

# Gender, Science and Technology: The state of the art according to journals of gender studies\*

Lucas Bueno de Freitas\*\*

Nanci Stancki da Luz\*\*\*

## Abstract

This research aims to present the state of the art of studies on Gender, Science and Technology. Developed in Brazil through bibliographical research, it examines academic articles in four Brazilian journals of gender studies from 2000 to 2015. Following this analysis, we verify the goals and the principle results of this research, mapping this field of study and presenting intersections and tendencies in the area. We point to the increasing advance of gender studies in the fields of science and technology, as well as to the challenges this field faces.

**Keywords:** Gender, Science and Technology; Studies of Gender, Science and Technology; Academic Journals.

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\*\* Doctoral Candidate in Technology at the Graduate Program in Technology (PPGTE) of Federal Technological University of Paraná (UTFPR) and member of the Nucleus of Gender and Technology (Getec). Curitiba-PR, Brazil. [lfreitas91@gmail.com](mailto:lfreitas91@gmail.com)

\*\*\*Doctor in Scientific and Technological Policy at the Federal University of Campinas; Professor at the PPGTE and in the Academic Department of Mathematics at UTFPR, and coordinator of Getec. Curitiba-PR, Brazil. [nancist@terra.com.br](mailto:nancist@terra.com.br)

## **Introduction**

In the fields of Science and Technology (S&T), one can perceive that there still exists a certain defense of a putative neutrality, which ignores the controversies and conflicts that are inherent in the production of these forms of knowledge, as well as their social consequences. The field of Science, Technology and Society (STS) questions this neutrality, as well as scientific and technological determinism. It recovers the social and human dimensions of the field and reveals the historical-cultural and power relations that are present in it. It questions what science and technology do and investigates their relations with social markers such as class, gender and race/ethnicity, incorporating new categories of analysis into our understanding of these supposedly neutral forms of knowledge.

The agendas of feminist and gender studies have greatly contributed to the advance of STS, revealing that S&T are not neutral: they possess a gender and are inserted in structures of power in which interests and disputes influence researchers' options and choices.

It is worth remembering, as Soares (2008:2) points out, that the various perspectives and focuses of a given field of study “will not bring about a really effective collaboration as long as they do not try to link up analyses originating in different areas of knowledge”. Taking up this perspective, the present article seeks to link gender, science and technology studies through an analysis of articles published in Brazilian scientific journals. Here, we seek out confluences, advances, and challenges for the field of Science and Technology Studies.

## **Gender Science and Technology**

According to Shirley Malcom (2011:64), “to undertake Science and create technology is part of what it is to be human”. For this very reason, these processes are wrapped up in power relations, which influence what is done and created, both in terms

of what, where, and when research is carried out and in terms of the methodological options, analytical perspectives, and forms of distribution of results that are adopted.

Common sense belief still persists in painting those who work with science as older (or at least not young) men who wear glasses and white coats and who (although heterosexual and married) don't seem to care much for domestic and family activities, dedicating themselves entirely to the "development" of knowledge that is useful to the human race. This symbolic representation of the science and technology-producing person has been historically constructed in tandem with a linear and acritical perception of the production of scientific and technological production. It has contributed to restricting women's access to the S&T field, demarcating it as masculine territory.

Women – marginalized in productive work – were associated with the artisanal labor, basic necessities and social welfare linked to reproduction (Pacey, 1990), "the work undertaken by women ended up situating them more as consumers rather than as producers of technology" (Cabral; Bazzo, 2005:7) and science.

Women have, of course, historically produced S&T. Unfortunately, however, their production has not been recognized to the same degree or in the same ways as it has been with their male counterparts. This has occurred because "women in science" is something that clashes with the scientific epistemology that is at the base of representations of the field, because female-produced science and technology has historically been appropriated or silenced by men, or even because female production have been (re)classified as pertaining to non-scientific spaces.

Given this set of facts, it is not surprising to discover that the women who have historically produced S&T have been situated as abject. We can see an example of this, for instance, in the Middle Ages, when women who understood the workings of nature were often classified as witches. A more recent example can be seen in the case of midwives, who are often treated as amateurs because their forms of knowledge do not have the stamp of "scientific rigor" of the great research centers dominated by men.

Gender relations have been present in the historical and social process of the construction of S&T. They have influenced how the field has selected, classified and hierarchized knowledge and techniques, declaring whether or not these were scientific. Activities developed within what was considered to be “private life”, associated with women, were simply not considered to be part of science. Among these fields were home economics (the administration of family life) and nursing (the care and comfort of patients), as Schiebinger (2001) has pointed out.

The exclusion of women from science and technology was enabled by scientific discourses that proclaimed, through biological determinism, that females were less capable of producing this sort of knowledge. More recent studies have demonstrated uneasiness with regards to this androcentric, hegemonic, and sexist worldview within the field of science and technology.

Employing the works of Marta González García and Eulalia Perez Sedeño (2002), we can delineate three avenues of questioning that challenge the dominant paradigm of masculinism in the S&T field. These are:

A) Questions of a historical nature that seek to recover the pioneering women who historically produced science and technology;

B) Questions of a sociological nature, which analyze the differences between the professional trajectories of men and women in the S&T field, detailing the many barriers that women have faced;

C) Questions of a pedagogical nature that analyze syllabuses and educational practices in order to reveal the systemic inequalities that are present in the academic environment and, by challenging these, seek to motivate girls and women to become producers of science and technology.

García and Perez Sedeño (2002) affirm that the historical avenue of analysis has been of fundamental importance for Gender, Science and Technology studies. Recovering the history of the female pioneers in S&T who have been “forgotten” over time is not just a question of respecting these women’s histories:

above all, it is an act that refutes the biological determinist discourses that stipulate that women are “naturally” incapable of producing science and technology.

With regards to the sociological questions, the perception that there is a low number of women in the S&T professions has provoked a need to investigate the reasons why this should be, as well as analyzing the differences between male and female academic/scientific career trajectories.

The third front pointed out by García and Perez Sedeño (2002) deals with educational issues and focuses on students: potential recruits for the S&T field. Many works (Saitovich; Lima; Barbosa, 2015; Ristoff, 2007; Stancki; Gitahy, 2015) point out that the number of women in these fields is rising and even, in some cases, surpassing the number of men. Ana Alice Costa and Cecilia Sardenberg reflect on these questions and point to the need to cultivate a feminist view with regards to science and technology:

One thing is certain: since the rebirth of feminism towards the end of the 1960s, scientific practices and technological development have been constantly critically viewed by feminism. This feminist gaze made evident the fact that different disciplines were constituted through the exclusion (or through the distorted representation) of women’s lives and experiences, being sustained by discriminatory practices that privileged men’s place in science – particularly in the field of natural sciences. Consequently, in this and in other fields, an androcentric view has persisted in terms of the definition of which problems should be engaged with, what projects should be created and how results should be interpreted. This has also had consequences for technological developments as well (Sardenberg; Costa, 2002:14).

The problem of gender in S&T goes beyond mere questions of inclusion, permanency, exclusion and distortion of the feminine experience in these areas. The production of these forms of knowledge was instituted through masculine epistemological and

philosophical base, a fact that exposes the need to alter the sexist and androcentric basis of S&T – something that can't be resolved simply by including more women in this universe. In other words, we must move beyond discussions of women's participation in science and think about science in feminism (Harding, 1986).

This view of things has allowed us to discern a fourth “front” in *Gendet, Science and Technology Studies*: epistemological transcendence in direction of a feminist science, questioning sexism and androcentrism in the content and presuppositions of the science in which the other three lines of questioning are inserted. It is not enough to simply include and support women in S&T, or to simply eliminate the barriers that still exist which block their careers. These things are, of course, necessary, but they do not touch the key structuring principles and presuppositions of science and technology. It is necessary for us to destabilize S&T's androcentric structures.

### **Research and Methodology Sources**

Scientific journals and magazines began in the 18th century as a substitute for the letters scientists exchanged among themselves (Hayashi, 2004). These publications are an important means of divulging the results of scientific research. According to Mayor (1996), Science is nothing without communication among scientists and researchers or between them and society at large.] Scientific publications constitute a space for developing this communication and are also a space where one can recover the memory of scientific production.

Considering journals' relevance for the distribution and democratization of knowledge, we have selected four of the most relevant for our research:

1. *Cadernos Pagu* (cad.pagu) of the State University of Campinas [Universidade Estadual de Campinas(Unicamp)];

2. *Revista Estudos Feministas* (REF) of the Federal University of Santa Catarina [Universidade Federal de Santa Catarina (UFSC)];

3. *Cadernos de Gênero e Tecnologia* (CGTec) of the Federal Technological University of Paraná [Universidade Tecnológica Federal do Paraná (UTFPR)];

4. *Revista Feminismos* (Feminismos) of the Federal University of Bahia [Universidade Federal da Bahia (UFBA)].

We selected these journals based on the following criteria:

- *cad.pagu* and the *REF* are the highest-ranked Gender Studies journals in the Brazilian CAPES system – Qualis A1<sup>1</sup> –, as well as being the oldest in the field (founded in 1993 and 1992, respectively);

- *Feminismos* is oriented towards Brazil's first graduate-level Gender Studies program, the Graduate Program in Interdisciplinary Gender, Women's and Feminism studies (PPGNEIM), at UFBA;

- *CGTec* originated in a group that specifically studies the intersection between gender and technology, the Nucleus for Gender and Technology (GETEC), of the Graduate Program in Technology (PPGTE), at UTFPR.

These periodicals' relevance to our research can easily be perceived by looking at the number of issues and articles they have published between 2000 and 2015 (Table 1).

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<sup>1</sup> Researched carried out utilizing the WebQualis system (<http://qualis.capes.gov.br/webqualis/principal.seam>), on 04/08/2015.

**Table 1 – Articles published between 2000 and 2015**

Journal	Year founded	n. of issues, 2000 - 2015	n. of articles 2000 - 2015
cad.pagu	1993	30	363
REF	1992	42	581
Feminismos	2013	6	57
CGTec	2004	18	44
<b>TOTAL</b>		96	1045

Source: authors' research.

As we can see in Table 1, 1045 articles were published. Looking at titles, key words and abstracts we selected the 43 articles which we will analyze here.

Utilizing Garcia and Perez Sedeño's (2002) categories and taking into consideration the tradition of gender studies and S&T, the articles we selected have been analyzed according to four different categories:

1. Universal pioneering women in S&T, a category we have denominated as "Historical";
2. The participation of women in S&T today, which we have denominated "Sociological";
3. The university-level education of future scientists, which we have categorized as "Pedagogical";
4. Critique of S&T's foundational presuppositions and movement towards a feminist paradigm for doing Science and technology, which we have chosen to call "Epistemological".

The distribution of the 43 articles in these four categories can be seen in Table 2.



Table 2 – Number of thematic articles in the categories listed

Categoria	cad. pagu	REF	Feminismos	CGTec	TOTAL
Historical	7	1	3	2	13
Sociological	4	4	2	6	16
Pedagogical	1	0	0	4	5
Epistemological	5	2	2	0	9
<b>TOTAL</b>	<b>17</b>	<b>7</b>	<b>7</b>	<b>12</b>	<b>43</b>

Source: authors' research.

*Cadernos Pagu* had the largest number of articles about Science and technology (17), followed by *CGTec* (12). However, if we look at the percentage of articles dedicated to S&T that were published in each journal between 2000 and 2015, we see that *CGTec* was the publication that most dedicated its content to this theme, with 27.2% of its articles dedicated to topics touching on S&T. It was followed by *Feminismos* (12,2%), *cad.pagu* (4,6%) and *REF* (1,2%).

With regards to authorship, the 43 articles were written by 54 different researchers – authors and co-authors – among which 52 were women and 2 men. This reveals that the Science, Technology and Gender theme seems to be currently something that majoritarily attracts the attention of female authors.

In terms of these articles' geographic distribution, 30 of the authors are Brazilian researchers. 3 are Mexican. U.S. Americans, Argentineans, Spaniards and the English produced a further 8 articles (2 per nationality). One article each was authored by Scots, Chileans or French. Of the 30 Brazilian authors, 8 are from São Paulo, 7 from Rio de Janeiro and another 7 from Paraná, followed by Bahia and Santa Catarina (2 articles each) and Minas Gerais, Piauí and Rio Grande do Sul (each with one article).

UTFPR was the institution that most generated articles (7) with Unicamp following closely (6). After this, we have UFRJ with 4 articles and UFSC, UFBA and UFF with 2 each.

## What do the gender studies journals tell us about science and technology?

### Gender, science and technology: historical articles

The recovery and valorization of women's historical role in science and technology was the most common of the four analytical categories into which we classified our themes, being responsible for 13 articles as shown in Table 3.

**Table 3 – Historical articles: number of articles published**

	cad.pagu	REF	Feminismos	CGTec	Total
<b>Historical Articles</b>	7	1	3	2	13

Source: Authors' research.

These articles dealt with topics ranging from the 16th to the first half of the 20th century, although 3 articles (one in *cad.pagu* and the other two in *CGTec*), dealt with a wider temporal canvas, presenting several scientists from different points of history in order to offer up an ampler view of women's participation in a given area such as the Natural Sciences (Casagrande et al., 2004; 2005) and the Informational Sciences (Casagrande et al., 2006).

One article that was published in *cad.pagu* had as its objective the analysis of women's participation in the natural sciences in Argentina during the first decades of the 20<sup>th</sup> Century (García, 2006). Two further articles from *cad.pagu* and *Feminismos* also looked at female pioneers in medicine. The article published in *cad.pagu* focused on women pioneers of Brazilian medicine in the second half of the 19<sup>th</sup> century (Rago, 2000), while the *Feminismos* article recovered the history of the first female students in the Medical College of Bahia in the 19<sup>th</sup> century (Vanin, 2013).

Another six articles present the life stories and scientific and technological contributions of specific women: *cad.pagu* published the stories of doctor Lady Mary Wortley Montagu (Perez Sedeño, 2000), astronomist Maria Francisca Gonzada de Castilho (Ramírez,

2000), natural scientist Marianne North (Dickenson, 2000) and biologist Agnes Chase (Henson, 2000). *Feminismos* recounted the story of biologist and politician Bertha Lutz (Souza, 2014) and doctor Maria Theresa de Medeiros Pacheco (Aras; Guimarães, 2014).

Finally, one article published by *REF*, written by Moema de Rezende Vergara (2007) analyzed, from a gender perspective, the letters used to divulge the results of scientific research during the 19<sup>th</sup> century.

In general, these articles have a common element in that they affirm that these women began their scientific careers in the domestic sphere, often as assistants to male scientists. The articles reveal that these women had to confront innumerable barriers and difficulties during their professional lives, which gives a heroic aspect to their stories, in particular due to the agency that they demonstrated in their pioneering work in areas that had been historically understood as masculine.

The research revealed by these articles also shows that some of these women were often politically organized and active. The life histories of Agnes Chase (Henson, 2000) and Bertha Lutz (Souza, 2014) exemplify the linkages between doing science and participating in the suffragist and feminist movements.

### **Gender, science and technology: sociological articles**

Life and work conditions and the barriers women confront in their professional careers in science and technology composed the theme of 16 of the 43 articles we analyzed, making it the most common theme encountered in our research. The breakdown of these articles by publication can be found in Table 4.

**Table 4 – Sociological articles: number of articles published**

	cad.pagu	REF	Feminismos	CGTec	Total
<b>Sociological Articles</b>	4	4	2	6	16

Source: authors' research.

*CGTec* was the journal that published the largest number of articles with this theme (6), while *REF* and *cad.pagu* also made significant contributions with 4 articles each. Também trouxeram grande contribuição, com a publicação de 8 artigos sobre a temática. The articles' research covered the period from the 1980s to the 2010s, focusing on analyzing the work of academic scientists – women connected to universities and/or professors in graduate programs, understood to be scientists because their teaching activities cannot be disassociated from their research and extension activities.

The main method used in these investigations was quantitative, presenting and comparing statistics regarding the participation, production, insertion and/or publication of men and women of science (Cabral, 2005; Melo; Oliveira, 2006; Bordi; Bautista, 2007; Kiss; Barrios Alvarez, 2007; Osada; Costa, 2007; Luz, 2009; Vasconcellos; Brizolla, 2009; Guevara, 2011; Muzi; Luz, 2011; Lima, M. P., 2013; Leta, 2014; Melo, 2014), with data generally being collected via the CNPq or individual universities' databases.

The articles show that the growing female presence in the scientific and technological professions over the last few decades is significantly linked to social and political struggles (Melo; Oliveira, 2006; Bordi; Bautista, 2007; Kiss; Barrios; Alvarez, 2007; Luz, 2009; Moreira; Velho, 2010; Lima, B. S., 2013; Melo, 2014). They also that increased female participation has not yet occurred in all areas. Although women outnumber men in the academic environment, they are still concentrated in specific areas such as Letters, Languages and the Arts. The numbers of women involved in those scientific fields common-sensically understood to be “hard” are still significantly less than the number of men (Cabral, 2005; Melo; Oliveira, 2006; Bordi; Bautista, 2007; Kiss; Barrios; Alvarez, 2007; Luz,

2009; Moreira; Velho, 2010; Guevara, 2011; Muzi; Luz, 2011; Melo, 2014).

This numeric disadvantage may be fed by machismos, sexism, misogynies, segregations and stereotypes that might be present in the academic environment and which impede women's ascension in the science and technology fields, reinforcing the horizontal and vertical segregation reported in the articles regarding women's professional career paths in S&T. The articles emphasize that even after women enter into the S&T/hard science professions, their activities continue to be anchored in gender-based binary socialization and in "naturally feminine" areas such as care and control (Cabral, 2005; Melo; Oliveira, 2006; Ousada; Costa, 2007; Vasconcellos; Brizolla, 2009; Lima, M. P., 2013; Leta, 2014).

According to the information revealed by the articles, this question has to do with the socially crystalized identities of "being a man" and "being a woman". The social construction of masculinity and femininity has historically provided different life trajectories for men and women in the field of science and technology. If the female gender has historically been associated with the private realm of the domestic, maternity, and care, we shouldn't be surprised that female insertion in S&T has been marked by the stereotypes and perceptions associated with these spaces.

The difficulty women encounter in rising to leadership positions in S&T was another question that appeared in the journals under analysis. Whether it's in having their abilities questioned for being women (Falkner, 2007; Lima, M. P., 2013), being obliged to constantly reaffirm or masculinize themselves, (Moreira And Velho, 2010; Lima, M. P., 2013; Lima, B. S., 2013), or being subjected to the double workload of balancing a successful professional career while being a wife and mother (Bordi; Bautista, 2007; Osada; Costa, 2007; Lima, B. S., 2013), women confront material and immaterial barriers which make it difficult for them to assume leadership posts (Cabral, 2005; Bordi; Bautista, 2007; Kiss; Barrios; Alvarez, 2007; Osada; Costa, 2007; Moreira; Velho, 2010; Muzi; Luz, 2011; Lima, B. S., 2013).

The articles present data that show salary inequalities are still something that has not been resolved. Research continues to reveal that women still receive lower salaries than their male colleagues (Bordi; Bautista, 2007; Kiss; Barrios; Alvarez, 2007; Luz, 2009) and that promotion becomes more difficult for women as they age. In other words, the younger a woman is, the “less difficult” advancement is in her academic career. This is due to the fact that as women age, they tend to acquire more family responsibilities – something that men do not experience (Cabral, 2005; Bordi; Bautista, 2007; Kiss; Barrios; Alvarez, 2007; Luz, 2009). This last factor is also influenced by the fact that scientific and technology funding organizations award less money to female researchers (Osada; Costa, 2007; Moreira; Velho, 2010; Melo, 2014).

Patrícia Guevara’s research in Mexico (2011) reveals another interesting data point: those women who achieve a certain renown and who are promoted to higher posts tend to be the daughters of fathers who are well known in the academic world. In other words, family influence can be a factor in academic prestige.

Among the questions presented by the authors of these articles, one stands out: the fact that women scientists often do not perceive the prejudices and discriminations that surround them and end up adopting the misogynist and sexist discourses that suppress and repress them. The binary roles of gender are naturalized in such a way that some female scientists do not even question the subservient space to which they are relegated. This, in and of itself, makes it difficult to increase female numbers and responsibilities in those sciences where men are numerically predominant (Kiss; Barrios; Alvarez, 2007; Moreira; Velho, 2010; Lima, B. S., 2013; Lima, M. P., 2013).

Resuming, then, these articles show that the study of gender, science and technology validates female experiences and reveals persistent sexism in the S&T field. Through this, it corroborates to construct a new arrangement of science and technology via the perspective that women scientists deserve to have their experiences respected and their work widely divulged; to occupy leadership post and receive salaries that are commensurate to

those of their male colleagues (Osada; Costa, 2007; Moreira; Velho, 2013; Melo, 2014).

### Gender, science and technology: pedagogical articles

The pedagogical discussion of science and technology – or, in other words, of its relationship to educational practices – was the category that the articles we analyzed touched upon the least. This approach, however, permits us to analyze how schools and universities, syllabi, pedagogical practices integrate and motivate girls and women into science and technology education. Only five articles dealt with this theme, however, one in *cad.pagu* and four in *CGTec*, as Table 5 shows below.

**Table 5 – Pedagogical articles: number of articles published**

	cad.pagu	REF	Feminismos	CGTec	Total
<b>Pedagogical Articles</b>	1	0	0	4	5

Source: authors' research.

The article published in *cad.pagu*, entitled “The construction of gender differences among medical students” (“A construção de diferenças de gênero entre estudantes de medicina”), written by Vera Helena Ferraz de Siqueira and Glória Walkyria de Fátima Rocha (2008), analyzed identity construction among medical students in non-formal university spaces, placing emphasis on gender and sexuality. The article concludes, via analysis of interviews conducted with female students, that “freshman pranks” which put women’s bodies under male control, teach female students to accept and reproduce situations in which sexism, harassment and lack of ethics are understood to be normative and acceptable.

One of the *CGTec* articles, entitled “The evolution of academic excellence as demonstrated by Spanish women, 1985-2003” (“Evolución de la excelencia universitaria demostrada por las mujeres españolas en el período 1985-2003”), written by Maria

Lemeiras Fernández, Maria Victoria Carrera Fernandéz, Ana Maria Núñez Mangana and Yolanda Rodriguez Castro (2007), described the level of female academic achievement in Spanish universities by looking at the number of national awards obtained by students and comparing the female presence in different areas of knowledge. The study concluded that women obtained slightly more awards than men in areas such as health (51% to 49%) and social and legal studies (53% to 47%), but that men received more awards in the humanities (55% to 45%) and in engineering (81% to 19%), with this last field showing the greatest amount of gender difference. Engineering was also the field in which the greatest number of awards was given out.

The articles “Female engineers in CEFET-PR?” (“Engenheiras no CEFET-PR?”), by Lindamir Salete Casagrande, Juliana Schwartz, Marília Gomes de Carvalho and Sonia Ana Leszczynski (2005), “Constructing feminine identities in engineering school” (“Fabricando identidades femininas em escolas de engenharia”), by de Karla Saraiva (2005), and “In spite of the advances, obstacles persist” (“Apesar dos avanços – obstáculos ainda persistem”), by Fanny Tabak (2007), all published in *CGTec*, present studies regarding women in engineering, a field generally understood as typically masculine.

The article by Casagrande et al. (2005) analyzed engineering courses in an institution in the Brazilian state of Parana that was well know for its excellence. It looked at whether or not these courses followed national patterns in terms of greater inclusion of female students and concluded that even though women were in the considerable minority, their presence was constantly growing in the university. Saraiva’s article (2005), on the other hand, looked at identity construction among female engineering students throughout their college career, showing the thin line between identity construction and the barriers that female engineers confronted in their professional life. Tabaks’ article (2007) discusses the barriers faced by female students in engineering courses, pointing out the advances that have been won and the challenges that still persist in this area.



The low number of articles in this thematic line of Pedagogy does not permit us to amply measure or diagnose educational processes in S&T. This shows the need, however, for greater research into the relationships between gender, science, technology and education.

This area is of great importance to women as, although their increased access to university has meant an increased access to the scientific and technological professions, the educational process does not always prepare students to perceive the discrimination and prejudice that surrounds them, or to reflect upon the exclusions that persist in the professional universe and in universities (under-representation of women in posts of power and prestige, for example, or lack of female participation in certain fields of knowledge).

We cannot forget, however, that the educational process and professional formation do not begin in the university: they start in infancy and take in all forms of socialization that occur during a person's school career.

It seems that reflection upon women's education is fundamentally important. If the educational process, in isolation, does not have the power to eliminate gender inequalities, without this process, the inequalities between men and women tend to increase and female exclusion tends to be reproduced, naturalized and perpetuated. It is thus essential that we unveil the "hidden curriculum that impregnates an educational system that presents itself as egalitarian and non-sexist, but which places many obstacles and difficulties in the path of one of the sexes" (García; Perez Sedeño, 2002:8).

### **Gender, science and technology: epistemological articles**

The feminist critique of science and technology and the search for a feminist epistemology in these areas was the third largest thematic area represented in the articles we analyzed, accounting for nine of them. *cad.pagu* was the journal that most published articles in this line (5), as we can see in Table 6.

**Table 6 – Epistemological articles: number of articles published**

	cad.pagu	REF	Feminismos	CGTec	Total
<b>Epistemological Articles</b>	5	2	2	0	9

Source: authors' research.

In the articles in this category, interest in measuring the importance of the contribution of gender studies to a critical analysis of science predominated (Löwy, 2000; Lopes, 2006; Matos, 2008; Maffía, 2014). Changes and conquests in the field of science were also taken into consideration (Keller, 2006; Schiebinger, 2014), as were proposals for and the evaluation of a science/field of knowledge based upon gender perspectives (Cabral, 2006; Menezes; Heilborn, 2008), as well as studies that draw parallels between gender studies and social studies of science and technology (Citeli, 2000).

The majority of the articles in this thematic line present reflections on science. Only one article, that of Carla Giovana Cabral published in *cad.pagu* (2006), points specifically to the question of technology. This study seeks to mobilize the feminist study of science and technology in order to form a critique of the supposed neutrality of technological determinism.

In this category, we also find an article about sexual diversity – the only one among the 43 analyzed. Writing in *cad.pagu*, Ilana Löwy (2000) presents a critical analysis of the universalist conceits of science, criticizing the notion of the biological basis of homosexuality.

Finally, Rachel Aisengart Menezes and Maria Luiza Heilborn's article published in *REF* (2008) falls into this thematic line. It discusses how stereotypes of gender influence the process of construction of a new medical specialization dedicated to the process of death and dying (palliative care, stereotypically linked to the feminine), demonstrating the existing prejudices that lie at the base of a new science under construction.

This category brings up an interesting question: of the 9 published articles that fall within it, 4 were produced by foreigners. A French woman and a U.S. American woman published in *cad.pagu* and *Feminismos* published the work of an Argentinean woman and a U.S. American woman.

Although Margaret Rago (1998:23) points out that:

At least in Brazil, it's obvious that there are no clarities or certainties with regards to a feminist theory of knowledge. It is not only that the question itself is not much debated, even in feminist circles, it's that the debate itself is being brought in, whole, through translated publications from the Northern Hemisphere.

It is Worth pointing out in this context that the 5 Brazilian articles were written by authors who are nationally recognized for their research into gender. This points towards a possible advance in terms of the construction of a Latin-American – and particularly Brazilian – feminist perspective on science and technology.

### **Final considerations**

The articles analyzed, in their different approaches and themes, together delineate science and technology as a space that has been historically and insistently constructed as masculine. The life histories of the female pioneers of S&T show that even though these women came from different contexts the barriers and difficulties that they encountered in their careers were common to all. There is also confluence to be seen in the barriers and difficulties that contemporary women face when they choose to act professionally in S&T, as well as the insistent difficulties that many women still confront in balancing their professional and family lives.

We also see commonalities in the advances that women have conquered in these areas, principally in terms of the growing number of women who are opting to take courses in scientific and technological areas. This permits us to say that these areas seem to

be facing a brighter future, at least with regards to female participation.

The studies of gender, science and technology that we have analyzed here have been focused on studies by/about/for women: discussions regarding sexual diversity, ethno-racial relations, and gender were not contemplated by these studies. We can also observe that the discussions regarding educational processes and S&T have been less discussed than those involving work and S&T. In this last field of study, discussions regarding the challenges, barrier and difficulties that women face in working in scientific and technological fields have predominated.

The publications have also sought to recover the conquests made by women scientists, technologists, and engineers, contributing to placing women in the history of humanity.

We conclude that Science & Technology is a fertile field for discussions of gender, in which women are opening up space to question the constructed presupposition of the neutrality of S&T. This should contribute to making these spaces more democratic and egalitarian.

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