moreover, many (Rheingold 1993; Castells 1996) expect the Internet, or its successor, to become one of the most – if not the most – important technologies for future communication and information retrieval. Given this, means of avoiding the exclusion of specific social groups becomes a crucial social issue. In discussing these inequalities, the gender dimension is often considered to be less important than factors such as age, ethnicity, or social status (Brouns 1998). In this article we want to put gender in the limelight again.

Research and policy concerning the underrepresentation of women as designers and users of new information technologies often focus particularly on the so-called deficiencies of women (Henwood 1993). Policies for change are thus restricted to educating women to fit the requirements of the technology, rather than designing the technology in such a way as to encourage a diversity of users. We want to reformulate the problem by exploring the extent to which the underrepresentation of women users can be understood in terms of technological choices made in the design of this technology. We aim to deconstruct the ‘black box’ⁱⁱ of DDS and analyze how gender has influenced both the design process, as well as the actual design that emerged. To do this, we draw on studies of technological development recently introduced by scholars in social and feminist studies of science and technology.

In the theoretical section, Akrich’s concept of a script and the multi-level theory of gender will be conceptualised and explained. These form the theoretical basis of this article. Following the multi-level theory, the empirical section will start by describing gender at the structural level of the organization of DDS, and in terms of the identity of its founders and developers. In the next part of the empirical section, gender will be examined at a symbolic level, within a context of the goals and content of DDS. Following on from this, we will focus on the interface of DDS. Although the designers tried to develop a system for everybody, many of their design-choices were gender biased because they used themselves as exemplary of the users. We finish the article with some concluding remarks.

2. Theoretical perspectives on gender and technology

The British sociologist Flis Henwood distinguishes between two ways of looking at the problem of gender and Information Technology (Henwood 1993). First, there is a liberal perspective, which focuses on women's exclusion from technology and seeks solutions in equal opportunity policies. Second, Henwood analyzes the gendered constructions of skills and power in relation to technology. Here the nature of technological work is analyzed. We distinguish a third position, one involving the social construction of the technology itself.

Social constructivist theories of technology reject the positivistic notion that technological objects have intrinsic properties. In this view, technology is seen not as autonomous from society, but as the product of social, political, and cultural negotiations among innovators, policymakers, and social groups. (Pinch and Bijker 1987; Bijker 1995). Although most attention has been focused on the role of innovators in the construction of technological objects, recent social studies of technology also include analyses of the role of users in technological development.

Traditionally, users have been regarded as important actors in the diffusion and acceptance of new technologies (Von Hippel 1976 and 1988). More recently within the sociology of science and technology, attention has shifted away from the analysis of users in the sociological sense (i.e. as identifiable persons involved in the diffusion of technologies) towards users in the semiotic sense (as imagined by the designers of a technology). As Madeleine Akrich has suggested, 'innovators are from the very start constantly interested in their future users. They construct many different representations of these users, and objectify these representations in technological choices' (Akrich 1995:168). As a result, technologies contain scripts: they attribute and delegate specific competences, actions, and responsibilities to their envisioned users. When these scripts reveal a gendered pattern, we can call them gender scripts (Oost 1995; Oudshoorn 1996).

The concept of 'script' is an important tool in analyzing the politics of technological objects. A script analysis enables us to understand how technologies play a role either in normalizing behavior, or in (re)allocating responsibilities and dependencies among people and between people and things. Scripts may also contribute to the exclusion of specific users if, for example, the designers' image of users represents only a selective set of competences, interests, attitudes, and values. Given the

heterogeneity of users, designers will, consciously or unconsciously, privilege certain representations of users and use over others. Studies of the development of information technologies, for example, indicate that design practices are dominated by the so-called 'I-methodology' in which innovators consider their own preferences and skills to be representative of those of the future user (Akrich 1995; Oudshoorn 1996). Technological objects become attuned to the interests and skills of young, middle-class men, rather than women or other groups underrepresented in the world of technology. The concepts of 'user representation' and 'gender script' thus appear to be useful tools for analyzing the extent to which the problem of underrepresentation of women as Internet users can be understood as a mismatch between the designers' image of users and the actual users.

Gender analysis

To understand whether and how technologies embody gender scripts, we will undertake a gender analysis of the design process of DDS. Adopting Sandra Harding's multi-level theory of gender, we will take into account gender processes at the structural, the symbolic, and the identity level (Harding 1986). The gender structure of DDS will be analyzed by mapping the gendered division of tasks and the delegation of responsibilities among designers and policy makers. Unlike many other design communities in the world of Internet, DDS involved designers of both sexes. This enables us to explore the extent to which women designers are committed to a different design style than their male colleagues, and particularly whether they are more likely to acknowledge the diversity in the interests and needs of female and male users. Feminist studies of technology have emphasized that in addition to gender structures, gender symbolism is important in making technologies a male domain. Technologies have a masculine image, not only because they are dominated by men, but because they incorporate symbols, metaphors, and values which have masculine connotations (Wajczman 1991). As Pacey suggests, technologies often represent a specific set of values. Thus some may prioritize the values of virtuosity, () and others may emphasize user or need values. Whereas the latter are linked to hegemonic feminine values, the former express hegemonic masculine values (Pacey 1983). High-tech areas such as space technologies, for example, emphasize the power of mankind to control the universe, thus creating and reinforcing the image of technology as a world of virtuosity. In contrast, technologies that are developed to improve the living conditions of the elderly may stress

care and user-friendliness as their main values. Adopting Pacey's framework of gender symbolism will help us to determine which values are dominant in both the designers' documents, as well as some media reports about DDS.

Finally, we try to map the gender dimensions of the technology's design by analyzing the gender identities of the designers and users of DDS. We will examine the designers' attitudes, interests, and learning styles regarding technology. Using Cockburn and Ormrod's distinction between projected identities ('potential, actual, or desired gender identities as others perceive or portray them') and subjective identities ('the gendered sense of self, the identity, created and experienced by the individual'), we will also focus on the projected identities of users by analyzing the designers' representations of them (Cockburn and Ormrod 1993).

3. The social shaping of DDS

'It is not a linear process – like there is money, there is a plan, consequently there is a project plan, a project manager, and that person decides how it should work functionally and goes to another person and that person builds it. It was not like that. We got drunk every night in the Winston, so to speak, and then the plan got adjusted.' (Interview Flint 1998b: 1)

This quotation by one of the founders of DDS is characteristic of the way in which the project got started. The organization of DDS was very informal, and the enthusiasm, idealism, and personal initiative of the contributors were indispensable for its survival. The organizational structure can be characterized as a network-organization (Krogt and Vroom 1989: 122, 123). Diverse organizations and private persons connected with parts of the project on the basis of their own private goals, knowledge, and interests, thus helping to shape the project. However, the 'ordinary citizens' for whom DDS was designed were not a part of the network.

In the following paragraphs we describe in greater detail the mutual development of the organization and design of DDS. We analyze how the interests and goals of the participating social groups were reflected both in the design process and in the actual design of DDS. This process resulted in a script that implicitly attracted users whose socio-cultural attitudes were similar to those of the initiators. DDS is a project reflecting very high ideals, such as the realization of a '*non-hierarchical space for everybody*' (Van Meerten 1993: 2). Nevertheless, we are left with an image of an organization in which personal goals and style unconsciously resulted in design choices which ran counter to these idealistic goals.

The birth of the concept of DDS

In the spring of 1993, Marleen Stikker helped to organise a series of debates about the cultural boycott of Yugoslavia in 'De Balie', an important political and cultural center ⁱⁱⁱ in Amsterdam. . During this project Stikker, who has vast experience in the field of new media, art, and politics, became aware of the importance of electronic mail as a means of communication for people in war-zones^{iv}. As a consequence She became involved in the Internet, and especially in Freenets where she did not, however, feel at home, meeting 'boys, mostly science students': '*They were not my kind of people, so to speak, and they weren't discussing my issues*' (interview Stikker 1998a: 4). Stikker became convinced that the Internet could be made more attractive to 'her kind of people', and that the arts and politics could play a bigger role . So in April 1993 she started a new Balie project.

Inspired by the metaphor of the 'digital town hall,' which was being promoted at that time by the American Presidential candidate Ross Perot, Stikker started formulating a plan. The metaphor was appealing because it combined computer networks with politics. This perspective was not only of interest to De Balie but also to the City Council of Amsterdam whom she had approached with her ideas. Local elections had been scheduled to take place in March 1994, and the City Council was extremely interested in new ideas to stimulate the involvement of citizens in local politics as the number of voters had reached rock bottom during the previous elections. The City Council thus subsidized De Balie for the DDS project, which was then defined as a ten-week project organized around the elections of 2 March 1994 (Van Meerten 1993: 1).

As a 'political tool' aimed at stimulating democracy, DDS had to be for everybody. In the project proposal the initiators promised that 'access will be extremely public-friendly, so that computer illiterates can participate too' (Van Meerten 1993: 2). Indeed, as we shall see, the initiators put a great deal of effort into achieving this goal. They had, however, underestimated the fact that the computer was already a strongly gender-biased machine in our society (van Oost 1994; Brosnan 1998). Moreover, in the process of developing DDS, choices were made that resulted in a masculine-oriented gender script.

Organizing DDS: who did it?

Stikker gathered a group of about thirty volunteers to help shape her ideas. She used her own network consisting of artists, graphic designers, and people working on media-projects, of whom very few had experience with Internet. Some were asked to moderate discussion-groups, or to provide information or art for the content of DDS. Most of them were involved in the so-called 'City-plan group' comprising four women and about fifteen men. In brainstorming sessions, this group helped to develop metaphors and a new language to replace traditional technical computer terms. By providing them with a space for their ideas, initiatives, and ideals, their enthusiastic contribution was ensured. As such, the individual backgrounds, personal goals and motivations of the workers were important factors in shaping the project.

This was particularly true for the core-group of three people who decided whether the ideas of the City-plan group could be programmed. This group included Stikker, who remained the project leader, Joost Flint, who wrote most of the policy documents and a user's manual, and Félipe Rodriguez, who together with Stikker did most of the programming work. Although Stikker herself was fascinated by the potential of the new technology, she lacked the skills to implement the technological part of the project on her own. This core-group spent more or less day and night discussing and creating DDS.

Rodriguez was a member of a group of four male hackers working together under the name of 'HackTic-Network'. Based on their ideal of free access to information for everyone, the hackers were the first group in the Netherlands to create an Internet connection for private persons, naming their computer 'XS4ALL' (pronounced as 'access for all'). As passionate idealists, the founders of the

HackTic-Network were easily convinced to take part in DDS. They were responsible for hardware and for system management. Their contribution to the project was so vital that DDS was called a 'joint project of De Balie and HackTic-Network'.

Rodriguez, who was the main participating hacker, described his motives for joining DDS as follows:

'DDS was a way to prove what is possible with the Internet, with that technology. And also an attempt to make it accessible. (...) XS4ALL was terribly complicated. A prompt was given, and from then on, the users had to do it themselves. (...) I was at that time striving to introduce the Internet, to make it bigger, to show all those people who did not understand me what it really was about.'

(interview Rodriguez 1998: 6). Thus, his personal goals^v in joining DDS were twofold: a fascination with what is technologically possible, and a desire to make the Internet more accessible. In addition Rodriguez was interested in the political potential of the Internet.

Joost Flint was the third person to join the core-group. Flint, who is the present director of DDS, had been a volunteer with HackTic for a few weeks when he heard about the project. He had been active as a journalist and writer, so he joined in order to write the user's manual.

An informal organization

Strikingly, none of the core-group's members had any form of computer-related education. Stikker studied philosophy, Flint had taken courses in political science, and Rodriguez, DDS's main programmer, had managed a restaurant. Although he calls himself a computer-nerd who has played with computers since childhood, he explicitly stated, 'I am not a programmer, just someone who understands computers.' This lack of a computer-related education may have contributed to the informal way in which the interface was built, as well as to the lack of a systematic users' profile. However, the informal style also facilitated the inspired, enthusiastic, creative and often chaotic process which was characteristic of this phase of the project. Time pressures intensified this specific character: *'It was such a huge chaos. (...) The week before DDS was opened, we moved to a new office (...) there was no light, no doors, the ceiling was just installed, no heating. We had to sleep alongside the computers, with a gas-heater, and we had to borrow power from the neighbors'* (interview Rodriguez 1998: 15).

The recruitment of journalists, graphic designers, and people from non-profit organizations by Stikker seems to have been one of the more successful ways of gathering together a diverse group of designers. This personal networking did attract women to the project, most of whom are still very active in computer networks. Nevertheless, looking at the gendered division of labour within DDS, women were mostly found in creative, assisting and policy-making positions, whereas male hackers dominated the programming tasks. Moreover, Stikker's network was biased towards people who were already interested in computers and their new possibilities - these were mostly men. And because she was not personally interested in women's issues, she did not specifically recruit women to correct this imbalance. In this respect, DDS became gendered at the structural level.

As an informal network organization, DDS had many faces. As various groups - including the City of Amsterdam, the HackTic-network, and individuals with diverse backgrounds - were drawn into the project, the identity and goals of DDS came to reflect this diversity. Organizations and private persons could find their own points of interest in the project, thus making it worthwhile for them to help build or subsidize it. In this way the project remained viable. Notwithstanding this diversity, all the people involved in the design process shared a fascination with new information technology. A fascination which got reflected in the design of DDS because of the informal and chaotic character of the organization (Francissen and Brants 1998: 35).

Goals and content of DDS

It is commonly believed that for women to adopt a new technology, its usefulness must be of particular relevance to them (see e.g. Boomen 1996: 10). Despite this, the founders did not give much thought to the question of why users would want to use DDS. Because of the network and voluntary character of the organisation, they designed DDS mainly according to their own preferred goals. As described in the previous sections, the designers shared a fascination with new technologies and an interest in politics. These interests were reflected in the two main goals of DDS presented to the public in policy documents, the user's manual and the press^{vi}. They can be labeled as technological goals, reflecting virtuosity values and political ideals. We will argue that neither the goals nor the content reflecting them are gender-neutral.

With regard to the first goal, DDS was seen as a way of introducing people to the Internet with all its potential for communication and information. The designers of DDS wanted to introduce the possibilities of data-communication to users; they wanted them to use the technology for the sake of technology itself. What the users themselves would want was not a consideration:

'What users themselves want? (laughing) Well...(...) the system of course was not built because people wanted it so badly; the system is built because we thought that a social function was connected with it, because we thought the Internet was important, that it needed to be introduced, and to show all that is possible with technology (...). These people had to get free e-mail to discover the rest [of the Internet]' (interview Rodriguez 1998: 30).

In the user's manual and newspaper articles, this technological goal was linked to travelling around the world, to excitement and adventure. With regard to technology, these kinds of values have been described as 'virtuosity' values. Like designing technology for its own sake, virtuosity values are connected with hegemonic masculinity in our society (Wajcman 1991; Connell 1987; Pacey 1983).

The second dominant goal of DDS was to stimulate political involvement amongst the citizens of Amsterdam. Given that politics in the Netherlands is more often practiced by men than by women^{vii}, this probably served to attract more men than women to DDS. Political issues discussed in DDS included urban city planning, the expansion of Schiphol Airport, ICT in society, and racial discrimination. Given that these topics have either a gender-neutral or a masculine connotation in our society, they strengthened the gendered nature of DDS^{viii}. The latter was further strengthened by the format of political discussions. Shade (1993) and Herring (1993, 1994) argue that the discussion style on mailing lists, which are comparable with the discussion-platforms in DDS, is generally more attractive to masculine users than to feminine users^{ix}. The presence of female moderators in DDS did not change this bias^x. As one of the female moderators explained, she changed her moderating style quickly to adopt existing Internet-conventions (Interview Boomen, p.10).

In light of the main reasons presented to potential users for using DDS, it was, overall, more attractive to male users. Nevertheless, for both goals - introducing the Internet and creating a political platform - the accessibility of DDS 'to everyone' was of vital importance. Thus the accessibility and user-friendliness of the interface will be discussed from a gender-perspective.

Designing the accessibility of the hardware

The designers of DDS paid close attention to the accessibility of the hardware and the usability of the DDS software. To begin with, we discuss the way in which the designers tried to overcome the societal bias determining who has access to computers. Secondly, we consider the design of the interface itself: what kind of choices were made, and in what way was the interface gendered?

One of the most important ways in which access to DDS could be obtained, was by using a PC and a modem with a phone line to DDS.. The installment of a modem was described as a difficult job even by the designers. Because the founders of DDS knew that not everyone had access to a PC and modem or the money to buy one, public terminals were installed. This plan was inspired by the Freenets in America, a project which had even succeeded in attracting homeless people to public terminals (Varley 1991, Rogers 1994). There was, and still is, a gender-bias in the distribution of computers, in who possesses computers. The majority of computer owners are men, making it easier for them to obtain access to DDS. Thus, it seems reasonable to assume that public terminals help to compensate for this inequality. Figures in Santa Monica do, however, not support this thesis (Rogers 1994: 407; Collins-Jarvis 1993: 61). No research has been done on the usage of DDS terminals by men and women^{xi}. Designers, however, stated that the typical public terminal user was a twenty year old male (Diemen 1998: 6).

Designing the interface

The DDS designers tried to build an interface that would be easy to use. To do this, several decisions were made. First, they chose to use FreePort software. FreePort was developed for Freenets in the US. It is a user-friendly menu-based program which allows users to navigate by selecting options from a menu (see figure). By choosing options, the user finally ends up with the required information or software, e.g. the e-mail program. To further enhance easy usage of DDS, the city-metaphor, which can also be found in the original FreePort software (Stallings 1996), was used far more consequently. In this way, a lot of technical language was avoided. Moreover, the decision was taken to translate most of the software into Dutch. However, due to a shortage of time, the command-keys were not changed. As can be seen in the figure below, showing a later version of the interface, the following

options were offered at the bottom of the screen: X=Exit; h=Main menu; v=Previous Menu, Choice ?. In DDS's original interface , which is no longer available on-line, the main menu contained the following (Flint 1994: III-2): 1 HELP; 2 The Postoffice; 3 Public Forum; 4 The Library; 5 Building for Art and Culture; 6 Town Hall; 7 Office District; 8 A Plaza; 9 Central Station; 10 Configuration Centre.

Figure 1

Apart from user-friendliness, there were other reasons for choosing the FreePort software. The sourcecode^{xiii} of this software was available, which made it easier for the designers to make changes to the original program. This was exactly what the founders wanted to do: partly because of what they themselves called the 'not invented here syndrome,' they wanted to leave their own mark on the program. They also wanted to offer users more functionalities than the original FreePort software allowed for. There was almost no discussion of this decision. The founders of DDS wanted to offer users all the functionalities of the Internet, not just an 'amputated' version (interview Stikker, 1998b: 7). This meant that Rodriguez integrated about six different software packages into the FreePort software. This made the interface far more complicated to use, since the functions of the keys varied as the user shifted between programs.

At the same time, the program did not start with the possibility of consulting a help menu. So users were expected to know how menus and tree structures work. This indicates that DDS was actually meant for more experienced computer users. But it also means that one particular learning-style was supported by DDS, one which all the designers of DDS shared:

'You have to keep things exciting; discovering is important. This has to do with the way in which I discovered the Internet and all its possibilities, you discover more and more, and that is fascinating. So you will have to let people discover things; that is fun' (interview Rodriguez 1998: 27, 28).

Thus, users were expected to find their way around DDS by *trial and error*. For this style of learning, one has to feel at ease with computers, and be self-confident enough to just try out things. As Turkle has shown, in our society this particular style of learning how to use technology and computers, is more often found amongst boys than girls (Turkle 1991: 48, 49).

Designing for everybody?

To assist with the use of the software, DDS opened a telephonic help desk and a user's manual was written. However, it was distributed only in Amsterdam. It was an apparent success, with its author - Joost Flint – estimating that about 2000 copies were sold. People came from all over The Netherlands to buy one. Flint wrote it using the I-methodology: *'it is very much written from my own experience. So I learned it myself and then wrote it down.'* (interview Flint 1998a: 13)

When reading the manual, one thing stands out. During the design process, the designers must have realized that in spite of their attempts to make DDS more user-friendly, it was still too complicated for 'computer-illiterates.' In other words, DDS and the manual were made for people 'who have little experience with data communication' but who do have some experience with computers:

'Both XS4ALL as well as DDS are advanced systems. They offer very much and are therefore, at first sight, maybe not so simple as you would want them to be. You will, however, discover that all the basic actions are fairly easy to learn for anyone who has worked with a computer before' (Flint 1994: II-3).

Of course there is an important difference between offering DDS to 'everybody' and offering it only to 'everybody who has worked with a computer.' Given that, in Dutch society the percentage of men with computer experience exceeds that of women^{xiii}, the gender consequences of this perception of the intended user has been negative for women.

Somehow, during the design of the interface itself, the diversity of the users and the user-friendliness of the design were no longer the main focus of attention. Moreover, no conscious choices were made about the user-groups for which DDS was intended. The problem of this 'designing for everybody' is that the designers did not consider what kinds of skills, knowledge, or cognitive capabilities they expected the user to have (see also Lieshout 1998: 35). Again, it is understandable that the designers saw themselves as being typical users, and hence that the design practice of DDS was dominated by the I-methodology. The question of the user-friendliness of the system became less relevant as the designers developed a system according to their own preferences, technical

capabilities, and learning-style. And although not all designers were male, they were masculine in their use of, experience with and attitude towards technology, making the design of DDS more suited to masculine users.

4. Conclusions

In summary, we can conclude that DDS clearly embodies a gender-script. Our analysis shows the gendered nature of this technology at the structural, symbolic, and identity level. This is all the more remarkable given that the designers of DDS were very idealistic and wanted to design a system accessible to everyone.

At a structural level, DDS represents a gendered division of tasks. We have shown how the founders of DDS personally approached non-profit organizations and private persons to help them design the project. This resulted in a more diverse group of collaborators than is usually seen in this type of organization. Some of the women who were asked to join are still actively working with computers and the Internet. However, the founders of DDS could not totally overcome the already gendered character of society's interest in the new technology and computer networks. Most of the people whom they successfully approached were already more or less interested in computers, and consequently were mostly male, young, and highly educated. Moreover, the design process shows a traditional gendered division of tasks, where most of the programming activities were done by male hackers. And although the main founder of DDS is a woman, and the brainstorming group included several women, this mixed membership did not result in extra attention being devoted to the position of female users.

On the whole, the designers had a masculine attitude towards technology. As they did a lot of their work voluntarily and were encouraged to bring their own ideals into DDS, the prevalent user-representation technique came to be the 'I-methodology.' Designers made choices on the basis of what they themselves found attractive in the new technology. Thus, at the symbolic level, the design practices of DDS reflect a world in which using technology for excitement and adventure, and

designing it for its own sake emerged as dominant technological choices, reflecting the masculine attitude of the designers towards technology.

At the identity level, the designers were personally interested in politics, fascinated with all the new technical possibilities of computer networks, and endowed with a masculine learning-style. This masculine identity was reflected in their representation of users, and thus in the technology they designed. This is remarkable given that, at a conscious level, the designers of DDS were very idealistic and took great pains to make their design user-friendly for everybody. They made the hardware more accessible by choosing user-friendly software which was translated into Dutch, by integrating the metaphor of a city, and by installing a help desk and writing a manual to support users. On the other hand, they prioritized a masculine learning-style and made the software more complicated by adding other software-packages with more functionalities. As a result, the initial DDS policy of making the digital city maximally accessible to everybody was transformed into one of making a technology for 'everybody who has worked with a computer,' a user representation that more readily accommodates male than female users. We thus may conclude that the DDS can be portrayed as a technology that incorporates a clear gender-script.

All in all, the fact that the DDS embodies a gender-script is not the result of conscious choices. On the contrary, our analysis of the organization of DDS shows that the ideal of making Internet technology accessible to everyone was at the heart of the project. The gender-script of DDS could, however, emerge in a design practice in which the designers took their own skills and interests as guides in making technological choices.

Acknowledgements:

We would like to thank Marleen Stikker, Joost Flint, Félipe Rodriguez, Reineke van Meerten, Michaël van Eeden, Marianne van den Boomen, Rob Gonggrijp and Nina Meiloff for their kind help and the opportunity they gave us to interview them. Moreover, we would like to thank the two anonymous referees of this journal for their useful comments on a previous version of this paper.

ⁱ American FreeNet Communities did slightly better, with for e.g. 18% female users in the Canadian National Capital FreeNet and 17% female users in Cleveland FreeNet, as opposed to the World-Wide Web's 10 % of female users (Patrick 1997). Santa Monica's Public Electronic Networking system (PEN) had 30% women registered as users after it was initiated (Collins-Jarvis 1993).

ⁱⁱ The notion of “opening the black box” of technology is rooted in the field of sociology of technology. During the last two decades a new social constructivist perspective on technology has been developed (Bijker, Hughes and Pinch, 1987). Scholars in this tradition analyse technology as the result of a social process in which different involved actor groups interact and give meaning to the technology.

ⁱⁱⁱ De Balie is a center for politics and society, arts and technology. Its’ ‘programme makers’, such as Marleen Stikker, are encouraged to develop experiments on the tangent planes between theatre and discussion, technology and art, politics and society.

^{iv} Earlier, Stikker had generally been interested in the potentials of new Information technology, but had no interest in the Internet because – as she put it – there was no one with whom she would want to communicate on the Internet (interview Stikker 1998a: 3).

^v These two goals are part of the hackers’ ideology (Håpnes and Sørensen 1993).

^{vi} Press-reviews show that four major newspapers in Holland devoted five articles to the opening of DDS. About 100 lines were written about using DDS for political purposes, 80 lines related virtuosity values to DDS (such as excitement and travel around the world), and about 50 lines were written about using DDS for information and communication in general (van Jole 15-1-94; Bosman 15-1-94; *Trouw* 15-1-94; *der Nederlanden* 15-1-94; *Limburg* 17-1-94).

^{vii} In 1994, only 34% of the members of national Parliament were female. The political participation of women is considerably lower than the participation by men, specifically as far as contacting politicians and dealing with societal issues are concerned. These kinds of participation by women have not increased between 1974 and 1979 (Elsinga 1985: 154-155).

^{viii} A few weeks after the opening of DDS, a female user took the initiative to ask for a discussion-platform for women: DDS.femail. After DDS was opened, female users became active in creating spaces for women. This phenomenon was also noted in Santa Monica’s PEN System (Collins-Jarvis 1993) and will be discussed in a paper to be presented in the fall of 1999.

^{ix} Shade and Herring argue that ‘flame wars,’ heated arguments which tend to appear on such discussion lists, are particularly unattractive to women. Moreover, a more masculine style of discussion generally seems to be facilitated by the mailing lists’ software, which makes it easy to ‘cut and paste’ in messages from other contributors. An extensive discussion about masculine and feminine styles of discussion on mailing lists, and how these are encouraged or discouraged, is beyond the scope of this article.

^x Research conducted in 1995 indeed showed that less than 2% of the contributions to a political Internet discussion were made by women (Ministerie Binnenlandse Zaken 1995).

^{xi} Moreover, because these terminals kept breaking down and were consequently very expensive to maintain, they were removed in the course of the first year and a half of DDS’s existence.

^{xii} The sourcecode of software is the original programming in the programming language in which it was written. Having access to the sourcecode means that the programmer is able to rewrite the original program.

^{xiii} E.g. the percentage of women studying and working in the field of Computer Science in the Netherlands is, compared to other Western countries, one of the lowest. In the nineties the enrollment of women in engineering studies of computer science did not exceed 5%. Business oriented IT-studies attracted only 15-20% female students (Van Oost, 1994).

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Figure 1: The lay-out of a second version of the interface of DDS (<http://www.dds.nl/archeo/selectie/index.html>, (2 February 1999)).