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Research in a Changing World: The Influence of Open Science and Social Media

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Abstract

The advent of digital technology which has given birth to rise in scientific communication is having profound effects on individual and institutional activities, including research. The paper discusses the influence of social media and open science on research. It reveals that social media is having notable influence on the research process. The paper also shows that open science is gaining acceptability among scientific researchers. It concludes that social media tools should be tailored to suit researchers needs. Funding agencies for research should encourage data sharing to minimize data redundancy. Academic libraries should engage in advocacy and build more data repositories to encourage open science.

Keywords: Research, Social media, Open science, Almetrics, Open access, Academic library.

Introduction

The proliferation and affordability of mobile devices; rise in digital technology and new modes of scientific communication are having profound effects on research. Additionally, increase in computer processing speed, prevalence of high

capacities storage devices and the ease with which computers can be networked have lead to new ways of carrying out research (Weinberger, 2012).

According to Walliman (2011), research is a systematic way of finding out about things that are unknown with a view to making life more meaningful. Research is the logical steps taken in finding solution to a problem.

To scholars, research is about braking new grounds and extending frontiers of knowledge.

There is a general agreement that research is, like never before, changing structurally because of rise in open access technology. In addition to accelerating elementary changes in scientific publishing, the effect of open access on research is leading to new business models (Sitek & Bertelmann, 2014). The broad effect of open access upon the growth of scholarly publishing and scientific communication is tremendous. This has led to the expansion in the scope of open science, and the application of social media in research most especially research reporting. Available to researcher for improvement of their productivity are a number of social media platforms. Examples include LatticeGrid, ResearchGate, Social Science Space, Academia.edu, and so on. Information sharing and networking are what most of these social media platforms offer researchers.

Scholars are recognizing the indisputable benefit of social media in the research process, which led to their frequent use in academic institutions all around the globe (Kichanova, 2012). However, the recognition of the pivotal role that social media can play in research process is not at the expected level most especially among researchers in developing nations. Open science is a concept that is gradually gaining ground among scientific researchers, hence the need for academic libraries to keep advocating that researcher embrace open Science.

There have been numerous studies on social media and yet there are still topics not explored with respect to research. This study is devoted to the use of social media as an

information source and information sharing tool in the field of research and the roles of academic libraries in the promotion of research through open science.

Evolution of Research

Man from creation has been committed to solving problems militating against his survival and quest for a better living. The establishment of universities during the medieval period increased humanity's appetite for knowledge acquisition and desire for a better environment. Research has undergone modifications from the ancient period through the middle age to the present knowledge age. Humanity is today partly defined by our ability to find information about events and situations around us. In this period of information explosion, coupled with the presence of human challenges, sound knowledge of research process is important to building a better society (Blaxter, Hughes, & Tight, 2006).

Research transformation has been such that today it is more of collaborative research than individualistic. Knowledge expansion coupled with breakdown of barriers to knowledge communication has increased collaboration among researchers. Collaboration and interaction analysis are relatively new areas in research. The level of collaboration and interaction among researchers most especially in online environments is now a subject of interest among stakeholders in the field of research. As part of the knowledge transformation process, the extent of collaboration among researchers can be subjected to measurement from the outside of that particular research process (Bratitsis et.al, 2008).

As part of the process of transformation in sustainability, it is imperative to set up a

mechanism for accessing the manner in which research is conducted. Good research design, methodology and dissemination provide answers to treats of sustainability of research. Thus, the research process itself merits a full consideration of its responsibility toward societal goals and values. Although the responsibility of research to society has recently been raised in scientific discourse, a systematic framework to guide such considerations that can be applied in a self-reflective manner across disciplines is lacking.

In this knowledge age, the diversity and complexity of data is increasing, this is as a result of increase in volume of data. Data manipulation technologies and algorithms can be so intricate that some researchers have posed fundamental questions about the reproducibility of computational research (Stodden, 2010). New data management issues have been raised due to the integration of quantitative and qualitative data in a way not hitherto possible. This integration is made possible by the application of Information and Communication Technology (Estabrooks, Janet, Greta, Gary & Peter, 2009). There is renewed mandate by funding agencies to researchers who have won research grants to share their data with other researchers to encourage data reuse and eliminate redundancy.

Academic Library's Promotion of Research through Open Science

Academic libraries are established to serve the information needs of members of their academic communities. The need to have a better connection with the research needs of students and lecturers by exploring how the knowledge, skills and practices of librarianship could be used in encouraging the evolving paradigm of open science, particularly in the area of data curation, has

caught the attention of professionals in the field of librarianship (Shaffer, 2013). They are therefore increasing their effort in connecting stakeholders in scientific research through open science.

Open Science can be defined as the process of making scientific data, lab notes and other scientific research information available through collaboration among researchers for the purpose of sharing, reuse, redistribution and reproduction (Ogungbeni, Obiamalu, Ssemambo, & Bazibu, 2016). The advocates of Open Science are of the opinion that there should be no hidden scientific process, scientific process should be made public and that both amateurs and professionals should have equal access to scientific data. The Digital Single Market strategy has led credence to the importance of open access principles and policies leading to optimal circulation and transfer of scientific knowledge (European Union, 2012). The gains of this optimal circulation are job creation, innovation and growth.

Fecher & Friesike (2014) discovered the positive effects that open science has on scientific research as simplifying scientific process, making research process available, increase in efficiency of research, finding alternative measurement for scientific research and encouragement of social and collaborative network.

Some academic libraries are seriously considering setting up data repositories that will be purely for extending the frontiers of scientific research; this is in addition to their well established institutional repositories. Academic librarians can certainly do many things to improve the usability of the journal literature. More and better tools are available to study researcher use of articles, from reading to citation

patterns, which can be leveraged to better target purchasing and licensing decisions. The continuous improvement in academic search engines such as Google Scholar and PubMed to enhance retrieval of relevant information has geared libraries to organize training for their clients to improve efficiency with which these clients search the internet for information. Librarians help researchers manage citations and articles, providing training and support for products such as Mendeley and Google Scholar. Open science is prompting major modifications to research practices and journal articles. These modifications reflect a concerted bid to increase the cumulative nature and validity of published findings so as to have a better understanding of science and its associated disciplines.

The focus of open science is to make scientific information available to those that need it, to improve their knowledge and engage in innovative research. Libraries therefore need to take the lead and see open science as their obligation. It is in such an atmosphere of active involvement in open science that will encourage both young and experienced researchers to always connect to library research network. Martell (2008) reminded us that the access paradigm has supplanted the ownership paradigm since the late 1970s and held sway through the remaining years of the 20th century.

Although academic libraries have been involved in the management of scientific data which have existed for many years, the advent of digital data is increasing the involvement of academic libraries in science data services. This increase in involvement is brought about by enhancement in data manipulation as a result of application of information and communication technology. According to Kinikin & Hench (2008), with the involvement of academic libraries in a

broad area of scientific data, libraries' roles in data management and data services tend to relate to a few well-defined categories of data: social science data, geographical information system (GIS) data, and bioinformatics data. While librarians with domain expertise may be prepared to partner with researchers and faculty members, library relationships with laboratory and research centre data managers also deserve further attention and exploration.

Social Media, Almetrics and Research

Social media are internet based applications that allows individuals to generate and contribute contents to a topic or subject known to members of a group. Social media has its root in web 2.0 and derives its ideology and technology from it. Web 2.0 is a platform on the internet that not only allows people to contribute content but also allows continuous modifications by other members of group in a collaborative manner. The interactive nature of social media allows individuals and communities to share, modify and discuss content generated by a user of the social media. User Generated Content can be seen as the sum of all the ways in which people make use of Social Media (Kaplan & Haenlein, 2009). Social media that have been built mainly for researchers include LinkedIn, ResearchGate, Mendeley and Academia.edu.

According to Kietzmann, Hermkens, McCarthy & Silvestre (2011) the uniqueness of the different social media is as a result of the different functional blocks on which they are built. The building blocks are sharing as seen in YouTube, identity as seen in LinkedIn and relationship as seen in Facebook. The analysis of these building blocks by researchers can enable them to have a better understanding of the variations of social media in terms of their functions

and effects on research. This understanding will enable researchers to develop a robust social media strategy based on the prevalence and use of each of the social media platforms in their community. Social media platforms are key catalysts in networking among researchers all over the world, of whom communication would have been difficult due to different geographical locations.

The key areas of knowledge production, processing and distribution as well as institutional settings are taken care by social as part of its functions. The functions of social media are useful in acquiring information most especially for literature (Barbour, K.; Marshall, 2012). Placement of files on shared folders helps in fostering better relationship and management of resources among researchers. This is supported by the multiple communication attributes of social media. Social media, from the technical perspective enhance academic communication. The scope of academic discourse is widened through the use of different channels. The group functions may support collaboration. However, social media platforms have not been adequately built and integrated with research process to serve as a place for publication of research findings. The challenge of having a user account before you can access information on them and lack of formalized peer-review mechanism are major reasons for not using social media for publication of research findings. Hence, publication within social media seems inappropriate at the moment. However, this could potentially change if thorough peer-review mechanisms are established.

Beer (2008) buttressed the advantages of social media to research by reporting that they serve as extra media for pointing to text that have published elsewhere. They

provide a number of functions in that respect: profiles, means of internal communication, tools to direct attention, group functions, and literature-related services. Social media are viable digital infrastructure at the organizational level and may be used e-learning channels. For example, social media serve as a dynamic list of “digital calling cards” and may help to set up networks of researchers with similar interests as a pool of potential cooperation and communication partners. Research tailored social media like Mendeley are very useful to researchers in citation and reference compilation. The popular general-purpose social media such as Facebook appear especially suitable for public relations, academic organizations such as research institutes, universities, scholarly associations, and networks, as well as for individual researchers.

Science Citation Index (SCI) – a pioneering product of erstwhile Institute of Scientific Information – completed a journey of 50 years few years ago. SCI is considered as a key enabler in making of topical areas of bibliometrics and scientometric. While SCI is completing its 50th anniversary, another related area – altmetrics or article-level metrics (ALMs) is gaining substantial popularity amongst scientific communities, research communicators and research funders. Altmetrics are metrics and qualitative data that are complementary to traditional, citation-based metrics. They can include (but are not limited to) citations on Wikipedia and in public policy documents, discussions on research blogs, mainstream media coverage, bookmarks on reference managers like Mendeley, and mentions on social networks such as Twitter and Facebook (Costas, Zahedi, Wouters, 2014).

Open access (OA) movement at the beginning of the 21st century has

strengthened online availability of scholarly publications across the world. The citation metrics using journal impact factor (JIF) and Journal immediacy index – both are associated with erstwhile SCI and now Web of Science and Journal Citation Reports of Thomson Reuter are felt inadequate in present circumstances while there is increased availability of scholarly publications in online public domain. Altmetrics not only counts citations an individual research papers obtained, but also other influences such as number of downloads, social media share, coverage in news media, etc. In the past, altmetrics research has examined reference managers, particularly Mendeley and CiteULike. Li, Thelwall & Giustini (2011) found that 92 % of Nature and Science articles in their sample had been bookmarked by one or more Mendeley users, and 60 % by one or more CiteULike users.

The performance measurement for assessing research productivity of individual scientists, as obtained solely from counting number of citations or aggregate/average values of JIF, is no longer valued by funding agencies in developed countries. Rather they started impact evaluation of research publications or funded research projects very differently. Thus, altmetrics of a published paper is measured multi-dimensionally integrating its usage (downloads, views), peer review (expert opinion), citations, and online interactions (storage, links, bookmarks, conversations).

Altmetrics can tell you a lot about how often journal articles and other scholarly outputs like datasets are discussed and used around the world. For that reason, altmetrics have been incorporated into researchers' websites, institutional repositories, journal websites, and more.

Conclusion

The underlying claim of those challenging scientific research to be more open is that it is closed to begin with, a perception not universally shared by scientists. Those who espouse the view that social media should be used to discuss scientific research tend to fall into one of either two camps: adaptationists or revolutionaries. Adaptationists are of the opinion that social media tools need to suit researchers needs in doing what they are already doing. Revolutionaries believe that new formats should replace established ones because they are more efficient, cheaper, faster, and better than the established formats of institutionalized academia (e.g. that blog posts should replace journal articles). The authors of this paper belong to the school of thought of the adaptationists. The methodological process of research may be compromised if left in the hand of bloggers.

In order to identify new roles for libraries in the research enterprise, librarians must first gain a deep and multi-faceted understanding of the research environment at their own institutions. This can be achieved through identification of primary areas of research emphasis, and analysis of institutional culture.

Most academic libraries are focusing all attention on building and maintaining institutional repositories that basically consist of journal articles and monographs, there is need for them to also give consideration to data repositories. This will further encourage scientific researchers, give them the confidence to embrace Open Science and make young researchers have access to secondary data. Funding agencies for research should continue to encourage data sharing – open science to minimize

data redundancy thereby widening the scope of research.

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