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Abstract

Academic Social Networking sites have been embraced by professors from across disciplines. These sites provide a myriad of networking and collaborative opportunities for faculty to expand their scholarly horizons and broaden their research impact. In this article, we analyzed the usage patterns of three Academic Social Networking sites, namely ResearchGate, Google Scholar Citations, and Academia.edu, at an urban, public, state university in Southern California with a highly diverse student population of more than 28,000 and more than 1700 faculty members. Our objectives are to describe and analyze professors' use of these three Academic Social Networking sites based on their subject areas and academic ranks.

Keywords:

Academic Social Networking sites, ResearchGate, Academia.edu, Google Scholar Citations

Introduction

Academic Social Networking (ASN) sites are often described as " 'Facebook for Nerds or Facebook for Scientists,' primarily due to their social networking functions" (Williams and Woodacre, 2016, p. 286). ASN sites have become a popular way for faculty and researchers to share their research and to network with other experts in their fields. They have also become another way for professors to show the impact of their scholarship by showing the number of views, downloads, followers, and in the case of ResearchGate, their own scores (RG scores). Since these sites offer several benefits, faculty researchers started exploring these sites to broaden their research networks and global collaborations.

This article focuses on three ASN sites: Academia.edu, ResearchGate, and Google Scholar Citations and its usage among faculty researchers. These three sites were started in the late 2000s including ResearchGate (ResearchGate, 2018). Academia.edu was also launched in 2008 (Duffy & Pooley, 2017), and Google scholar citations had a limited launch in 2011 (Conner, 2011).

ResearchGate

ResearchGate offers networking and collaboration opportunities for researchers, either professors or graduate students, to share and access scientific publications, disseminate data, and get statistics about views, downloads and citations of their research (ResearchGate, 2018).

Academia.edu

Academia.edu is also a social networking platform that allows users to share academic research and track the research of academics they follow. According to Academia.edu, it attracts over 47 million unique visitors a month (Academia.edu, 2018).

Google Scholar Citations

This site is slightly different from above two ASNs since it can be used to identify all of the citations associated with specific articles. In other words, it allows authors to track publications that have cited their works (Google Scholar Citations, n.d.).

Literature Review

Features of ASNs

A number of articles examine features of different ASNs and compare the functionality of each site. Espinoza Vasquez and Caicedo Bastidas (2015) identified five broad services that ASN sites provide: "1) collaboration, 2) online persona management, 3) research dissemination, 4) documents management, and 5) impact measurement" (p.1). They then evaluated five different sites: ResearchGate, Impactstory, Academia.edu, Mendeley, and Linkedin, using these criteria. Ovadia (2014) describes the features and metrics of Academia.edu and ResearchGate. This author also found that researchers tend to choose to use sites that their departmental colleagues use.

As explained in Lovett, Rathemacher, Boukari, and Lang (2017), the ability to upload and share the full-text of publications is a feature valued by users of ResearchGate and similar academic social networks. This makes ASNs significant sources of freely available scholarly content.

Identification of ASN Users

Several sources provide information on disciplinary differences in the use of ASN sites, but this literature is limited and not always comparable in terms of variables (sites and types of users). Ortega (2015) examined research conducted by the more than 11,000 members of the Spanish National Research Council, analyzing their use of ASNs (Google Scholar Citations, ResearchGate, Academia.edu, and Mendeley). He compared usage in eight broad research areas: humanities and social sciences, biology and biomedicine, natural resources, agriculture science, physical science and technology (S & T), materials S & T, food S & T, and chemical S & T. This author looked at not only the number of profiles and publications within each discipline but also at followers and followings, as well as visits and views. He found that researchers in the Humanities and Social Sciences are much more active on Academia.edu; ResearchGate has the largest population of researchers from Biology and Biomedicine, and Food S & T; Google Scholar Citations is favored by scholars from the physics S & T area.

Thelwall and Kousha (2014) focuses specifically on the use of Academia.edu by Philosophy scholars in the United Kingdom and compares their usage to researchers in law, history, and computer science. They also looked at gender and age as factors in the use of Academia.edu. By using age as a factor, they also compare faculty and student use of this ASN.

Almousa (2011) also analyzes disciplinary use of Academia.edu by Jordanian researchers in various positions: graduate students, faculty members, independent researchers, and post-doctoral researchers. He focuses the following disciplines: Anthropology, Chemistry, Computer Science, and Philosophy. In each category, except Philosophy, he found that graduate students make up the largest group of users of Academia.edu. Thelwall and Kousha (2015) discuss university rankings as a factor in faculty use of specific ASNs.

Results from a study conducted by Megwalu (2015) in York College in New York show that the use of Academia.edu is directly tied to academic discipline and status. Using server logs, surveys, interviews, the author worked with professors from the departments of physics, linguistics, and sociology to determine details of communication behaviors, motivation, and perceived professional benefit for using Academia.edu.

Ali and Richardson (2018) examined the use of five ASN sites by Social Sciences faculty in Karachi, Pakistan. Using the following classifications for academic rank: Lecturer, Assistant Professor, Associate Professor, Professor; they found that the number of Assistant Professors using the ASN sites was higher than any other rank. Eighty percent of faculty surveyed used multiple sites.

None of the articles reviewed discussed faculty rank across disciplines in terms of the classifications used in our study: Adjunct, Tenure-Track, Tenured, and Emeritus.

Impact of ASN Sites

"Changes in technologies and communication have brought with them new ways of using and managing information" (Campos & Valencia, 2015, p. 265). Borrego (2017) more specifically stated that "social media (web technologies that allow the creation and exchange of user-generated content) have greatly extended the opportunities for informal dissemination of scholarly output" (p. 186).

It has become increasingly important to be visible within academic communities, and academic social networking sites are facilitating this process "through interactive feedback, dashboard analytics, and scholarship as user-generated content" (Duffy & Pooley, 2017, p. 3). In an effort to increase their visibility faculty "are instructed to build their online personae and engage in personal branding—often by curating a strong social media presence" (Duffy & Pooley, 2017, p. 3).

Odell (2016) discusses the idea of using faculty interest in ASN sites as a way to increase their use of IRs. ASN sites are more popular because they are considered to be more

user-friendly and have more interactive features than IRs. A discouraging finding of a recent study is that many Library and Information Science authors do not take the time to self-archive their work (Chaudhuri & Baker, 2015). Borrego (2017) also states that "despite the large number of IRs that is [sic] available, research shows that they are frequently underpopulated" (p. 185).

Definitions and features of ASNs are widely discussed. Although Thelwall and Kousha (2014) said there was surprisingly little research has been done on who uses ASNs, the situation has changed somewhat in the past five years. Most of the recent studies described in this literature review have been conducted outside of the United States (United Kingdom, Spain, Pakistan, Jordan) using selected disciplines on specified sites. This literature review shows that ASN usage patterns in different academic departments and among different faculty ranks on an individual comprehensive, public American campus have not been clearly identified or analyzed. Although our research findings offer a snapshot in time and place, we believe our study is a valuable addition to the literature in this area.

Methodology

Objectives and Research Questions

The principal objectives of this study were to describe and analyze faculty usage of three different academic social networking sites, ResearchGate, Academia.edu & Google Scholar Citations at the California State University, Los Angeles.

We will answer the following questions:

1. Which ASN sites do faculty from specific academic departments prefer to use?
2. What are the ASN usage patterns of professors from four academic departments identified as having largest number of users?
3. What is the representation by rank of faculty using these three ASN sites?

Setting

Our study was conducted at California State University, Los Angeles (Cal State LA), a comprehensive, urban, public, state university located in Southern California with a highly diverse student population of 28,531 and 1,718 faculty members (National Center for Educational Statistics, 2017).

We analyzed Cal State LA's faculty profiles from the four departments with the largest number of users in each of these three ASN sites. Since each ASN site was organized very differently, we had to take a unique approach to analyzing the profiles to find comparable data.

Data Sources and Access

Our first task was to select the ASN sites we wanted to use for our study. We identified sites that included both social networking features and strong scholarly content and that were comparable in focus and scope. We informally talked to professors about which ASN sites they most commonly used. We finally decided to use the most popular ASN sites, Academia.edu, ResearchGate, and Google Scholar Citations, since they met our criteria and were most likely to provide the most data. While ResearchGate and Academia.edu are ASN sites for both students and faculty, Google Scholar Citations is primarily for faculty members and researchers.

We used our personal accounts on each of these ASN sites to access data for the analysis described below.

Data Collection, Analysis, and Findings

First we did a search by institution to determine the number of our users on each of these ASN sites. As of May 2018, the total number of ResearchGate numbers was close to 2,500 from Cal State LA compared to the users of Academia.edu that totaled 1325. Google Scholar Citations was being used by 80 faculty members and researchers.

Then we had to go through every individual profile on ResearchGate to find out whether or not it was a faculty or student profile. It was a particularly time-consuming process to analyze the profiles in ResearchGate since this ASN site has a large number of users from Cal State LA. Typically, faculty profiles have a higher RG score than that of a student profile. Thus, it was easier to distinguish faculty accounts from student profiles because of their high RG score within ResearchGate.

Contrary to ResearchGate and Academia.edu, Google Scholar Citations "presents for each researcher their list of publications as indexed in Google Scholar" (Ortega, 2015, p. 523) and is primarily for scholars, researchers, and faculty members. For that reason, it was not necessary to identify the faculty profile from all profiles in Google Scholar citations. In other words, most of the profiles in Google Scholar Citations are faculty profiles. Our research finding indicates that though there are a large number of users within the two ASN sites, the number of faculty profiles are low compared to student profiles in ResearchGate and in Academia.edu. Interestingly, student accounts are less active in both Academia.edu and ResearchGate sites.

To facilitate data analysis we chose to study professors from the four "top" academic departments on campus, namely those with the highest number of total users. The top four departments varied for each ASN we analyzed.

The following table shows the numbers of professors in the top four departments in ResearchGate and Academia.edu.

Figure 1 (below) shows that the number of faculty in the top four departments at Cal State, LA using ASN sites is much higher in both ResearchGate and Academia.edu compared to Google Scholar Citations.
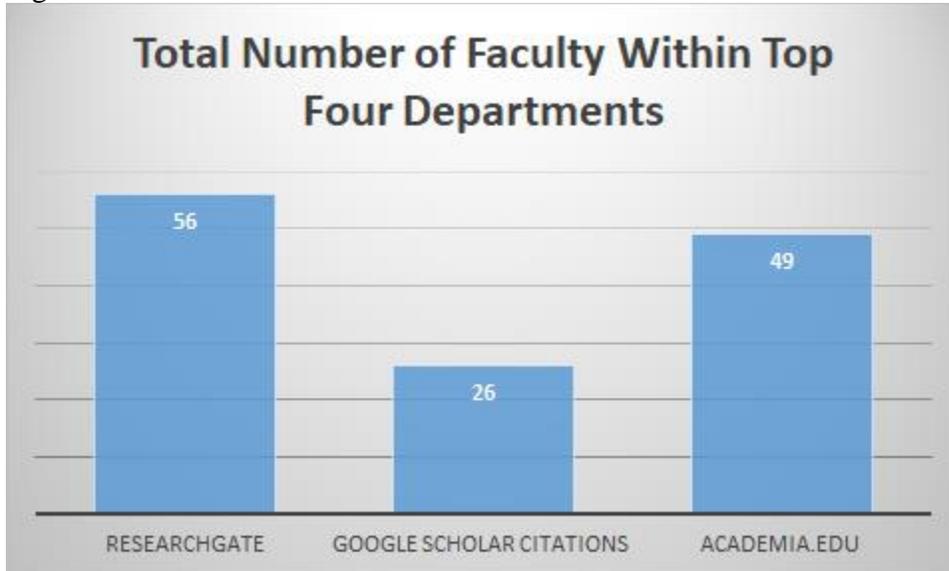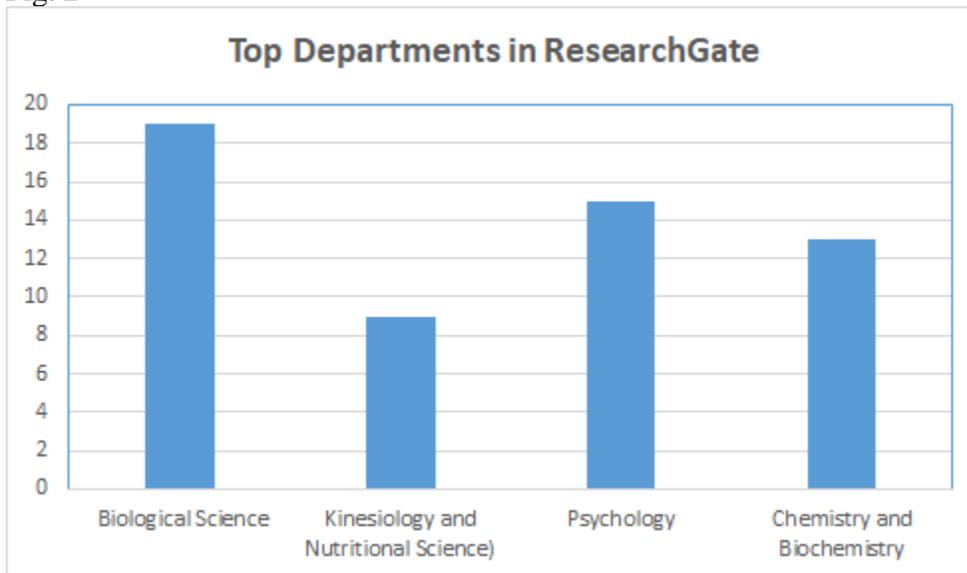
Fig. 1

Total Number of Faculty Within Top Four Departments

Fig. 2

Top Departments in ResearchGate

ResearchGate (RG) – Figure 2 (above), displays the top four departments by the number of users in ResearchGate. The top four departments are Biological Sciences, Psychology, Kinesiology and Nutritional Science, Chemistry and BioChemistry. Within each department, many student members' accounts are inactive. We noticed this similar trend within each of the four departments. The Department of Biological Sciences has the highest number of users from Cal State LA: 165 users with 160 publications. We went

through every profile from the top four Cal State LA departments and found out from the name, description, and research interest. Since member's profiles didn't always identify the user's status, we had to search for every profile in Google to find out if that was a faculty, or student or a postdoctoral researcher. For every faculty profile, we were able to access the official faculty page from our institution.

The number of members and the number of publications are not necessarily proportional. Interestingly, Chemistry is the fourth largest department with 123 members and with 399 publications. The Department of Psychology has 154 members and 159 publications, and Kinesiology, the third largest department has 149 members with only 41 publications.

Figure 3 (below) shows the four departments at Cal State LA with the largest number of users in Academia.edu.

Fig. 3
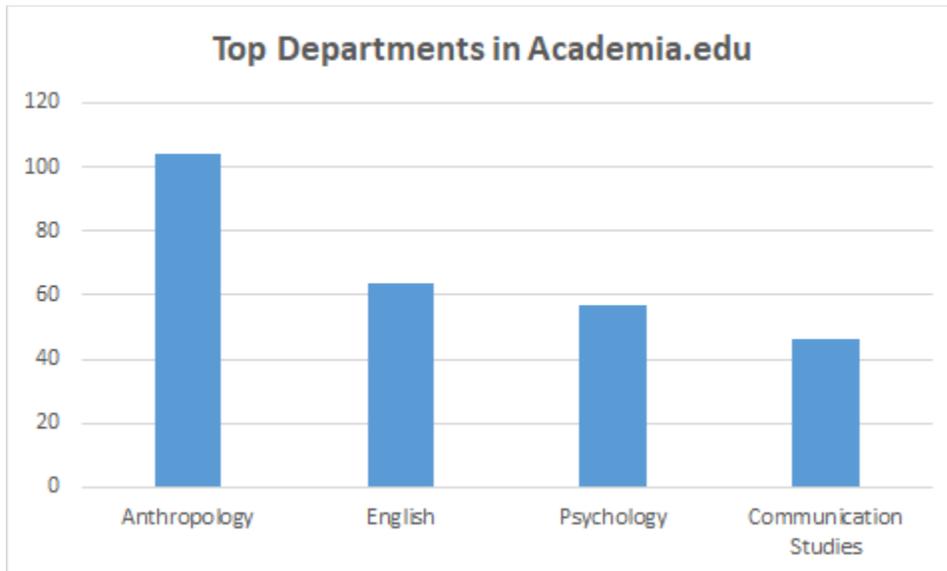
Academia.edu (AE)

Academia.edu lists the total number of Cal State LA users by department. Within each department, it then lists the number of faculty, Emeritus Professors, Adjuncts, and Graduate Students. This breakdown of users is unique to Academia.edu. In the two other sites we looked at, users had to self-identify as faculty or students. We began by making sure that all of the variations of the same department names were combined (Anthropology, Anthropology/Archaeology, Archaeology, Archaeology & Anthropology, Forensic Anthropology, etc.) to make a list of the top four departments. Next, we went through each list of users within the department removing duplicate accounts and then making a spreadsheet showing the number of users for each faculty classification (faculty, emeritus, adjunct). Finally, to refine the faculty classification we went through

the faculty lists and looked up each name on the Cal State LA website to see whether the faculty member was tenured or tenure track.

As of May 2018, the top departments by number of users are Anthropology, English, Psychology, and Communication Studies. The above graph (Fig. 3) confirms that researchers in the Humanities and Social Sciences heavily use Academia.edu. While the Department of Psychology has 57 user profiles with 125 documents, the English department has 64 user profiles with two documents in it. Similar to ResearchGate findings, the number of documents doesn't depend on the number of users within one department. As of May 2018, Anthropology has 104 users, with 173 documents in Academia.edu. Communication Studies 46 users with 30 documents

Fig. 4
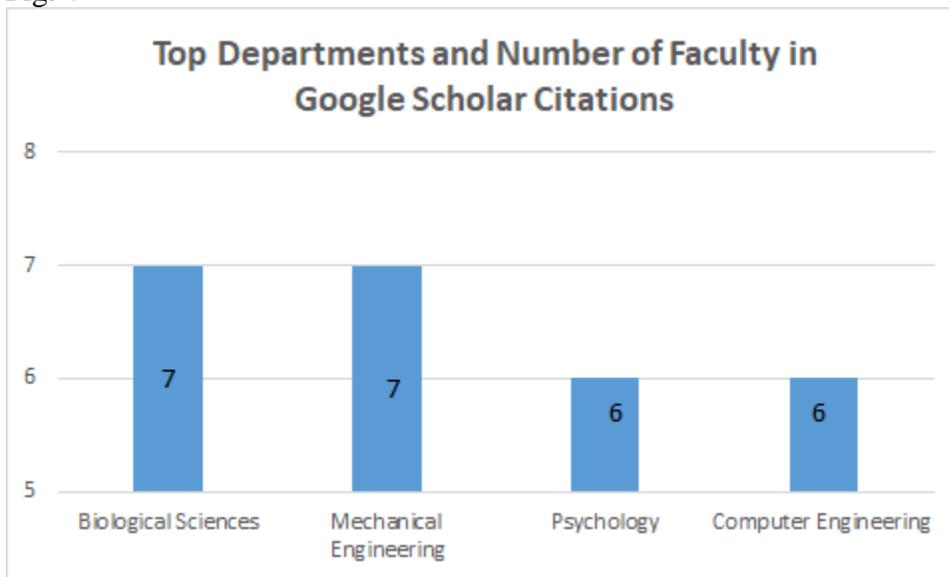
Google Scholar Citations (GSC) - For this study, we analyzed every Google Scholar Citations profile from Cal State LA. As mentioned on the GSC page, to create a profile and set one's affiliation to California State University, Los Angeles, everyone needs to verify an email address from one's institution (Google Scholar Citations, n.d.). Similar to other two ASN sites, we identified the total number of members based on Cal State LA's affiliation.

In May 2018, there were 80 profiles created from Cal State LA, and the top four departments in Google Scholar Citations were Biological Sciences, Mechanical Engineering, Psychology, and Computer Engineering. There was a concentration of natural sciences faculty in Google Scholar Citations. Interestingly, as seen in Fig. 4, faculty usage is almost identical in Google Scholar Citations among the top four departments. There were seven faculty members in Biological Sciences and Mechanical Engineering and six faculty profiles in Psychology and Computer Engineering departments.

The percentage of faculty within two ASN sites are significantly lower compared to total number of members from top four departments. As mentioned above, RG has a total of 2500 members and only 56 faculty members (2.24%). Similarly, Academia.edu has a total of 1325 members and only 49 faculty members (3.69%) which is logical since Cal State LA has over 27,00 students to 1700 faculty.

Faculty participation by academic rank varies widely among the three ASN sites. The number of tenure-track and tenured faculty members are significantly higher than those of the adjunct faculty members and emeritus professors. Interestingly, the number of adjunct-faculty members was highest from top four departments in Academia.edu. compared to two other ASN sites we studied. Similarly, Google Scholar Citations has the highest representation of tenure-track faculty members compared to adjunct and tenured faculty numbers within the GSN site.

Table 1 Number and percentage of faculty by academic rank from top four departments

Academic Rank	Adjunct	Tenure-Track	Tenured	Emeritus
	Total Number %	Total Number %	Total Number %	Total Number %
ResearchGate	9 34.61%	13 23.63%	33 57.89%	1 20%
Google Scholar Citations	3 11.53%	13 23.63%	9 15.78%	1 20%
Academia.edu	22 44.89%	9 18.36%	15 30.61%	3 6.12%
Total	26 (18.18%)	55 (38.36%)	57 (39.86%)	5 (3.49%)

Discussion and Conclusion

This study, conducted at Cal State LA, describes and analyzes the ASN usage patterns in twelve academic departments. While ASN sites (ResearchGate, Academia.edu, Google

Scholar Citations) offer similar collaboration opportunities to researchers, we determined the preferences and academic ranks of professors in the four academic departments that have the highest number of users in each of these three sites.

We found that faculty from different disciplines have noticeable preferences in their use of ASN sites. For example, we determined that ResearchGate is more popular among science faculty and Academia.edu is more popular among social sciences faculty. On the other hand, though faculty from various disciplines use Google Scholar Citations, Biological Sciences, Psychology, Computer Science/Engineering, and Mechanical Engineering have the largest number of Cal State LA users. These findings were similar to those of Ortega (2015) and Aguillo (2012) who identified the same academic users of Google Scholar Citations. Cal State LA Biological Sciences faculty are heavy users of both Google Science Citations and ResearchGate. Ortega's study (2015) also indicated a preference for ResearchGate among Biology and Biomedicine scholars. Our study determined that Cal State LA faculty in the Humanities and Social Sciences are the major users of Academia.edu. Ortega (2015) also found that Academia.edu was the preferred site for researchers in Humanities and Social Sciences.

Our research findings are consistent with Ortega (2015) showing that researchers use different ASN sites for different purposes. ResearchGate and Academia.edu are used to explore collaboration with other researchers, while GSC is used to track authors' citations. Although usage of ASNs varies widely by department at Cal State LA, our study found that Psychology is the only department at our institution that has one of the highest number of users in all three academic social networking sites. We investigated further and found out the overlap of a few Psychology faculty who are users of multiple ASN sites namely Academia.edu and Google Scholar Citations.

Faculty rank was also found to be a determining factor in researchers' use of ASN sites. ResearchGate has the highest representation of tenured faculty members of the three ASN sites. Although it might be expected that young, untenured faculty would be more prolific users of ASN sites, we found that tenured professors make up the largest group across the three ASN sites. This finding differs from that of Ali and Richardson (2018) who determined that Assistant Professors, corresponding to untenured professors at Cal State LA, make up the majority of users in the Faculty of Social Sciences, the focus of their study.

Additionally, it was determined that nine faculty members are active at least one ASN site and have submitted articles in Cal State LA's institutional repository. Interestingly, of the nine, two professors, one in Math and one in Mechanical Engineering, are users of all three sites. One researcher in Psychology and one in Geosciences are users of ResearchGate and Academia.edu. One professor in Biological Sciences uses ResearchGate and Google Scholar Citations.

As described in Lovett, Rathemacher, et al. (2017) and in Odell (2016), the use of ASN sites and IRs is complementary. Now that we have compiled a list of researchers that are

using ASNs, the library faculty can reach out to them since this population is more likely to be open to self-archiving their work in our institutional repository.

Limitations of This Study and Implications for Future Research

This study analyzed ASN usage patterns at one institution during a specific period of time. ASN sites change so frequently that this "snapshot" focus will need to be updated at Cal State LA as demographics, user experiences, and user needs change. Similar studies would need to be replicated at different institutions to determine the similarities and differences to the findings at Cal State LA.

Our study only looked at quantitative information and in the future we would like to expand our research to include faculty interviews and focus groups to understand faculty usage of these sites more fully. Statistics can be used to make inferences about how professors use ASN sites for their research, classroom teaching, and collaborations. The only way to determine faculty motivation is to use qualitative methodologies. This would allow researchers to expand discussions to include authors' rights, copyright, open access, institutional repositories, and scholarly communication in general.

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