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Contributing to Wikipedia

A Question of Gender

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INTRODUCTION

Although women are more inclined to give—their competence in care, for example, is completely naturalized—they are in the minority both as users of the online encyclopedia Wikipedia and as contributors to its content. In every country, Wiki-Work (participation in the Wikipedia project) differs according to gender—the proportions of users and contributors are much higher for men, who constitute over 80 percent of contributors (Glott, Schmidt, and Ghosh 2010; Dejean and Jullien 2012). As a consequence, this collaborative, nonacademic project has not achieved its main goal: to construct and democratize knowledge as universal and egalitarian. As many works have shown, only a small number of individuals contribute to the encyclopedia, which has been unable to eliminate traditional social and gender divisions (Bourdeloie 2009). Not only are women less common among the contributors, but women (and men) who are uneducated and from disadvantaged socioprofessional categories are also less represented in this community. In this study, among the various determining social factors that influence participation in the Wikipedia project, we have chosen to emphasize the gender issue.

We will start with the observation that the "gender gap" concerns all Wikipedia versions, as shown in the survey conducted by the United Nations University- Maastricht Economic and Social Research Institute on Innovation and Technology[1] (UNU-MERIT, Glott, Schmidt, and

Ghosh 2010). Our quantitative study of the French Wikipedia[2] (Jullien 2012)—a research project named *Prosodie*—showed similar results. We received 13,627 responses from survey participants, of which 5,062 are contributors. Results were published online from mid-January to mid-February 2011. Access was initially limited to a few of the site's organizers, who offered their comments, and then published in the "Bistro" section (discussions regarding Wikipedia), and lastly it was published as a banner on the home page of the French Wikipedia with the collaboration of members of Wikipedia France and administrators of the Internet site. Some 5,139 women responded to this survey; that is 27.71 percent of total respondents. When considering such gender gaps, we postulate that the "Gender System," which implies a hierarchy between men and women founded on natural differences, is particularly at cause (Ridgeway and Smith-Lovin 1999). Our hypothesis is that Wikipedia, a "hybrid object"—both technical and cultural—is considered legitimate on the technical plan: highly valued in terms of computer technology but not valued in terms of knowledge, due to its unconventional nature. Indeed, we can recall that the encyclopedia's credibility was highly questioned until the scientific magazine *Nature* published, in December 2005, the results of an investigation proving that the rate of errors in Wikipedia is comparable to that of an official encyclopedia such as Britannica. Since then, several scientific works have been eager to show that Wikipedia benefits from a high degree of precision (Chesney 2006). Nonetheless, its informal and nonacademic nature remains. This does not resonate with girls' upbringing regarding culture, as they are socialized in a universe that favors legitimate cultural activities, at least in Western countries such as the United States or France (Octobre 2005; Christin 2012). Inequalities in Wikipedia contributions reflect gender inequalities in society.

LITERATURE REVIEW: COLLABORATIVE PROJECTS, INFORMATION TECHNOLOGY, AND THE "GENDER GAP"

Wikipedia's Characteristics: Uses and Contributions

Wikipedia has been the subject of numerous works, though few question the sociodemographic profiles of either users or contributors. The first consequential survey to have explicitly studied this question is the 2006 international investigation conducted by the UNU-MERIT (Glott, Schmidt, and Ghosh 2010). This investigation is, to our knowledge, the most significant on the subject, generating 125,347 responses, with 24.92 percent female respondents. This study has shown that the majority of contributors are male, with higher education levels than typical users and better knowledge of computers. Even though many factors explain contribution to the encyclopedia, social class and gender, as well as level of education (Glott, Schmidt, and Ghosh 2010; Dejean and Jullien 2012), constitute decisive factors (Lim and Kwon 2010; Lam et al. 2011). This is shown in the results of the inter- national UNU-MERIT

investigation and by the Prosodie study conducted on the French version of Wikipedia, whose conclusions were similar concerning diploma and gender variables. Educational background constitutes a significant variable in determining who fulfills the role of contributor (table 9.1). In the case of the French Wikipedia, Wikipedians are even more educated, with a high proportion of PhD users. It has been shown that there is an "entry barrier" to becoming a contributor. This means that even if there is no barrier based on socioeconomic status, the cultural capital expressed by the educational background constitutes a symbolic barrier. When a larger proportion of contributors have higher education levels than most users, we consider that there is a barrier.

For the UNU-MERIT study, we can situate this barrier at the master's level: 15.07 percent of contributors, and only 10.11 percent of users, have a master's degree (for lower educational degrees, the rate was also lower for users than for contributors). For our study, we can situate this barrier at the level of an undergraduate degree (17.9 percent of readers, 29.5 percent of contributors).

Our study shows similar results with regard to gender, which may constitute a variable determining contribution (table 9.2).

Table 9.1. Profiles of Users and Contributors to Wikipedia according to Level of Diploma (in %)

Wikipedia n = 125,347 UNU-MERIT Study French Wikipedia n = 13,514 Prosodie Study

	Readers	Contributors	Readers	Contributors
Primary education	14.77	12.36	15.1	12.8
Secondary education	37.69	33.45	22.82	18.88
Higher education—Undergraduate	29.17	28.38	17.9	29.5
Higher education—Masters	10.11	15.07	16.36	21.1
Higher education—PhD*	2.30	4.59	9.49	12.23
Other	5.96	6.15	7.03	5.48

(For the French version of Wikipedia, we based our study on the system of LMD (Licence, Master, Doctorat). Primary education = before the Baccalaureate (no high school diploma)
Secondary education = Baccalaureate (high school diploma) Undergraduate = License (three-year college degree)
Higher education—Master = Master
*Higher education PhD = this level of diploma corresponds to the Baccalaureate + six and more, used by the French Prosodie study.
We placed in "Other" those who claim to have no diploma.

Figure 9.1. Evolution of gender distribution according to date of entry in Wikipedia (Prosodie study).
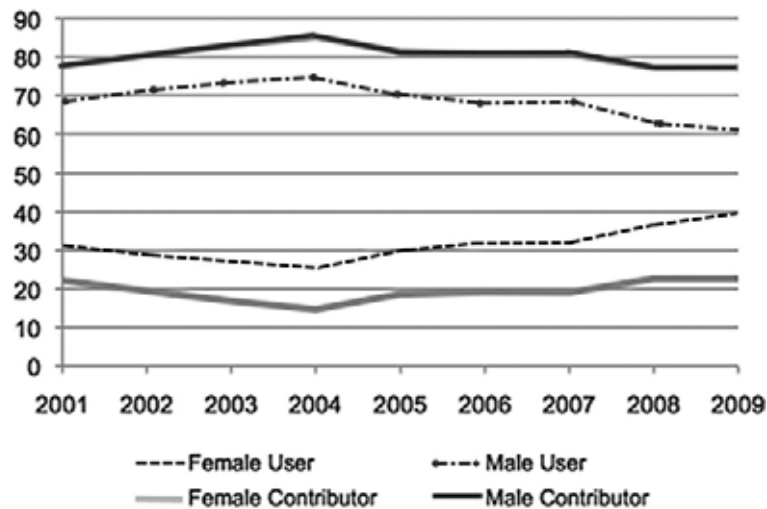
Women represent only 12.83 percent of contributors according to the UNU-MERIT study, versus 18.64 percent for the French version. This "glass ceiling" is not specific to France since it concerns all of Wikipedia's versions (Glott, Schmidt, and Ghosh 2010). As for use of the encyclopedia, although higher, the women's representation remains nonetheless inferior to that of men (31.23 percent in the UNU-MERIT study and 38.48 percent in our study). This gender gap is the subject of our investigation. More specifically, we focus on certain dimensions and on the analysis of underlying causes. Firstly, it is important to emphasize that though the portion of female users tends to increase over time, the proportion of female contributors seems, on the other hand, to stabilize (figure 9.1); it is as if the status of the contributor constituted an obstacle difficult to surmount for women. This leads one to think that the maintenance of a gender gap is less the result of technical inhibitions[3] — that is, a lack of skills — than the result of cultural and symbolic inhibitions linked to gender norms, underlying beliefs, and representations according to which the masculine and the feminine, defined on a sociocultural level, pervade objects as well as practices.

Gender, Computer Software, and ICT

To understand gender distinctions in relation to Information and Communication Technologies (ICT), it is necessary to understand that there can be no bio- logical determinism regarding technology and gender. The microcomputer was, for example, conceived of as an object marked by the seal of male domination (Turkle 1986), although the history of computer programming shows that in the early days of computing we find a significant number of women, although they were only assigned to simple data recording operations (Ensmenger 2010b). However, since the time when programming became an industry and a professional field, women have been marginalized (Ensmenger 2010a), especially as proficiency in information technology tests favored masculine backgrounds and characteristics (Ensmenger 2010a, 77–78). This topic is, incidentally, at the core of several works that suggest cultural attributes of male gender were incorporated into computing machines, resulting in women's initial aversion to these objects (Ensmenger 2010a). Indeed, research has indicated that women give up on computers because the software is not appropriate to their gender identity (Perry and Greber 1990). This helps to understand the masculinization of the computing profession (Ensmenger 2010a, 77), why women are nearly always a minority in computer-related projects, why males dominate open-source software communities, in which females represent only 1.5 percent of developers (Nafus et al. 2006)—in contrast to 28 percent in commercial software communities (Nafus et al. 2006)—and, finally, why those communities are considered extremely sexist (Reagle 2013). There are many causes often found in gender attributes of technological devices. These attributes stem from sociocultural representations according to which computers are not women's business. According to the Flosspols study, for example, it is shown that women do not gravitate toward the universe of open-source software not only because they do not feel welcome but also because the participants in these communities do not generally view their presence favorably (Nafus et al. 2006).

However, since computers became ICT, with the emergence of the Internet and the digital world, they are attractive to women. This statement is eloquent since it bears witness to the existence of gaps between computer use and the use of media or communication. That is, although computer use has become generalized, there is nonetheless a boundary between the field of computers and that of communication. Computer and Internet use are indeed widespread. Large national and international investigations show that men and women—at least in Western countries—are nearly equal in regard to Internet use (Comscore 2010). Nevertheless, it is not possible to conclude that women's technical skills have increased, in that ICT require few technical skills, but rather, above all, practical skills (Bourdeloie 2013). In this way, it is not possible to interpret the appropriation of ICT by women as a sign of increased technical mastery on their behalf, nor of a valorization of them (Bourdeloie 2013). Digital culture, in the sense that it becomes closer and closer to media culture, does not include any additional prestige, contrary to computer culture, which is a highly valued masculine domain (Collet 2011). This is also confirmed by the fact that computer science professions

have gradually become highly esteemed (Ensmenger 2010a). Possibilities offered by ICT, and particularly by Web 2.0, do not seem to change the stereotypical gender-based division in interests. Studies have shown that many websites reinforce stereotypical representations of male and female roles (Carstensen 2009). In addition, gender-based use confirms the differentiation of activities according to assigned roles: women use the Internet more for communication and men more for information, political news, and leisure (Fallows 2005; Harp and Tremayne 2006; Jones et al. 2009). Works on Wikipedia abound on this topic, including a study showing that men used the encyclopedia more for leisure activities, specifically idle reading (Lim and Kwon 2010). More generally, studies show that gender differences do not only concern ICT uses but also the investment of time. Indeed, several investigations highlight differences in time spent on the Internet according to gender, with males devoting more time to entertainment (Fallows 2005; Comscore 2010). The Nafus et al. Flosspols (2006) investigation has also shown that differences in participation in open-source communities, which require an investment of time, are due to unequal gendered distribution of time: women have less free time because of their participation in domestic and child-rearing tasks (Treas and Drobnič 2010). This is potentially valid for Wikipedia. However, even though gender-based Wikipedia use is influenced by differences in available leisure time, another significant point involves the legitimacy of the encyclopedia. More often than their male counterparts, female students underestimate the quality of references mentioned in the encyclopedia, as if they accorded more importance to conventional sources. They have a less positive image of the project and less confidence in it, as well as in their capacity to evaluate the information presented—that is, in their own skills (Lim and Kwon 2010).

We will now analyze precisely the gender differences judged as the most significant in light of both the technical and cultural nature of this collaborative encyclopedia project that is Wikipedia.

GENDER DIFFERENCES IN WIKIPEDIA'S CONTRIBUTION

In view of both the constant and international characteristics of this "glass ceiling," it is important to understand the inferred meanings regarding gendered relations to skills and expertise. The actual activities performed by the contributors, and the different degrees of legitimacy attributed to these various activities, must also be taken into account.

Gender, Skills, and Expertise

The hypothesis most frequently mentioned in previous studies concerns confidence in one's skills according to gender (Abbiss 2008; Enochsson 2005; Hargittai and Shafer 2006; Vekiri and Chronaki 2008). Confidence is not directly linked to actual skills, but rather to the perception that each person has of their own skills. Several studies have shown that men, without being more knowledgeable than women, tend to overestimate their own computer skills and consider women

as less competent (Hargittai and Shafer 2006). In addition, many studies show that young boys have higher self-esteem, especially in their relation to computers (Abbiss 2008; Vekiri and Chronaki 2008), and that, more generally, they affirm greater self-confidence (Enochsson 2005).

Although our statistical investigation does not allow for qualitative consideration of relation to competence, the quantitative results are nonetheless revealing regarding gender. When contributors evaluated their own computer skills, such as the capacity to search for information on the Internet, to conceptualize complex documents, to manage shared files, or to use multimedia skills (table 9.3), it seems that except for searching for information on the Internet, where women are in the majority of those declaring that they have "no problem" (77.7 percent versus 75 percent), and for the conception of complex documents, where the difference is not significant (0.2 percent), for all other activities requiring greater technical expertise, men evaluate themselves higher than women. It is possible to interpret these results in light of men's tendency to overestimate their skills (Hargittai and Shafer 2006), but also in light of the fact that men more often perform the activities requiring the most specific technical skills. Table 9.4 shows that male contributors consider themselves as specialists in a sector (49.9 percent versus 45.2 percent) — that is, in an epistemic space of skills or of knowledge — a situation reversed for the specialization in a type of activity (for example, the activities in table 9.5), where women are the majority (19.8 percent versus 16.3 percent). In reality, these gendered preferences recall the traditional division of roles according to which women focus specifically on identified tasks and men are more willing to recognize themselves as experts and specialists in an epistemic sector.

Gender, Activities, and Legitimacy

Regarding the activities involved in the actual contributions that were catalogued (table 9.5), it is significant that men dominate everywhere except in activities linked to adding references or sources in the text (gap of +1.4 for women [p-value: 0.0132]). The result is interesting to observe in that this is a relatively invisible activity — contrary to the proposition of a new article or the reorganization of a text — and one that contributes to legitimizing the credibility of the encyclopedia. The data thus corresponds fully to questions regarding the perception that contributors have of Wikipedia (table 9.6) concerning its organization, adhesion to its philosophy, election process, and more. On this point, there are gaps regarding the "perfectly fair" process of selection and attribution of roles: 14.5 percent of men versus 15.7 percent of women (p-value: 0.01188) — and the conception of the tool perceived as a means "important for improving general knowledge" or the adhesion to the philosophy of the project (66.9 percent for men versus 57.9 percent for women [p-value: 5.871e- 09]). This leads us to the hypothesis that men tend to adhere more readily to the encyclopedia's procedures and mechanisms of legitimization, whereas women appear to be more detached and do not take the project too seriously. In addition, this result confirms the investigation by Lim and Kwon (2010), who show

that female students are less inclined than their male counterparts to use unconventional sources of in- formation. It is interesting to view this statement in parallel with works in sociology of culture that show that girls are more encouraged, as children, to exercise legitimate cultural activities, with high scholastic value (Octobre 2005; Christin 2012). Women participate more than men in high-status cultural activities are more likely to read fiction, go to art museums, and attend classical and opera concerts, live plays, and dance performances (Christin 2012).

DISCUSSION AND CONCLUSION

In many survey studies, and especially Web-based surveys—a declarative statistical method deprived of face-to-face meetings—the question evidently arises of the representativeness of the sample. However, in basing our own mode of conception and diffusion of the survey on that of UNU-MERIT, we dispose of the methodological means to compare the two studies. Due to similarities concerning level of education, as well as gender and class, the results are important. Another limitation concerns the comparative data gained from the UNU-MERIT study and our study. The later specifically focused on socioprofessional categories of contributors, which were not solicited in the UNU-MERIT study. The French study demonstrates the pertinence of this criteria regarding chief executives (for men: upper classes 27.8 percent versus employees and workers 8.3 percent; in contrast to 23.8 percent and 7.2 percent for women, respectively), as well as students (30 percent male and 27.7 percent female), who constitute a significant proportion of contributors. In the same way, the data that we have for our study allows us to state the cumulative effects according to the level of education and the person's gender. We thus notice that male contributors are always more educated than women, whereas more female than male contributors have no college degree (8.2 percent for women versus 4.9 percent for men). Limitations must be taken into account: notably, an absence of certain international comparative sociodemographic data. This is due to different methodological tools reflecting cultural factors. Here, we have chosen to focus on gender. We have not added other categories, abandoning an analysis in terms of intersectionality (analysis examining social relations insofar as gender is at the intersection of other power relationships concerning social class, age, race, etc.). Our research allowed us to highlight how gender constitutes a determinant variable for understanding the mechanisms of development of the Wikipedia project. Only a few statistical works (e.g., Liang, Chen, and Hsu 2008 or Antin et al. 2011) have identified the social determinants of participation. On the other hand, Wikipedia has become a field of investigation for numerous researchers who attempt to study the sociotechnological implications of the collaboration. For example, Dejean and Jullien (2012) collected, in 2011, 7,029 articles concerning Wikipedia in the database *Science Direct* (http://www.sciencedirect.com). The majority of articles concerned the analysis of tracks and artifacts. The literature (Jullien 2012) shows us that the questions of users'

experience, the quality of articles, the collaborative structure, as well as conflicts and motivations for participation in Wikipedia, have also been widely studied (e.g., Kimmons 2011; Konieczny 2010). Here, in emphasizing gender, we have attempted to demonstrate that Wikipedia is not an isolated space, but rather profoundly anchored in the social. Thus, as with technical and scientific activities (Keller 1985), participation in Wikipedia is strongly differentiated and largely influenced by class- and gender-based relations of domination. The latter are manifested in various ways: by the underrepresentation of collaboration and use by women, so that the production of "female content" constitutes a real challenge for the Wikimedia Foundation (Bourdeloie 2013). Finally, the Wikipedia project contributes to maintaining the gender system, "which includes processes that both define males and females as different in socially significant ways and justify inequalities on the basis of that difference" (Ridgeway and Smith-Lovin 1999), even if it offers possibilities for displacing the gendered lines dividing activities.

Table 9.2. Gender and Contribution to Wikipedia (in %)

Wikipedia n = 125,347 UNU-MERIT Study

French Wikipedia n = 13,514 Prosodie Study

	Users	Contributors	Users	Contributors
	n = 81,497	n = 43,850	n = 8,486	n = 5,028
Male	68.28	86.56	61.52	81.36
Female	31.23	12.83	38.48	18.64

Table 9.3. Self-Declared Skills of Contributors according to Gender (in %)

	Search for information on the Internet		Conception of complex documents		Management of shared files		Multimedia skills (know how to modify images, sounds, and video)	
	Female	Male	Female	Male	Female	Male	Female	Male
No problem	77.7	75	56.1	56.3	24.9	29.4	26.2	31.1
Easy	18	21	29.4	29	25.1	28.5	28.5	28.4
Mostly easy	1.8	2.9	8.7	10.6	27.1	24.5	24.9	23.5
Not easy	2.5	1	5.9	4.1	22.9	17.6	20.5	17
Pearson's Chi-squared test: p-value	0.0001114		0.04203		9.858e-05		0.007324	

Reading the table: 77.7% of female contributors consider that they have "no problem" with finding information on the Internet.

Table 9.4. Self-Evaluation of Expertise according to Gender (in %)

	Female	Male
Consider themselves specialized in a theme, an area of expertise	45.2	49.9
Consider themselves specialized in an activity	19.8	16.3

Reading the table: 45.2% of female contributors consider themselves specialized in a theme, an area of expertise.

Table 9.5. Activities of Contributors according to Gender (in %)

	Female	Male	Gap Male – Female	Pearson's Chi-squared test: p-value
Supplement to a text, content addition	55.5	58	+2.5	0.1652
Adding references or sources in a text	29.7	28.3	-1.4	0.0132
Correction of grammar, spelling, or typing mistakes	60	64.3	+4.3	0.0783
Clarification of a formulation	28.5	31.6	+3.1	0.06541
Proposition of a new article	21.1	23.8	+2.7	0.07778
Reorganization of a text	15.5	19.9	+4.4	0.001784

Reading the table: 55.5% of female contributors said that they had completed a text or added content.

Table 9.6. Perception of the Legitimacy of Wikipedia

F = Female Male = Male	A hierarchical structure is necessary for one's performance		You adhere to the overall philosophy of the project		The process of selection and role distribution is fair		You are part of the Wikipedia "community"		Participation in the Wikipedia project is fun for you		*is an* important tool for improving your level of general knowledge	
	F	M	F	M	F	M	F	M	F	M	F	M
Totally disagree	5.9	5.2	3.6	1.5	4	3.4	15.7	12	7.8	7.3	3.6	1.5
Mostly disagree	10.2	9.1	1.2	1.2	3.9	4	15.2	16.1	7.8	7	1.2	1.2
Neither agree nor disagree	31.6	25.4	9	5.3	55.7	51.8	35.2	30.4	15.7	22.9	9	5.3
Mostly agree	31.1	35.2	28.3	25	20.7	26.3	21.7	28.1	41.9	42.3	28.3	25
Totally agree	21.1	25.1	57.9	66.9	15.7	14.5	12.2	13.4	26.7	20.5	57.9	66.9
Pearson's Chi- squared test: p-value	0.0002608		1.566e-09		0.01188		2.251e-05		0.0848		5.871e-09	

NOTES

1. Led by the UNU-MERIT (center for research and study at the University of the United Nations and the University of Maastricht in the Netherlands) at the request of the Wikimedia Foundation, the international investigation on Wikipedia's readers and contributors (the Wikipedia Survey) was translated and published online during the second trimester of 2008 in over twenty languages.

2. This survey was conducted in the context of the ANR CCCP-Prosodie Program (2009–2012).

3. For example, the UNU-MERIT study (Glott et al. 2010) has shown that only 8 percent of respondents would be more inclined to contribute to the online encyclopedia if "the technology were easier to use."

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