Women scientists' digitally mediated activity, genres and digital tools: A cross-sectional survey across the disciplines

Carmen Pérez-Llantada, Oana Maria Carciu, Rosana Villares

Institute for Biocomputation and Physics of Complex Systems, University of Zaragoza, Spain

Introduction

Over the past decades, genre studies, activity theory, studies of communicative practices in organizations, and literacy studies have all provided valuable insights into how individuals work at a particular time and place and how they engage in communicative action to accomplish their tasks (Spinuzzi, 2023, p. 1028). This research has been particularly useful in comprehending writing genres in organizations (Orlikowski & Yates, 1994; Yates & Orlikowski, 1992), situated discourse practices (Kjellberg, 2009) and aspects of social interaction through genres, i.e., typified texts that respond to recurring rhetorical situations (Bazerman, 2004). In the context of professional and public science communication, the advent of digital technologies (i.e., personal computers, software and applications, and the Internet) has transformed scientists' socioliterate activity, leading to significant changes in the processes of production, circulation and dissemination of scientific knowledge, as reported elsewhere (Pérez-Llantada, 2021). Technological affordances have facilitated open science practices that aim to increase the reproducibility, rigor and trustworthiness of scientific research (Bartling & Friesike, 2014). These practices are reflected in the emergence of digital genres of professional communication such as registered reports (Mehlenbacher, 2019), online data articles (Pérez-Llantada, 2022) and open peer reviews (Breeze, 2019), to mention a few. Technologies also support collaborative practices between large research teams (Thibault et al., 2023) and enable data interoperability in the conduct of scientific processes through the use of

electronic laboratory notebooks (Kwok, 2018; Trachtenberg, 2016). Email communication enables a fluid social interaction at work and web platforms support digital networking and collaboration. Sharing data and results is also possible today thanks to electronic repositories, such as ArXiv, Zenodo, GitHub, and, PubMed Central, where scientists can make their data protocols and their article preprints available online.

The use of digital technologies in public science communication has also impacted genre-based socioliterate activity that supports what Loroño-Leturiondo and Davies (2018) define as socially responsible research, that is science communication aimed at broad publics. Rhetorical genre studies argue that scientific and social responsibility rationales have posed new rhetorical exigences such as the need to democratize science by communicating it to wider audiences (Kelly & Maddalena, 2016). Blogs (Kwok, 2018), microblogs such as Facebook, Instagram, Twitter/X (Orpin, 2019) and online citizen science projects (Mehlenbacher, 2019), among other discursive practices, exemplify science communication aimed at reaching broad publics. Albeit in different ways, these genres require the adaptation of scientific content to 'accommodate' Internet audiences, as Wickman and Fitzgerald (2019) put it, which involves the use of plain language and the deployment of interpersonal language resources to convey authoritativeness and build credibility and trust while also creating proximity with the audiences (e.g., Mauranen, 2013 on science blogs). Communicating scientific content to diverse audiences also involves the use of carefully articulated narratives to make a persuasive appeal and trigger audience's participation and collaboration in scientific processes, for example in science crowdfunding projects online (Mehlenbacher, 2017).

Taken together, these studies provide substantial evidence that digital transformation is driving an increasing reliance on digital affordances in scientists' socioliterate activity. However, this transformation has also led to a number of unanticipated consequences, including disparities in scientific productivity and international collaborative networking, as well as cultural and gender

disparities in citational impact and first-authorship recognition. For example, Santoro and Belli (2018) raise concerns about the effects of the unequal distribution of information and communication technologies. Taking the case of Latin American universities, they explain that limited opportunities to engage in the dominant scientific communication practice of publishing online in paywall journals could only be remedied through scientific collaboration and networking, which increases competitiveness and "democratise[s] scientific practice in precarious territories" (p. 316). Thelwall et al. (2019b) report on imbalances in scientific productivity within the STEM fields. In their analysis of complex networks across disciplinary areas, Clemente-Gallardo et al. (2019, p. 76) conclude that, unlike the life sciences, humanities and social sciences researchers are less likely to have international collaborations because their collaborations are mainly domestically oriented. Larivière et al. (2013) report global gender differences in international collaboration, resulting in citation disadvantages for female scientists. Comparing men and women top- and non-top scientists in Italian universities, Abramo et al. (2019) conclude that, while there are no differences in terms of collaborative behavior, there exist disciplinary differences in productivity according to quantitative performance indicators. The fact that women scientists tend to engage more in national rather than in international collaborations, as their male counterparts do, is partly associated with lower research productivity and hence lower scores on performance indicators. Examining altmetric indicators of research productivity in political sciences, Meibauer et al. (2023) find that publications authored by men receive higher altmetric attention compared to those authored by women. Overall, this diversity of studies captures the multiple and significant impacts of digital technologies on socioliterate activity, particularly in relation to scientific productivity and collaborative behaviour.

Approaching the study of digitally mediated genre activity

In this article we draw on seminal genre theory (Bhatia, 2004) to map patterns of professional and public science communication in the context of digital transformation. We understand writing activity, genres and discursive processes as taking place within a 'disciplinary culture'. A disciplinary culture is characterized in terms of "'professional goals and objectives', 'generic norms and conventions' and professional and organizational identity'" (p. 130). In line with Bhatia (2004), we would argue that digital transformation may affect disciplinary cultures in different ways. Russell's (1997) conceptualization of an 'activity system' is also instructive because it invites a focused examination of the types of interaction that takes place within and outside a particular activity system, the mediating tools (objects and artifacts) that members of the system draw upon in genre-based interactions and, more broadly, the contextual effects or rationales that motivate change in the activity system. Genre systems theory (Bazerman, 1994, 2004) also offers important insights into how individuals in a social system create and convey meaning and value through the performance of interdependent, intertextually linked genres. Studies of genres, writing and text production are also a relevant area of inquiry for understanding the ways in which genres are influenced and shaped by community norms and media affordances. As Andersen et al. (2014) note, the various forms of genre collectivities conceptualised in the literature (e.g., sets, systems, ecologies, suites, colonies) are valuable for tracing common trends and possible differences across disciplinary practices as well as available resources and contextual impacts on socioliterate activity. We also want to acknowledge the value of situated writing studies and studies of writing and science (e.g., Prior & Hengst, 2010; Wickman & Fitzgerald, 2019) for understanding scientists' digitally mediated practices. These areas of inquiry highlight the significance of material-semiotic artifacts, such as computers and technological tools, and provide theoretically grounded insights into current online scientific writing practices in the professional and public spheres.

To the best of our knowledge, little research has been done to understand the extent to which genre-mediated activity is reliant upon the range of technological tools and resources that support social interaction and communicative practices today. In this article, we aim to explore this activity in relation to discipline-specific forms of interaction. As Becher and Trowler (2001) explain, each disciplinary culture has a distinct epistemological frame, which makes the variable of 'discipline' worth investigating. In addition, the gender differences reported in the literature invite inquiry into the ways in which women scientists, in particular, use digital technologies to produce, share and communicate science. Our research was guided by the following research questions:

RQ1. What socioliterate activity do women scientists across disciplines engage in to produce, circulate and disseminate scientific knowledge?

RQ2. What sets of interdependent genres or genre systems support this activity?

RQ3. What digital mediational tools facilitate the production, circulation and dissemination of scientific knowledge to expert and non-expert publics?

Methods

In this study we adopted a non-experimental research design based on survey techniques, which has the advantages of economy of design and rapid data collection (Creswell, 2014, p. 203), allowing us to formulate hypotheses and validate them based on the respondents' perceptions and opinions. For this research, we used an open list of a Spanish association of women scientists[1] to conduct a cross-sectional survey (i.e., with data collected at a specific point in time) (n=3,558). We chose this sample because the views of women scientists alone are not typically represented in studies of scientific research, especially in studies of digitally mediated activity. Thus, although we do not discuss the findings in this chapter as representative of all scientists or even all women scientists, our study does provide evidence of how subgroups (in this case, women) in national

organizations (in this case, Spain) view disciplinary practices, genres, and digital tools for scientific

communication as well as their personal values regarding those practices, genres, and digital tools.

Given the differences in disciplinary ethos reported earlier, we chose 'discipline' (i.e.,

professional culture) as the main variable for stratifying the population. Accordingly, we grouped

the participants into 5 broad disciplinary fields: Humanities and Arts (HA), Social Sciences (SS),

Engineering and Mathematics (EM), Physical Sciences (PS) and Biomedical and Health Sciences

(BHS) in order to identify common trends as well as differences in our target population. Table 1

shows the distribution of respondents by disciplinary field.

Table 1. Distribution of respondents

Disciplinary field	Total	Total %
Humanities and Arts (HA)	79	9.04
Biomedical and Health Sciences (BHS)	398	45.54
Physical Sciences (PS)	155	17.73
Social Sciences (SS)	104	11.90
Engineering and Mathematics (EM)	138	15.79

The survey design was based on theoretical constructs drawn mainly from genre theory,

with additional insights from activity theory, genre and socioliteracy and situated literacy studies.

The survey consisted of three sections that we cross-referenced with the research questions. The

first section aimed to inquire about digitally mediated literate activity and also included items to

identify possible contextual influences or contextual impacts. The second section sought to map the

genres the respondents relied on to carry out this activity. The third section aimed to identify what

digital mediational tools (computers, software, apps and Internet resources) supported the

production, distribution and dissemination of genred texts. The survey included a total of 58

behavioural and attitudinal items that specifically related to socioliterate activity. Orality and

multimodality practices, which we also surveyed, fall outside the scope of this study and will be

addressed in future research. The survey received approval from an ethics committee (Nª refª.: RAT

2023-183).

Responses were collected using an online Google form. The link to the survey was sent via

email to each individual scientist. Their contact emails were available in the open database of AMIT

website. The questionnaire remained open for three weeks. The response rate, 874 responses

(24.56% of the total population contacted), was considered representative with an acceptable

margin of error of + - 3%. We ran descriptive and inferential statistics (with SPSS 13.0.0) for

answering the RQs and for assessing the practical implications of the findings. For the questions

that took qualitative values, the Pearson Chi-square test and Yates' correction or Fisher's exact test

were applied when chi-square tests were not applicable. Those with ordinal quantitative variables,

i.e., with values ranging from 1 to 5 (1 being *not important* and 5 being *extremely important*), were

compared across the disciplinary fields. For the quantitative values we used the non-parametric

Kruskal-Wallis test, which does not rely on any assumptions about the distribution of the data. In

those cases in which the test was significant, we conducted multiple comparisons between groups

to determine which were significantly different from each other. The statistics were tested at a

significance level of ≤ 0.05 (95% confidence level).

For the interpretation of the findings we used genre theory and we also borrowed insights

from activity theory, studies of communicative practices in organizations and writing and

socioliteracy studies. Genre theory, particularly Bhatia's (2004) work, helped to find structure in the

data and to frame the interpretation of patterns of difference, absence, and similarity range of

genres deployed by the respondents in their professional community. The interpretation of

collaborative patterns was based on Yates and Orlikowski's (1992) claim that with new electronic

media, "key dimensions of collaborative work have all shifted […] encouraging different types of

social interaction" (p. 14). Genre systems theory enabled us both to gain insight into how texts and

textual practices are organised (Bazerman, 1994, 2004, 2015) and to develop a more nuanced

interpretation of "the sequence and timeliness of text production within the context of the

distributed work of the entire activity system" (Andersen et al. 2014, p. 307). As the study was

concerned with digital transformation, it seemed appropriate to consider Finnemann's (2016)

framework, which characterises digital materials according to "their particular configurations of

hypertext features" (p. 6). This framework facilitated the discussion of the digital genres that

underpin emerging forms of science communication online. In particular, it enabled us to

understand the role of networked digital media in discourse practices and, ensuing from this, to

assess the pedagogical implications of these genres, which are harnessed by their multiple source

knowledge system configurations.

Results

In this section, we use descriptive and inferential statistical findings to explain the respondents'

varying levels of engagement in different digitally mediated activities and the predominant

supporting socioliterate activity identified in the survey. Furthermore, we report on their

perceptions of the significance of the respondents' dominant discursive practices in their

professional context and their own perceptions, thereby identifying potential discrepancies

between current workplace research policies and the respondents' own interests and values for

particular digitally mediated discursive practices. We also present findings on the extent to which

respondents utilise specific digital mediational tools and resources when engaging in digitally mediated activity.

Technology mediated activities

The survey responses showed that written practices primarily rely on the Internet and digital media, yet some activities are more common than others. As shown in Table 2, almost all the respondents (92.41%) are involved in digitally mediated collaborative activity with national and international colleagues (e.g., scientific publications, research project proposals) and in activities aimed at reaching out to the national and international community (e.g., personal/institutional/group websites, blogs, e-newsletters). Activity related to knowledge dissemination involves the use of academic social networking sites (e.g., Academia.edu, ResearchGate) and online data sharing repositories (e.g., GitHub) (87.69% and 87.08% of the respondents, respectively) (Table 2). Approximately, 75% of the respondents also use social media microblogs to increase their visibility as researchers and for research outreach. However, activity aimed at giving visibility to research results (e.g., social responsibility reports), as well as activity related to reaching broad audiences (e.g., use of research group websites) were (much) less prevalent.

Table 2. Overall patterns of digitally mediated activity

Discipline-specific differences were found in activities aimed at gaining visibility and recognition as a researcher, and communicative practices aimed at reaching the international scientific community (Table S1. Statistical differences in activity types). While the HA group shows a high level of engagement in activities aimed at gaining visibility and recognition, the EM group is

associated with planning to do so in the future and the BHS group with not planning to do so in the future (p = 0.035). It was also statistically significant that the SS group plans to participate in activities to reach out to the international scientific community in the future (p = 0.002).

Interestingly, the data showed that the respondents' involvement in the aforementioned actions appears to be influenced by the level of importance attached to them in the scientists' professional contexts. According to respondents, two activity types that are particularly highly valued (rated *important/very important/extremely important*) (Table 3). First, are those activities associated with traditional genres that are now re-mediated or moved to online environments (e.g., online scientific publications, technical reports, research proposals). Second, are those activities aimed at sharing and promoting research and at reaching out to the national and international scientific community (e.g., having personal/research websites, blogs, e-newsletters, academic social networks, and data sharing repositories). Noticeably, while these two activities are particularly highly valued, the respondents reported that other activities related to science dissemination aiming to reach non-specialized audiences were also relatively important in their professional contexts. While these activities scored low in terms of level of involvement, they were perceived as generally valuable within the discipline and even more valuable by the respondents themselves.

Table 3. Comparison of importance of activities (cumulative % = *important/very important/extremely important*)

Type - Activity aimed at…	In their professional context	By individuals
Collaborating with national and international colleagues	88.33%	92.33%

Reaching out to the international scientific community	81.92%	87.3%
Reaching out to the national scientific community	76.54%	83.3%
Promoting scientific culture and open science	64.42%	82.61%
Gaining visibility and recognition as a researcher	73.11%	81.35%
Disseminating research to non-specialized audiences	62.47%	80.55%
Giving visibility to the transfer of research results	68.65%	76.32%

The marked disciplinary differences found indicate that the importance given to the above activities may influence the extent to which respondents participate in certain digitally mediated activities. Biomedical and Health Sciences (BHS) were most distinct in this respect (Table S2. Perceived importance of activities in the professional context). Specifically, socioliterate activity aimed at reaching out to the scientific community and activity aimed at collaborating with national and international colleagues were perceived as more highly valued in the BHS group's professional context than in the Social Sciences (SS) group (with p-values of 0.014 and 0.005, respectively). Activity for disseminating research results to a broad audience and activities for promoting scientific culture and open science were also considered of greater importance in the BHS group's professional context compared to the Engineering and Mathematics (EM) group (p-values of 0.001 and 0.012, respectively). Furthermore, activity aimed at giving visibility to the transfer of research results were perceived as more important in the BHS group than in that of the Humanities and Arts (HA) group (p = 0.002). The comparison of the SS and Physical Sciences (PS) groups showed significance at the level of 0.005 for the same activity type.

Statistical significance was also found in the perceived importance that the individuals of each disciplinary group attach to digitally mediated activity aimed at reaching the national scientific community and activity aimed at collaborating with national and international colleagues (Table S3.

Importance of activities as perceived by respondents). While both communication processes were

considered to be important by approximately 90% of all respondents, the p-values showed that,

compared to the other disciplinary groups, the HA group attached greater importance to activity

aimed at reaching out the national scientific community and that the PS group attached greater

importance to activity aimed at collaborating with national/international colleagues than the SS

group.

Centrality of genres

Figure 1 shows that the most central genre for the survey respondents was the research

article. The majority (95.33%) of respondents reported writing research articles for open access

journals and 75.86% reported writing science popularization for online journals. Less common

genres were press releases for e-bulletins and e-newsletters (62.59%), and research transfer-related

documentation (62.01%), personal/group/institutional websites and research-related blogs

(56.06%), infographics (44.62%), and social media posts (41.08%). Similarly, as also shown in Figure

1, online crowdfunding proposals and citizen science projects were, by far, the least common

genres (i.e., *unimportant*), suggesting very little contextual impact of the kind of participatory

science activity advocated by the open science movement.

Figure 1. Centrality of written genres

Interestingly, the findings seem to reflect the divide between the STEM and non-STEM fields

in terms of collaborative behavior, each group approaching communicative practices in a distinct

manner —either collaboratively, individually or both (Table S4. Statistical differences in writing

activity). While the EM, PS and BHS groups collectively author articles for open access journals and

science popularisation articles, the SS group does this both individually and in collaboration (p<0.001). Furthermore, the three groups' responses showed that they create content for websites/ blogs collaboratively, whereas the HA group does this individually or collaboratively (p = 0.034). It was also statistically significant that the EM and PS groups engage in microblogging collaboratively, while the HA and BHS groups do so individually and the SS group both individually and collectively (p = 0.024). The BHS group was statistically more likely to write press releases individually (p = 0.015). However, there were also statistical differences in writing documentation, with the EM group writing collaboratively, the HA group writing individually and the BHS group writing in both manners (p<0.001).

Table 4 compares the respondents' perceived importance of these genres in their professional context with their own perceptions of them. Not unexpectedly, articles in open access journals receive the highest level of importance (95.19%, of which 87.07% are *very* or *extremely important* responses). In contrast, other written genres are considered less important, for example transfer-related documents (67.39%), microblogs (62.93%), e-bulletins and e-newsletters (61.90%), science popularisation articles (61.30%), and websites and blogs (51.26%). As also seen in Table 4, regardless of their disciplinary group, the respondents personally very highly value the same core group of academic genres, namely, articles in open access journals, articles in science popularisation journals, e-press releases, and research transfer-related documents. However, there appears to be a slight discrepancy between the importance placed on genres that enable research outreach (e.g., infographics, Twitter threads, and online crowdfunding and citizen science projects) in their professional context and the importance the respondents attached to them.

Table 4. Comparison of level of importance of genres (cumulative %=*important/very important/extremely important*)

Genres	In their professional context	By individuals
Open access research articles	95.19%	95.08%
Posts on social media	62.93%	70.48%
Transfer-related documents	67.39%	68.65%
Science popularisation articles	61.3%	63.96%
E-press release notes, e-newsletters	61.9%	63.96%
Websites, blogs	51.26%	62.81%
Infographics	40.39%	53.32%
Twitter threads	31.81%	42.22%
Online crowdfunding and citizen science projects	26.66%	36.61%

The statistical analyses confirmed that disciplinary culture is a factor in determining the importance of professional genres. According to the multiple comparisons, the professional context of the BHS group placed greater importance on open access journal articles than the EM and SS groups (with p-values of 0.045 and 0.019 respectively) and greater value to e-press release notes and newsletters than the HA, EM, and SS groups (with p-values of 0.004, 0.001 and <0.001 respectively) (Table S5. Multiple comparisons of relative importance of genres in the respondents' professional context). Moreover, the BHS respondents places more importance on crowdfunding and CS projects online when compared to the HA, EM, and PS respondents (p-values of 0.006, 0.005 and <0.001 respectively). Infographics are also more important in the professional context of the BHS group when compared to that of the PS group (p = 0.012), and blogging is significantly more important than in the PS context (p = 0.001). There was also statistical significance when comparing

the HA and EM professional context, the former giving more importance to science popularisation journals (p = 0.042).

Finally, 'discipline' was once again a key factor in determining the importance the respondents attached to the genres mentioned above (Table S6. Multiple comparisons of relative importance of genres in the respondents' own view). Compared with the HA, EM, and PS groups, the BHS group showed greater interest in crowdfunding and citizen science projects (the difference being significant at the p-levels of 0.005, 0.004 and <0.001 respectively). This group also placed more importance on microblogging than the EM group (p = 0.010) and on infographics compared to the PS group (p = 0.010). On the other hand, the HA group gave more importance to microblogging and to research webpages and blogs than the EM group (as shown by p-values of 0.022 and 0.016 respectively).

Digital mediational tools

As shown in Table 5, it was clear that digital tools and Internet resources support socioliterate activity related to professional (expert-to-expert) scientific communication in several ways: 82.3% of the respondents use online writing tools, dictionaries and translation tools; 77.63% use collaborative spaces; and 73.74% use data collection tools. All these tools are in line with their main socioliterate activity, namely publishing, promoting and giving visibility to their research, as well as maintaining research collaboration with national and international peers. Moreover, the cumulative percentages, when grouping *Yes* and *No, but I am considering it in the future* responses, further indicate their current use and expected future use of platforms for open peer review platforms (75.13%) and content editing tools (61.45%). Finally, while 35% of them are already using AI tools for content generation, 40.97% are considering using them in the future.

Table 5. Digital tools mediating professional (expert-to-expert) science communication

Digital tools	Yes	No, but in the future	Cum. %
Online writing tools, online dictionaries and translation tools (e.g., Word checker, Grammarly, DeepL, …)	82.3	7.64	89.94
Data/information collection tools (e.g., forms, repositories such as GitHub, Mendeley, ...)	73.74	13.93	87.67
Digital collaborative spaces (e.g., Google suite, Dropbox, OneNote, ...)	77.63	6.72	84.35
Platforms for open manuscript review (open peer review)	39.89	35.24	75.13
AI tools to generate content	25.79	40.97	66.76
Content editing tools (e.g., WordPress, Wix, Webflow, ...)	35.39	26.06	61.45

When comparing the disciplinary groups, no significant differences were found in the use of online writing tools, collaborative spaces and open manuscript review platforms (Table S7. Statistical differences regarding the digital tools supporting professional science communication). However, there were differences in the use of data/information collection tools (p = 0.031), with the EM group using them, the BHS planning to use them in the future and the HA group showing mixed responses (associated with both the item *No, but I plan to use them in the future* and the item *I don't plan to use them in the future*). The use of content editing tools was also significantly different (p = <0.001). The HA group uses them, the PS group plans to use them in the future and the SS group shows mixed responses (showing significant associations with the items *Yes* and *No, but I plan to use them in the future*). The EM, PS, and BHS groups are significantly associated with not planning to use them in the future. The use of AI tools for content creation also differed significantly between the EM and SS groups. Additionally, AI tools for content creation also showed significance differences with a p-value of 0.002. Only the EM and SS groups were significantly

associated with the use of AI, in contrast to the HA group, which showed significance in the item *I do not plan to do so in the future*. The PS, BHS and SS groups showed a significant association with planning to use them in the future.

Turning to the use of digital tools for producing, distributing and disseminating science to broad audiences, consistent with the centrality of activity types and genres reported previously, the overall percentages of use of these tools were lower. Table 6 shows that nearly 70% use online writing tools (67.03%), yet not even half of them use digital collaborative spaces (42.28%), data/information collection tools (41.14%) and content editing tools (37.93%). Clearly, AI content-generating tools and e-platforms to compose crowdfunding proposals and citizen science projects as well as digital tools to adapt scientific content for lay audiences are rarely used, which has important implications for researchers' training in participatory science.

Table 6. Digital tools mediating public science communication

Digital tools	Yes	*No, but in the future*	Cum. %
Online writing tools, online dictionaries and translation tools (e.g., Word checker, Grammarly, DeepL)	67.03	11.9	78.93
Artificial Intelligence tools to generate content	24.18	40.6	64.78
Content editing tools (e.g., WordPress, Wix, Webflow)	37.93	22.64	60.57
Data/information collection tools (forms, repositories such as GitHub, Mendeley, …)	41.14	15.62	56.76
Digital collaborative spaces (e.g., Google suite, Dropbox, OneNote, …)	42.28	13.06	55.34
Tools for adapting specialised content to non-expert audiences (e.g., Readability test, Automatic readability checker, De-jargonizer)	10.33	39.51	49.84
Crowdfunding and citizen science e-platforms	16.78	32.88	49.66

While no statistical differences were found in the use of collaborative spaces, online writing tools and tools for adapting specialised content to non-expert audiences, the disciplinary groups differed significantly regarding some other digital tools (Table S8. Statistical differences regarding the use of digital tools supporting public science communication). The EM group was associated with using data/information collection tools unlike the PS and BHS groups, that reported having no plans to use them in the future. And, like the SS group, the HA group showed a significant association with planning to use data/information collection tools in the future. Content editing tools also showed significant associations (p = 0.037). The use of these tools was associated with the HA, SS, and PS groups, but not with the EM and BHS groups, significantly associated with the item N*ot planning to use them in the future*. The BHS group showed significance in the item *I'm planning to use them in the future*, suggesting different dynamics in this particular group. Finally, only the BHS group was associated with the use of crowdfunding and citizen science e-platforms, and this group and the SS group showed an association with using them in the future. AI tools to generate content were significantly associated with the EM and SS groups. In contrast, the HA was associated with *not planning to use them in the future* responses while the PS group showed mixed behaviour (associated with both *not planning to use them in the future* and *planning to use them in the future*).

Discussion

The aim of this article was to examine women scientists' socioliterate activity across disciplines in order to learn about their digitally mediated discourse practices and to better understand the processes of production, circulation and dissemination of scientific knowledge in relation to digital technologies. Thus far we have argued that digital transformation has influenced socioliterate activity, that writing traditional genres (now moved to web environments) is the

dominant discourse practice compared to other forms of science communication on the Internet, and that digital mediational tools mainly support professional (expert-to-expert) over public communication of science online. Below we discuss these three points as well as implications for writing instruction.

Digitally based socioliterate activity

Genre theory and activity theory claim that texts are tools for carrying out an activity, and that genres, as semiotic tools, vary according to the communicative goals they are intended to achieve (Bhatia, 2004; Russell, 1997). Activity theory also claims that change results from historically situated human interactions (Russell, 1997). In this article we provide evidence to support these claims. Findings from our cross-sectional study have shown that the main activity the respondents engaged in irrespective of their disciplinary fields was publishing articles in open access journals. Additionally, we found that almost all the respondents used academic social networking sites and social media for online networking, from which we can assume that by sharing their research results with other peers they aim to ensure their visibility as researchers and increase their research impact.

Although the findings indicated that the respondents' socioliterate activity was digitally supported, our statistical analysis showed this finding was not equally so in all the disciplinary groups. The data, in fact, showed a range of disciplinary differences in interactions, publication strategies, data sharing practices, and communication approaches, including those that extend beyond the scientific community. Following Becher and Trowler (2001, p. 36), the knowledge/ethos of the "hard sciences" (here, the PS group), concerned with universals and seeking consensus over the questions addressed, may explain its involvement in international collaboration. Knowledge of the "soft sciences" (here, the SS group), concerned with situated knowledge and enhancing

professional practice, may account for the more locally focused activity found in this group. Humanities knowledge, personal, value-laden and concerned with details, may be the reason why the HA respondents were more likely to engage in activity aimed at gaining visibility and recognition, in contrast to the EM respondents, whose disciplinary knowledge/ethos is said to be more purposeful and pragmatic. The fact that the BHS group had the highest percentages of participation in activities with direct social impact and showed interest in engaging in them in the future may be due to their distinct object of enquiry.

Bhatia (2004) argues that investigating the particular goals and objectives of a professional culture offers insights on the genres and discursive processes deployed in such culture. In this study genre-mediated socioliterate activity proves to be influenced by the goals and objectives of the scientists' professional cultures. In all the disciplinary groups activity related to international collaboration was ranked at the top of the list, along with activity related to research productivity and research outreach, both of them valuable bibliometric indicators (Thelwall et al., 2019a, b). Activities aiming at research dissemination, as well as activity aiming to increase researchers' recognition were also highly valued, from which we can infer that engagement with productivity-related genres, namely journal articles, aligns with the goals and objectives of the respondents' professional context. The only exception to our finding was the BHS field, which also valued highly genre-based activity supporting science dissemination to broad audiences and participatory science genres, all of them aligned with the social exigence of democratising science (Mehlenbacher, 2019).

A clear mismatch was found between the social interactions or types of activities that the respondents actually engage in and the value they place on them. They engaged in those digitally mediated writing activities that were highly valued in their professional context, namely activities that were centred on national and international networking and underpinned various professional goals such as knowledge sharing and citational impact. In addition, they also valued highly certain

activities in which they participated much less frequently, specifically research outreach activities to give visibility to their work and to promote scientific literacy. It can then be inferred that while the scientists may be aligning with the open access organizational requirements, they are also sensitive to socially responsible research, advocated by the open science agenda (Bartling & Friesike, 2014). One point should be made here, though. While the majority of the BHS scientists participated in these activities or expressed willingness to do so in the future, the respondents representing the other disciplinary fields did not. As this was a discipline-specific statistically significant difference, future research needs to explore scientists' perceptions and attitudes towards socially responsible research activities, paying particular attention to the variable 'professional culture'.

An important limitation of this study is that we do not know from the data the extent to which these patterns of activity are gendered as the population that we surveyed was not stratified accordingly (i.e., men/women). In future research it would be important to address gendered differences by statistically controlling this demographic variable. It is also important to acknowledge that the information available in the AMIT database does not allow us to determine whether the individuals have lower expectations due to gender discrimination. The scope of their responses is also somewhat limited as they reflect the respondents' perceptions, values, personal backgrounds and life experiences, which may affect the survey results. Notwithstanding these limitations, the findings are generalisable insofar as the AMIT database includes women scientists from a range of professional contexts, both geographically and organisationally. These women scientists belong to a variety of organizations, including public and private universities, industry, and the R&D sector. In order to enhance the generalisability of the findings, we propose qualitative follow-up interviews with the scientists. These interviews could provide more in-depth insights into the value of the activities and the writing practices they engage in within their disciplinary contexts.

Genre dynamics

In this article we support the view of activity systems as complex dynamic systems influenced by historical changes (Russell, 1997, p. 512). Specifically, we have shown that the women scientists that responded to the survey were increasingly engaging in digitally mediated activity enacted by a system of genres. Typified texts (Bazerman, 1994) support organisational processes within and outside the workplace, in this case activity aiming at national/international collaboration and research dissemination. Journal articles, science popularisation articles and blogs, among others, written collaboratively in some disciplines (e.g., the EM and PS groups), represent what Yates et al. (1997) conceptualise as collaborative genres of writing. They require social interaction between individuals and the use of digital technological tools mediating such interaction. The study unveiled that they write and publish in open access, share research data and results online and disseminate science through e-newsletters, press releases, blogs and microblogs. In addition, online collaborative spaces, data sharing repositories, content editors and social networking sites were the main mediational tools. These digitally mediated communication practices could ecologically connect genres to other genres online, allowing us to further map genre systems and "the sequence and timeliness of text production within the accomplishment of the distributed work of the entire activity system" (Andersen et al., 2014, p. 307). For instance, online articles could be connected to electronic laboratory notebooks (Kwok, 2018), registered reports (Mehlenbacher, 2019), data articles (Pérez-Llantada, 2022) and open peer reviews (Breeze, 2019), as these genres are of growing interest to the scientific community in order to align with the required transparency of scientific processes and science reproducibility principles of open science.

It is worth noting out that the genres requiring collaborative writing were discipline-specific. It was statistically significant that professional cultures, as conceptualised by Bhatia (2004), influence communication practices in a number of ways. Although the genre repertoires identified in each disciplinary context did not show much variation across the disciplinary groups,

collaborative behaviour in article production and popularisation, research group blogging and microblogging, and research transfer documentation was mainly associated with the STEM fields, specifically the EM and PS groups. In contrast, there was a significant association with the BHS group for single-authored practices such as writing press releases, and commenting on microblogs. These differences, supported by the statistical analyses, have important implications for understanding the communicative purposes these collaborative genres serve and the audiences they intend to reach. These genres promote research internationally and give researchers visibility and recognition (Hyland, 2018; Luzón, 2017). Compared to collaborative practices, individual practices and, perhaps, more national/domestic collaborations in the BHS and especially in the HA and SE groups explain the interest in activities aimed at gaining visibility and international recognition. They could lead to differences in productivity and lower citation impact (Clemente-Gallardo et al., 2019). Other variants (e.g., publishing paywall journal articles vs open access publishing) or even access to technologies may also negatively affect researchers' productivity and citation count, as Santoro and Belli (2018) point out.

Thibault et al. (2023) argue that open science practices necessitate a reorganisation of scientific work. Given the hierarchy of genres found, it can be inferred that the scientists are aligning their work with open access mandates, supported by digital tools and Internet resources. The fact that they attached great importance to activities related to socially responsible research, which is fundamental in open science (Bartling & Friesike, 2014), needs to be further explored in future research. The strong associations with traditional (now remediated) written genres (articles and abstracts to be published in open access journals), suggest that these key genres create systems of intertextually linked documents, as argued by Bazerman (1994) in the case of patents. Here, then, it can be argued that a journal article can be intertextually linked to other texts such as a research project proposal or a grant application, whether they are written sequentially or

concurrently. The content of an article can also be repurposed in the form of a popularisation article, a blog/microblog post, or a research transfer-related document. Our respondents used these latter genres relatively frequently.

Andersen et al. (2014, p. 319) explain that mapping patterns of genre systems allows us to better understand genres are part of the larger social and communicative systems that determine the distributed work of a given activity system. In light of the findings, it is unsurprising that our women respondents' main discourse practices were inextricably linked to journal article writing, which was very/extremely important both professionally and personally. In other words, the larger social system establishes a hierarchy of genred texts which is aligned with social motives, specifically, the existing agendas mostly centred on research productivity, promotion and impact. Then, as Loroño-Leturiondo and Davies (2018) argue, the very occasional production of genred texts related to public communication of science would require pedagogical intervention. Online participatory science genres are worth discussing here in relation to socially responsible research, as they have important pedagogical potential insofar as they involve multiple source knowledge systems. Finnemann (2016) posits that genres involving complex configurations of hypertext features act as multiple source knowledge systems that enable interaction and interactivity. The hypertext configurations of online crowdfunding proposals and citizen science projects include multimodal affordances (e.g., images, embedded videos, tables, graphs), an online discussion board and interactivity tools for citizens. They also integrate hyperlinks to social media for wider dissemination and outreach, widely used in participatory science. The survey results showed that these genres, both of which are multiple source knowledge systems genres, were not very popular, a trend that was consistent across the disciplines. With a few exceptions, the survey consistently showed low participation in genres that target broad publics. Future research would need to explore these findings further, as they may echo claims made by webometric studies reporting

lower engagement with these types of genres. Following Meibauer et al. (2023), further investigation of these issues is also important as it may help to clarify why women scientists in certain fields have lower social media visibility and why their published work has lower altmetric impact.

Writing development

This study provides empirical evidence that today's digital transformation introduces new discourse practices based on digitally mediated genres and digital tools and resources. The survey results confirmed that the scientists' primary socioliterate activity, and the one that was most highly valued both personally and institutionally, was writing scientific articles. Hence, the tools and resources assisting the process of writing scientific articles were consistently related to aspects of text production (language and style correction tools) for greater efficiency. They also revealed that other valued activities were those that served to promote and disseminate their published articles widely, namely resources such as open access repositories and academic social networking sites for greater visibility and impact. Promoting and disseminating research was also strongly reflected in other key activity types and forms of writing that our women respondents engaged in, such as science popularisation articles for online journals, e-newsletters, blogs and microblogs. We then believe that a realistic pedagogical intervention to support writing development should put the focus on those discursive practices and writing resources and tools that can enhance the promotion of research while also encouraging writing beyond expert audiences. This is an important intervention given that the survey revealed that contextual impacts determined the importance of certain communicative practices over others across disciplinary cultures. Using the survey as a needs-analysis tool, we propose below a pedagogical approach that focuses on writing across genres and writing metagenres, in both cases integrating writing development opportunities along with digital skills development.

Instruction focusing on writing across genres can take traditional genres (e.g., articles, abstracts) as a starting point for writing intertextually linked digital genres such as e-newsletters, science popularisation articles, blogs or microblogs. Microblogging is a key discursive practice in public science communication (Kjellberg, 2009), yet only half of the respondents in our study engaged in this practice. Input and awareness raising of processes of content uptake and repurposing (say, using content from an abstract to compose a research blog entry or a post) could elicit greater involvement in this practice. In this article we only looked at writing practices, but writing across digital genres could further familiarise the trainees with processes of semiotic remediation, which are also fundamental to online science communication (Prior & Hengst, 2010). Therefore, it seems appropriate to suggest composing tasks on simple digital genres that combine visual and verbal elements, for example, an infographic based on a previously published work. Although infographics were considered important/very important by half of the respondents, they were significantly important only in the BHS field. Composing tasks could easily integrate collaborative tools, content editing software and tools and resources for assessing whether the scientific content used in these digital texts is accessible to non-expert audiences. Significantly, only 10% of the respondents used these digital tools and resources. In this study, the vast majority of the scientists relied on online dictionaries and grammar checkers in the writing processes, with 24% using AI tools. As 40.60% of the respondents would consider using them in the future to communicate science online both to expert audiences and broad publics, writing instruction can provide guidance on the ethical use of AI in the writing process.

Given the institutional demands on research productivity, it was unsurprising that emerging digital genres had only a relative impact on these female scientists' socioliterate activity. On the other hand, it was not unexpected that, apart from the BHS group, the respondents very rarely engaged in participatory science online (only 15%), despite their potential to enhance citizens'

scientific literacy (Bartling & Friesike, 2014). Writing instruction can then raise awareness of the

rhetorical exigences and the standardised discourse features of these genres, paying attention to

the adaptation of scientific content to Internet audiences (Orpin, 2019; Wickman & Fitzgerald,

2019). This rhetorical practice is fundamental to public understanding of scientific issues. Learning

about tools for self-assessment of plain language use can help scientists to ensure that the science

that they communicate is accessible to non-expert, lay audiences. In addition, the ability to

compose participatory genres can raise awareness of digital writing as a form of communication

that encompasses not only verbal and multimodal communication, but also the deployment of the

interactivity and hypertextual affordances of the Internet.

The survey findings accord with earlier views of learning to write across domains by making

connections between genres (Lindenman, 2015; Wickman, 2023). Our respondents write for

professional and, though to a much lesser extent, for lay audiences. They also engage in a broad

spectrum of parascientific genres that lie in between these two domains of language use. We

therefore propose that instruction provides input and text production practice on ways of making

metageneric connections. Using Finnemann's (2016) framework, we would argue that metageneric

knowledge of various types of discourses (informational, promotional, educational), and different

forms of communication online (monologic and dialogic) may help scientists learn how to transfer

prior genre knowledge to compose genres of different domains, either informational, promotional,

or educational (e.g., online lab notes instructions, science blog entries, registered reports, data

articles or social media posts, to name a few). This could widen their discursive skills, allowing for

greater versatility in their writing. Wickman (2023) highlights that developing knowledge of

metagenres is pedagogically beneficial because it raises awareness of genre stability and flexibility.

Lindenman (2015) also underlines that establishing connections between genres enables writers to

effectively respond to new rhetorical exigences across language domains. We would further add

that instruction focused on metageneric texts enables writers to communicate science online across

subdomains, not only professional, expert-to-expert science communication, as was the case for

the scientists in this study, but also public communication of science.

The findings revealed significant disparities in the use of digital tools and resources across

STEM and non-STEM fields. Digital connectivity is crucial for international scientific collaboration

and networking with national and international peers, as noted by Santoro and Belli (2018). It leads

to increased productivity, an issue in which women scientists appear to be at a disadvantage,

according to Abramo et al. (2019). Based on the findings, we recommend instruction focused on the

disciplines to better meet the needs of each professional culture. We also advocate for instruction

that is inclusive of non-STEM scientists that, as shown in this article, also have a clear role to play in

digitally mediated production, circulation and dissemination of scientific knowledge.

Conclusion

Communicating science to expert and broad audiences using the Internet and social

media has become a key societal priority for scientists' professional development. This is a

priority driven by the current agendas of open science and the democratisation of science,

albeit with varying levels of impact and implementation across academia and the R&D sector in

Europe and elsewhere. To support this priority, there is still much to be explored in relation to

the complex dynamics of professional communication in the workplace, and how digital

technologies serve as mediating tools in writing activities aimed at the expert scientific

community to share and exchange scientific knowledge, and at non-specialist publics with

different interests, motivations and levels of curiosity about science. In this study, we have

found evidence of emerging digitally mediated communication dynamics that invite us to

critically evaluate contemporary written communication practices and to find solutions to

support the development of digital writing, in this particular case to meet the language and

communication needs of scientists. These needs are not dissimilar to those of other writing communities, which today also need to develop writing and communication skills across modes and media. Addressing the digital transformation through the development of literacy, along with digital readiness, resilience and capacity, should trigger our ongoing efforts to find appropriate ways to increase writers' awareness of digitally mediated writing and, on the practical side, to enhance their experiences of learning to write across genres and digital media.

References

Abramo, G., D'Angelo, C.A., & Di Costa, F. (2019). A gender analysis of top scientists' collaboration behavior: Evidence from Italy. *Scientometrics*, *120*, 405-418. **https://doi.org/10.1007/s11192-019-03136-6**

Andersen, J., Bazerman, C., & Schneider, J. (2014). Beyond single genres: Pattern mapping in global communication. In E.-M. Jakobs & J. Perrin (Eds.), *Handbook of writing and text production* (pp. 305-322). De Gruyter.

Bartling, S. & Friesike, S. (Eds.) (2014). *Opening science. The evolving guide on how the Internet is changing research, collaboration and scholarly publishing*. Springer.

Bazerman, C. (1994). Systems of genres and the enactment of social intentions. In A. Freedman & P. Medway (Eds.), *Genre and the New Rhetoric* (pp. 79-101). Taylor and Francis.

Bazerman, C. (2004). Speech acts, genres, and activity systems: How texts organize activity and people. In C. Bazerman & P. Prior (Eds.), W*hat writing does and how it does it: An introduction to analysing texts and textual practices* (pp. 309-339). Taylor and Francis.

Bazerman, C. (2015). A genre-based theory of literate action. In N. Artemeva & A. Freedman (Eds.), *Genre studies around the globe: Beyond the three traditions* (pp. 80-94). Trafford Publishing.

Becher, T., & Trowler, P. (2001). *Academic tribes and territories. Intellectual enquiry and the culture of disciplines*. The Society of Research into Higher Education and Open University Press.

Bhatia, V. J. (2004). *Worlds of written discourse*. Continuum.

Clemente-Gallardo, J., Ferrer, A., Íñiguez, D., Rivero, A., Ruiz, G, & Tarancón, A. (2019). Do researchers collaborate in a similar way to publish and to develop projects? *Journal of Informetrics*, *13*(1), 64-77. **https://doi.org/10.1016/j.joi.2018.11.004**

Creswell, J. W. (2014). *Research design. Qualitative, quantitative and mixed methods approaches*. Sage.

Finnemann, N. O. (2016). Hypertext configurations: Genres in networked digital media. *JASIST*, 1-10, online. **https://doi.org/10.1002/asi.23709**

Hyland, K. (2018). Narrative, identity and academic storytelling. *ILCEA* [Online], *31*. **http://doi.org/10.4000/ilcea.4677**

Kelly, A. R., & Maddalena, K. (2016). Networks, genres, and complex wholes: Citizen science and how we act together through typified text. *Canadian Journal of Communication*, *41*(2), 287-303. **https://doi.org/10.22230/cjc.2016v41n2a3043**

Kjellberg, S. (2009). Scholarly blogging practice as situated genre an analytical framework based on genre theory. *Information Research*, *14*(3), paper 410. Retrieved from http://InformationR.net/ir/14-3/paper410.html [Last accessed on 29 September 2024]

Kwok, R. (2018). Lab notebooks go digital. *Nature*, *560*, 269-270. **https://doi.org/10.1038/d41586-018-05895-3**

Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Global gender disparities in science. *Nature*, *504*, 211-213. **https://doi.org/10.1038/504211a**

Lindenman, H. (2015). Inventing metagenres: How four college seniors connect writing across domains. *Composition Forum*, *31*. **https://compositionforum.com/issue/31/inventing-metagenres.php**

Loroño-Leturiondo, M., & Davies, S. R. (2018). Responsibility and science communication: Scientists' experiences of and perspectives on public communication activities. *Journal of Responsible Innovation*, *5*(2), 170-185. **https://doi.org/10.1080/23299460.2018.1434739**

Luzón, M. J. (2017). Connecting genres and languages in online scholarly communication: An analysis of research group blogs. *Written Communication*, *34*(4), 441-471. **https://doi.org/10.1177/0741088317726298**

Mauranen, A. (2013). Hybridism, edutainment, and doubt: Science blogging finding its feet. *Nordic Journal of English Studie*s, *12*(1), 7-36. **http://ojs.ub.gu.se/ojs/index.php/njes/issue/view/301**

Mehlenbacher, A. R. (2017). Crowdfunding science: Exigencies and strategies in an emerging genre of science communication. *Technical Communication Quarterly*, *26*(2), 127-144. **https://doi.org/10.1080/10572252.2017.1287361**

Mehlenbacher, A. R. (2019). Registered reports: An emerging scientific research article genre. *Written Communication*, *36*(1), 38-67. **https://doi.org/10.1177/0741088318804534**

Meibauer, G., Phull, K., Alejandro, A., & Ciflikli. G. (2023). Alternative metrics, traditional problems? Assessing gender dynamics in the altmetrics of political science. *Eur Polit Sci*., *23*, 179-198. **https://doi.org/10.1057/s41304-023-00431-y**

Orlikowski, W. J., & Yates, J. (1994). Genre repertoire: The structuring of communicative practices in organizations. *Administrative Science Quarterly*, *39*(4), 541-574. **https://doi.org/10.2307/2393771**

Orpin, D. (2019). #Vaccineswork: Recontextualizing the content of epidemiology reports on Twitter. In M.-J. Luzón and C. Pérez-Llantada (Eds.), *Science communication on the internet. Old genres meet new genres* (pp. 173-194). John Benjamins.

Pérez-Llantada, C. (2021). *Research genres across languages. Multilingual science communication online*. Cambridge. **https://doi.org/10.1017/9781108870528**

Pérez-Llantada, C. (2022). Online data articles: The language of intersubjective stance in a rhetorical hybrid. *Written Communication*, *39*(3), 400-425. **https://doi.org/10.1177/07410883221087486**

Prior, P., & Hengst, J. (2010). *Exploring semiotic remediation as discourse* practice. Palgrave. **https://doi.org/10.1057/9780230250628**

Russell, D. R. (1997). Rethinking genre in school and society: An activity theory analysis. *Written Communication*, *14*(4), 504-554. **https://doi.org/10.1177/0741088397014004004**

Santoro Lamelas, V., & Belli, S. (2018). Digital communication in scientific practices: Limitations and possibilities for equality. *Prisma Social*, *20*, 316-332.

Spinuzzi, C., & Zachry, M. (2000). Genre ecologies: An open-system approach to understanding and constructing documentation. *ACM Journal of Computer Documentation*, *24*(3), 169-181. **https://doi.org/10.1145/344599.344646**

Spinuzzi, C. (2023). What is a workplace? Principles for bounding case studies of genres, processes, objects, and organizations. *Written Communication*, *40*(4), 1027-1069. **https://doi.org/10.1177/07410883231185875**

Thelwall, M., Bailey, C., Makita, M., Sud, P., & Madalli, D.P. (2019a). Gender and research publishing in India: Uniformly high inequality? *Journal of Informetrics*, *13*(1), 118-131. **https://doi.org/10.1016/j.joi.2018.12.003**

Thelwall, M., Bailey, C., Tobin, C., & Bradshaw, N. (2019b). Gender differences in research areas, methods and topics: Can people and thing orientations explain the results? *Journal of Informetrics*, *13*(1), 149-169. **https://doi.org/10.1016/j.joi.2018.12.002**

Thibault, R. T., Amaral, O. B., Argolo, F., Bandrowski, A. E., Davidson, A. R., & Drude, N. I. (2023). Open Science 2.0: Towards a truly collaborative research ecosystem. *PLoS Biol, 21*(10), e3002362. **https://doi.org/10.1371/journal.pbio.3002362**

Trachtenberg, Z. M., Burns, T. J., de Beurs, K., Ellis, S. E., Gates, K. K., Kelly, J. F., Randall, A. R., Schlupp, I., Soppelsa, P. S., Soreghan, G. S., & Zeigler, J. J. (2016). The Anthropocene biosphere: Supporting 'open interdisciplinarity' through blogging. *Trends in Ecology and Evolution*, *32*(1), 1-3. **https://**doi:10.1016/j.tree.2016.10.018

Wickman, C. (2023). Genre and metagenre in biomedical research writing. *Journal of Business and Technical Communication, 37*(2), 140-173. **https://doi.org/10.1177/10506519221143113**

Wickman, C., & Fitzgerald, E. (2019). Writing and science: An editorial perspective. *Written Communication*, *36*(1), 3-8.

Yates, J., & Orlikowski, W. J. (1992). Genres of organisational communication: A structurational approach to studying communication and media. *Academy of Management Review*, *17*(2), 299-326. **https://doi.org/10.2307/258774**

Yates, J., Orlikowski, W. J., & Rennecker, J. (1997). Collaborative genres for collaboration: Genre systems in digital media. *Thirtieth Annual Hawaii Conference on System Sciences*. Computer Society Press.

---

[1] The aim of the association, AMIT, is to achieve the full and equal participation of women in the Spanish scientific system in all fields of knowledge. We understand that if these scientists have joined the association, it is because they identify themselves as women, regardless of their sexual orientation. While AMIT is open to women and men who support women researchers, its database is exclusively for women scientists. The purpose of this database is to generate research studies on women scientist and, more generally, to give visibility to the research activities of women scientists.