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University libraries as active agents for change. The BitViews Project: how University librarians can turn all journals green and clear the path to open science

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ABSTRACT.
There can be no open science without Open Access (OA).
This paper is a call to arms to *individual* University librarians to make a decisive move towards open access. The *short-term* objective of OA is defined as the immediate, cost-free, online access to the *content* of all peer reviewed scientific, medical, and scholarly articles. This amounts to unrestricted access to the *author's approved manuscripts* (AAMs) deposited in institutional and other repositories. Even in the current academic publishing ecosystem, largely directed and managed by a few oligopolistic commercial publishers, 80% of peer reviewed articles can be deposited as AAMs, but only a small minority of researchers *choose* to do so. The reason for this failure is that currently there are no individual incentives for researchers to promote their AAMs, as the main currency of academic recognition and esteem (the citation count) resides with published articles. The author has described elsewhere how an open-source blockchain application (BitViews) can collect, validate, and disseminate at minimal cost online usage data of all AAMs available on institutional repositories. The resulting public ledger of usage data can be used to arrange discipline-specific non-citation research impact measures thereby providing the incentive for more authors to deposit their AAMs in a virtuous circle. The green OA thus achieved allows researchers in the global South to enter scholarly communication not only as consumers but also as producers of peer-reviewed knowledge. BitViews Project allows individual university libraries to be catalysts for change. The paper explains how a novel application of game theory (*conditional crowdfunding*) will empower individual libraries to spread the relatively miniscule costs of setting up BitViews using a two-stage mechanism that minimises free-riding and offers a no-risk opportunity to libraries to deploy their institutional repositories not just as stores of information, but as active tools to achieve open access.

Keywords: open access, BitViews, blockchain, author's approved manuscript, conditional crowdfunding.

1. AFTER THE PANDEMIC: RETRENCHMENT OR RESOLUTION?

It is difficult to be optimistic while a pandemic that has already claimed nearly four million fatalities is still raging in many countries. It may be considered callous even to suggest that the Covid-19 catastrophic shock may force the scientific and academic community to re-examine its behaviour and implement changes leading to a better and fairer world. But this is exactly what this paper is about.

The history of the successful development of *several successful* vaccines in *record* time is still being written, but it can be safely surmised that without unrestricted access to the relevant scientific literature the pace of progress would have been much slower. And yet the very same governments that have poured unprecedented funds into vaccine science and are even considering the suspension or modification of patent rules to facilitate the increased production of vaccines had failed *to compel* the publishers of paywalled scientific articles to grant open

access to all scientists involved in Covid-19 research, relying instead on the gracious (temporary) beneficence of such publishers, only too happy to score cheap PR points.

If ever there was a time for every single individual involved in the production and diffusion of knowledge to take action to ensure the long-awaited achievement of open access, it is now. As this is a paper squarely aimed at University librarians, it is they, *as individuals,* who are taken to task and are challenged *to act.* The alternative, the very real and indeed probable alternative, is for librarians to retrench in the face of the post-pandemic re-alignment of power between the academic publishing oligopoly, fund-constrained Universities, and research funders: a business-as-usual scenario, tinkering with "transformative" deals, paying lip service to proper open access, and leaving the power of the academic publishing oligopoly fundamentally unchallenged.

This, I believe, is the proper context in which to assess the BitViews project in post-pandemic times. Does BitViews provide *individual* University librarians with an opportunity to move to open access or is the comforting safety blanket of associations, consortia, committees, societies, and working parties the appropriate environment to make the necessary changes to improve scholarly communications?

2. WHAT IS BITVIEWS AND HOW CAN IT LEAD TO OPEN ACCESS?

Interested readers may find details of the BitViews project in a series of articles that sketch and illustrate the basic concepts[1], but the key idea is very simple.

Imagine a world where every institutional repository is endowed (at zero cost) with an application that collects online usage data of all the author's approved manuscripts deposited in it. The data are validated (using COUNTER criteria) and then aggregated on a worldwide basis by DOI. The resulting ledger of usage events (which AAM has been accessed, where, and when) is made available (again at zero cost) to anyone interested in the diffusion of scientific and scholarly knowledge. BitViews is the open-source blockchain application that makes this possible.

In order to see how this relatively minor innovation can unlock the door to open access, open access itself has to be defined precisely. With the exception of some OA purists and fundamentalists, what matters to anyone interested in *knowledge* (researcher, student, member of the public, policy-maker, etc.) is the *content* of peer-reviewed research, not its packaging. This is why the proper target for open access is the AAM, not the Version of Record (the published article).

Once this obvious fact is accepted, a number of implications follow:

(a) even in today's publisher-dominated ecosystem, nearly 80% of all peer-reviewed research can be legally made available on open access in AAM form;

(b) the remaining 20% (and more generally, a change in academic etiquette) can be achieved if current proposals to mandate the OA deposit of AAMs by Coalition S and the US Office of Science and Technology are implemented. The US National Institute of Health could provide further impetus by changing its ill-conceived policy of mandating the deposit of the *pre-prints* (i.e., non peer reviewed) of NIH-funded research to mandating the OA deposit of (peer-reviewed) AAMs;

(c) the focus of open access advocates ought to be on inducing the producers of peer-reviewed research to deposit their AAMs, not on providing additional revenue streams to publishers who allow their *VoRs* to be available on open access.

(d) the free public ledger of AAM online usage created through BitViews provides the raw data that can be used to create new non-citation research impact metrics, thereby closing the loop in so far as the authors of peer-reviewed research would have a personal individual incentive to deposit their AAMs (otherwise their non-citation impact would not be recorded).

I have argued elsewhere (La Manna, 2020) that the long-term effects of BitViews go well beyond unlocking open access, with wide-ranging implications not only for the diffusion of knowledge, but also for the production of knowledge by hitherto excluded researchers. Moreover, the very practice of (and reward for) peer review would be affected by the provision of reliable non-citation impact data.

In the next section I want to focus on the role of University librarians in finally bringing about open access after over twenty years of largely ineffectual attempts.

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[1] Lamanna & La Manna (2018 and 2019); La Manna (2020).

3. CAN UNIVERSITY LIBRARIANS ACT AS *INDIVIDUALS* TO UNLOCK OPEN ACCESS?

I have two questions I would like to put to all University and Research librarians:
1. How many regional/national/international associations, consortia, societies, groups, and organisations are you and your library members of?
2. In the last, say, ten years how many practical actions have you (and your library) *individually* taken in the active support of Open Access?

I guess that for most, if not all, librarians the answer to the first question is "A large number" and to the second is "what do you mean – *individually?*"

My own knowledge of the Open Access movement is too incomplete to even suggest that the answers to my questions may go somewhere towards explaining the glacial progress of Open Access in the last twenty years.

In a more positive vein I shall try to frame the BitViews project as a potential vehicle for practical action by *individual* librarians. In what follows I shall assume (not unreasonably, given the fairly general recognition of BitViews as a "good idea" in the librarian community) that most librarians are sympathetic to the aims of the BitViews project, but have questions on how they individually can make it succeed.

a. *How is BitViews funded?*

It is crucial to realise that BitViews requires only a one-off investment, with no recurring costs and thus with no need for any permanent structure to administer its running. This is a direct consequence of BitViews' underlying blockchain technology. Once the application that collects, validates, and aggregates AAM usage data is installed on Open Access repositories, the actual running of the application is fully automated, i.e., does not require any staff input. The consortium blockchain used by BitViews involves a small number of "collating nodes" – effectively repository servers operated by trusted and financially secure Universities in the global North who are expected to cover the totally insignificant storage costs. Being open source, the BitViews application is designed so that any of the collating nodes can be easily adapted to cope with changes in repository software.

There exists a pleasing symmetry between the nature of blockchain technology and the type of organisation envisaged for BitViews, in so far as for both the key feature is *decentralisation*: the BitViews application does not require a centralised clearing house to collect all the AAM online usage data, with each access event being automatically collected, validated, and aggregated and placed on a public ledger. Similarly, once the application is successfully developed, tested, and distributed, BitViews does not need a formal central organisation to run it. Whose *individual* actions are required? - The librarians of the leading Universities in the global North with a personal interest in Open Access[2].

b. *How much does BitViews cost and who pays for it?*

As explained above, BitViews has no running costs and in fact the BitViews application will be made available at zero cost to every University and Research repository in both the global North and the global South. The only cost to be funded is the cost of developing and testing the open-source application, which amounts to US$400,000. This one-off setup cost is going to be shared amongst all participating libraries in the global North through a novel mechanism we call *conditional crowdfunding*. This mechanism has been designed to ensure that the set-up cost is shared as efficiently as possible and it works as follows:

In stage 1, participating libraries indicate the maximum pledge they are prepared to contribute to fund the US$400,000 target; a pledge is not a binding commitment,

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[2] Needless to say, the decision to participate in BitViews is taken by individual librarians but of course any financial contribution to the project will be coming from institutional sources.

but a mere indication of interest – no funds are disbursed. On the closing date of this pledging phase, all pledges are summed up. If the total is less than the target, the project is closed. If total pledges exceed the target, in stage 2 participating libraries contribute *pro rata* (e.g., if total pledges amount to US$800,000, each library pays in only half of its maximum pledge). The key point here is that it is up to *individual* libraries to decide whether to participate and if so how much to pledge: no associations are involved. Of course, it is in the interest of each librarian to encourage others to join in, because the more libraries that participate and pledge, the lower their actual contribution. Whose *individual* actions are required? The librarians of all Universities in the global North with a personal interest in Open Access.

c. Who arranges, monitors, and delivers the development of the BitViews application?

As explained above, the need for a formal structure to run BitViews applies only to the set-up phase of the project. The project is directed by myself under the supervision of the Board of the BitViews Community Interest Company (equivalent to a Public Benefit Company in the USA). The Board will comprise representatives from leading libraries in both the global North and the global South. A Community Interest Company is a non-profit legal entity and its charter will specify that whatever assets the company owns cannot be sold under any circumstances and, if dissolved, the value of any assets will be returned to all participating libraries *pro rata*. This is to prevent the non-profit company from being sold on (e.g., to a commercial publisher). The entity overseeing the production of the BitViews application cannot be established as a charity because of the interplay of UK and USA legal requirements: under US law public Universities cannot make charitable donations (and hence their contributions to the BitViews project have to take the form of pre-sale invoices) and under UK law charities cannot be directly involved in the sale of goods and services). A CIC, instead, can sell goods and services while being non-profit and with a clear social good mission.
All of the above should provide a robust safety net for all librarians who wish to support the route to open access provided by the BitViews project, a project designed for, supervised by, and empowering the international University library community.

4. LEAP OF FAITH OR BUSINESS AS USUAL?

It is difficult to underestimate the change in mindset necessary to make the BitViews project succeed: University and research librarians, who have to navigate between the Scylla of their senior administrative paymasters and the Charybdis of knowledge-hungry faculty and students, have always sought solace in numbers, whence the unusually large range of library associations, societies, consortia, etc. Networking is second nature to most librarians, whose immediate response to any challenge is to set up a working group, responsible to a committee of the appropriate association's subdivision, whose interim report is then shared with other societies' boards – you get the picture.
BitViews, instead, calls to task senior librarians as *individuals*: do they support the route to OA envisaged in the project? If so, are they prepared to pledge the miniscule resources required to make the project succeed? Are they personally willing to encourage other libraries to contribute by actively promoting the project? All these decisions can be taken by individuals – they do not need the approval or permission of any organisation/association/society/consortium. In this light, BitViews can be seen as the first experiment aimed at coordinating the policy decisions taken by hundreds of individual librarians for the common good. If it succeeds, the same template can be deployed to tackle other problems in the field of scholarly communication and librarianship more generally.
After the hiatus due to the pandemic, the BitViews project is ready to be resumed, but the timing is crucial and can only be determined by the general consensus of librarians. When should the three-month pledging window be opened? In other words, in view of the reshuffling of resources and priorities facing libraries in the next few months, when would most librarians in the global North be able and willing to pledge their support to the BitViews project?

The answer to these questions could not be simpler and, again, requires a single decision by individual librarians, namely, sending a one-line email to info@bitviews.org : either "Never" (thereby suggesting that the project is not worth supporting) or "Month/Year", indicating the most auspicious starting time to gather pledges. The choice, dear IATUL members, is yours and yours alone.

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