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Making the invisible become visible: Recognizing women's relationship with technology

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ABSTRACT

This discussion paper explores a new rhetoric that might help to increase our understanding of women's relationships with information and communication technology. We have often heard the claim that women have to give up part of their femininity in technological contexts. However, it is not always femininity women have to "give up", the author argues, but rather their close bond with technology – a "something else" that has no precise name, and which for that reason can slip away in an almost invisible way. This paper claims that we need to make this "something else" become visible, suggesting the concept of "technicity" as a place to start the discussion.

KEYWORDS

technicity; gender-technology relations; gender and ICT; feminist technology studies

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A MISMATCH AND A DESIRE

Since the early 1980s we have seen a constantly growing number of feminist technology studies that have increased our knowledge about gender–technology relations. Information and communication technology (ICT) has been viewed as a field dominated by men to such a degree that men, masculinity and technology have been found to be symbolically connected to one another (Lie, 1998). Various "narratives" have developed in this field of research, focusing mainly on the exclusion of women, such as the "world without women" narrative "where women and femininity appear as matter out of place"(Sørensen, Faulkner, & Rommes, 2011, p. 45).

A subsequent narrative that has gained currency is the "chilly culture" narrative, in which the male hacker has a central place together with "observations of women choosing not to engage with ICT" and the "leaky pipeline" – women leaving technology owing to a climate they experience as "unwelcoming" (Sørensen et al., 2011, p. 47). Concepts and explanations that have been used in these exclusion-focused studies include for instance "incompatibility" between women and technology, technology as "inauthentic" for women, and femininity as something to hide or moderate in the field of technology. Over the last two decades we have seen an increasing discrepancy in Norway and other Western countries between, on the one hand, a continuing tendency to talk about women and technology as "incompatible" or as having a weak relationship, and, on the other hand, girls' and women's increasing involvement in and fascination with new digital technology (Corneliussen, 2011; Powell, Bagilhole, Dainty, & Neale, 2004; Webster, 2006). Patterns of access to and use of ICT increasingly show a generation and not primarily a gender gap (Vaage, 2013); a growing number of alternative courses and degrees in computer education attract a larger number of women than traditional computer science in faculties of science and engineering (Corneliussen, 2011), and a growing group of women find a career in the field of ITEC: Information Technology, Electronics and Communications (Webster, 2006). The growing presence of women in the field of technology also means that we have to develop other ways than concepts such as "incompatible" to describe girls' and women's relationships with technology today. The aim of this paper is to initiate this discussion by exploring how this mismatch is discursively constructed in our perception of the relationship between women and technology.

There is a widespread agreement among feminist researchers that gender should be seen as a social construction. Faulkner claims, however, that "many people of all ages cleave to the ideology of gender difference", with the result that "[t]he ideology of gender difference is so pervasive (and comfortable), it can feel like 'tilting at windmills' to suggest this approach is counter-productive" (2009b, p. 186). One reason why the ideology of gender difference remains strong is that gender categories have the ability to appear as stable or fixed (Scott, 1988; Connell, 2002). However, we also know that perceptions of gender are in fact

changing (Braidotti, 2002), that women's situations in working life have changed over the last three to four decades (Schiebinger, 2008), and that the role of new digital technology has become increasingly important and integrated in the everyday life and practice of both men and women (Elovaara, 2004). Thus, in the gender-technology relationship we can find changes in gender categories, changes in technology and changes in the relationship itself, which all lead to a continuous challenge being posed to concepts and theories we use when studying gender-technology relations. "Our agency – our desire – is critique, the constant undoing of conventional wisdom; the exposure of its limits for fully satisfying the goals of equality. It drives us to unforeseen places" (2011, p. 43), writes Joan Wallach Scott about historians of feminism, women and gender research. These words resonate with this project, which started as a thought experiment driven by an urge to explore the tension mentioned above, between the tendency to describe girls' and women's relationship with technology as a "lack" or "deficit" (Lagesen, 2011, p. 148) and a growing group of techno-fascinated technology experts and professionals among girls and women of all ages. This "desire" has indeed led me to (what for me have been) "unforeseen places", to which I now invite you to follow. There are still more questions to ask than answers to give, and I hope that this paper can contribute to further discussion of perceptions and conceptual tools that will be useful for the exploration of gender-technology relations.

CHALLENGING THE "INCOMPATIBILITY" BETWEEN FEMININITY AND TECHNOLOGY

Let us start by exploring the perception of a distance or an incompatibility between femininity and technology. Research on women and technology has taught us that women face a number of challenges when entering technological fields. Recruitment campaigns have aimed at increasing the number of women in technology, with little lasting effect on attracting women to traditional fields such as computer science. "The door may be open, but the world beyond it does not invite entry. Computing is a masculine world, in which women do not feel comfortable," explains Mahoney (2001, p. 171). As a minority, women have to deal with masculine cultures and with stereotypes, symbols and discourses privileging the connection between men, masculinity and technology (Cohon & Aspray, 2006; Corneliussen, 2011; Misa, 2010; Sørensen et al., 2011). The result is, as we saw, that "women and femininity appear as matter out of place" (Sørensen, 2011, p. 45). Thus one of the most problematic challenges women face is that while masculinity and technology in certain ways seem to refer to each other, femininity and technology seem to act as opposites and as incompatible with each other. This makes technological pursuits appear "gender inauthentic" to women (Faulkner, 2000b) and invites women to "give up" part of their femininity (Turkle, 1988; Wajcman, 2004), as has been reported in research from the 1980s until recently (Bagilhole, Powell, Barnard, & Dainty, 2008). A number of studies have illustrated how many women in technology strive to find a suitable balance between gender identity and professional identity in fields of technology (Adam et al., 2005; Godfroy-Genin, 2009; Phipps, 2007). A study from the UK gives examples of women who play down either their femininity or their technical knowledge; women who try to become "one of the boys"; a woman claiming that she couldn't be feminine because she was technological, and couldn't be technological because she was feminine; and

a woman saying that "I think if you dress too smartly, too nicely, too feminine ... you are at risk of not being taken seriously" in technology (Kitzinger, Haran, Chimba, & Boyce, 2008, p. 18). These and similar examples illustrate what seems like an endless battle, in which femininity and technology outmanoeuvre each other.

Although the examples above illustrate a conflict between technology and femininity, we need constantly to remind ourselves that it is not women themselves who are incompatible with technology. It is rather the concept of women as an opposite of the dominant image of men as technologically competent, and to the male nerd or geek. Several studies have shown that "[i]t is women's membership, not their competence" in technology that is the problem (McIlwee & Robinson, 1992. p. 138, quoted in Faulkner, 2009b). Similarly, Hofstede found that

[w]omen are not considered suitable for jobs traditionally filled by men, not because they are technically unable to perform these jobs, but because women do not carry the symbols, do not correspond to the hero images, do not participate in the rituals or foster the values dominant in the men's culture (Hofstede, 2003 (1991):16, quoted in Bagilhole et al., 2008, p. 12).

Despite women being increasingly active in technological fields, these environments (including girls and women) do not trust women to be as good at or as fascinated with technology as men. Thus women "have to put up with the fact that it is always taken for granted" that they are not as skilled with or interested in computers as men are assumed to be (Nordli, 2003, p. 170). In widespread perceptions or hegemonic discourses, women's interest in, experience of and knowledge about technology do not seem to be able to "mark" women.

With reference to her study of engineering cultures, Faulkner describes this as the "in/visibility paradox": a pattern in which "women engineers are simultaneously highly visible as women yet invisible as engineers" (2009b, p. 169). This paradox gives an explanation for why women feel they have to "prove" themselves in fields such as technology and engineering, fields that have traditionally been associated with and numerically dominated by men. In explaining how the in/visibility paradox works, Faulkner refers to "gender in/authenticity" as a way of talking about how "engineering and pleasure in technology are (felt and perceived to be) 'gender authentic' options for men and 'gender inauthentic' options for women" (2009b, p. 172). Thus gender in/authenticity has to do with conforming or not to a gender-specific norm, and Faulkner gives a number of examples illustrating "how much easier life is for those who conform to the norm" (2009b, p. 173). Faulkner concludes that "most women engineers are aware of their gender visibility and of the need for them to work harder than the men to prove their engineering credentials" (2009b, p. 176).

The important point for us here is what seems to be a constant battle between perceptions of women and femininity on the one hand, and perceptions of technology on the other. Let us move on to look at the effects of this battle.

"GIVING UP" FEMININITY – OR "SOMETHING ELSE"?

In many of the examples mentioned above it seems obvious that it is gender identity that is "under attack" and that women feel that they have to present themselves as a little less feminine to be accepted in technological contexts dominated by men and references to masculinity. In many of these stories, femininity seems to function as a barrier against women being recognized as interested in or competent with technology, and therefore also as something that women have to hide or "give up" to be perceived as having an interest or competence in technology: the signs of being a woman need to be moderated – "if you dress too smartly, too nicely, too feminine ..."

Let us start with the "giving up" of femininity. In the research projects I have worked on over the last few decades there have been a number of examples of femininity being perceived as the problem. In interviews with women in computing I have heard many stories providing examples of femininity acting as a barrier against being perceived as knowledgeable in the field, such as the claim that the male professors "don't see it coming" when a female student scores high marks, students looking disappointed when a woman turns out to be their teacher in computing, or even female students fighting to be accepted as skilled among their male fellow students. As an opposite example illustrating the link between masculinity and technology I have also interviewed a male student in computing who suggested that it was easy for him to learn computing because he was a boy, a second male student suggesting that people almost expected him to study computing because he was a boy, and a third man suggesting he would have had to hide his lack of knowledge if he had not participated in a computer class in which women dominated (Corneliussen, 2011).

These examples illustrate that while women might find that they have to work hard to be accepted as skilled in computing, men might even encounter an expectation about computer knowledge they don't have. For some women it becomes important to moderate their expression of femininity in order to be (or to feel that they will be) taken seriously in technological contexts. This is where the "giving up" of femininity appears, as with one of the women I interviewed who was careful not to appear "too feminine" when participating in male-dominated contexts. However, it is not always femininity that is under attack, as I will illustrate below, but rather women's relationship with technology, women's positive feelings for technology, their pleasure in technology, their knowledge or competence or intense engagement in technology – these were just as likely to be the things that women had to "give up" when appearing in a technological context. One example is a newspaper article presenting a group of women working as computer engineers. They were carefully described in ways that made it clear that they were totally different from male computer experts. They were certainly not nerds, and they did not talk only about technology: "Instead they talk about weddings, children, men . . . about a lot of things that often occupy women in their late 20s and early 30s" (Corneliussen, 2011, p. 44). And it was emphasised that they 'worked with people'—just as they assumed other young women wanted to. This is rhetoric we recognize from recruitment campaigns for IT education and professions both in Norway and in other Western countries (Lagesen, 2003; Woodfield, 2000), in which

a discursive space is opened for women, but tied to features associated with women (such as people skills) and not to women's potential skills in technology. Another example is the way young girl bloggers, who have become a highly visible group in Norway, are described as doing typical girls' stuff, such as writing a diary, rather than being acknowledged for their achievements and for the competence or interest in technology that is required when running a blog with daily updates, pictures, videos or polls (Dmitrow-Devold, 2013).

The power of dualism has been noted as strong in Western discourse about computer technology (Faulkner, 2000a), and as long as being a computer expert is closely tied to men and masculinity, women will appear as opposites. The simple logic is that geeks are men; therefore, women are not geeks because they are not men. In short, men are like men, and women are like women, and technological competence, interest and experience are involved only on one side of the dualism (Phipps, 2007). Faulkner points to an often-repeated claim that women in engineering have to "fit in" to "a masculine culture" (2009a, p. 4). From this perspective we can see the logic in the assumption that women have to "give up" part of their gender identity or femininity to "fit in" to a masculine culture. However, in the examples mentioned above, that is not a correct description of the situation. The presentation of the women working as computer experts is not an illustration of women "giving up femininity". On the contrary, they are reconstructed as "proper" women; they are re-feminized and re-inscribed in a traditional discourse about women, interested in things that are of interest to women, which are not technology but rather weddings, etc. Thus, unlike the women whom Sherry Turkle (among others) wrote about (1988), these women do not have to give up their femininity; they rather *gain* femininity.

Even more important is that they simultaneously lose something else, as the "technique" used to emphasize their similarity with other women is to weaken or moderate their interest or absorption in technology. They are not described in ways that make them "fit in" to the masculine culture. Instead, they are made understandable as *different* from the "male geek" – a figure we have learned to admire for his technological skills, which he has acquired because he is absorbed in technology. We could see this as illustrating the ideology of gender difference in practice, only that this time it is not femininity women have to give up, but "something else". This "something else" is tied to the role and importance of technology for the individual – in this case for women who choose a career working with technology. What makes this complicated is that we do not really have any good ways of talking about what exactly it is that is "given up" in this case. The things that technology does for and with us, and with who we are, have no precise name. Thus the "giving" up of this "something else" can happen in an almost invisible way because the "something else" does not exist discursively as a recognized "entity" or category. In addition to this "something else" itself being unnameable and therefore invisible, it becomes double invisible when we talk about women. The concept of women is not associated with a close bond with technology, and thus, apparently, women cannot give up what they have never had.

Thus the aim here is to propose a language for talking about this "something else" in order to make visible what women might have to "give up" other than femininity when entering fields of technology. This "something else" clearly has to do with our relationship with technology, with how technology is a part of us and part of who we are. This "something else" I want to point to is related, but not identical, to descriptions of how technology is merged with, extends or in other ways literally becomes part of our bodies. What I want to indicate here is rather what technology (defined broadly as knowledge, skills, routines, symbols and practices) means for how we become who we are. And for this purpose I want to launch the concept of "technicity" into this thought experiment, as one place to start looking for help to understand the importance of technology for the individual.

FROM "THE FAULT OF EPIMETHEUS" TO "IDENTITY FORMATION"

The concept of technicity has been used for different things in the past, in philosophy and the philosophy of technology. More recently, Bernard Stiegler and his work *Technics and Time* has been important in this field, and I will give a brief introduction to some of his thoughts on humanity's relationship with technology that have been an inspiration in this project. However, the encounter I had with the concept of technicity that sent me to the present "unforeseen place" was through game studies, in a work where technicity was used to talk about how technology enters identity work.

Let us start with Stiegler and his thoughts on "originary technicity" (Bradley, 2011, p. 120). In the first volume of *Technics and Time: The Fault of Epimetheus* (1994), Stiegler argues that human beings can deposit memories, experiences and knowledge in technology, as a new type of memory (epiphylogenetic memory) (Bradley, 2011, p. 122). Through technology and technological systems, human beings can transfer their memories to future generations (Stiegler 1994, p. 236). Stiegler refers to the myth in which Prometheus makes up for "the fault of Epimetheus" by giving human beings the skill of the arts, *tekhnē* (1994, p. 193). "The fault of Epimetheus", Ertuna explains, "is precisely this gift of exteriorization, or, putting the humans outside of themselves" (Ertuna, 2009, with reference to Stiegler, 1994. p. 193), making this a story about the invention of the human as a "process of becoming, whereby at every moment in history humans reinvent themselves via the technical and social object" (Ertuna, 2009).

Stiegler's thoughts contribute the idea of technology "depositing" something in us, based on our relationship and experience with technology, and the way that technology acquires meaning for us and our self-image. With Stiegler we can claim that the presence of technology in our lives defines us as much as we define technology. I will, however, move on to describe the concept of "technicity" in line with the work that first introduced me to this concept, which was Jon Dovey and Helen Kennedy's use of it to study how technology is involved in "formations of identity and power" in computer game cultures (Dovey & Kennedy, 2006, p. 18). They have taken this concept from David Tomas, who uses technicity to describe identity in the cyborg worlds of William Gibson's cyberpunk novels, and "to describe ethnic-type relations among cyborgs, especially since traditional blood ties are increasingly replaced, in threshold cyborg cultures, by technologically defined social

bonds" (2000, p. 184–185). Tomas uses the concept as an alternative to "ethnicity" in a society in which technology enters group- and identity-formations in vital ways. Dovey and Kennedy adopt the concept from Tomas and use it to analyze how technology is involved and results in specific formations of identity in computer game cultures (2006). They elaborate on the concept in a study of the "participatory cultures of computer game production and consumption", and illustrate how creativity, technical interests, and abilities produce specific expressions of identity in which technology is a vital part (2007). In the Western world today, ICTs – computers, the internet, and smart phones – have become so important that it is not imaginary, as in William Gibson's novels, but quite true that technology is a vital part of our identity formation, of the process of shaping who we are and how we live.

Dovey and Kennedy's use of the concept of technicity captures what I want to emphasize, which is the importance and involvement of technology in our everyday lives, our self-perception and self-presentation. In this project "technicity" can be defined as the role that technology plays in defining the individual, thus as a concept it can help to make visible the presence of technology in identity formation. An illustrative example of technicity is a quote from a woman I interviewed saying simply that "technology says a lot about who I am". She is not referring either to a particular technological artefact or to a particular instance of using technology, but to the general presence and importance of technology in what she sees as all aspects of her life. While feminist technology researchers several decades ago would question a study of the relationship between human beings and technology without paying attention to gender, the question today is rather whether we can study human beings or gender *without* paying attention to technology – or, rather, to the involvement of technology in defining who we are; that is, to "technicity".

TECHNICITY AS A TOOL TO MAKE THE "SOMETHING ELSE" BECOME VISIBLE?

There are yet more topics to explore; however, the question I raise here is how to make the invisible "something else" become visible. The consequences of not recognizing women's close bond with technology are many, as already illustrated. For individual women, one of the consequences is that their technological expertise is met with doubt, which is likely to keep feeding the "leaky pipeline", referring to the tendency for more women than men to leave computing (Camp & Gürer, 2002).

Another consequence of failing to see women's close relationship with technology is the way it affects reasoning for why we should want women to choose a career in technology. We have seen women being invited into computer education and the computer business, but the rhetoric is often built around feminine aspects, such as communication skills and being good with people, rather than on women's technological contributions (Lagesen & Sørensen, 2009). The problem with this strategy is that when men show the same "feminine" traits they are seen as "even better" than women because they benefit from the association between masculinity and technology (Woodfield, 2002). This also puts women in a double-bind: if they offer femininity, it is not the real thing. On the other hand, if they don't offer femininity, they have nothing special to offer, thus raising the question of "Why hire

women who act like men, when you can hire men?" (Staunæs & Søndergaard, 2008, p. 153). Thus we can easily recognize the challenge of fighting the perception of an incompatibility between femininity and technology, and in this fight the concept of technicity, by stating the importance of technology, can help to prevent women's relationship with technology from being ignored and hidden behind ideas of femininity.

As researchers, we contribute to specific discursive constructions of gender-technology relations, and the language of technology being incompatible with women in particular contributes to creating a discursive and symbolic distance between women and technology. Theories and concepts we use for research contribute to opening up as well as limiting what we are able to study and find in our research. My argument is that we need a concept like technicity to realize the importance of technology for our lives and for our identity work. It can help to make clear that what women have to "give up" is not always femininity, but rather this "something else" that I have suggested we call technicity. If we manage to make "technicity" visible we can simultaneously make it less easy to bypass the importance of technology when talking about women with active or professional relationships with technology.

We shall probably continue to discuss what this "something else" is and what it should be called, but that does not change the main challenges I have pointed out: first, that femininity is given priority as that which is assumed to be "given up", making the sacrifice of the importance of technology becoming invisible, and, second, that this becomes doubly invisible owing to the lack of a label. Third, because it is invisible it masks what is happening when women's technicity is ignored, diminished, misinterpreted or renamed in a non-technological way, owing to the low expectations about women's involvement with technology.

While a concept such as technicity can help to make this become visible, the concept alone does not solve the entire puzzle; we also need to recognize that women, just as much as men, can have close bonds with technology. Wajcman has claimed that technology cannot do anything for women's identity (1991, p. 89), while men can in a sense "dress up" in technology, and technology through its associations with masculinity can say something about men's identity (Lie, 2003, p. 259). I do not believe that this is a true description of the situation in the Western world today. More than a decade ago I interviewed women studying computing who with great pleasure described how technology made a difference to how they were perceived, by themselves as well as by others. They enjoyed being able to impress their friends and families with their newly acquired computer knowledge, and they enjoyed having gained access to what they used to see as "a forbidden and masculine world" (Corneliussen, 2003, 2005). In more recent interviews with women working with technology in Norway and Israel, many of them emphasize that technology shapes their image of themselves, as we saw in the examples above; technology makes them who they are, and none of them can imagine themselves (or their world) without technology. Also, other studies of girls and women in technology document that technology definitely matters in girls' and women's identity construction today. Lee (2011) concludes in her study that,

despite negative gender stereotyping, "women do want to work in ICT" (p. 177), but still we come across arguments that girls stay away from technology because they are "anxious to adapt to the female image" (Sagebiel & Dahmen, 2006, p. 11), which does not include technology as gender-authentic for women. Girls will probably always want to adapt to an image of being female and feminine, so we need to find ways to avoid the idea that technological competence and technological joy are excluded by images of femininity.

NEW VISIONS

It should not be a surprise that women choosing a career in technology do so because they enjoy working with it, and some of the women I have interviewed are indeed very excited by technology and share many positive experiences. Simultaneously, the same women might also have experiences in which the simple fact of being a woman becomes a barrier in their career in technology. Faulkner found the attitude "I can be feminine and an engineer" to be more widespread and more accepted now than in similar studies from the 1980s and 1990s (2009b, p. 185). My most recent interviews with Norwegian women working with technology support this, with stories from women who insist on their right to be both feminine and deeply interested and involved in technology. Although they also illustrate the "work" they have to do to be accepted as skilled with computers – to "nag to be heard", to "insist on being respected" and to constantly "prove" themselves – I think we can confirm that the relationship between femininity and technology *is* changing. "[D]iscourses and symbols change less rapidly than actual practices and people" (2009b, p. 186), and we should not trust things to correct themselves without intervention, Faulkner warns us. The suggestion of visualizing "technicity" is my intervention, driven by my desire to explore and challenge traditional and stereotypical perceptions of gender and technology – stereotypes that often are voiced in gender dualisms that are not supported in practice (Faulkner, 2009b). Thus I suggest "technicity" as part of what Joan Wallach Scott describes as our "quest for theories that could provide alternative ways of seeing and knowing" (Scott, 2011, p. 41).

When I first started this thought experiment I was struck by a vision that Cynthia Cockburn shared in 1983: "How impossible it seems to imagine a technical training course ... where women are simply in a majority" (1999 (1983)). The number of women is still alarmingly low in many branches of technology education, but we also have technology departments with a majority of women, in particular within the humanities (Corneliussen, 2011). Numbers matter, Lagesen points out (Lagesen, 2007), and we should not stop working to increase the proportion of women in technology. But it is also time to move on, to reach for new visions, and this is mine: What if "technicity" were a way of structuring our thoughts: would journalists insist on writing about what kind of non-technological interests women in computing have, or would the focus stay on their technological interests and achievements? Would women be invited into computer education because they are good with people, or could they be invited because women find pleasure in technology? Could a popular discourse that recognized every individual's technicity make it easier for girls to imagine themselves working with technology? These are some of the questions that the concept of technicity invites us to ask. The challenge

is both complicated and complex, and there might very well be other solutions than "technicity". However, it is vital to explore ways of recognizing women's involvement with technology and to find tools to help resolve what seems to be a continuous battle between femininity and technology.

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