International Journal of Gender, Science and Technology
http://genderandset.open.ac.uk

"That Mystic Device Only Women Can Use" - Ascribing Gender to Domestic Technologies

Inari Anna Aaltojärvi

University of Tampere, School of Management

ABSTRACT
In a world full of technologies, it is important to examine how these material objects become a part of our everyday lives. This article addresses the issue of gender and material culture by contemplating how the social category of gender is employed when giving meanings to domestic technologies. More precisely, it asks *what kind of gendered identities people ascribe to domestic technologies and how these gender divisions are constituted*. First, I introduce the theoretical concepts of technology, gender, script, and material culture, which are followed by a description of the data consisting of an Internet survey of 405 respondents. The analytical section begins with an overview of quantitative statistics. Subsequently, I analyse how people ascribe gender to technical objects and how these meanings are constructed with three types of thematic discourses: expertise, appearance and sound, and routine activities. It will be deduced that gender is not enough to fully understand domestic appliances as age and other social aspects intersect with gender. Further, no gadget is given gendered meaning in isolation but it is understood in a wider and evolving context of other technologies and surrounding culture.

KEYWORDS
domestic technology, material culture, gender, script

"That Mystic Device Only Women Can Use" - Ascribing Gender to Domestic Technologies

INTRODUCTION

In an age of increasing numbers of technical artefacts in the home, it is important to study what kinds of roles these mundane gadgets play in our everyday lives, and especially how the rich array of relationships between them and people can be understood in domestic environments.

The connection between gender and technology, particularly the overall masculinity of technology within academic fields, technology design and work places, has been widely noted in feminist technology studies. As important as these studies are, however, they have not thoroughly elaborated *why* and *how* technical devices in *domestic* realms are perceived as gendered *by the users*. Furthermore, material culture studies focusing on such questions as how people interact with material objects and how these material objects are given meanings, have not addressed the issue of *technological* devices. In addition, the notion of gender is often missing in these investigations about materiality and sociality.

This article focuses on how the social and cultural category of gender is deployed in understandings of domestic technologies in the context of material culture. More precisely, I ask *what kind of gendered identities people ascribe to domestic technologies, and in what terms these gender divisions are constituted*. With these questions, I aim to broaden and elaborate on the academic work pursued by scholars in the fields of material culture studies and feminist technology studies. Furthermore, this kind of knowledge could be taken advantage of in the design of future domestic technology since appliances may be targeted, and therefore also used, differently and more equally when we know how users ascribe meanings and gender to them.

At the beginning of the article, I introduce the concepts of technology, gender, script, and material culture, followed by a description of the data and analysis methods of the study. My main task, subsequently, is to dissect how people ascribe gendered meanings to material technologies and how these meanings are discursively constructed. Finally, I will discuss the implications of the results within the overall context of gendered material technology.

THEORETICAL BACKGROUND OF THE STUDY

Technology, Gender, and Script

I employ the idea of the social construction of technology and maintain that processes of technology and gender are mutually co-produced: no party is primary, but both co-exist and demand one another. As Faulkner (2001, 82) argues,

> Gender and technology are seen as co-produced. Here a parallel is drawn between the social construction of gender and the social construction of technology, in which each are seen as performed and processual in character, rather than given and unchanging.

In other words, technologies not only have an effect on gender relations and identities, but also gender has an impact on technologies, their development and design.

Quite commonly, technology studies addressing gender have concentrated on the institutional aspects of technology, such as masculinity of technology design (e.g. Berg & Lie 1995, Cockburn 1997, Faulkner 2000a; 2000b, Oudshoorn et al. 2004, Southwell 1997), gender in engineering, ICT, and other masculine-related work places (e.g. Bury 2011, Cockburn 1983, Cukier et al. 2002, Griffiths et al. 2007, Kelan 2007, Todd et al. 2005, Turkle & Papert 1990, Rommes et al. 2007, Verbick 2002), and gender in technology-related education (e.g. Denner 2011, Hanor 1998, Lipinsky et al. 1986, Mayer-Smith et al. 2000, Reinen & Plomp 1997, Sutton 1991, Volman & van Eck 2001). However, *domestic* technologies in everyday contexts have not been studied much and if they have, the studies have tended to focus on *novel* technologies (e.g. Berg 1999 on smart home design and Rommes et al. 2011 on gendered computer games) and/or information and communication technologies (ICT) (e.g. Dholakia 2006 on Internet, Livingstone 1992 on ICT in general). Some studies address older, basic domestic appliances, but focus mainly on the configuration of the users in the design process (e.g. van Oost 2003 on shavers and Smeds et al. 1994 on vacuum cleaners). I suggest that “old” and thoroughly familiar technologies in the home should also be acknowledged in the research. New technologies are not given meanings in isolation but are compared with those older well-known devices we often take for granted (Peteri 2006, 213).

Wajcman (2000, 449) notes that interest towards domestic technologies in feminist technology studies arose in the 1970s with the debate over the significance of women's housework and its relationship with paid work outside the home. The main approach at that time was the impact of technologies on women's lives, which illustrated social sciences' pessimistic idea of technological determinism that neglected the power of the users of technology (e.g. Bose 1979, Cowan 1983). By the late 1980s, attention shifted from this rather monolithic and stable view to studying "processes by which technology is developed and used, and those by which gender is constituted" (Wajcman 2000, 450). For example, Cockburn & Ormrod (1993), in their highly influential study about the microwave oven, showed how domestic technology evolves from its gendered design process to its gendered consumption (see also Chabaud-Rychter 1994 for the study of the electric food processor and Silva 2000 for the gendering of the cooker and the microwave oven).

Another analytical tie between technology and gender has been formulated with the notion of "script". The analytical base of this article also leans on the concepts of inscription and de-scription by Akrich (1992), the notion of user configuration by Woolgar (1991) and the idea of gender script deployed by van Oost (2003) and Rommes et al. (1999). Following Akrich’s (1992) idea, I suggest that the designers

inscribe their ideas of the world in or onto technical devices (intentionally or not) and users read those "codes" through their own capabilities and former experiences. This means that not all people perceive the same gadgets the same way, and this reading process may be quite different from that which the designers had expected. This kind of "reading" is an everyday skill that people practising ascribing do not usually notice. Woodward (2007, 58) aptly points out that "Being able to read material culture in terms of its cultural meaning is an indispensable – yet somewhat problematic – social skill that is integral to our commonsense everyday interpretations".

Ellen van Oost (2003) uses "gender script" as an analytical tool in her article about materialised gender. The concept of gender script could be viewed similarly to Akrich's inscript and de-script since van Oost (ibid., 195) writes that "Gender script refers to the representations an artifact's designers have or construct of gender relations and gender identities – representations that they then inscribe into the materiality of that artifact". However, while my analysis has its point of departure in the idea that designers do inscribe gender into their products, my focus in this paper is on *users*, who ascribe the gender scripts to devices in different ways, rather than designers' intentions and actions.

Material Culture Studies

The theoretical and analytical foundation of this article also draws from material culture studies. The study of material culture contains a broad field of scholarly activities and involves scholars, for example, from anthropology, sociology, psychology, and design & cultural studies (Woodward 2007, 3 – 4). Following the hypothesis of material culture studies, I maintain that objects and artefacts are a central part of our everyday lives and surrounding culture. First, they affect our mundane activities with their physical appearance by having the ability to restrict or enable our actions. Second, objects do not only have a visible, physical essence, but they are able to create, mediate and sustain different meanings that are linked to wider patterns of the surrounding culture. I also argue that this physicality and symbolism of materiality informs the social identities of people and actual practices: what we feel we are or would like to be, what we do and can do, are largely affected and mediated by different material objects (e.g. Appadurai 1986, Cieraad 1999, Dant 1999;2006, Miller 1998;2001, Molotch 2003, Tilley et al. 2006, Woodward 2007).

There are three main theoretical approaches used in material culture studies. The Marxist and critical approach is production-based (not consumption-based) focusing on materialism and fetishism, not materiality per se. The second is a structural and semiotic approach emphasising relationality and difference of an object. Derived from linguistics, structuralism treats and analyses material objects as if they were language. These two approaches have their benefits, but this study is founded mostly on the approach that Woodward calls "symbols and cultural categories"; that is, the approach that stresses agency and people's abilities to read and convert different cultural meanings that are offered to them by the wider structure of culture and society. (Woodward 2007, 35 – 109.)

Woodward (2007, 107) writes that "the cultural approach emphasises the *meaningfulness of objects*" (italics by Woodward), and this meaningfulness is formed with the help of classifications and categories. I suggest that objects form a system of codes and meanings, and this system arises from the wider cultural pattern of meanings that are not natural in their origin but arbitrary and based on a social convention. As we will see in the subsequent analysis, these meanings and an overall pattern of culture are often expressed with simple classifications and dichotomised concepts. For this research, the most important dichotomies are man – woman, novel – obsolete, and young – old. In order to live in a complex, sometimes even chaotic world, people need classifications that artefacts mediate to them. As Kopytoff (1986, 70) analyses:

> We can accept, with most philosophers, linguists, and psychologists, that the human mind has an inherent tendency to impose order upon the chaos of its environment by classifying its contents, and without this classification knowledge of the world and adjustment to it would not be possible.

In terms of classification, gender, and domestic appliances, it has been common to separate so called brown devices from white devices. White devices are basic domestic appliances that are used to save time (for example a washing machine), and brown devices are time-consuming and mainly entertaining in nature (for example a television set) (Bowden & Offer 1994). It has been argued that white devices are categorically feminine, while brown devices are usually linked to men and masculine activities (Gray 1992).

However "natural" the classifications might appear, it should be remembered that they always incorporate morality. In addition, classifications are connected to emotionality as well as to norms and sanctions, and therefore link an individual to the wider society and broader cultural narratives. For example, the notion of good and bad is imbedded in the everyday lives of people, and this comparison affects the ways we act and how it is "appropriate" to feel in a given situation. Technological devices and machines have a special role in the classification process as they are inclined to produce knowledge and power once they have been accepted by the users and their use has become a standard. As Akrich (1992, 222) has argued: "Technical objects have political strength. They may change social relations, but they also stabilize, naturalize, depoliticize, and translate these into other media."

The underlying logic of the article is that people tend to classify objects in a gendered way, and this classification process is very similar to their conduct and attitudes when interacting with other human beings. In the case of computing, for instance, people talk to computers as if they were human beings. Furthermore, if the computer is able to communicate with users via an interface agent, people interpret the talk of the computer differently according whether the voice is feminine or masculine. In other words, people tend to apply anthropomorphism to technical objects, and their behaviour and interaction with the devices follow the hidden and explicit social rules that are used in the interaction with other people. (e.g. Nass & Moon 2000.)

DATA AND ANALYSIS OF THE STUDY

The data in this study were gathered through an internet survey (n = 405) in which people were asked to divide different domestic technologies[1] into "more feminine", "more masculine" or "gender neutral". The respondents were advised to associate freely and explain their answers in open-ended spaces. The addition of a "gender neutral" option meant that the respondents were not pushed into making a gender division if they did not feel this was appropriate.

I adopted the idea of an on-line survey from Oudshoorn et al. (2002), who organised an exhibition on gendered artefacts in which they introduced highly gendered objects as well as gender neutral designs. In the first section, the researchers exhibited (in their words):

> Barbie and Destructor dolls, electric shavers for women and men, microwave and video recorder, kitchen machine and drill, bicycles for women and men, powder box and knotted tie, shoes and watches for women and men, and automobile advertisements. In the cluster of gender neutral objects, the researchers displayed: Unisex perfumes and jeans, recumbent bicycle, Dr. Martens shoes, and unisex pill[2].

Alongside with the exhibition, the researchers conducted a survey in which the visitors were asked to divide different objects into "mostly masculine", "mostly feminine", or "neutral". Objects in the survey were 'mobile phone, microwave oven, cd-player, automobile, tractor, typewriter, microscope, "ski-burner"[3], and a personal computer' (Oudshoorn et al. 2002, 479). As expected, people saw objects as gendered and most devices were viewed as being predominantly masculine or neutral. Interestingly, only two of the objects, the typewriter and the microwave oven, were consistently regarded as more feminine.

My survey was launched in October 2007 and I used the method of snowballing (Knight 2002, 122; Warren 2002, 87) to approach the participants. The survey was first e-mailed to 20 friends, the mailing lists of staff and Master's students in the Department of Sociology and Social Psychology at the University of Tampere, and the mailing list of *Teknologianet*[4]. When these respondents distributed the survey to their friends, colleagues and acquaintances, the number of responses reached over 400 in the three weeks following the launch.

In order to conduct more elaborate quantitative procedures in the future, the respondents were asked to give background information at the start of the survey. Notably, the data of 405 respondents were biased in terms of sex, age, education and income because over two third of the respondents were women, the median age was between 25 and 40 years, half of the respondents had a higher degree from university or polytechnic, and the annual income of nearly half of the respondents was between 20 000 and 50 000 euros. Nearly 67% of the respondents were married or living with their partner at the time of the survey, and 63% lived in an apartment building while 37% lived in a detached or terraced

house. Additionally, 65% of the respondents had children, either still at home or no longer living with their parent/parents.

Therefore, the data do not represent the overall population of Finland, but provide a sample of Caucasian, middle-class, wealthy and well-educated adults. Moreover, the majority of the respondents lived in families with children. The results should not be read in a strict and normative manner as they reflect the modes of how people give meanings to domestic appliances and they propose a direction in which further analysis and design could be converged. Moreover, quantitative procedures are not the only ones used in the analysis but open-ended answers in the survey were qualitatively analysed and arranged to deepen the explanation of the meaning making processes. In other words, although the starting point is the quantitative Internet survey, this study is qualitative and interpretative in nature. As Woodward (2007, 4) puts it: “Once the voice of the user is introduced, clarity and certainty give way to multiple interpretations, practices and manipulations. What was once fixed by analytic measure and conceptual clarity alone melts away”.

In this article, I concentrate on the descriptive analysis of the survey and the analysis of the open answers in which the respondents justified their gender choices. At the beginning, a simple statistical descriptive is introduced, but the main focus is on the open answers that are analysed discursively. In practice, this means that I ordered the open answers and their contents so that the most common ways to talk about domestic appliances could be formed (compare with Coffey & Atkinson 1996, 26 - 45). Importantly, the finding and analysis of these common discourses are not only based on the actual objects that the respondents wrote about in the open answers, but also on what they chose to write about. Thus my interest was not solely on "what" people were talking about but also "how" and "why" they were talking about it (Woodward 2007, 6).

ASCRIBING GENDER TO DOMESTIC DEVICES

Do Domestic Gadgets Have Gender?

It is commonly argued in feminist technology studies that machines and other technical objects are regarded as masculine in Western cultures. While technology is associated with objectivity, knowledge and hardness, all traditionally considered masculine qualities, women are more associated, for example, with sensuality, social relationships, and nurturing (e.g. Lohan & Faulkner 2004, Wajcman 2004).

In my data, all the technologies addressed were seen as gendered by some respondents. In Table 1 the distribution is shown device by device. As Table 1 shows, the most commonly gendered objects were the hairdryer and the washing machine, both of which were considered rather unanimously feminine. The stereo music system, the computer, and the television set were also seen as gendered with the majority of the respondents regarding them as more masculine. The most neutral devices, in turn, were the radio, the microwave oven, the refrigerator, and the coffee maker, respectively. The VCR and DVD players were the most uncertain in their gender identity as about half of the respondents perceived them as gender neutral while about 40% of the respondents saw them as more masculine.

Table 1. Gender of Domestic Technologies (n = 405)

	More Masculine %	More Feminine %	Gender Neutral %
Most Neutral			
Radio	14.6	11.6	73.8
Microwave Oven	18.8	4.9	70.1
Refrigerator	18.3	12.3	69.4
Coffee Maker	9.9	30.6	59.5
DVD Player	40.2	8.9	50.9
VCR Player	42.7	7.2	50.1
Most Feminine			
Hairdryer	1.7	91.4	6.9
Washing Machine	7.7	64.0	28.4
Most Masculine			
Stereo System	58.5	3.7	37.8
Computer	52.6	2.5	44.9
Television	49.1	4.9	45.9

The statistics were also examined with regard to the respondents' own sex. When the devices and their perceived gender were so examined, it could be seen that sex as a background factor did not significantly affect the answer. As shown in Table 2, the only exceptions in this matter were, surprisingly, the coffee maker and the computer.

Table 2. Gender of Coffee Maker and Computer by Respondents' Sex (n = 405)

		Respondent's Gender		
		Female	**Male**	**Total**
Coffee Maker	More Masculine (%)	8.2	14.4	9.9
	More Feminine (%)	35.4	18.0	30.6
	Gender Neutral (%)	56.5	67.6	59.5
Computer	More Masculine (%)	47.3	66.7	52.6
	More Feminine (%)	3.1	0.9	2.5
	Gender Neutral (%)	49.7	32.4	44.9

Coffee Maker Pearson Chi-Square = 0.002
Computer Pearson Chi-Square = 0.002

In Table 2 we can see that female respondents tend to consider the coffee maker more feminine while for more men it seems gender neutral. However, when the respondents' age is added to this observation, we find that younger female respondents (less than 40 years old) emphasise the feminine nature of the coffee maker. The older respondents, in turn, were more unanimous with their judgements irrespective of their sex.

In the case of the computer, more men than women think the computer more masculine while women perceive computers as more neutral. As in the previous example of the coffee maker, this alters when the variant age is added to sex: The older the female respondent, the more feminine or neutral they consider the computer, and the older the male respondent, the more masculine is the computer. Why this is so, it is hard to say without a further examination and more detailed statistical analysis.

However, these figures are not that unequivocal since many of the respondents still used gender division in spite of marking the gadget as neutral. For example, when asked about the gender status of the radio, one male respondent (ID10) clarified that "the car radio is more masculine and the radio at the workplace is more feminine", but his overall answer was gender neutral. In terms of computers, the main factor connected with gender was their portability. Many respondents assessed computers as gender neutral but still argued in the open-ended text space that it "depends on the computer. The desktop is more masculine whereas the laptop is more feminine" (woman ID17). In other words, the statistical methods of cross tabulation and elaboration are not unequivocal and reliable in this case, so the open answers of the data are emphasised.

How Domestic Gadgets Embody Gender?

Figures presented above demonstrate that people use the social category of gender in terms of material devices in the home. However, the numbers alone do not highlight *how* a specific gadget is gendered. In order to obtain a more detailed and subtle understanding of the gendering of technology I now turn to consider the open answers in which the respondents elaborated on their choices. There appear to be three discursive themes through which people ascribe gender to domestic technologies: expertise discourse, appearance and sound discourse, and routine activities discourse.

Expertise Discourse

The first way to give gendered meaning to an object was through an expertise discourse. It was common to consider *who understands the gadget better*, that is, who maintains, updates, and supports others to use the device. Not unexpectedly, almost all of the devices in this cluster were considered masculine. In her study of industrial practices, Cockburn (1985, 7) concluded that "Among the have and have-nots of technological competence, women and men are unevenly represented. (…) The technical competence that men as a sex possess and women as a sex lack is an extension of the physical domination of women by men". This is quite a striking result given the year my data were gathered (2007, over 20 years after Cockburn) and the fact that women still perform more domestic duties than men (e.g. Aalto &

Varjonen 2004, Pääkkönen 2005). This means that women must be able to use domestic devices and therefore have at least some kind of technical competence, but this still seems to go unnoticed by both men and women. In other words, perceptions that technical competence is a masculine trait are persistent although women are fluent users of domestic appliances.

In particular, computers, VCR players and DVD players were categorised using this expertise discourse. In terms of the VCR player, expertise was indicated through the ability to program the device. In the words of one male respondent (ID15): "In case of the VCR player, there is this myth that only a male with a PhD in technology knows how to time it". In addition, if some respondents did not consider the computer masculine, they commonly made it clear that their opinion was an exception. As one female respondent (ID75) wrote, after marking the computer as feminine, "I think we are an anomaly in this case because I work with the computer all the time at home and my husband needs it only occasionally. It is me who also takes care of all installations etc." The only domestic technology for which women were explicitly given the specialist's role was the washing machine. Men, in particular, were keen to point out with a hint of self-deprecating humour that, for example, "it is that mystic device only women can use" (Male ID41). All of a sudden men were no longer experts, even though their skills were enough to tackle much more complicated gadgets such as DVD players or stereo systems.

In the expertise talk, the gender division was also justified by *who was considered more interested* in the device in question. The stereo system, strongly associated with masculinity, was depicted particularly through young men's enthusiasm, and this was often thought either silly or an extension of one's manhood. In the words of one male respondent (ID 41): "The stereo system is a device that is part of a masculine armament race. The sturdier the bass, the bigger the balls". Further, *the newness of technology* affected the perceived gender of technologies and in this way also expertise, as the latest and more complicated devices were regarded as more masculine. In particular, the concept of hi-fi was affiliated with men, as one female respondent's (ID14) answer to the stereo system indicates: "The stereo system reminds me of the enthusiastic hi-fi amateurs, who are all men". See Keightley (1996) for a more detailed description of the connection between men and home audio.

Combining the overall idea of masculine expertise and technology, it was rather unexpected that both male and female respondents evaluated that manly devices are difficult or even impossible to use whereas feminine technology was given praise as practical and simple. For example, one female respondent (ID19) marked both VCR and DVD players as masculine and explained: "These [VCR players] can be diabolically hard to use because programming has been executed with men's logic", and "These [DVD players] also have inconceivable complications, so they are men's products". Interestingly, in this answer the respondent directly links the gendered male script of the device to the expected user.

In several cases the gender of the device was merged with age. To continue the case of the VCR player, one female respondent (ID 79) wrote that "(VCR player) is

an old man whose ability to function is expired." As this quote indicates, age was quite commonly used to deepen the description of the device in question, and sometimes the material appliance was depicted being a human and having human characteristics.

Appearance and Sound Discourse

Another commonly used method of dividing technology into masculine and feminine was *by their appearance*. First, masculine gadgets were described as big, black, and angular, that is, box-shaped. For example, one female respondent (ID11) argued about the microwave oven that "it has both masculine and feminine features; cooking is feminine, but its appearance (that is box-like) is masculine". Another female (ID31) gave a subtle account about the gender of the computer by remarking:

> The ordinary desktop computer is more masculine to me, but the laptop is more feminine. Maybe the lightness of the laptop and its small size makes it more feminine whereas the big size and multi-element structure of the desktop computer feels more masculine. Overall, the use of the computer is gender neutral although the modes of use may vary in terms of gender.

Notably, a similar association between lightness and femininity was also made with new, flat screen televisions. Many respondents explained that although televisions are in general more masculine, newer flat models reflect femininity.

As well as its appearance, *the sound of a gadget* was also considered important in distinguishing between masculine and feminine technologies. A frequently expressed opinion was that the louder the noise, the more masculine the device. For example, the stereo system was often seen as masculine because of its volume. Furthermore, the coffee maker aqcuired its feminine character through its sound which was described as "puffing" (Male ID67) or "bubbling" and "chattering" (Female ID40). The usual notion was that the sound of feminine devices was more continuous and stable in comparison to masculine ones with their more distracting and outrageous noise.

This builds on the notion of the gendered appearance of material objects described by Kirkham & Attfield (1996, 4), who write about the "pervasiveness, persistence and power as well as usefulness of binary oppositions" and argue that

> They (binary oppositions) play a part in the gender differentiation of many objects, particularly in relation to colour and size. In our society today, the main visual oppositions which cluster around that of male/female include dark/light, pink/blue and large/small, although others such as geometric/organic, smooth/rough and hard/soft also apply.

As the gendered discourse of appearance implies, technologies are not gender neutral tools for achieving a goal. Indeed, what technical devices look like is not an

insignificant matter or merely an issue of aesthetics. Their appearance also has practical consequences since a certain gendered image of the device implies who is intended to use it and how.

Routine Activities Discourse

Finally, perhaps the most obvious way to divide domestic technical appliances into genders was based on *who used them more frequently* (in real life or imagined) and how the domestic division of labour in the respondent's household was arranged. The most feminine devices, the hairdryer and the washing machine, were particularly given their significance according to the normal and/or expected user. The gendered status of the washing machine was so strong that even if respondents marked it as a gender neutral object, they still usually mentioned its common feminine image in the open answer. For example, one of the female respondents (ID31) remarked: "In my opinion, doing laundry is gender neutral. Using a washing machine is not bound to a certain gender in my inner circle although in the traditional division of labour, women have been responsible for laundry."

Respondents' replies echo common practices in Finland where women still in the 21st century tend to be the ones usually doing the laundry at home (Lammi-Taskula 2004, 184 – 185), and this also applies to the UK and France (e.g. Kaufmann 1998, Pink 2007, Shove 2003). However, some researchers outside Finland have shown that traditional gender roles have been broken down at least at some level and men's role in housework has risen (e.g. Gershuny et al. 1994, Gershuny 2000). Men's increased participation in housework, it has been argued, may be partly due to domestic technological innovations (Silva 2002). In addition, some gender connotations of household devices have changed and "some of the negative connotations of 'heterosexual housework'" have been challenged (Silva 2002, 336). For instance, Silva (2000) has analysed the gendering of cooking appliances and has stated that the "script" of these kitchen appliances has been transformed to encompass also men, women who are not interested in cooking, and children.

In some cases routine activities and/or the expected user of a device were described with a sort of anthropomorphist thinking. This feature was most notably present when talking about feminine devices. For example, one male respondent (ID 298) unravelled the gender identity of the microwave oven as follows: "You put something inside it, and then associate this with the kitchen that is still associated with a woman bustling about in it".

As mentioned, the feminine hairdryer and washing machine were the most commonly mentioned gadgets within this discourse. This raises the question as to whether feminine contact differs from the masculine one, and in particular, is it more resilient and effective than masculine contact, leaving a more permanent mark on the object it touches? Is the masculine character of devices then more likely to be achieved through the inner or outer qualities of the device, that is, through its newness or appearance? Feminine touch was depicted as being so forceful that it also operates indirectly through the surrounding space: Devices situated in the kitchen - which is considered a feminine area at home - are

therefore seen as feminine. Accordingly, a woman does not even need to touch the gadget to make it gendered; it is merely her imagined presence in the space that is sufficient to mediate a feminine identity to the device.

In this discourse, technology is considered an extension of humanity in the way that if a gendered human touches the device by using it or is present in the same room, the device itself becomes gendered. Obviously, this may also operate the other way around, and it is the device that has gender in the first place which it mediates to the user. Hence, it could be speculated, for example, that a feminine gadget may convey feminine traits to the male user. This might, for one part, explain why men do not commit themselves to washing laundry as much as women do. In other words, the use of the strongly feminized device may pose a threat to masculinity of a male user. Whatever the direction, this result is intriguing since Western cultures have had a strong tendency to distinguish between humans and materiality, and between culture and nature. This classification has also been hierarchical as humans have constantly been raised over substance in importance (e.g. Kopytoff 1986, Latour 1993, Olsen 2003; 2006, Prown 1982). To contradict this inclination, the results of this study indicate that materiality and objects are as important as sociality and people, and in many cases they cannot be separated from each other.

SUMMARY OF THE RESULTS

I have argued throughout the article that people tend to use the notion of gender when giving meanings to domestic technology. In the first part of the analysis, it was shown with simple statistics that the hairdryer and the washing machine were the only devices that were quite unanimously perceived as feminine, while the most masculine appliances were the stereo system, the computer, and the television set. The radio, the microwave oven, the refrigerator, and the coffee maker were, in turn, considered the most gender neutral in the data. The VCR and DVD players were items that almost half of the respondents perceived as gender neutral, but they were also seen as more masculine as over 40% of the respondents located them in that cluster.

Drawing on qualitative data, the gendered meaning making of domestic devices was further explored through three thematic discourses. First of all, *expertise* was used when dividing technologies into masculine, feminine and gender neutral. For example, the respondents explained that the VCR and DVD players are devices that men usually understand better. In other words, men were considered as having technological expertise regarding these appliances. Furthermore, in some cases, an overall interest in some device was included in the expertise discourse.

Secondly, devices were discussed and gendered in terms of *the appearance and sound discourse*. In these instances, the gender of technical devices was depicted through how they looked and sounded. The more masculine appliances were considered, among others, black and angular, while the more feminine devices were described as small and simple-looking. In addition, the first were thought loud and producing continuous noise while the latter were described as producing a puffing or bubbling sound.

Finally, the respondents argued that the *routine activities of the home* and the general domestic division of labour were issues affecting the perceived gender of a technological gadget. For example, the washing machine was considered more feminine because of the image and/or an experience of women doing laundry. The physical location also imposed femininity onto certain gadgets. The kitchen — a feminine area of the home — was sometimes enough to convey femininity to the technological object in question.

Table 3. Summary of Masculine and Feminine Attributes of Domestic Technologies

Attribute	Masculine	Feminine
Appearance	Big, angular, black, static, ugly, many buttons and indicators	Rounded corners, portable, beautiful, light colours, simple-looking
Usability	Hard to use, requires expertise	Easy to use, if requires expertise it is common sense
Technicality	Complex technique	Simple technique
Sound	Noisy, aggressive	Silent, bubbling
Rate of Novelty	New innovation	Old and familiar, archaic
Use	Entertainment, status improvement	Cleaning, cooking, cosmetic care

Table 3 sums up all the gendered features of the domestic technical appliances introduced in the previous sections. In this stereotypical and dichotomised classification, masculine and feminine devices seem to differ quite strongly from each other. For example, men are considered to use technologies mainly for entertainment purposes or as status improvement, while women take care of the household and themselves by doing chores and using technical devices for cosmetic care. In addition, women do not understand complicated technology and prefer older and simpler “push-the-button” devices, while men are interested in novelties and capable of compiling, using, maintaining, and fixing complicated gadgets. Furthermore, women are physically smaller, sensitive creatures and have their eyes on beauty as feminine gadgets are light, carefully designed, silent, and pretty. Men are thought robust and associated with noise and ugly, un-designed black boxes. In conclusion, feminine gadgets represent the body (nurture, make-up and looking good, eating and cooking) and human-centredness (simple, user-centred design). Masculinity in technology, in turn, denotes rationality; intellectual capabilities and technical expertise. Moreover, women can be interpreted as anchors for reality by their link to practical house maintenance while men are connected to virtual reality by their keen interest in entertainment. In other words, the results support the findings of the earlier studies contending that entertainment technology is masculine, and technical expertise is usually connected to men (e.g. Cockburn 1985, Gray 1992, Lohan & Faulkner 2004, Wajcman 2004).

The masculine nature of technologies is, as stated before, widely noted in feminist research. However, the open answers from this on-line research study indicate that this may not be so clear cut. Being a man or a woman, or a man-like or woman-like

device, did not solely determine the hierarchical status attributed by the respondents but gender was ascribed within a wider contextual framework including variables such as age and location. For example, the VCR player was gendered using a stereotyped image of an older male no longer fully capable of operating in the world and with other people. As Cockburn (1983, 123 - 150; see also Faulkner 2000a; 2000b) has noted, not all men (or women) are the same and masculinity (or femininity) is not formed only in terms of femininity (or masculinity), but in terms of other men (or women). Further, this demonstrates the thoroughly moral and hierarchical nature of classifications: if an object is attributed as having some quality, it is at the same time compared with another object having higher or lower status (Woodward 2007, 88).

By saying this, I do not want to imply that gender does not matter or deny that women may feel/are oppressed in many technology-related issues. References to gender inequality were also seen in my data as some female respondents criticised the state of things in their own lives or more generally in the world. However, it should be pointed out that masculinity was not simply preferred or considered better in these data. Indeed femininity in technologies was quite often seen as more refined, designed and beautiful, and easier to use. Again, although the technical competence of women was often hidden or not acknowledged at all, feminine expertise was mentioned by some participants, usually in terms of feminine gadgets such as the washing machine, but sometimes also in terms of computing.

CONCLUSIONS

In this paper I have aimed to illustrate that the ways in which people classify technologies suggests that devices are not only instrumental tools but embedded in the social lives of people and can be assigned a gendered status. Yet, it seems to me that gender alone is not adequate to describe social identities given to different devices. In particular, age tends to intersect with gender in many answers and this dimension operates on two levels. To begin with, it is an attribute attached to the device on its own terms. For example, the VCR player was considered an old and robust technology and its “not-so-fancy” gendered image of an old man is entwined with these technical features. Nevertheless, it is not only the newness or obsolescence of the technical device that the age refers to, but also the age of the average user, that is, the user the respondent envisions as the intended addressee of the device. The stereo system, for example, was frequently depicted as more masculine because of an image of young men as the main users. As a result, both gender and age were part of how the respondents constructed the meaning of domestic technical objects and combined the social and material levels of the world and culture.

The original rationale for the survey was to analyse the relationship between technology and people, that is, one person in a relationship with a single device. However, in the course of the analysis, this focus turned out to be too narrow, and it became apparent that there were also other relationships impacting on the social status of both devices and people, for example, those between two or more technologies, and between people and more than one technology. As a result, a

single device is part of the bigger structure of many devices, and, according to structuralist thinking about goods (Douglas & Isherwood 1996, Levi-Strauss 1979), it also acquires its meaning in terms of this broader context. As its name denotes, the structuralist approach emphasises structures and a semiotic relationship between objects. In other words, “objects have meanings that are relational and contextualised.” (Woodward 2007, 80). Objects are thus read in terms of their difference from other objects, and they are evaluated and given meaning according to whether another object is of the same or different class. In addition, new technology is given meaning in terms of older technology, and vice versa (see Dunbar-Hester 2009). For example, the VCR player was frequently compared with the DVD player, and the refrigerator was mentioned in terms of other kitchen appliances, and their gender identities were affected by these groupings. To extend the scheme and consider all domestic technical appliances, a division was usually made between brown goods and white goods; those aimed to entertain and use time, and those intended to save time (Bowden & Offer 1994). When a certain device was classified under one category, it was then compared with other devices of that kind and gained its status according to this two-step process. For instance, the television set was many times firstly grouped with other entertaining devices that are traditionally masculine, and only secondly it was pondered if the features of the appliance in question attribute more to feminine or masculine.

In terms of the concept of the script, these results raise interesting questions. First, they direct attention to multiple ways of assigning gendered meaning to a technical device. As shown, gender may be derived from the cultural image of expertise, material essence, or practices, and in some cases these three are combined together. This raises the question as whether the notion of script excessively emphasises the abilities of designers and their power to guide and influence the users. Designers are obviously able to embody meanings and possible user actions within material objects, but this does not mean that users have to act and/or ascribe meanings to technologies according to designers’ intentions. The results of this on-line survey show that the respondents are imaginative and fully capable of creating their own meanings and activities. As Silva (2000, 625) has argued after analysing the user manuals of the cooker and the microwave oven: "The scripts for operation of the technologies expressed the normative gendered expectations in society. But the actual usage of technologies, as expressed in recipes and practices, tended to depart significantly from such norms." This has also been acknowledged by Akrich (1992) who have written: “It may be that no actors will come forward to play the roles envisaged by the designer. Or users may define quite different roles of their own.” (ibid., 208). While Akrich and Silva are writing about users and their *practical* interpretation of the scripts produced by designers of technologies, the same point could be argued about gendered meaning making processes. In other words, designers inscribe gendered meaning to a technological object, but users may choose whether they want to conform to that script or create their own meanings.

Another issue that the survey results raise about the script is the evolving status of objects, which relates to the previous point about “unexpected users”,. Kopytoff (1986, see also Dant 2001) writes about the “social biography” of things, meaning

that transformations in the meaning of an object are prone to happen at some point in its trajectory. The change may be due to several factors and could depend, for instance, on the owner (objects are given, for example, to a friend or a relative) or on the society in which it is used (for example, newness may affect the status of an object). With this in mind, the script does not necessarily hold at the moment the device reaches the market, and it may drastically change as the new owner of the device ascribes a different meaning to it. In practice, this temporality and contextuality mean that both the designers and researchers of technology should acknowledge the processual and changing nature of devices and not take their presence and meaning as stable and given.

ACKNOWLEDGEMENTS
The research was supported by UCIT – Doctoral program in user-centered information technology (University of Tampere). I also wish to thank the referees and Professor Ilkka Arminen and Dr Jari Aro for their helpful comments.

ENDNOTES

[1] Technological devices in the survey were: microwave oven, television set, hairdryer, computer, refrigerator, radio, washing machine, VCR player, DVD player, coffee maker, and stereo system. These objects were selected to portray both entertainment technologies and white large devices of the home. Moreover,it was important that the appliances of the survey included smaller, not necessarily everyday gadgets in the home (e.g radio and hairdryer) and also digital as well as manual appliances (e.g coffee maker and DVD player).

[2] The unisex pill ”was the first contraceptive that would enable women and men to share responsibilities for contraception” (Oudshoorn et al. 2002,475).

[3] Ski-burner is “a gas-flame apparatus for heating skis while waxing them” (Oudshoorn et el. 2002, 479).

[4] Teknologianet is a Finnish association for people interested in technology studies and design.

REFERENCES

Aalto, K., and Varjonen, J. (2004) Hoituuko kaksi kasta samalla kuin yksi? Kotityöaika erikokoisissa perheissä. In Pääkkönen, H., ed., *Perheiden ajankäyttö.* Helsinki: Tilastokeskus, pp. 21–40.

Akrich, M. (1992) The de-scription of technical objects. In Bijker, W., Law, J., eds., *Shaping technology/Building society. Studies in sociotechnical change*. Cambridge MA: MIT Press, pp. 205 – 224.

Appadurai, A., ed. (1986) *The social life of things. Commodities in cultural perspective.* Cambridge: Cambridge University Press.

Berg, A-J., and Lie, M. (1995) Feminism and constructivism: Do artifacts have gender? *Science, Technology & Human Values*, 20(3), pp. 332 - 351.

Berg, A-J. (1999) A gendered socio-technical construction: The smart house. In MacKenzie, D., Wajcman, J., eds. *The social shaping of technology*, 2nd edition. Maidenhead: Open University Press, pp. 301 - 313.

Bose, C. (1979) Technology and changes in the division of labour in the American home. *Women Studies International Quarterly*, 2(3), pp. 295 - 304.

Bowden, S., and Offer, A. (1994) Household appliances and the use of time: The United States and Britain since the 1920s. *Economic History Review*, XLVII(4), pp. 725 – 748.

Bury, R. (2011) She's geeky: The performance of identity among women working in IT. *International Journal of Gender, Science and Technology*, 3(1), pp. 34 – 53.

Chabaud-Rychter, D. (1994) Women users in the design process of a food robot: Innovation in a French domestic appliance company. In Cockburn, C. & Dilić, R., eds. *Bringing technology home. Gender and technology in a changing Europe*. Buckingham: Open University Press, pp. 77 - 93.

Cieraad, I., ed. (1999) *At home. An anthropology of domestic space*. New York: Syracuse University Press.

Cockburn, C. (1983) *Brothers. Male dominance and technological change*. London: Pluto Press.

Cockburn, C. (1985) *Machinery of dominance. Women, men and technical know-how*. London: Pluto Press.

Cockburn, C., and Ormrod, S. (1993) *Gender and technology in the making*. London: Sage Publications.

Cockburn, C. (1997) Domestic technologies: Cinderella and the engineers. *Women's Studies International Forum*, 20(3), pp. 361 - 371.

Coffey, A., and Atkinson, P. (2006) *Making sense of qualitative data. Complementary research strategies*. Sage Publications: London.

Cowan, R.S. (1983) *More work for mother*. New York: Basic Books.

Cukier, W., Shortt, D., and Devine, I. (2002) Gender and information technology: Implications of definitions. *SIGCSE Bulletin*, 34(4), pp. 142 - 148.

Dant, T. (1999) *Material culture in the social world: Values, activities, lifestyles*. Buckingham: Open University Press.

Dant, T. (2001) Fruit/Toolbox: Biography of objects. *Auto/Biography*, IX(1&2), pp. 11-20.

Dant, T. (2006) Material civilization: Things and society. *The British Journal of Sociology*, 5(2), pp. 289 – 308.

Denner, J. (2011) What predicts middle school girls' interest in computing?. *International Journal of Gender, Science and Technology*, 3(1), pp. 54 – 69.

Dholakia, R. (2006) Gender and IT in the household: Evolving patterns of internet use in the United States. *The Information Society,* 22, pp. 231 – 240.

Douglas, M., and Isherwood, B. (1996) *The World of goods: Towards an anthropology of consumption*. London: Routledge. First edition 1979.

Dunbar-Hester, C. (2009) 'Free the spectrum!' Activist encounters with old and new media technology. *New Media Society*, 11(1&2), pp. 221 – 240.

Faulkner, W. (2000a) The power *and* the pleasure? A research agenda for "making gender stick" to engineers. *Science, Technology & Human Values*, 25(1), pp. 87 - 119.

Faulkner, W. (2000b) Dualisms, hierarchies and gender in engineering. *Social Studies of Science*, 30(5), pp. 759 – 792.

Faulkner, W. (2001) The technology question in feminism: A view from feminist technology studies. *Women's Studies International Forum*, 24(1), pp. 79 - 95.

Gershuny, J., Godwin, M., and Jones, S. (1994) The domestic labour revolution: A process of lagged adaptation. In Anderson, M., Bechhofer, F., Gershuny, J., eds. *The social and political economy of the household*. Oxford: Oxford University Press, pp. 151 - 197.

Gershuny, J. (2000) *Changing times*. Oxford: Oxford University Press.

Gray, Ann. (1992) *Video playtime: The gendering of a leisure technology*. London: Routledge.

Griffiths, M., Moore, K., and Richardson, H. (2007) Celebrating heterogeneity? A survey of female ICT professionals in England. *Information, Communication and Society*, 10(3), pp. 338 - 357.

Hanor, J. H. (1998) Concepts and strategies learned from girls' Interaction with computers. *Theory into Practise*, 3(1), pp. 64 - 72.

Kaufmann, J.C. (1998) *Couples and their laundry*. London: Middlesex University Press.

Keightley, K. (1996) 'Turn it down!' She shrieked: Gender, domestic space, and high fidelity, 1948 – 59. *Popular Music*, 15(2), pp. 149 – 177.

Kelan, E.K. (2007) Tools and toys. Communicating gendered positions towards technology. *Information, Communication & Society*, 10(3), pp. 358 - 383.

Kirkham, P., and Attfield, J. (1996) Gendered object. Introduction. In Kirkham, P., ed. *Gendered object*. Manchester: Manchester University Press, pp. 1 – 11.

Knight, P. T. (2002) *Small-scale research. Pragmatic inquiry in social science and the caring professions*. London: Sage Publications.

Kopytoff, I. (1986) The cultural biography of things: Commoditization as process. In Appadurai, A., ed. *The social life of things. Commodities in cultural perspective.* Cambridge: Cambridge University Press, pp. 64 – 91.

Lammi-Taskula, J. (2004) Sukupuolijärjestelmä, vanhempainvapaat ja isät. In Aalto, I., and Kolehmainen, J., eds. *Isäkirja. Mies, vanhemmuus ja sukupuoli*. Tampere: Vastapaino, pp. 167 - 192.

Latour, B. (1993) *We have never been modern*. Cambridge MA: Harvard University Press.

Lipinsky, J, Nida, R., Shade, D., and Watson, A. J. (1986) The effects of microcomputers on young children: An examination of free-play choices, sex differences, and social interactions. *Journal of Educational Computing Research*, 2, pp. 147 - 168.

Livingstone, S. (1992) The meaning of domestic technologies. A personal construct analysis of familial gender relations. In Silverstone, R., Hirsch, E., eds. *Consuming technologies. Media and information in domestic spaces*. London: Routledge, pp. 113 - 130.

Lohan, M., and Faulkner, W. (2004) Masculinities and technologies. Some introductory remarks. *Men and Masculinities*, 6(4), pp. 319 - 329.

Mayer-Smith, J., Pedretti, E., and Woodrow, J. (2000) Closing the gap in technology enriched science education: A case study. *Computers & Education*, 35, pp. 51 - 63.

Miller, D., ed. (1998) *Material cultures: Why some things matter*. London: UCL Press.

Miller, D., ed. (2001) *Home possessions: Material culture behind closed doors*. Oxford: Berg Publishers.

Molotch, H. (2003) *Where stuff comes from: How toasters, toilets, cars, computers and many other things come to be as they Are*. London: Taylor and Francis.

Nass, C. & Moon, Y. (2000) Machines and mindlessness: Social responses to computers. *Journal of Social Issues*, 56(1), pp. 81 – 103.

Olsen, B. (2003) Material culture after text: Re-membering things. *Norwegian Archaeological Review*, 3(2), pp. 87 – 104.

Olsen, B. (2006) Scenes from a troubled engagement. Post-structuralism and material culture studies. In Tilley, C., Keane, W., Küchler, S., Rowlands, M., Spyer, P., eds. *Handbook of material culture*. London: Sage Publications, pp. 85 – 102.

Oudshoorn, N., Saetnan, A., and Lie, M. (2002) On gender and things: Reflections on an exhibition on gendered artifacts. *Women's Studies International Forum*, 25(4), pp. 471 - 483.

Oudshoorn, N., Rommes, E., and Stienstra, M. (2004) Configuring the user as everybody: Gender and design cultures in information and communication technologies. *Science, Technology & Human Values*, 29(1), pp. 30 - 63.

Peteri, V. (2006) *Mediaksi kotiin. Tutkimus teknologioiden kotouttamisesta*. Tampere: Tampere University Press.

Pink, S. (2007) The sensory home as a site of consumption: Everyday laundry practices and the production of gender. In Casey, E., Martens, L., eds. *Gender and consumption. Domestic cultures and commercialisation of everyday life*. Aldershot: Ashgate, pp. 163 – 180.

Prown, J. D. (1982) Mind in matter: An introduction to material culture theory and method. *Winterthur Portfolio*, 17(1), pp. 1 – 19.

Pääkkönen, H., ed. (2005) *Perheiden ajankäyttö*. Helsinki: Tilastokeskus.

Reinen, I. J., Plomp, T. (1997) Information technology and gender equality: A contradiction in terminis? *Computers and Education*, 28(2), pp. 65 - 78.

Rommes, E., van Oost, E., Oudshoorn, N. (1999) Gender and the design of a digital city. *Information technology, Communication and Society*, 2(4), pp. 476 – 495.

Rommes, E., Overbeek, G., Scholte, R., Engels, R., de Kemp, R. (2007) 'I am not interested in computers'. Gender-based occupational choices of adolescents. *Information, Communication & Society*, 10(3), pp. 99 - 319.

Rommes, E., Bos, M., and Geerdink, J.O. (2011) Design and use of gender specific and gender stereotypical toys. *International Journal of Gender, Science and Technology*, 3(1), pp. 186 – 204.

Silva, E.B. (2000) The Cook, the cooker and the gendering of the kitchen. *The Sociological Review*, 48(4), pp. 612 - 628.

Silva, E.B. (2002) Time and emotion in studies of household technologies. *Work, Employment and Society*, 16(2), pp. 329 - 340.

Shove, E. (2003) *Comfort, cleanliness and convenience: The social organization of normality*. Oxford: Berg.

Smeds, R., Huida, O., Haavio-Mannila, E., and Kauppinen-Toropainen, K. (1994) Sweeping away the dust of tradition: Vacuum cleaning as a site of technical and social innovation. In Cockburn, C. & Dilić, R., eds. *Bringing technology home. Gender and technology in a changing Europe*. Buckingham: Open University Press, pp. 22 - 41.

Sutton, R. E. (1991) Equity and computers in the schools: A decade of research. *Review of Educational Research*, 61(4), pp. 475 - 503.

Tilley, C., Keane, W., Kuchler, S., Rowlands, M., and Spyer, P., eds. (2006) *Handbook of material culture*. London: Sage Publications.

Todd, K., Mardis, L., and Wyatt, P. (2005) We've come a long way, baby! But where women and technology are concerned, have we really? *Proc. of the 33rd annual ACM SIGUCCS conference on user services*. New York: ACM Press, pp. 380 - 387.

Turkle, S., and Papert, S. (1990) Epistemological pluralism: Styles and voices within the computer culture. *Signs*, 16(1), pp. 128 – 157.

van Oost, E. (2003) Materialized gender: How shavers configure the user's femininity and masculinity. In Oudshoorn, N., and Pinch, T., eds. *How users matter. The construction of users and technology*. Cambridge MA: MIT Press, pp. 193 – 208.

Verbick, T. (2002) Women, technology and gender bias. *Journal of Computing Sciences in College*, 17(3), pp. 240 - 250.

Volman, M., and van Eck, E. (2001) Gender equity and information technology in education: The second decade. *Review of Educational Research*, 71(4), pp. 613 - 634.

Wajcman, J. (2000) Reflections on gender and technology studies: In what state is the art? *Social Studies of Science*, 30(3), pp. 447 - 464.

Wajcman, J. (2004) *Technoscience*. Cambridge: Polity Press.

Warren, C. (2002) Qualitative interviewing. In Gubrium, J., Holstein, J., eds. *Handbook of interview research. Context and method*. Thousand Oaks: Sage Publications, pp. 83 – 101.

Woodward, I. (2007) *Understanding material culture*. London: Sage Publications.

Woolgar, S. (1991) Configuring the user: The case of usability trials. In Law, J., ed. *Sociology of monsters*. London: Routledge, pp. 57 - 99.