Mutable Technology, Immutable Gender: Qualifying the "Co-construction of Gender and Technology" Approach.

Postprint version (Accepted manuscript)

Published version:

Women's Studies International Forum 66 (2018) 56–62
https://doi.org/10.1016/j.wsif.2017.11.014

Received 29 October 2016; Received in revised form 15 November 2017; Accepted 28 November 2017

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Abstract

In highly technical societies, gender is largely produced in relation to technology. In this article, we explore the effects on the construction of gender and technology when groups of parents discuss technological activities. To do so, we report the results of a research project conducted in Barcelona, in which fathers and mothers, after playing video games with their sons and daughters, expressed their opinions about that activity, the relations their sons and daughters have with video games, and their own relationship with technology. The results support the idea that gender and technology are discursively and practically in permanent co-construction and have a relatively firm relationship that guarantees stability to both. However, we find that when people are confronted with facts that contradict the dominant perception that women are technologically unskilled or uninterested, it is only technology and not gender that is flexibly interpreted.

Keywords

Gender and technology, Co-construction, Performativity, Gender trouble, Interpretative flexibility

Introduction

In the fifth episode of the third season of *The Big Bang Theory*, in searching for topics of conversation, the aerospace engineer Howard Wolowitz asks Bernadette Rostenkowski, his new friend who is finishing a doctorate in microbiology: *"And computers? Do you like computers?"* to which she responds: *"I use them, but I don't like them"* (Lorre, Prady, & Cendrowski, 2009). For some women, computers are something tedious to which they can only show their indifference (Anderson, Lankshear, Timms, & Courtney, 2008; Kelan, 2007; Rommes, Overbeek, Scholte, Engels, & De Kemp, 2007). Nonetheless, Laia, a participant in our research, maintains that computing jobs are not technical jobs but creative. These are jobs where, in her own words, "you use language to create something". Laia was a unique participant; she appeared to be the only woman in a technological company with 120 employees. However, instead of seeing herself as less feminine, she has opted to redefine computing itself to make it a profession involving a stereotypical 'feminine quality': language. In this move technology —but not gender— is flexibly interpreted.

Within the field of psychology, which is the authors' field, the problematic relationship between gender and technology has scarcely been attended to (for recent exceptions on digital family or social networking sites, see Gordo-López, 2015, Dobson, 2014a, 2014b). However, in recent decades, an entire field has emerged with an abundant output highlighting the socially constructed nature of technology and its relation to the construction of gendered subjectivities. Perspectives such as that of social studies of technology (Bijker & Law, 1992; Pinch & Bijker, 1984), by describing the role and meaning of technologies in our societies, encourage us to abandon the idea that these are neutral constructs that determine our lives with straight effects. The social construction of technologies refers to a complex assemblage of social relations and processes, which include gender, that not only affect their design, development and

implementation, but that make up their meaning, usability and efficiency. As some authors have indicated (Pinch & Bijker, 1984, 1986; Oudshoorn & Pinch, 2003), technology may be interpretatively flexible: as users also play a part in defining technology, different groups may endow it with completely different meanings. For instance, Cockburn and Ormrod (1993) showed how the microwave was shaped in a gendered way, as different gender roles were projected onto it before, during and after its design (cited in Lagesen, 2012). From a constructivist view, technology is created in social relationships, carrying social meanings and expressing social norms, and so too is gender. Therefore, it is not only the machines that get gendered, but also and especially their users. As Lagesen argues 'The most prominent theoretical approach in feminist studies of technology has been the idea that gender and technology are co-constructed' (Lagesen, 2012, p.443). As Landstrom put it "gender [should not be thought of] as an identity trait that comes from within the individual and determines their relationships with others, but as something emerging in the processes in which people and technology are enmeshed." (2007, p. 10). However, 'gender is generally treated as a stable, pre-given category that shapes the technology under scrutiny. It is black-boxed, "the content and behaviour of gender relations is assumed to be common knowledge, and their meanings are stabilized and no longer need to be considered" (Ormrod, 1994: 32)' (Lagesen, 2012, p. 444). It would appear, then, to be fruitful to look at how gender itself is constructed around specific technological settings.

As Judith Butler (1988, 1990) stated, gender is a performative effect made up of certain ways of doing and saying that persist. Furthermore, it is a contingent effect that must be iterated in order to survive. As Pujal and Amigot detailed, identification practices, which imply specific performances, are not only gestures, postures and appearances, but they also entail the intervention of language and discourses about the self: 'This is what [Butler] calls repeated

linguistic interpellation which produces a self-recognition and a self-difference in the subject in terms of identification-disidentification' (2010, p.143). These performative effects are produced within a 'heterosexual matrix'—a linguistically constructed worldview that reproduces itself by claiming gendered subjects as already having an implied desire for each other (Butler, 1990), a 'grid of cultural intelligibility through which bodies, genders, and desires are naturalized' (Butler, 1990: 194). Performativity 'is linked not only to the formation of the subject but also to the production of the matter of bodies' (Barad, 2003, cited in Morison & Macleod, 2013). Thus, it can be argued that, as language is always language in a context, we should explore how it works to position participants in relation to technological discourses and with what effects in scenarios where identity claims are made around the use of technology.

One interesting specific scenario may be video gaming practices, as it is a familiar technological space where gendered practices around technology can be easily observed and discussed by its participants. The use of video games is extremely differentiated between boys and girls, both in terms of time dedicated to them and appreciation for them (Gil-Juárez, Feliu, & Vitores, 2010; Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010; Winn & Heeter, 2009). Unfortunately, as Hayes (2008) discussed, the appreciation and command of video games is an important factor in encouraging interest in information technology expertise. The gender divide in the use of video games has been related on several occasions to a decrease in opportunities for women (Gil-Juárez, Vitores, Feliu & Vall-llovera, 2011; Hayes, 2008; Jenson & de Castell, 2005). However, approaching the subject as differences between boys and girls in the use of a particular machine, takes two givens as an explanation: technology and gender. This means that some characteristics of video games would then clash with some essential characteristics of women and vice versa. A considerable problem in tackling the digital divide in this way is that it assumes as a starting point that gender and technology have fixed qualities independent of

the very situations in which actors are involved and independent of the meanings that actors give to these situations — that is, outside the particular relationships between users and technologies, and outside the accounts that users give of their own use, and that of people around them. In this article, we aim to show how both technology and gender meanings are not givens, but rather, they are negotiated in the course of discussions around its users (Faulkner, 2001; Wajcman, 2010). To do so we analysed the accounts of a group of fathers and mothers on the uses of and interests in video games by their daughters and sons, as well as their own relationship with these games and with new technologies.

The main goal of the research we undertook was to analyse the discourses that construct gender and technology when people discuss video gaming in order to describe how both become obvious and unquestionable. We did find that reification happened, however not in a symmetrical way, since when common understandings of gender and technology conflicted during the discussion, technology's meaning became more flexible, thus guaranteeing that gender remained unchanged and could continue to appear essential and static.

Method: Video gaming and talking about it

Parents gender their children, as Kane found in her research: "[For sons], most parents made efforts to accomplish, and either endorsed or felt accountable to, an ideal of masculinity" (Kane, 2006, p. 173). To be able to analyse how gender and technology are created and stabilised in parents' talk, and to provide a relevant context for discourse on gender and technology to emerge meaningfully – i.e. not in abstract talk but in talk about specific practices around technology – we organised 6 video game workshops for mothers and fathers, their sons and daughters in Barcelona, Catalonia, Spain. The workshops took place between April and November 2010. They were planned and developed with the collaboration of a company

specialising in the design and implementation of educational and leisure projects: MARINVA. The workshops were one hour long, during which mothers and fathers with their sons and daughters could simultaneously play four games for 15 minutes each. Games were selected following the criteria that they should be diverse in their gendered common associations and in the ways they were to be played[1].

These workshops took place in different schools and community centres in the city providing us with a diverse sample from different economic, cultural and educational backgrounds. The distribution of Barcelona inhabitants is correlated with household income distribution (Barcelona City Council, 2012). The workshops and the discussion groups, ordered from the lowest to the highest household income were located in: La Teixonera, Horta, Sant Antoni, Sagrada Família and Sant Gervasi[2].

In total, 37 mothers and fathers with a son or a daughter aged between 8 and 14 years of age attended the workshops answering a call for volunteers in a study of video games. The call was made through the usual local practices of each school or community centre, normally a flyer given by the staff to the children or a notice posted on the news board. After an introduction in which we explained that volunteers would participate in research on the use of video games, we explained the consent form given to them and asked them to fill it out. We provided information on: (a) research; (b) contact details for the research team; (c) how the data would be used (conditions and guarantees for storage, archiving, exchange and safe use of data); and (d) commitment to ethical management of these (confidentiality and anonymity).

During the time they played, we made observations and took field notes for every couple (mother/father with his/her daughter/son) participating in each workshop and for each of the games. Their time playing the game was videotaped too. Although we acknowledge that these

observations possibly oriented our current analysis, these data are not the subject of this article and are not explicitly handled here.

When they finished playing, the adults and children were separated into two discrete discussion groups (6 children groups and 6 adult groups, that is 12 discussion groups in 6 different sessions). We believe this arrangement produced very specific discussions, not based on the proposal of hypothetical situations but rather tied specifically to the experience that fathers, mothers, sons and daughters had just had. The discussion groups were transcribed so as not to hinder the actual flow of the conversation, employing usual punctuation conventions so that the content would be easy to read later on. The data (video sessions, field notes, audio records and their transcriptions) have been stored safely with access restricted to the research team.

In this article, we present and discuss only the results for the groups made up of adults[3]. In total, the participants comprised 37 adults (26 women and 11 men), each group comprising between 5 and 8 adults. We began the discussion by asking which game they liked best of the games they had just played, if they liked playing with their children and if they did it at home. The discussion continued with talk of video game tastes, their personal experiences with them and regulating their child's play. Then we introduced the question of imagining their children working in that field and asked them for their practices with technology at home (who did what).

For the analysis, we considered it appropriate to follow some suggestions brought forward by Morison and Macleod's (2013) performative-performance analytical approach: to look for the common elements across discussion groups in terms of discursive resources and also to pay attention to trouble and the process of repair. To understand the identity work accomplished in an interview, attention must be payed to trouble and the process of repair. Trouble can be understood as the "difficulties with regard to the onus to remain consistent in narration"

(Morison & Macleod, 2013, p. 571). Repair can be done in the form of correcting a previous position in order to avoid criticism, but also, in Butlerian terms, to maintain the illusion of gender as anchored to the sexed body. In every group, ideas on gender differences developed relatively soon, usually when discussing tastes and developed in the discussion about future imagined jobs for the children. In trying to account for the apparent sex differences in the behaviour and the feelings that emerged during the workshop and its subsequent discussion, participants consolidated the gender binary in many ways. The final codes could be organised into three categories: "segregated worlds", "different domestic responsibilities" (which included gaming with children), and "disaffection from technology". In short, binary gender was reified through the description of two segregated worlds, apparently caused by children's individual tastes; through adults taking differentiated domestic responsibilities, specifically by fathers playing with boys' games (but not with girls' games) and being the common solvers of technological issues and by mothers not doing so even when they had the ability to engage with technological activities; and through mothers not having time to play and feeling hopeless about technology. Although the different discussion groups were relatively consensual on every one of those aspects, trouble occurred in Laia's group, the only woman participant having a technological job. In this case, technology was flexibly interpreted to avoid contradicting the gender binary.

Results

First, we present the three categories just mentioned organised around two major subjects: gaming in itself, as a gendered practice, and home, as the space where gendering takes place. After that, we will focus on Laia's group's particular interaction.

Accounting for gender in gaming

In the words of adult participants, the existence of the gender binary was reaffirmed by using the metaphor of men and women inhabiting two different worlds. As Carles stated: '*…the worlds of boys and girls are very different…*[4].' Two worlds whose differences can be observed as they live up to customary stereotypes: a peaceful girls' world compared to an active and violent boys' world:

> *...I have two girls and the games have to be calm, I mean, give them games of... a game in which you kill people and... and they're not, they're not interested, and on the contrary when my nephews come and see the games my daughters… […] they're not interested at all, there are no deaths, of course... it's that... Am I right or not? Yes, the worlds of boys and girls are very different.*

This two worlds view paralleled a common practice: the mothers from our discussion groups made clear that they hardly ever played video games with their children, mainly providing the explanation that they had domestic responsibilities to look after. As Elisabet stated: '*...but it's different with the father, because with the mother it's like... ok, they're playing, so I'll do some things, it's like... ok, they're busy, I can do things that need to be done'.* Most fathers, unlike most mothers in the groups, told us that they played video games. In fact, fathers considered it 'quality time' that they shared with their children. Maybe not surprisingly some fathers made clear they were very actively involved in their sons' games, but that this did not occur so clearly when it concerned their daughters' games: '*I never play with them'* said Xavier. But mothers did not play with their daughters either. Therefore, for girls, playing video games had easily become an activity that adults did not share with them, sending them the message that grown-up women do not play.

In electronic play, as with traditional play, genders are practised, tastes and interests are tried out and preferences are established that usually coincide with the cultural mandates of gender (Jenson & de Castell, 2011; Walkerdine, 2006). Unsurprisingly, the absence of technologies in the girl's world looked correct and even desirable:

> *but for example, it is interesting too when my daughter's friends come, normally they don't play that, but maybe it's because she is a girl, right? Maybe it's more a boy thing, right? Playing video games, but the girls play, really, like all kids should, they play...they put on dresses, or they play theatre, I don't know, things like that* (Thomas).

When girls play *'like all kids should',* they are normatively constructed as appropriate to what is expected of a healthy childhood. Remarkably, in this excerpt only girls corresponded to this nostalgic construction of a *good* childhood, the a-technological childhood. The 'good girl' trope (quiet, peaceful, caring) (Walkerdine, 2006) was thus re-enacted within the technological practices discourse.

Sex differences in play and in the feelings involved in play were usually organised around statements about children's personal preferences. These were considered personal options about which parents should not have an opinion, for individual tastes were something to be respected. These personal preferences were not seen as provisional during the discussion, but established as hard stable facts; they were put forward as interests that last over time and were uninterrupted, continuing into adulthood. For instance, Susanna said that she has always considered herself *hopeless* with computers, clearly to indicate a stable disposition. In fact, when Susanna commented on the only game she liked, she recreated an emotional world that was very negatively oriented towards video games:

> *So, maybe that's why I like it, right? But I also think that it is very... it's very cool, it's the only one that doesn't make me suffer, I mean, that it doesn't present...a... yes, a situation of finding myself with something that I can't solve, and not... and not enjoy it, you know? That is what happens to me with video games, they're too much for me, I don't...I don't enjoy them* (Susanna).

Discussants managed to produce arguments that always developed in such a way as to confirm the gender dichotomy. This was achieved by maintaining that there were differences between men and women in practices, uses, tastes, needs and habits and accounting for them as individual choices or preferences (Rommes et al., 2007). This in turn had the effect of naturalising that difference, anchoring it in the private/individual world and not the public/social one. In an argumentative context in which categorical differences were denied as such and explained by individual preferences, the 'different worlds' metaphor managed to remain: mothers did not play, girls were not supposed to and video games were a possible cause of anxiety and suffering.

Accounting for gender and technology at home

Following our question about who does what at home when technological stuff is involved, a gendered division of tasks was usually described, as appears in other domains (Breen & Cooke, 2005; Tremblay, 1997). Three main reasons were offered when the participants tried to account for this domestic division: different abilities and knowledge, habit or individual interests. Although gender was invisibilised, as it did not surfaced explicitly as a possible cause, the resulting domestic arrangement was clearly gendered.

Usually the first account that justified the 'sexual' division of technological tasks was an account of the different abilities and knowledge the members of the couple have. For example,

a division of people from the "humanities" and people from "science" regarding interests, tastes and personal skills overlapped in the interviews with a technological divide. Susanna attributed her low skill and interest in new technologies to the fact that she was from 'humanities': 'a*nd maybe because I don't have that skill, I mean, that matters too, doesn't it? That…that I'm more from humanities*'. Xavier, in answering the question about who was in charge of appliances at home, gave the same explanation, making it clear who studied humanities and who studied science, and assuming that this explained the home distribution of tasks: '*In my house I do it because I studied science, and my wife studied humanities...'.* But even when this explanation was not possible, e.g. when both members of the couple were 'science' people, the symmetry in skills did not changed the division of tasks. *'...no, at home we all studied science, but Josep does it more than I do, and I... if he does it, then I don't have to worry, I mean I do other things, but if he needs me I get involved too, but...*'… The justification in this case was based on the fact that she did 'other things', but what finally happened at home was that the male member of the scientific couple managed the electronic appliances.

A different account of another gendered division of tasks emerged when both members of the couple shared abilities and knowledge. When Laia, the participant with a technological job, told us that: '*... as far as arranging hardware is concerned, I mean apparatuses, my husband does it, but I do the I.T. I mean, when it comes to software, I know more than he does, and he knows more about equipment than I do',* she shifted to a different gendered arrangement: men take care of the hard part of technology (hardware or apparatus) and women take care of the soft part (software or code) (Guerrier, Evans, Glover & Wilson, 2009). The hardness or softness of technology is a product of discursive negotiations and not a given fact. Video games offer a clear example of that as they are present on both sides of the *hard-soft/code-machine* dichotomy, and in their manufacturing men are present on both sides of this dichotomy. In this

case, this hard-soft dichotomy appeared when a troubling gendered situation had to be accounted for: Laia actually was technology proficient. Situating herself in the soft part of technology allowed her to save face (Goffman, 1967) in that situation, maintaining both herself and her husband on the 'correct' side of the gender binary.

In a cultural and political context in which public discourse cannot explicitly support inequality and thus gender becomes invisible (Rommes et al. 2007), this division of tasks brought about more justifications, such as *habits*, as Carles told us:

> *... I mostly do the more technological things, but, that doesn't mean my wife doesn't do things either... but, it's that, sometimes, we do things out of habit, don't we? Electronic things or connecting things, well… it's set in stone that I do it, but she could do it perfectly well.*

Or individual *interests* can also be used to build a justification of this division:

> *... I don't mean to say that at a given time she couldn't do it, but I think that she hasn't needed to do it, and anyway, I think she doesn't like it, and it's combined with the fact that, maybe I like it more, you know?...* (Joachim).

Under an egalitarian discursive regime, differences in individual tastes were used as a justification for inequalities in practice. As per 'needs talk', 'individual differences' talk also "allows for value judgments and normative relationships to appear as timeless and universal facts and lends them moral force" (Lawler, 1999, cited in Morison & Macleod, 2013). As pointed out by Rommes et al. (2007), the combination of gender egalitarian discourses seen as an accomplished fact with the individualist discourse presented by the choice of a profession or an activity as something based on interests, tastes and merits, systematically hides the consideration of tastes and 'choices' as something that is affected not only by access to social,

cultural and economic resources, but also by being part of a society that has different expectations for women and men. Similarly to gender discourses, equality discourses have also performative consequences. Normative discourses about individual differences in tastes embedded in equality discourses reiterate assumptions regarding gender-segregated practices, which remain intact, albeit unspeakable.

Technology Trouble

As Morison and Macleod (2013) stated, to understand identity work, we must pay attention to trouble and repair. Trouble emerges with the difficulties in remaining consistent in narration (Morison & Macleod, 2013). Repair can then be done by correcting a previous position in order to avoid criticism and also to maintain the illusion of gender as anchored to the sexed body.

During the discussions of fathers and mothers, technology changed in its nature with relative ease

- *Interviewer: Do you imagine her working in the technology industry in the future?*

- *I can't imagine her in that world; I see her focusing on other... more, tangible things, because I find all of this to be more unreal, you know? So her, no, I can't imagine her like that...* (Isabel).

Whereas technology was presented as not suitable for a mother and her daughter, because of it being intangible, in the following excerpt, which was produced in the same group shortly after the preceding, it was posited as not suitable for women in general, but precisely for the opposite reason, for being too manual and concrete. A biological explanation emerged in the discussion and the nature of technology was apparently adapted to the requirements of the argument:

- *It's different, a woman's brain, there are a lot of studies about it. A woman's brain is very different from a man's brain, so the trend is, technology, manual skills are another thing that seems to be more aimed at men, in the brain...* (Jaume).

Therefore, there seemed to be an implicit consensus about the fixed nature of gender that seemingly forced technology to be redefined in order to fit into the variety of relationships women have with it. An important instance of that occurred when one of the groups was confronted with a mother who did work with technology, something that is not easily accommodated in current models of femininity (Bury, 2001; Faulkner, 2007, Kvande, 1999). It is important to look at the entire sequence to see how this evolved during the discussion:

- *It is that it is not..., I mean, the technological part does not have anything of a manual technique, let's say.* (Laia).

- *Yes but tech...* (Jaume).

- *It is super-rational, on the one hand, and super... I do believe that precisely it combines, with much balance, what is of girls and what is of boys, and I believe that few things are so... reflect so many different parts of intelligence.* (Laia).

- *We can't, eh, I mean, particularise, I mean, the fact that there are women who work in technology does not mean that, I mean, it's not the general rule, I mean, the trend of sexes I think, has been studied quite a lot, hasn't it? One thing is the... manual skills, which appear to be stronger in the man's brain, and we don't know why... and it's not... but it is stronger than other activities that women have. They have qualities that men don't have* (Jaume).

- *And what qualities do women have?* (Laia).

- *I, the job you do, I don't know, eh, but maybe it's more creative than technical, is it?* (Jaume).

- *Of course, of course* (Daniel).

- *No, what's happening is that...* (Laia).

- *Because of course, if you do little drawings, and so on, and the result is something very pretty...* (Jaume).

- *First of all, I do not d[raw]...* (Laia).

- *Maybe not…I mean, when I talk about technical, technical-scientif... I mean scientific-technical* (Jaume).

- *...the procedure matters more to them than the* (Isabel).

- *...pure physics, pure engineering...* (Jaume).

- *...than the result* (Isabel).

At this point, one of the discussants asked if this was all the time allotted as the time was already consumed and the discussion ended somewhat abruptly. We closed the discussion group and thanked them all. When everybody stood up, Laia approached Jaume and told him:

- *Do you know what happens? They are fundamentally creative careers, it's not, you can't say: it's creative and as a result it's not that technical* (Laia).

- *Bu...* (Jaume).

- *No, no, no, but that they are fundamentally creative means that you have a language, you have a language and you have to use it to create something, and that is what it is to be a... computer specialist* (Laia).

During this sequence, Laia firstly transformed Jaume's assertion that technology involves manual skills, stating that on the contrary, it is, on the one hand, 'super-rational', but she did it without questioning brain differences and accepting that there were boys' and girls' parts of intelligence. In the controversy, it appeared to be easier to change technology's characterisation than the brain's. Following this, Jaume insisted on the manual character of technology, therefore making it not suitable for women because of brain sex differences. Now technology was made tangible, something you deal with, literally, with your hands. Nevertheless, Laia's job made the discussion uncomfortable, since she was not in an expected professional situation. When Laia attempted to question Jaume's statement by asking sarcastically about women qualities, she found that her own work within the technology field was undermined. Her job in digital post-production of animation became drawing pretty pictures. When Laia attempted to defend herself from those who questioned that her work was truly technological, her interlocutors changed the nature of technology again. Thus, the idea that technology was not manual but *scientific* was developed. If you are a woman what you do cannot be technical, or correspondingly, technical has to be something different from what you do. The manual nature of technology disappeared from Jaume's statements to become "rational" (as Laia was arguing before), converting technology into something *pure*, meaning closely linked to pure science, as opposed to an elided applied science. Now, technology was changed, in Isabel's words, into being more interested in the *procedure* (abstract) than in the *result* (concrete). This rhetorical strategy managed to maintain gender in its place. Technology, something apparently so material and so solid, dissolved, deformed, molded and modified itself to the heat of the discussion.

When Laia, who had been debased, took Jaume aside, she did so to return technology to the field of the stereotypically feminine: creativity and language. A turn was brought about in the nature of that which was technical. However, in exchange for this turn, gender was maintained as it was. Bringing technology closer to a field reputedly feminine preserved femininity as the sphere of creativity and language. This last version of technology managed to move it from the field of masculinity to that of femininity. In this case, when trouble appeared, a thorough work of repair to maintain consistency was undergone. However, as maintaining both technology and gender consistency simultaneously was impossible, technology unceasingly mutated its character – but not so gender. It is arguable that faced with such a dilemma, gender, as being much more central to social order, was given priority. The illusion of brain differences, as a metonymy of the sexed body, was maintained.

Discussion

Throughout the different discussion groups, the gender binary was kept immutable through: (a) the justification of household task divisions due to different interests or habits, even when there is equal knowledge; and, (b) the taken for granted different leisure interests boys and girls have. However, as shown in our last excerpt, when people were confronted with facts that contradicted the dominant perception that women are technologically mediocre or uninterested, technology and not gender was flexibly interpreted. As Lie (2003) synthesizes, apparently people "find it easier to redefine what ICT is than to change their own and other people's ideas of gender differences' (Lie, 2003: 29). Landstrom (2007) suggests that it would be beneficial to the project of understanding the coproduction of gender and technology to conceive feminist theory as a 'struggle to render more mobile, fluid, and transformable the means by which the female subject is produced and represented' (Grosz, 2005,p. 193, cited in Landstrom, 2007). Actually, some authors argue that "gender identity seems to be a [...] flexible concept as the

meaning of masculinity and femininity seems to shift between contexts, might be irrelevant or downplayed in a situation, or subverted in another" (Nentwich & Kelan, 2014). Although it may seem paradoxical, this flexible character apparently does not exclude the possibility of its reification.

The cherished possibility of overthrowing the givens we live by can only occur within the same spaces in which domination is produced and reproduced. In our highly technical societies, gender is largely produced in relation to technology, and it can only be fully resisted through this same relation. As co-construction of gender and technology proponents suggest, how we understand, perceive and perform gender is not only the result of discourses about what it means to be a woman or a girl, it is also linked to a technical fabric comprising objects, devices and procedures associated with them (Wajcman, 2004). These contribute to stabilising and making certain norms, attributes, categories, guidelines and ways of life last over time. By describing a world in which girls do not have skills or interest in technology, this world comes into existence. However, the usual idea of the mutual co-construction and mutual stabilisation of gender and technology (Faulkner, 2001; Oudshoorn, Rommes, & Stienstra, 2004; Wajcman, 1991, 2004) needs to be qualified for it is not a symmetric process.

In the first two parts of our results section, we have seen that Butler's insight – that gender is an appearance constituted through the repetition of normative acts that respond to concrete interpellations from the discourses in which we live – can be incorporated into a co-construction of gender and technology approach. In addition, following our interpretation of the long sequence commented on in the last part of the results, we can also wonder with Butler (1997, p.19) if "that constitution is necessarily final or effective". As Butler stated, these interpellations and reiterations may lead to *defective* repetitions of social mandates, which open up transformation possibilities (Pujal & Amigot, 2010). Laia's effort is not, despite everything, an

insignificant effort. The mutable citation of technology her presence and positioning generated, may pave the path to other possible citations of gender. If, as she argues, computing is language and creation then it is incorrectly located on the masculine side of the gender dichotomy, according to the prevalent stereotypes in the western world. Laia's argument facilitates the emergence of a different comprehension of computing, a comprehension that removes it from its usual location and allows it to be situated in a space shared by everyone regardless of its ascribed gender. In the long run, only the emergence of more of these androgynous spaces could bring about the breaking up of a dichotomous gendered life.

In their discursive displaying sex differences were solidified. However, the same did not occur with technology; surprisingly, as technology is commonly considered to be at least as material and solid as a gendered body, if not more so. For this reason, it is not possible to establish any plan to resist the gender binary if we do not first understand that if technological spaces persist as spaces of great inequality it is because while the meaning of technology is flexibly interpreted when needed, the meaning of gender is not; on the contrary, technology is flexibly interpreted to avoid making gender flexible.

Conclusions

According to Landstrom, 'an analytical asymmetry […] has haunted feminist constructivist technology studies from the outset' (2007, p. 10). The fact is that while technology has usually been approached in these studies as gendered and having different meanings, uses and effects, gender itself, even when it is discussed as a social and cultural construction, has largely been dealt with as a fixed and evident construction (Bray, 2007; Lagesen, 2007; Landström, 2007). Now, it is clear why: the gender binary is strongly rooted in technological discourses and

practices and will not be destabilised if technology is assumed as having all the flexibility. However, infusing performativity in this field can give us some tools to understand its powers, imagine new forms of destabilisation, and maybe avoid reproducing common discourses within academic reflection.

Co-construction of gender and technology approaches could benefit from incorporating Butler's work on the performative effects of the repetition of social norms and of interpellation: to "make sense of the role of technology […] in the re-assembly of how people construct themselves and their actions" (Lagesen, 2012, p .442), and, to avoid "the risk of 'black-boxing' gender as an analytical tool, which leads to 'an artificial analytic closure' (Gill and Grint, 1995: 20)" (Landström, 2007, p. 10). In this work, we have considered gender as the result of repeating norms and identity speeches made by our participants in relation to technology. Probably, the mere presence of a masculine designed technology constitutes a permanent reminder of how to act in front of it – a permanent interpellation made by technology's presence. Actually, technology is also performative in materialising the body, and it does so through very effective performances (McKenzie, 2001). The efficiency of machines makes efficient the people who work with them; they impose their rhythms like in an assembly line, on what they expect from you. As Conquergood remarks (2002) if we have to recognize the embodied knowledge, 'the practical knowledge through [which] corporeal lives are lived' (Loxley, 2007, p.153), we have to acknowledge not only the know-how but also the know-who, that is the who does what with technology and how they 'assemble'. As Landstrom comments: '"Assemblage" refigures subjectivity as constituted in complex relationships with technology, placing the relationship as the crucial mechanism, not identity' (Landstrom, 2007 p.17). When looking closer at this assemblage, through our participants' narrations of their and their children's relations to technology, we have seen that it is produced within a heterosexual matrix and simultaneously

within a set of equality discourses that silence its gendering. This immutability of gender contrasts severely with the mutability of technology.

Analysing the resistance to the bending of gender categories can be politically frustrating but can prove fruitful to avoid essentialist backlashes. As 'talk performs the gender difference that heteronormativity requires' (Landstrom, 2007, p. 20) feminist claim that things could be otherwise needs to rest on accurate accounts of how gender is performed by talk in specific contexts. Other talk is possible; however, it is not here yet in parenting involving technology.

Funding

This work was supported by the Spanish Ministry of Science and Innovation (Grant :CSO2008-05203-E/SOC).

Notes

[1] The selection criteria for the games were:

- That their recommended ages were between 8 and 14 years
- That 2 players could play them simultaneously (a mother or father and daughter or son)
- That they could be played in 10-15 minutes
- That they implied a variety of accessories
- That both games of competition and cooperation were included.

4 games were selected according to these criteria:

- 1 PC game of simulation and cooperation (Spore. Creature creator)
- 1 Console game created to play in a cooperative group or family (Super Mario Galaxy for Nintendo Wii)

- 1 Console game with traditional gamepads for sports competition (Shaun White Snowboarding PlayStation)
- 1 Console game with an alternative accessory like dance pad (Dance Factory for PlayStation)

[2] Assuming a figure of 100 for Barcelona global household income index: La Teixonera has 71.3, Horta 80, Sant Antoni 94.8, Sagrada Família 95.3 and Sant Gervasi 187.9 (Barcelona City Council, 2012).

[3] Unfortunately, although children's views should also be taken into account, discussions in children's groups were not as rich as in parents'. They explained their practices and affections rather succinctly, and did not really engage in the discussions as parents did, therefore making reliable interpretations practically impossible.

[4] Like this one, the quotes in this article were originally in Catalan or Spanish and were translated by the authors. All first names mentioned are not the real names of the participants.

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