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Gender and Technology: new capabilities or old masked prejudices?

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Editorial

The concept of "gender" is pervasive in our societies, and therefore its influence shows also with respect to technology. The interdisciplinary field of study which analyses the relations between women, men, gender and technology, named Gender and Technology Studies and developed in the Seventies, critically analyses and debates a number of technologies: reproductive, environmental, information technology, used at home or at

work. In recent years, a process of deconstruction of technology has been set up, which is parallel to the deconstruction of the concept of "gender" (Bencivenga 2015).

Understanding and discovering how technology may be involved in gender inequalities can allow us to get to more democratic technology forms and also to a more conscious use of technology. The contributions collected in this issue of "About Gender" represent a useful addition to the study of these relations; they attempt to explore their implications from different approaches, with the final objective of fostering a deeper reflection and discussion, devoting special attention to the capacity of *new* technologies of conforming the world.

Clearly, it is not possible to comprehensively deal with all the aspects involved in the debate about gender and technology in this paper, we can only offer some thoughts for a debate, which, in our opinion, is critical. Above all, because the ideology which comes with the new products and discoveries brings with it an increasing authority which is at risk of presenting everything that it determines, or that it contributes to determine, as something "natural" and "necessary", and not as something that is due to the peculiar path that history has taken for some casual and contingent reason[1].

However, the long term social effects that these new technologies determine are not known and it is not obvious that the current configuration of a problem is the best possible, the right one or the true one: we do not have to agree with the so-called experts without asking for a good explanation. Following this critical approach, we cannot disregard how the world of new technologies has been modelled within a male perspective, conveying a knowledge filled with gender connotations. We should reflect, for instance, on the fact that the majority of those who collaborate with Wikipedia are men (more than 90%)[2] and it is quite startling to realize that only 13% of innovative start-ups in Italy are founded by women[3]. The data slightly vary in other European countries, but they do not change a widespread gender gap which is also reflected in the

[1] Amongst the many historical cases, we may recall, for instance, how the evolutionary advantage of black africans against malaria has turned out to become a social disadvantage once they arrived in the American fields, as it made them the best slaves, encouraging raiding them in their countries (Harari 2014, 175). Moreover, of how maybe how the conditions of the first human farming communities have casually contributed to the differentiation of the social roles between men and women (Pozzolo 2011).

[2] http://27esimaora.corriere.it/articolo/wikpedia-un-sapereal-91-per-cento-degli-uomini/

[3] http://www.ilsole24ore.com/art/tecnologie/2016-03-08/le-startup-donne-sono-solo-13percento-italia-101933.shtml

tech sector. It is a gap that arises out of a cultural void, which shows how digital knowledge is developed on the myth of equality, of blindness towards the differences that do not relate to mere competence, without considering the attribution of advantages/disadvantages at the starting point. A myth that has also fed the idea that technology had some natural antibodies against offline discrimination. It is a belief that does not seem to find any kind of empirical confirmation, but that, unfortunately, has been perpetuated until today, preventing the carrying out of actions that could make it possible in reality. On the contrary, for a long time the development of a critical dimension in the technological sector has been hindered, and when it was actually introduced, this dimension remained - sadly all too often - limited or reduced to sterile ideological oppositions on the benefits or disasters that the new technology of the moment would have automatically determined. The so-called counterculture, so to say, is and has been "counter" only under certain aspects, shadowing others. After all, it grew out in a social context founded on race, gender and economic dynamics, as discriminatory factors, that are not at all neutralized by the mere use of technology, but only come out modified, reshaped, moved; so that, that aura of freeing energy that was initially attributed to technology has ended up hiding the existing inequalities[4] and, in certain cases, even creating or generating new ones.

The stereotype of the tech expert is still definitely male: even up to today the STEM field (Science, Technology, Engineering and Mathematics) is perceived as de-womanizing, a characteristic that, moving from person to person, creates a vicious cycle, reinforcing the stereotype that keeps on rejecting women (Kessels 2014). Even if women use and work in technology, when talking of a "geek", it is still a man that is pictured in one's mind. It is interesting to think about the famous TV series *Big Bang Theory* and what its characters do for a living. The four main male characters are all dedicated to the "hard" sciences (physics, astrophysics, engineering), whereas the three women are a broke actress that works as a waitress and two scientists who, coincidentally, deal with microbiology and neurosciences, reminding us of how, from

[4] Gianformaggio (1996) distinguishes between inequalities and differences «in nature, if we can put it this way, there are equalities and differences, but no inequalities » (54-55). Gianformaggio then notes that «[in some cases] "Equal" means worthwhile, whereas "different" means inferior. This connotation of equality is the *sameness,* and the difference is the sign of exclusion » (55-56) (translation by the authors).

the projections that are currently available on the enrolments at the faculties of medicine, the future doctors will mostly be women. It is clearly a phenomenon that can be read through different lenses, all in all it could be seen as a positive result[5] but, considering how these are still sectors connected to life, to its reproduction and protection, instead of being part of the so-called hard sciences, we cannot but wonder: are we witnessing the production of a high-profile occupational segregation?

After all, it is known how stereotypes have an impact on the life choices of people, generating an effect that determines a self-fulfilment of what has been thought as likely. Hence, the push towards typical feminine or manly paths of study already comes from the family, where parents tend to expect different results based on the sex of their children (Viljaranta et al. 2015).

Since technology is widespread at all levels, from domotic homes to the reproduction of the species, from the production of goods to the new models of instruction, for a clearer vision of the relations between gender and technology, it appears useful to adopt a multi-perspective approach, which adequately highlights how technology both builds social events and is built by them at the same time, in a cycle which structures its perception and determines its developments and future changes, both technological and social. In this direction, to fully understand the causes of the persistence of the gender gap in the STEM field, it could be useful to take into account the methodology that comes from the studies on intersectionality. It seems indeed to be possible to identify multiple causes, more than single experiences, amongst the reasons of the lack of inclusion of women in these areas of study and work (Schoon 2015).

The field of studies named "Gender and Technology", the concepts that are at its basis and their evolution reflect the interest raised in the past sixty years in the fast evolution of technology, including information and communications technology.

The first studies that have critically reflected on the role of women in technology date back to the end of the Seventies and shortly follow the first analyses on the role of women in science (Harding 1986). The combination of gender and technology has been an object of analysis especially since the eighties of the past century. At first, the attention was devoted to the attempt to understand how some stereotypes had evolved:

[5] So like the whole sector of "bio" in University courses.

for instance, the belief for which men would be different from women for their alleged superior (if not exclusive) technical and manual skills. Hence the tendency of men to understand the functioning of an electrical system or the motor of a car would have been read as a "natural" tendency -today we may call it *genetic* - that was absent in women, but that would be "compensated" with their likewise natural and exclusive ability to deal with technology in other fields, like the domestic one (Cockburn and Omrod, 1993).

This technological determinism has long curbed the awareness of the patriarchal character of technology in the eyes of the selfsame feminist scholars, but towards the end of the Eighties new constructivist approaches emerged, offering new insights for the feminist studies of the time. Attention was devoted to unveiling how the social construction of gender would pass also through the development of technology and its usage. The change of perspective has pointed out the role of women in the production and consumption sectors, favouring the reflection on how interactions amongst the different actors could have the power to influence technology. At the same time, there was the perception of a need of studying how, in turn, technology influences relations amongst people, creating and modifying social relationships, which are considered as contingent constructs and not as unchangeable a-prioris (Wajcman 2000).

In order to analyse the root causes of the technological gender gap, Sciannamblo's contribution (*"Binary codes. A gender-informed discussion on professionalism in the nascent digital computing"*) retrospectively reflects on the genderized construction of a profession/ality in the technological field. Reading back on the experience of the ENIAC project, Sciannamblo points out how the high number of people present in the technological field in those years was due to the fact that, the men having been called to the front, the women's labour force had substituted for them. This emancipation forced by the war is thus merely apparent, since it is emphasiseded how these women employed in highly technological projects, who worked at very high levels of complexity and innovation, would be considered to do a "non professional-oriented" work, so that they were not identified as individuals but as a group: the "ENIAC girls". This allows us to underline how it is not sufficient to just approach women to technology to destroy the stereotype.

In the same years when reflections are devoted on how the development and the use of technology influence and contribute to the construction of gender - and perhaps encouraged by these studies - a new and increasing awareness of how technology embodies highly patriarchal values in the Western world arises in radical feminist theory. In this perspective, attentive studies have been carried out on the new medical reproductive methodologies (Denny 1994) and on the increasing medicalization of life.

The contribution of Lia Lombardi (*Reproductive technology in Italy between gender policy and inequality. Can we speak of social infertility?*), published here, reflects on the social effects of this massive medicalization, especially in the reproductive field. It is beyond doubt that there is a pivotal influence of the new reproductive technologies in encouraging new parenting, so that medicine itself tends to become a regulatory tool of social behaviours, even more than other traditional factors; allowing for example the separation of a woman's body of from maternity, one acts on her work choices[6] and the construction of her family ties. Nonetheless, the influence of technology is ambivalent and in many cases it seems to reinforce gender stereotypes instead of solving them. For example, studies evidence how, while male infertility represents a stigma, female infertility would not be perceived in the same way, a woman does not lose her *sex appeal*. This difference, in a way that is only apparently paradoxical, leads to emphasize the research on the incapability of the female body to generate, in the attempt to turn away the spectre of the stigma from the male universe, with the strange effect of actually reinforcing traditional gender roles. On the one hand, indeed, medicine allows the decomposition of the body in its parts, something that seems to prelude to a generic sexually "undifferentiated"; on the other hand, however, it also tightly reties to the bonds and the roles, rooting them through genetics and medical science.

The emergence of the Internet in the past thirty years or so has offered the chance of an innovative study on the influence of technology on gender thanks to the rapid and radical mutation that the use of computers has determined; these are tools used not only at work but also for communicating and for recreational purposes. Studies on gender and technology have progressively found new fields of analysis: technology is not only

[6] http://www.wired.it/economia/lavoro/2014/10/16/perche-congelare-gli-ovuli-unottima-possibilita/ https://www.theguardian.com/technology/2014/oct/15/apple-facebook-offer-freeze-eggs-female-employees

constituted by objects, but also by culture, and as such it is implicated in the construction and evolution of individual identity (Haraway 1980, 1991), including gender identity. Here is how the feminist critique of cyberpunk literature, where misogynistic nuances have been evidenced, and the reaction to a pessimistic perception of technology have contributed to the production of a cyber-feminist vision: where cyberspace and internet are considered as tools for the dissolution of social constructs like sex, gender and sexual difference.

Rosa Traversa's contribution (*New Feminist Movements And The Challenge Of Micro-Politics In Italy: The Case Of 'Femminismo A Sud')* analyses the current cyber activism as a practice able to articulate space and materiality as political subjectivities. To do so, the author analyses the passage between public and private spheres in the context of a blog, unveiling the political interaction between means and aims.

From the years 2000, a new perspective has developed that sees both technology and gender as socially constructed, in a process of reciprocal modelling which makes the understanding of the one difficult if not in pair with the understanding of the other (Lohan and Faulkner 2004); at the same time, the post colonial and post-gender perspectives have broadened the field of analysis, including new characters. The relationship between technology and knowledge has been studied under a gender approach also in organisations where, in particular, the study of cognitive processes has allowed a better comprehension of those aspects that can influence the use of technology in a professional field. The work environments have been seen as privileged places where men construct their male identities, their interpersonal relations and, as dominant gender, they model the female gender (Martin 2001)

The reflection on telework proposed by Francesca Cilento and Eleonora Brivio (*Telework as a female opportunity of conciliation between family and work: an Italian study*) shows the importance of continuing to analyse it, at least in the Italian context, paying attention to the scarcity of knowledge still shown by many employers and to the parallel lack of professional, personal and even cultural recognition of teleworkers, especially female.

Today we keep wondering about what role gender plays in scientific research and in the development of technologies. The approach remains interdisciplinary on all levels,

research, development and teaching, thanks to the interaction of information technology, social sciences and cultural studies (Horwath, Kronenberger, and Appel 2014). Even the program of research and development of the European Union, Horizon 2020, starting from 2013 has introduced gender as a transversal priority to take into account in the single European projects (Schiebinger and Klinge 2013). This choice has a significant potential for the diffusion of the concept of gender in all the various phases of technological research in the context of STEMM. In this direction, the contribution of Clementina Casula (*Filling the Gender Gap in STEM fields: Effectiveness and Ambiguity of an Empowerment Policy*) encourages a reflection on the measures that have been implemented for reindorsing the female position in the context of STEM. It is indeed clear that the reasons behind the technological gender gap are manifold, but nonetheless the measures implemented for developing female empowerment are still sectorial and fragmented, although necessary. The study proposed by Casula correctly shows how the stereotype of the conflict between women and technology is taken by women themselves in a perceptive cycle that reinforces it and self-fulfils it. To contrast this negative effect, an important role is taken by all the measures, amongst others, directed to the sharing of positive examples of good relations between the feminine world and technology. Indeed, as it has been for other kinds of personal narratives (for instance, violence) of sharing of experiences, in these dialogical modalities women find the self-esteem and the determination of which they have been deprived by the stereotype.

Feminism in the Seventies did not manage to "pass the baton" to the next generations of women[7].

If what stated by Tullia Carettoni Romagnoli in an interview to Catalano appears extreme, when she affirms that "there was a will of not passing the baton"[8] to the next generation because the idea was that each had to reach their own awareness, surely there has been a delay, an hindrance in the generational passage of feminine awareness of the patriarchal structures. However, the preceding generations achieved conquests that have lead to new social conditions from which other generations of women have moved and

[7] Inter-university working group on women's political subjectivity 2011.
[8] Catalano 2013, p. 148.

move, trying to retrieve a common horizon of claim for change, with the awareness of wanting to share it with the next generations. It is an "horizon" that perhaps we are progressively reclaiming, encouraged by the social "counter-reform" that has become particularly insisting in the last few years, bonding with the discourse of the economic crisis even since the first years of the century[9].

This is not the right venue to investigate the reasons behind the generational break in claiming, but in some way the unawareness of sexist stereotypes of many young and very young women can find an origin in this discourse. Of course it is not the only one, and on this point it may be interesting to refer to the freading *I frutti del backlash: la scia di sangue del neomaschilismo* published in the blog Femminismo a Sud discussed by Rosa Traverso in her contribution[10].

In the past, it might have been possible to think that the pervasiveness demonstrated by technology could have made it a neutral tool of common usage. On the contrary, its penetration in private and working life has not had a particular impact on the removal of gender stereotypes; conversely, it has in part modified them, showing a change, that was not, however, introductory to their elimination, so that it ended up obscuring its repositioning. The diffusion of technology has contributed to opening traditionally male jobs to women, but it has not undermined the social hierarchies: it has only modified them, aligning them to the new needs. For instance, the alleged female unreliability on the *public s*phere continues to have a role in the corporate culture, where women are usually assigned to computers like their colleagues, but thanks to the political use of maternity, on the one hand they are described and lived, therefore reconstructed, as a *disturbance* when they are on maternity leave and, on the other hand, by the same mechanism, the model of the "absent-minded moms" in the workplace is constructed[11]: because, being mothers, they cannot be as dedicated to their work as their male

[9] On this point, we refer to the entire volume issue of About Gender 4/2013 and to the editorial of that monographic section (I. Fanlo Cortés, S. Pozzolo 2012).

[10] https://femminismo-a-sud.noblogs.org/post/2011/01/09/i-frutti-del-backlash-la-scia-di-sangue-del-neomaschilismo/

[11] M. Cozza 2007, 44.

colleagues - obviously limiting the theme of conciliation between family and work only to a female audience[12].

Clearly, maternity keeps being a pivotal moment in gender discrimination, highlighting how the "official" entry of women in the labour market has not at all brought with it a change in their domestic workload.

We have already recalled how the "female engineer" does not exist in many gendered languages, but only the "engineer" in its male connotation, evidencing how certain jobs still "naturally" refer to men. We can still add how, in the expressive modalities referred to tech environments, a series of symbolic references that exclusively refer to a male universe still remains, contributing to perpetuate the gender division of roles and gender stereotypes. For instance, as asserted by Michela Cozza, "to state that the IT technician is a computer "mechanic" or that his work is similar to that of a "plumber" may appear as a banal operation to spice up the narration", but at one point one sees how it is not so when one notices how "to analogically link IT to a mechanical work, or to technical operations carried out in a production workshop, it is a justification for the absence or low presence of women in the field, once again based on the distinction between what is feminine and what is male"[13]. When, instead, IT work is described in terms of "care", then "the 'disposition' to relations and the proverbial feminine 'precision' are for the firm a guarantee for customers"[14].

The control of the roles obviously happens on various levels, starting from the male and female presence in different formative scientific paths, that is reflected in the construction of the workplace, divided between the administrative/assistance and the technical/programming sectors, hence determining the known phenomena of occupational segregation, then also underlined in the linguistic uses that perpetuate the model of "miss" as opposed to that of the "(male) engineer/doctor".

In 2016 it seems to be still current what Löwy (2006, 174) pointed out ten years ago: "the fact of being a woman is still a handicap *per se*, regardless of familiar status, of the presence of offspring or sexual orientation, and this handicap may be linked to the

[12] On the Welfare State, the following reflections are interesting: Fraser 2014; Alberstson Fineman 2004, 2010; Eichner 2005.
[13] Cozza 2007, 44-45.
[14] Cozza 2007, 46.

persistence of stereotyped representations of femininity and masculinity and to their reproduction in the labour market"[15].

In the past fifteen years a vicious circle has developed, encouraged by the numerous projects and programs - that are often co-financed by the European Union through its framework programs and the permanent learning program - designed to encourage girls and women to study and work in scientific sectors. Constantly talking about the necessity of encouraging the acquisition of IT and technological skills may however contribute to reinforcing the idea of the unsuitableness of women and girls. In the same way, underlining the low number of women and girls in the tech sectors is at risk of conveying the idea that they may be less interested in sciences and have more difficulties in acquiring competences in this sector than their male and men peers. Applying these ideas to "women" in general is a short step away and it may run the risk of continuing to pass on negative stereotypes in society in general. At the same time, academic research is less and less discussing the theme of differences between men and women in the use of technology. Today the academic sector that analyses gender and technology is not anymore focused on the study of identity, for instance in the studies on *technicity,* namely the role of technology in defining who we are (Bradley, 2011). Examples of it are the studies on how technology is involved in the creation of identity, thanks to research that was initially focused on the study of computer fames [?] but that are now dedicated to computers, Internet and smartphones, seen as elements that contribute to the creation of identity, of how we perceive and represent ourselves, to the modelling of who we are and how we live (Corneliussen 2013). Another example is given by the analysis of how technologies for communication have allowed the development of communities for transgender individuals in North America, favouring rights awareness, the exchange of information and a confrontation on the evolution of gender identity (Hill 2005).

The perspective on gender analysis appears to be very important to try to re-direct policies, but also research, deconstructing the new "conformist" modalities that tame us

[15] «le fait d'être une femme constitue un handicap en soi, indépendamment du statut familial, de la présence d'enfants ou de l'orientation sexuelle. ce handicap peut être rattaché à la persistance de représentation stéréotypées de la féminité et de la masculinité et à leur reproduction dans le monde du travail». Translation by the authors.

to a normality that keeps on subordinating some subjects and perpetuates old hierarchies.

As we have seen, talking of technology does not limit the discourse to purely technical aspects, to scientific disciplines or limited aspects of life. The total pervasiveness that technology has taken on in the past decades and its presence in every aspect of life - let us think of the Internet of things, the extension of the Internet to objects and places[16] and to big data[17], just to give a couple of examples - make it essential to leave a maximal overture to academic reflections. This allows us to oversee all the aspects related to technology, to its interaction with our biological and constructed world, to the new positive and negative addictions that are formed through its use, but also to the positive aspects that may improve life conditions on an individual, social and political level.

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[16] Under a perspective of the Internet of things, objects create a pervasive, interconnected system, using the manifold communication technologies.

[17] Big data refers to a collection of data that is extremely extended in terms of volume, speed and variety, so that it requires specific technologies and analytical methods. The extraction of value from these data is enormous and it regards every field.

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