

# **Exploring the geographies of academic social network sites from a socio-technical perspective: an investigation of scientific literature in Spanish**

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## **Abstract**

Academic social network sites (ASNS) like ResearchGate and Academia.edu can be analysed as techno-cultural systems through which researchers perform a number of tasks and roles that can be collectively defined as digital scholarship. This study sets out to map empirical Spanish-language research studies on the use of ResearchGate and Academia.edu among scholarly communities. The aim is to verify possible research gaps regarding shared scholarly knowledge and networked learning supported by ASNS. The study is based on a theoretical framework which treats ASNS as networked socio-technical systems that encompass systemic dimensions and individual usage as strictly intertwined elements influencing each other. This occurs at three levels: 1) the *socio-economic* level, which includes components like ownership, governance, and business model; 2) the *techno-cultural* level, which includes components associated to technology, user/usage, and content; and 3) the *networked-scholar* level, which includes components related to networking, knowledge sharing and identity. The research reported here is an extension of a previous study of English-language scientific literature which was carried out with the same methods. The corpus of the study was collected from a search of leading databases of international scientific literature (Web of Science, Scopus and a number of Ibero-American scientific databases). The search yielded 12 papers, which were selected according to a set of criteria and analysed in terms of components of the aforementioned three-level framework. The results show that ResearchGate is attracting greater attention, with a particularly high proportion of studies dedicated to social science areas like library and information sciences and communication science. Analysis at the networked scholar level, encompassing forms through which scholars build their identities and reputation in social spaces, revealed that this was underused. The results highlight a need for more specific studies on open and distributed knowledge exchange generated in ASNS from a networked learning perspective, including both individual and collective scholarly practices. Moreover, increased use of qualitative methods could contribute to shed light on new practices among scholars for building reputation and professional identity.

## **Keywords**

Academic social network sites, ResearchGate, Academia.edu, Socio-technical system, Scholarly communication, Spanish-language scientific literature.

## **Introduction**

Digital scholarship, understood as the use of digital evidence, methods of inquiry, research, publication and preservation to achieve scholarly and research goals, has been a hot topic of debate in recent years (Costa, 2013; Greenhow & Gleason, 2014; Veletsianos & Kimmons, 2012; Weller, 2011). The use of digital platforms to sustain and support the four dimensions of digital scholarship (discovery, integration, application, and teaching), as elaborated by Boyer in his seminal work (Boyer, 1990), has been affecting scholarly practices and socialisation of knowledge in several ways, and is also having an impact on policies of faculty development (Raffaghelli, 2017). Networked Participatory Scholarship (Veletsianos & Kimmons, 2012) and Social Scholarship (Greenhow & Gleason, 2014) are among the theoretical references in the sector of educational technology that investigate new forms of scholarly communication and social media affordances for researchers. One line of research is devoted to the study of social media for enhancing digital scholarship practices in the

light of networked and social participatory frameworks (Li & Greenhow, 2015). However, empirical research on the use of academic social network sites (ASNS) in scholarly communities seems to have mostly attracted attention in the library and information sciences, where ASNS are seen as deployments for reputation building and alternative ranking (Nicholas, Herman, & Jamali, 2015). As reported in a recent review (Manca, 2018), the majority of these studies focus on the general uptake or impact assessment of alternative metrics, while very few investigate the individual and collective scholarly practices that ASNS support from a networked learning perspective. In spite of the steady growth in the overall body of research literature being shared on ASNS like ResearchGate and Academia.edu, the use of these sites - as a research topic itself - is relatively under-explored in the non-English language scientific literature. The significance of this gap is underlined by the consideration that non-English languages are widely used in research and academic publishing, especially in the applied disciplines of sciences and social sciences (Liu, 2016). Specifically, over the past decade there has been a steady increase in the proportion of Spanish-language contributions to the body of humanities and social sciences literature indexed by scientific citation indexing services like Web of Science (De Filippo, Marugán, & Sanz-Casado, 2014); this is a development worthy of appropriate consideration. Moreover, there appears to be no existing ASNS in Spanish, and ResearchGate and Academia.edu are the most popular academic sites for Spanish research communities. The aim of this study is to review scientific literature emerging from Spanish-speaking scientific communities regarding the use those communities make of academic social network sites. This study forms part of a wider effort to further analyse theories and methodological approaches employed in studying ASNS like ResearchGate and Academia.edu. It extends previous work analysing empirical studies published in English-language peer-reviewed journals with a specific focus on ResearchGate and/or Academia.edu (Manca, 2018). Both studies adopt a socio-technical perspective that employs three-level analysis of ASNS (Manca & Raffaghelli, 2017), as illustrated in the next section. In the following we present the theoretical framework, method and results of the survey. Considerations about the implications of the study are provided, along with indications for further research.

## Theoretical framework

According to some authors, digital scholarship is a complex techno-cultural system that exploits technological innovations and deploys dominant and alternative academic cultural values (Stewart, 2015). From this perspective, social media are platforms that encompass coevolving networks of people, technologies, economic infrastructure and legal-political governance, and are the result of techno-cultural and political economy views that shape social communication on these platforms (van Dijck, 2013). A framework that accommodates individual use of academic platforms, namely ASNS, and the ways scholars employ these sites for scholarly purposes has been proposed by the authors (Manca & Raffaghelli, 2017). In addition to the techno-cultural and political-economical levels proposed by van Dijck (2013), the framework adopts and adapts the Networked Participatory Scholarship model (Veletsianos & Kimmons, 2012) to include scholars' usage of these sites for their scholarly purposes (e.g., networking, collaboration, knowledge sharing, identity, etc.). As a result, the framework considers the systemic/infrastructural dimension and the personal/practical dimension of ASNS at three different levels: 1) the *socio-economic* level, which includes components like ownership, governance, and business model; 2) the *techno-cultural* level, which includes components associated to technology, user/usage, and content; and 3) the *networked-scholar* level, which includes components related to networking (connectivity of communication and collaboration), knowledge sharing (collective and distributed learning), and identity (reputation and trust as elements that shape academic personae). In this framework, the technological affordances of ASNS and scholars' sociality are seen as intertwined dimensions complementing the individual and systemic exploitation of such sites. The framework has been adopted for analysing the technological affordances that ASNS like ResearchGate and Academia.edu provide for scholarly purposes at the system and usage levels (Manca & Raffaghelli, 2017).

Probably the most well-known of the ASNS currently in operation is ResearchGate. This was founded in 2008 as a social network service for academics and currently has more than 12 million registered users from 193 different countries. Considering ResearchGate from the viewpoint of the theoretical framework, with its three levels (socio-economic, techno-cultural, networked-scholar) and associated elements, the following picture emerges. At the socio-economic level, the service is a for-profit company (*ownership*) whose *governance* component is mostly managed through its Terms and Conditions. It provides a wide range of free-of-charge services supplemented with subscription-based services like the Job Openings section for posting job ads (*business model*). At the techno-cultural level, ResearchGate users are provided with a number of features to spur connectivity and to channel social interaction (*technology*), like News Feeds, automatic signals of other users who share the same scholarly interests, endorsement of other researchers for their skills and expertise, and suggestions on new researchers to follow. Moreover, Recommend and Follow buttons are made available to foster interaction with peers and to highlight projects and publications. Active participation, such as posting new

content or activating new connections, may be further enhanced by posing research questions and by sharing expertise in the Questions discussion threads (*user/usage*). ResearchGate affords the publication of diverse types of scientific output (*content*), including both official publications and grey literature like open datasets, drafts, results from failed experiments, and open reviews of papers. A recently added feature allows users to organise research outputs into Projects, permitting publications and other research outputs to be grouped according to research topics. At the networked-scholar level, the possibility to build an individual network of contacts is mostly based on the Follow feature, which gives users access to new and updated information, together with opportunities to locate relevant expertise (*networking*). *Knowledge sharing* chiefly regards the adding or uploading of research products, commenting on publications and projects, and asking and replying to questions via the Questions feature. Finally, user *identity* is mostly conveyed through the profile. ResearchGate also proposes its own set of proprietary reputation metrics: RG Score, RG Reach and h-index. The first of these, RG Score, has been criticized for having questionable reliability and an opaque calculation methodology, which makes it hard to compare with other popular standard scores (Orduna-Malea, Martín-Martín, Thelwall, & López-Cózar, 2017).

The other highly popular ASNS is Academia.edu, which was founded in 2008 by Richard Price. This service counts over 52 million accounts and attracts 36 million unique visitors a month. Academia.edu is a for-profit company with headquarters in San Francisco (*ownership*). It grants users a worldwide, revocable, non-exclusive, transferable license to exercise any and all rights under copyright (*governance*). The *business model* is largely based on a wide range of free-of-charge services, which are supplemented by premium accounts offering features like enhanced analytics and a Job Board for advertising academic vacancies. The *technology* component comprises features like the news feed (which updates users on new uploads, bookmarked publications, etc.) and Suggested Sessions and Suggested Academics for increasing connectivity among members. At the *usage* level, Sessions allows users to create pages where peers and colleagues can leave general comments on papers or line-specific annotations. Academia.edu encourages the sharing of diverse types of scientific output, including papers, books, book chapters and drafts, but also conference presentations and teaching material (*content*). At networked-scholar level, users mostly build their individual network of contacts using the Follow feature, which allows them to subscribe to their contacts' updates without automatic reciprocation (*networking*). The *knowledge sharing* component chiefly regards the adding or uploading of research output such as publications, drafts and teaching materials. As for the *identity* component, the Profile feature includes a "Total Views" tally, a "top" percentile designation and an Author Rank. The service also provides an analytics dashboard, a feature that has spurred criticism among some users for reinforcing a culture of incessant self-monitoring and for amplifying and accelerating the logic of self-branding (Duffy & Pooley, 2017).

## Methods

The focus of this literature review is to provide a critical and theoretically founded analysis of peer-reviewed literature that 1) appears in Spanish-language academic journals and conference proceedings; 2) specifically investigates the use of ResearchGate and Academia.edu for scholarly purposes; 3) reports empirical findings; 4) presents research questions and documentation of all procedures. The review primarily concerned the state of empirical research and so conceptual papers were excluded. Finally, only studies that included separate results for ResearchGate or Academia.edu were considered.

The corpus of the study was collected through an extensive search using the keywords "ResearchGate" and "Academia.edu" (applied separately) and distinct search criteria for each source, as follows: 1) Web of Science (TOPIC, Spanish); 2) Scopus (TITLE-ABS-KEY, Spanish); 3) EBSCO Academic journals, Journals, Reviews (TX All Text, Spanish). In addition, three Spanish-Portuguese scientific databases, SCIELO, Dialnet and Redalyc, were searched. No specific timespan was defined.

The searches were run on 31 August 2017 and yielded a total of 12 articles. These were sorted and analysed according to the inclusion criteria, and the references they contained were searched so as to retrieve further papers. This additional search yielded three papers. After reading the full text, the final number of papers selected for review was 12. The papers were analysed and coded by the two authors according to the following criteria: author(s) and year of publication; academic social network site investigated (ResearchGate and/or Academia.edu); geographical area of authors' affiliation; research area; research design and methods (quantitative method; qualitative method; mixed approach); aim and theme of the study (general uptake; outreach; assessing impact; practices and new modes of communication); framework level (socio-economic, techno-cultural, and networked-scholar, including the elements at each level); main findings. The theme categories were adopted from Kjellberg, Haider and Sundi's (2016) review. Application of the three-level framework was made possible through an iterative process of qualitative content analysis (Hsieh & Shannon, 2005) and agreement between coders was 83%.

## Results

All the studies (12; 100%) investigated ResearchGate, while nine (75%) were devoted to both Academia.edu and ResearchGate. No papers (0%) studied only Academia.edu. As reported in Table 1, the temporal distribution showed that there was a stable number of rather recently published articles in the period 2014-2016.

When considering the geographical provenance of the authors' affiliations, four out of the 12 articles were written by a core cluster of authors engaged in scientific collaboration between Ecuador and Spain, possibly through a PhD programme in Ecuador (Calva & Portilla, 2016; Campos-Freire, Rivera-Rogel, & Rodríguez, 2014; Punín, Campos-Freire, & Calva, 2014; Punín, Dereito, & Calva, 2014). A further paper with a focus on Ecuador was written by the Ecuadorian side of the group (Calva & Larrea, 2016), while another was published by Spanish researchers who co-authored with the above mentioned cluster of researchers (Campos-Freire & Rúas-Araújo, 2016). This latter paper could be connected to a second cluster of authors from a specific region of Spain (Galicia), which contributed three studies to the dataset (Dafonte-Gómez, Míguez-González, & Puentes-Rivera, 2015; Fernández-Marcial & González-Solar, 2015; Froufe, 2016). The remaining three papers were authored by researchers from other Spanish regions (Andalusia, Basque Country, Catalonia) and featured international, national and regional focuses (González-Díaz, Iglesias-García, & Codina 2015; Martorell, Canet, & Codina, 2014; Orduña-Malea, Martín-Martín, & Delgado-López-Cózar, 2016).

**Table 1: Demographics of the studies**

Year of publication	2014	4
	2015	3
	2016	5
Geographical provenance of individual author affiliation	South America (Ecuador)	5
	Spain (Andalusia, Basque Country, Catalonia, Galicia)	11
Geographical coverage of studies	South America (Bolivia, Brazil, Colombia, Ecuador, Peru)	6
	Europe (Portugal, Spain)	6

As for the research areas, methods and theories, Table 2 reports the number of articles retrieved from different journals and the main research area/s of these journals. All the 12 studies were published in journals belonging to the Social Sciences; three of these (25%) also cover Physical Sciences (Computer Sciences). The main social sciences topics that the journals address were Communication Studies (6; 50%) and Information and Library Sciences, including Biblioteconomics and Scientometrics (4; 33%).

**Table 2: Journals and related research domain/subject areas**

Journal name	N	Main research topics/areas
El Profesional de la Información	4	Social Sciences (Information Science & Library Science), Physical Sciences (Computer Sciences)
Hipertext.net	1	Social Sciences (Communication studies)
Opción	1	Social Sciences (Communication studies)
Revista Científica de Estrategias, Tendencias e Innovación en Comunicación	1	Social Sciences (Communication studies)
Revista Gral de Informacion y Documentacion	1	Social Sciences (Information Science & Library Science), Physical Sciences (Computer Sciences)
Revista Latina de Comunicación Social	1	Social Sciences (Library Science, Communication Studies)
10th Iberian Conf. on Inf. Syst. and Technologies, CISTI 2015	1	Social Sciences (Information Science & Library Science), Physical Sciences (Computer Sciences)
II Cong. Int. de la Red Iberoamericana de Narrativas Audiovisuales	1	Social Sciences (Communication studies)
VI Congreso Int. Latina de Com. Soc.	1	Social Sciences (Communication studies)

With regard to the research methods, most studies adopted quantitative measures (9; 75%), mostly descriptive statistics; only two collected data from surveys. There was also a small group of mixed-method studies (3; 25%): one described three use cases examining ResearchGate metrics in depth through critical analysis; the

other two included some interviews, which were analysed as part of the quantitative approach.

**Table 3: Themes of the studies and the three-level framework**

Levels	Socio-economic			Techno-cultural			Networked-scholar		
	Ownership	Governance	Business model	Technology	Usage	Content	Networking	Knowledge sharing	Identity
General uptake	-	-	-	-	9	-	3	-	-
Impact assessment	-	-	-	1	1	-	-	-	-
Practices and new modes of communication	-	-	-	-	-	-	-	-	-
Outreach	-	-	-	-	1	-	-	-	-

*Note: the total number is more than 12 because some studies investigate more than one theme*

As for the theories underpinning the studies, more than half of the articles considered theories on general social network sites or concerned with ASNS, concentrating in particular on the question of visibility and reputation as key drivers for researchers' engagement with ResearchGate and Academia.edu (Froufe, 2016; González-Díaz et al., 2015; Martorell et al., 2014; Punín, Dereito, & Calva, 2014). Aligning with this background, but not overlapping in all cases, another solid group of studies (particularly those classified within the area of Information and Library Science) enriched the debate with perspectives from the sociology of science (i.e., Visible and Invisible College) and from Scientometrics (Calva & Larrea, 2016; Calva & Portilla, 2016; Campos-Freire et al., 2014; Dafonte-Gómez et al., 2015; Fernández-Marcial & González-Solar, 2015; Orduña-Malea et al., 2016; Punín, Dereito, & Calva, 2014; Punín, Campos-Freire, & Calva, 2014). Finally, very few studies considered social theories like social capital or physical social networks and the analysis of these as a means for investigating knowledge sharing and reputation building in academic communities (Campos-Freire & Rúas-Araújo, 2016; Campos-Freire et al., 2014; Dafonte-Gómez et al., 2015).

Finally, with regard to the themes of the studies and the three-level framework analysis, as shown in Table 3, the majority of the studies (9; 75%) analysed the degree of use and penetration of ASNS for enabling scholarly communication. Overall, the main concern of this strong group of contributions considered the extent of scholars' presence on ResearchGate, Academia.edu, or both, as well as the number of followers and following researchers. These data were gathered as part of investigation into a research problem concerning the visibility of researchers in Ibero-American countries. Moreover, this problem was frequently connected to two types of impacts of ASNS: the first regards dissemination of research at international level and the connected reputational issues; the second concerns the feasibility of using ASNS as a means to analyse scientific reputation in this region. Some slight differences amongst the papers in this group were found relating to the geographical and disciplinary coverage of the analysis: while some included transnational and comparative approaches (Campos-Freire et al., 2014, Punín, Dereito, & Calva, 2014), others considered specific national contexts (Calva & Larrea, 2016; Calva & Portilla, 2016; Campos Freire & Rúas-Araujo, 2016; Dafonte-Gómez, 2015; Punín, Campos-Freire, & Calva, 2014) or intra-institutional situations (Fernández-Marcial & González-Solar, 2015; Punín, Campos-Freire, & Calva, 2014). Overall, the authors found scarce usage of ASNS (under 50% of the populations included in samples, with data collected via profiles or through direct surveys), as well as unbalanced and narrow patterns of following/followers. The papers reveal that researchers tended to follow and be followed by their colleagues at the same institution, while they mostly follow international colleagues without interactions. Only one paper covered the problem of impact assessment (Orduña-Malea et al., 2016). This latter study adopted a conceptual approach for critical analysis and discussion of RG metrics and how they are formulated (technology sublevel), and also of the potential impact for reputational purposes (usage sublevel). As for the usage component, one study considered the outreach of ResearchGate and Academia as ASNS (González-Díaz et al., 2015) based on the types of effort researchers make to expand open science in a specific disciplinary area (communication studies), considered as a strategy to increase research impact. Lastly, only three studies focused on scholarly networking. Two of these (Punín, Campos-Freire, & Calva, 2014; Punín, Dereito, & Calva, 2014) considered the practices of knowledge sharing among researchers in connection with their efforts to become more visible, attempting to explain why most researchers tend to engage passively with ASNS (empty profiles). One of these two studies (Punín, Campos-Freire, & Calva, 2014) explored this issue through in-depth interviews. The interviewees reported that they lacked the linguistic confidence to exchange

directly in English-speaking environments (i.e., the "Questions" tool in ResearchGate does not allow the posting of questions in languages other than English); moreover, they expressed concern about intellectual property rights issues regarding the published research. Calva and Portilla (2016) also included this perspective as a complementary interpretation of usages. Overall, topics concerning learning to act and being a scholar in digital spaces (ASNS and their affordances) were absent from almost all papers.

## Discussion

This study focused on the Ibero-American region builds on a prior research investigation that applied the same methodology to analyse the English-language international literature. Hence, comparison of outputs from the two studies will help to enrich the discussion. While the description of the single components of the socio-technical model addresses ASNS and their usage, the overall model encompasses a vision of networked professional learning within ASNS: the of contents shared more frequently, how scholars build their professional identities and how they take care of their reputation. The combined results show that, of the two ASNS, ResearchGate attracts greater attention from academic research communities, mainly due to its proprietary reputation metrics. By the same token, the studies analysing Academia.edu reveal that scholars from the humanities and social sciences have a preference for this platform, which aligns with the reported international trend (Kramer & Bosman, 2016). Moreover, the group of studies considered herein showed more concern for the forms of presence and engagement on ResearchGate than for the impact of its metric scores or their correlations with more traditional forms of research evaluation. The authors generally acknowledge the international debate on altmetrics as the search for alternative metrics supporting research evaluation (Sugimoto, Work, Larivière, & Haustein, 2017), and recognise the need to increase ASNS uptake in Ibero-American countries. Nevertheless, the types of analysis conducted and the indicators employed do not address these needs satisfactorily. In most cases the studies describe a phenomenon occurring in specific regions or at the national level, with no comparative strategies of analysis (e.g., adopting inferential statistics) other than the identification of cases.

As for the disciplinary and geographical areas, a high concentration of studies on specific areas centred on library and information sciences and communication studies within the field of social sciences. This could be attributed to the rather narrow group of authors contributing to investigation of the topic in the region (see the authors' geographical areas of provenance). However, this pattern is consistent with the broader international situation, where most studies come from information and library science. As discussed by Manca (2018), this tendency may be attributed to the longstanding interest within these disciplines for scholarly communication and to the changing role of librarian services in the emergence of new types of digital services (Borgman, 2007). At the same time, this trend goes hand in hand with another prominent issue in the sociology of science and scientometrics, namely the need to generate new opportunities for raising the visibility of scholars in the periphery of knowledge production. Indeed, the two most commonly adopted theoretical perspectives, the *Visible and Invisible college* (Wagner, 2008) and the theory of social networks (boyd & Ellison, 2007), were presented as background support for more strongly "voiced" Ibero-American research.

Finally, we come to analysis of research themes as they relate to the proposed theoretical framework of ASNS as socio-technical multi-layered systems. Most of the papers adopted exploratory approaches largely focused on the usage of ASNS. The networked scholar level of analysis was little explored, which aligns with the international situation. Phenomena at this level encompass the ways in which scholars build their identities and reputation in social spaces, how they learn to experience and undertake new forms of scholarship (Stewart, 2015; Veletsianos & Kimmons, 2012), and how they deal with the tensions between *the habitus* of traditional scholarly practices and practices at the frontier of innovation based on digital and networked spaces (Costa, 2013). Studies published in the educational field that focus on professional learning processes (both formal or informal), whether through qualitative or deep narrative explorations, are rare (Manca, 2018). However, one can notice that in the Ibero-American case there is a complete absence of this perspective. As stressed by Veletsianos (2016), further research needs to address the fragmentary nature of the evidence about scholars' experiences in online social networks and social media, and the lack of understanding of the ways scholars are using and experiencing social media. Moreover, as Raffaghelli (2017) suggests, the lack of systematic approaches to faculty development on digital scholarship (including the adoption of ASNS) could explain scholars' underuse of the affordances that digital tools make available to foster more public, democratic and shared science.

More specific studies are required that adopt a networked learning perspective to investigate the open and distributed learning that ASNS generate, including both individual and collective scholarly practices. Moreover, qualitative methods such as ethnographic observations, narrative approaches, participatory and design-based research models accompanying quantitative studies could contribute to shed light on new scholarly practices for building reputation and professional identity as both complementary or main approaches. To conclude, the

Ibero-American group studied almost completely lacks studies focusing on outreach and on how social media and academic social network sites can be used to make science more openly available (a finding that correlates with the international situation, as documented in Manca, 2018). This denotes that research on open science based scholarly practices is very poorly documented in the Ibero-American group and Spanish-language scientific production. This issue is paradoxical considering that a key concern expressed by the articles in this review is the marginalisation of Spanish-language research. Finally, the role of the socio-economic conditions into which Ibero-American researchers work could restrain the engagement in open science practices, although it did not emerge from the data, could be considered in future research.

## Conclusion

While systematic, this review of the literature has gathered only a very small number of papers on ASNS use by Ibero-American researchers. This indicates a gap in current research on ASNS participation and forms of engagement, highlighting the general need to deepen the study of ASNS in specific regional contexts. This effort should attempt to dig into issues like the motivations of lurking, the scarce exploitation of technological affordances, and the impact that these new digital tools are having in the processes of becoming and being digital scholars. As emphasized here, future studies should take into consideration new methodologies (both quantitative and qualitative) to explore the constructs associated with ASNS phenomenology. It is worth stressing that the digital professionalism of Latin American academics has been associated more frequently with teaching than with research; scholars in this region prefer to participate in general social networks (like Facebook and Twitter) as spaces for teaching and learning (Costantino & Raffaghelli, 2017). This issue should be further explored to understand whether professional identity building in this region entwines diversified strategies for communicating academic knowledge (through teaching activities rather than through traditional scientific production). Another important issue regards the extent to which the language in which science is produced in this region hinders direct communication in academic digital social spaces. In summary, the experiences and politics of “having a voice” in ASNS for specific regional and cultural contexts should be further studied as a means to understand the geographies of digital scholarship.

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