A roadmap for building your scientific reputation on social media

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ABSTRACT

The wide adoption of online media for scholarly purposes triggered a rapid increase in the access to scientific information. This led to several outcomes, including considering internet as the main functional medium for disseminating knowledge. Here we briefly describe how this represented one of the foundations of the open access revolution and how this is connected to the development and circulation of alternative metrics for research outcomes. We then enumerate a list of practical suggestions on how to proceed when dealing with the online dissemination of research products, in order to build and maintain a scientific reputation on internet.

Keywords: Open access, Scientific reputation, Social impact, Social media

Introduction

Open access manifestos

Scholar communications, since the late 1990s, underwent a revolutionary transition from physically delivered printed manuscripts, to readily and globally available electronic media. This followed the widespread diffusion of internet as a communication infrastructure, as scholar writers could be described as those writing for impact rather than commercial purposes (1). Widening the access to scientific writings and making the manuscripts immediately available became a necessity as soon as the exchange of information started occurring exclusively in electronic form.

In the early noughties three distinct documents collected this demand and channeled it into conceptual and practical guidelines. Budapest (2), Bethesda (3) and Berlin (4) declarations were published as "open access manifestos," to define both the philosophical and technical features of guaranteeing the access to knowledge through internet. All the declarations carefully state practical guidelines to "go open," describing among the other things the procedure of self-archiving.

Internet as functional medium

For the purposes of this discussion, it is interesting to observe that in the manifestos there is an official designation of internet as the functional medium for distributing knowledge (see preface of (4)). Moreover, the potential of transforming scientific communications in a common online conversation is also underlined in (2). This aspect of the manifestos is sometimes underrated (see also (5)), even if it is the one that opens new insights and potential developments to scientific communication itself.

In the following sections we will first describe innovative ways to quantitatively depict the impact of a research outcome and then suggest several actions to transform research outcomes into hubs around which online scientific conversations unfold. This would generate new ways of connecting to other researchers, leading to distinctive approaches to build and increase an online scientific reputation.

Traces of impact

Scholar writers always relied on carefully crafted filtering systems to select what to read, as "no one can read everything" (6). In Figure 1 there is shown a potential "flow" of interactions between readers and research outcomes, from left to right, starting with the filtering operations. Filtering could occur either as a plain operation of keyword search, or through both in person and online interactions with other people. Online interactions may happen even without actual conversations, in asynchronous ways, by means of reading someone else's takes on outcomes (blog posts, popular science articles, etc.).

Following the filtering, there is the collecting phase (center of Fig. 1), starting with saving and storing the outcome

Keyword
search

Face-to-Face
academic
discussions

Social media
(Twitter,
Facebook, …)

Online mentions
(blogs, news,
Wikipedia, …)

Accurate
reading

Saving and
archiving

Vertical
reading

Citation

Trace of
impact

Filtering   Collecting   Sharing
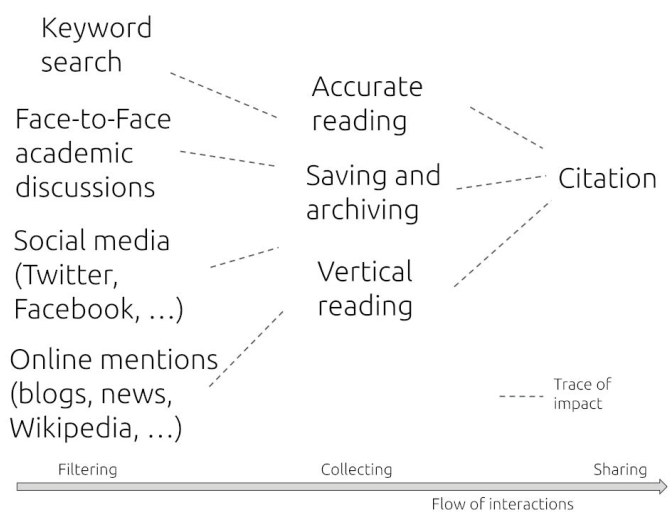
Flow of interactions

Fig. 1 - Traces of impact. Interactions between readers and research outcomes, from selection to citation, through personal conservation and storage. Despite all these operations being highly interconnected and having an impact on researchers' professional life, standard indexes based on citations cover just a small part of this complex trace of impact network. Altmetrics, on the other hand, take into account all the impactful links between the different interactions, returning a rich, complementary picture of a product impact.

in personal collections for future use. One could choose to "vertically read" a research outcome to have just an idea of the topic, or go for an accurate examination, which may prove crucial for one's own work.

In a "classical" situation, a researcher first filters potentially interesting publications, then reads them and finally mentions only the relevant ones in a new research outcome. Therefore, citations (left of Fig. 1), in this framework, is the only quantitative way to assess the impact of a research effort.

However, as Figure 1 suggests, there actually exists a whole ensemble of interactions at different levels, which represents a trace of the impact (6) that research outcome had on the readers.

Altmetrics (alternative metrics or article level metrics) are an attempt to take into account the complexity of these interactions and reconstruct the full trace of impact by quantitatively keeping track of all the actions on a research product. This includes: saving in online reference managers, citing in popular science journals/blogs/Wikipedia, twitter mentions. With altmetrics there could be assembled a rich collection of online discussions around a research product. As opposed to "classic" citation indexes, altmetrics do it in an immediate way, because there is no delay between a mention in a social media discussion and the increase of the indexes. In addition to this, they can uncover the impact of a product outside the plain academic environments (Wikipedia) and they allow assigning an impact to something that sometimes would be difficult to cite (a dataset, a piece of software with no associated manuscripts, etc.).

This is something that steers for "internet as a functional medium," sharing the "science as a conversation" point of

view. Authors with a carefully fine-tuned scientific reputation play a crucial role in this transformation, and they could promote this innovative way of discussing scientific issues by disseminating their work on social media.

Social media for scientists

Goals

As we mentioned earlier, through altmetrics it is possible to keep track of all the mentions and online interactions of a research outcome. This is useful to weave the canvas of the trace of impact around them. As a result, scientific outcomes rather than remaining an isolated and circumscribed product are included within wide-ranging, informative scientific conversations happening online. Thus, authors can build and maintain a professional online scientific reputation.

This conceptual goal could be practically accomplished regardless of the online platform. It is a scientific communication effort of carving out specific pieces of information relevant to the chosen target.

Basic requirements

Open access

Every scientific outcome disseminated online should be readily and openly available for every reader, to facilitate examination and trigger online discussion.

While generic discussions on open access may present different facets and balances among the actors involved, for online dissemination open access becomes necessary. It is impossible to take full advantage of the qualities of online conversations such as immediacy and portability if we place a barrier of any kind between the dissemination and the fruition of the scientific outcome.

DOI

Every scientific outcome, of every kind (7), when put online, should be associated with a digital object identifier, mainly because it represents a single, safe and maintained landing place for all the different interactions readers can have with the product. In this way, different dissemination strategies and online scientific conversations will contribute to the growth of the same digital object.

Building professional scientific social media profiles

Address the readers

Any online post should always address something useful for the readers (8). There is no point in posting information that turns out to be useful just for the author, this would turn out to be annoying (see also the section below). Building an online profile where readers could land and find something interesting for their everyday professional life should be the goal. This should be kept in mind as a premise before posting anything online. It's interesting to observe that there could be a great intersection between something that could be useful for both the author and the readers, for example, a social media platform could be used as a scrapbook, posting relevant links or readings ready to be recalled in the future. This could be a classic example of "useful for the authors" platform use.

But if, for each link posted, the author adds even one single line of description, this is already something extremely relevant as a filtering mechanism for potential readers.

As a rule of thumb, it might be valuable to verify whether there could be an answer to a relevant question to a post: "Which is the author's current professional position?", "What is the main topic of this paper?", "Which is the relevance of this tool? For what scientific field?"

Fine-tune content and target

Content and target are two conceptual areas that should be carefully fine-tuned. They are not completely independent of each other but for the purposes of the present discussion they may be examined separately.

A basic, easy-to-remember, categorization of online content may be drawn between what we could consider "information" and "entertainment." According to the online platform, the boundary between these two categories could be more and more blurred, even nonexistent (see, for example, TikTok videos).

When maintaining a professional scientific account whose primary objective is to build an online scientific reputation, informative content should be the main focus. The goal, for the purposes of this discussion, is to embed scientific outcomes within rich and informative online conversations.

The "address the readers" rule should be the ultimate guiding principle in any case. For example, pictures of social events at a conference may answer the question "is the author attending this workshop?"

There is no such thing as audience selection for public profiles on social media, because everyone can read everything. That is why targeting is basically achieved through carefully crafting the messages conveyed in the posts. Mainstream topics would attract mainstream readers and vice versa.

This is what is described in Figure 2. The horizontal axis represents content categorization, as previously depicted: on the left side there is plain "entertainment" content, and on the right side there is plain information. The vertical axis represents target categorization: at the bottom there is mainstream audience and on top there is "professional network," referring to a specific, technically and scientifically trained audience supposed to be experts on specific topics. The intersection of these two axes partitions this "dissemination" space in four areas, filled with different colors according to what would be useful to find in a professional scientific profile.

On the bottom left there is mainstream entertainment content: jokes, generic memes, generic fun content, etc. This area is characterized by a dark red color, because there is no actual point making this the actual focus of a profile. It's not informative for readers, it does not answer actual, useful professional questions.

On the top left there is professional network entertainment: inside jokes, lab life tweets or social events. While on the one hand this content could be somehow useful for readers ("what is it like to work with this person?"), it is still a light red area, because it does not convey scientifically relevant information.

On the bottom right there is the mainstream content area. This light green area characterizes some kind of content that could be of interest to basically everyone. According to the field the researcher is working in, falling in this area could be extremely relevant. Popular science discussions, crunching hard to digest information and returning it in an easy to understand way, transforming difficult concepts into accessible examples and stories, etc. This could be a crucial and profile-defining area, especially in particular topics (climate change, medicine, epidemiology, etc.).

Focus on the content for your professional network

On the top right, in Figure 2, there is the main focus of the current discussion. Dark green area represents information relevant for a specific professional network. This includes many different kinds of discussions, first: technical threads. Practical problems in everyday lab life are probably the most relevant ones: a software that does not respond in
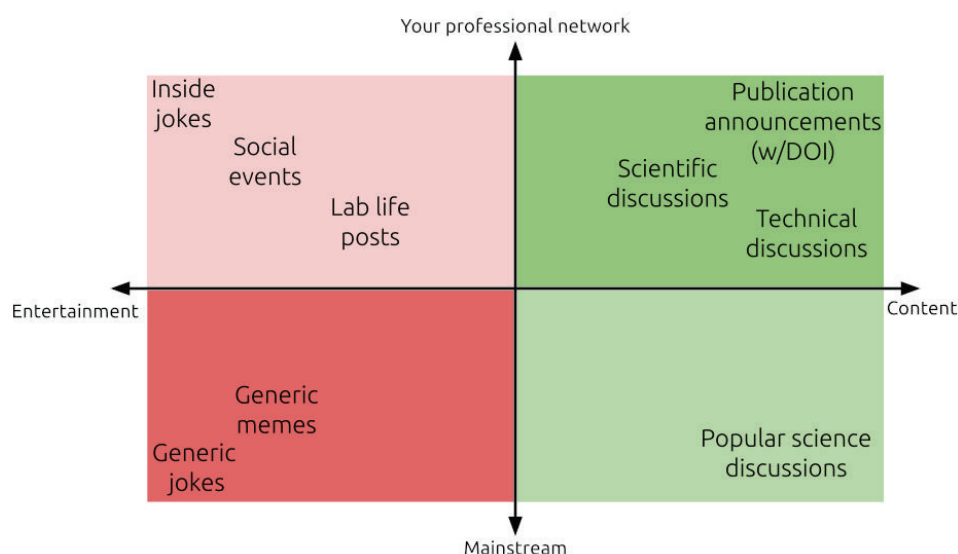

Fig. 2 - Partitioning dissemination space. Every online post should be carefully prepared by thinking of its potential position within this space. The dark green area should be the main focus of an online professional scientific profile. The most important task to perform is placed on the top right corner and it is the research product announcements (always including a DOI).

Fig. 3 - An example of a professional scientific profile on Twitter: Prof. Micah Allen (image retrieved on August 30, 2022 – Online, with permission). By combining text and emojis, there could be indicated many different pieces of information all at once in the "bio" part of the profile landing page. This forms a concise and informal online version of a business card. A specific tweet related to a publication (including a persistent link to the research product and an image) is positioned on top of the timeline, using the "pinned tweet" Twitter feature. This could be used as a "highlight" feature to convey relevant messages or disseminate specific products in an effective way.

an expected way, strategies for device calibration could work better, etc. A similar point could be made for scientific discussions. Translating interactions that used to be held at conferences into ongoing written conversation is a way to interact with people, which might be geographically distant, coming from different backgrounds and holding different professional roles in their professional life. Collating such a variety of points of view can be hard in real life, while social media offers a unique opportunity to connect diverse audiences and integrate different concepts.

Build a post for scientific outcomes

Dark green area in Figure 2 also includes one of the most important kinds of scientific communication to develop and maintain for a scientific social media profile: the dissemination of scientific outcomes.

Anything (manuscript, code, data, experimental protocol, etc.) carrying a DOI is worth disseminating. Here we enumerate a few rules of thumbs that could be followed when building a post for a scientific outcome:

1. Mention the DOI. This would link the post to the product landing page (see, for example, Figure 3 – the highlighted tweet). It would be easier for data-harvesting initiatives to connect a scientific discussion on any platform to the product itself. The product-level metrics would consider whether the product is the focus of an online exchange of ideas;
2. According to the platform, mention the title and the main message in what you think would be the immediately visible version of the post. On platforms that limit the number of characters (Twitter), title and message should fit into the 280 characters. On platforms working with previews (Facebook, LinkedIn), these two pieces of information should appear without any other action by the reader. On visual content-based platforms (Instagram, TikTok) the content should be available at the initial stages of the post and be persistent for a reasonable time for the reader to crunch and digest both the title and the message;
3. Include a figure (see, for example, Fig. 3 – highlighted tweet). According to the desired target audience, an image related to the content of the scientific product will be a way to convey a message in a quick and easy way. On platforms where it is easy to include pictures (Twitter, Facebook, LinkedIn) the choice of the relevant figure would be crucial, because a picture should answer a question related to the main message of the scientific outcome: "Which is the connection between two variables?", etc. On platforms where the main focus is visual content (Instagram posts and stories, TikTok) visual flow could be used to create effective narratives, for example, make histogram bars appear one after the other, populate portions of heatmap regions one after the other, etc.

Finalize the post

According to the platform, there are many other relevant suggestions to be mentioned, before finalizing the post.

1. On social media platforms where there is a limited number of characters (Twitter) draft in advance the whole text and divide it in sections. Enumerate the sections and specify the final number of sections in the whole thread (for a thread unfolding in 6 tweets: 1/6, 2/6). This would quickly communicate to the readers that there is more after the very first post; at the same time, if the total amount of sections is not big (maximum 5 or 6 posts), this would suggest that the whole thread could be read in a reasonable time.
2. On social media platforms where hashtags are relevant (Twitter, Facebook, LinkedIn, Instagram), select those that could be considered as a relevant conceptual box where to enclose the topic of the scientific outcome. It is better to be specific than generic. It is unlikely that readers are

looking for #science-related tweets. It is possible, instead, that readers are looking for #molecularbiology or #rest-ingstatenetworks-related posts.

3. There is no point in automatic cross-posting between different platforms. Every social media has its own highlights and flaws. The goal of a scientific social media profile should be to trigger conversations instead of just flooding platforms with the same information. Pick a platform and carefully draft your content accordingly.

Don't be annoying

An account on social media is a way of building a representation of one person's specific profile, whether this relates to specific personal interests (sports, politics, etc.), generic personal narration (personal pictures, etc.) or, as in the case of this discussion, to a research-related profile.

The relative ease with which one could post, the potentially infinite audience, the cross-relations made possible by online tools (hashtags) make these platforms powerful and potentially unpleasant for the readers.

Therefore, the first and foremost unwritten rule for every potential use of the profile is in maintaining a useful and informative professional social media account, to avoid all the annoying behavior: insulting, using toxic argumentations, appealing to logical fallacies to prove a point, etc.

Examples

OHBMx – An online conference on Twitter

An interesting example of discussing scientific outcomes online is the OHBMx Twitter conference (9), which occurred in Twitter from 2017 to 2019 as #brainTC and in 2020 as OHBMx. Presenters were required to prepare self-consistent threads of 6 tweets potentially including links and images, as if they were a sort of an online version of a conference presentation.

There were at least two interesting implications of such an event. First, accessibility and inclusivity, because everyone from everywhere in the world could immediately access the scientific material and, potentially, take part in a peer-to-peer conversation without potential barriers between the conversation stakeholders. Also, persistence, considering that the material will stay there on the social network, easily findable through the hashtag #ohbmx. In this way one could potentially interact with original authors even months later after the actual conference.

#EEGManyLabs – building a multi-site replication of influential EEG experiments

EEGManyLabs (10) is a large-scale international collaborative replication effort whose goal is to directly test the replicability of key findings from 20 studies which were considered influential for the development of knowledge of human cognition studied with electroencephalography (EEG). A crucial part of the project was to select the studies to test. This was done by combining systematic keyword searches and social media advertising. The name of the project is a hashtag itself, meaning that it is easy to unleash all the power of cross-referencing in Twitter. Through the hashtag, they called the EEG community of interest and collected ideas to nominate studies they deemed worthy of replication. This is an example of what could have taken years of work, expensive communications and a potentially partial cut on the final selection carried out in a short period of time, with a potentially unlimited audience and no specific barriers to accessing the scientific discussion.

Conclusions

Open access manifestos described how internet should be considered the functional medium where knowledge is disseminated and discussed. Here we illustrated how this transformed the scientific outcomes from static, isolated objects to hubs of ongoing online scientific discussions. We briefly introduced the altmetrics, suggesting that they are an attempt to transform this generic guideline into a quantitative measure. We finally enumerated a list of actions that readers can take to build a reliable and successful professional profile on social media for their online scientific reputation, supporting how this proved relevant for disseminating scientific products and building innovative ways of conducting research.

Disclosures

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