Open Access Goals Revisited: How Green and Gold Open Access Are Meeting (or Not) Their Original Goals

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The authors ask how far the open access movement has come in meeting its initial goal of making scholarly research freely available to all potential users immediately upon publication through open digital repositories (green OA) or open access journals (gold OA). In 2002, the Budapest Open Access Initiative named the movement and examined the new opportunities that technology made possible. In 2012, the same group declared partial success: 'We're solidly in the middle.' The main challenge has been economic sustainability. The authors argue that gold OA has fared better and has more potential for economic stability than green OA. As commercial publishers have found ways to live with and even profit from open access, the movement has not yet achieved its goal of reducing costs for libraries. The future remains uncertain for OA as the means to meeting its goals need more critical evaluation and revision.

Keywords: open access, gold open access, green open access, scholarly communication

The open access (OA) movement has gained followers over the last decade. OA has made outstanding progress in establishing itself as a new philosophy for scholarly communication. However, the path from obscure new idea to reality has not been easy. Now, perhaps more than ever, OA is the subject of much speculation among scholars, publishers, and librarians. Much of the debate these days still centres on the economics of OA: Is it sustainable; will library budgets soon be freed from out-of-control subscription price increases; will OA journals entirely replace some subscriptions? But one question that has received little attention is whether we can say that, yes, OA is a success. Has OA achieved its initial goals? Has it done what its advocates said it would do? This article will

examine the initial goals for OA and give a progress report on how well OA has achieved them.

Before we can answer that question, we have to take a step back. It has been over a decade since OA's initial advocates arrived on the scene, lauding its noble cause and phenomenal potential. We have seen many scholarly publishers rush to offer OA options; we have seen new gold OA journals appear by the hundreds; and we have seen university libraries across the nation (and world) race to implement institutional repositories. Likewise, the LIS (library and information science) literature on OA has exploded to match the feverish interest in the movement. To give an idea of the magnitude of this explosion: One bibliography of OA literature cites over 1300 documents, and it was published eight years ago and lists only English-language works.[1] More up-to-date statistics come from a search of the database *Library Literature & Information Science Full Text*. On 15 March 2014, a search for 'open access' in 'TX all Text Fields' produced 5464 results. Likewise, another general search in the *Library and Information Science Abstracts* database had 3099 results. It is no great surprise that libraries have a keen interest in the progress of OA since their role as providers of access to scholarly communication has remained integral to their service model and has determined in large part their spending for scholarly resources. Yet despite making leaps and bounds since the late 1990s and early 2000s, to date the OA movement has not met with full success in achieving the goals announced by its early advocates. In this paper, we will attempt to outline the gaps between initial hopes and current realities with special emphasis on the differences between green and gold OA. We hope that this progress report will highlight the need for scholars and librarians to carefully determine how to align their actions with OA objectives and to demonstrate their long-term support for OA.

REVIEW OF EARLY ADVOCACY

Proponents of open access argued at the outset that research, mainly in peer-reviewed journals, should be immediately and openly accessible to all (without price or permission barriers). The basic definition of OA literature in these early days could be stated as follows: Scientific and scholarly research articles are considered to be open access when they are made freely available to all potential users immediately upon publication through open digital repositories or open access journals. Essentially,

today's variations on this simple definition still share its fundamental components.

Stevan Harnad, an early and aggressive advocate of self-archiving (now known as green OA), accurately reasoned that scholars, unlike other writers, produce reports on their research without the expectation of payment but instead with the hope that their work will have a beneficial impact in their field.[2] With the advent of digital technology and the Internet, this body of 'give-away' literature (as he coined it) had no good reason to remain locked up by barriers to access — or, rather, no reason other than to protect the revenue stream of traditional publishers. In 2002, the Budapest Open Access Initiative (BOAI) gave the movement a name and again argued that technology afforded new opportunities for scholarly communication to reach a broader audience in support of the public good.[3] Indeed, all proponents (scholars, librarians, and publishers alike) repeated this theme — the public good, everyone agreed, was the single greatest reason for breaking down barriers. The means to this end, however, were up for debate.

The BOAI, along with other advocates (including Peter Suber and the Bethesda Statement on Open Access [BSOA]) maintained that self-archiving was one important strategy to release the literature for open use.[4] Self-archiving — whether of preprint manuscripts, published versions, or significant revisions of published versions — offered a means of removing price barriers and, as stated by the BSOA, increased the long-term preservation of scholarly works.[5] Universities and their libraries were called upon to assist by implementing institutional repositories for these purposes and to instruct faculty on how to deposit their work.

The other major strategy that the BOAI, BSOA, and Suber promoted was the use of open access journals.[6] These journals, otherwise known as gold OA, gave scholars an alternative outlet for their work. The literature published in these journals would be made immediately accessible to users free of charge without anyone having to circumvent copyright restrictions or negotiate with publishers to grant the permission to self-archive. In this sense, gold OA took the subscription bull by the horns by tackling the issues with traditional publishers head-on. Competition, the BOAI asserted, would be a good thing in the scholarly publishing market.

Critics, on the other hand, suggested that without the revenue from subscription fees, there was no way for gold OA journals to achieve long-term sustainability. In other words, they were doomed to fail. But the

BOAI, recognizing this issue, maintained that alternative business models could offer substitutions for traditional revenue streams and, better yet, would end up costing less. Some of their suggestions for collecting fees to cover the cost of production included

> foundations and governments that fund research, the universities and laboratories that employ researchers, endowments set up by discipline or institution, friends of the cause of open access, profits from the sale of add-ons to the basic texts, funds freed up by the demise or cancellation of journals charging traditional subscription or access fees, or even contributions from the researchers themselves.[7]

These myriad suggestions, along with the following statement that one need not be favoured over another, implied that the focus of the BOAI's advocacy was less about supporting a single business model for gold OA and more about experimenting until the right one was found. Above all, advocates promised that, by one means or another, OA was already proving itself to be sustainable. The question revolved around who should be responsible for paying to publish research. Traditionally, the responsibility had fallen to libraries; but, in the OA world imagined by the BOAI, this was no longer obviously the case.

Another benefit of OA, hinted at by the BOAI but more strongly and repeatedly vocalized by Harnad, was the possibility for the movement to solve one of the major problems with scholarly communication—the extraordinary increases in subscription fees.[8] Libraries, as integral suppliers and consumers of information, had been subject to whatever necessary or whimsical hikes to subscription fees publishers decided to throw at them. In the past, they had two choices—either pay the higher price or cancel the subscription. Harnad unapologetically argued, and still does, in favour of green OA as the best candidate for solving the problem of high fees as a barrier to libraries' providing scholarly information to their users.[9] The BOAI, on the other hand, did not take such a forceful approach as Harnad's. They did not declare in so many words that OA (in whatever form) would be libraries' savior from the budget-constricting clenches of subscription fees. That aspect of the movement simply did not have the same importance as the loftier hopes for the greater good. Ruffled feathers aside, the obvious possibilities of cost savings from OA were not hard to infer and implied that OA could *eventually* ease the burden on libraries. Moreover, the BOAI was closely followed by the

release of a selection of frequently asked questions about its intentions, along with answers provided by the BOAI creators; they were viewable on the BOAI Web site and published in a special issue of *ARL*.[10] In these, the language is more direct: 'Journal prices have been rising faster than inflation and faster than library budgets for three decades. On the open-access model, journal costs will drop. Paying for them will be easier even if no additional money is found.'[11]

But even here, the BOAI conveniently sidestepped making any overly definite statements about eliminating the old subscription models. Indeed, they were careful to reaffirm only their desire to advance OA. Any competitive pressure on non-OA journals was merely a hoped for side effect. In answer to a question about the BOAI's intended impact on traditional journals, they responded that the intention was 'not to put for-profit publishers out of business,' that they were willing to help non-OA journals transition to OA, and that the journals had 'nothing to fear ... except competition.'[12] The lofty goal of making literature openly accessible was reiterated over and over in such a way as to imply that it was not at odds with the business interests of traditional publishers. And yet, the OA model seemed to be inherently at odds with the subscription model and remains so to this day.

CURRENT STATE OF OPEN ACCESS

In September 2012, OA advocates reconvened in Budapest to reaffirm their original principles. 'Today,' they said, 'we're no longer at the beginning of this worldwide campaign, and not yet at the end. We're solidly in the middle, and draw upon a decade of experience in order to make new recommendations for the next ten years.'[13] The BOAI has lost none of its noble aspirations, but, after a decade of experimenting with OA, their new recommendations have more substance. The question remains, though: 'Is OA doing what advocates claimed it would?'

First, only '7.7 percent of the scholarly articles published' in 2009 used the gold OA model.[14] Though a laudable increase over previous years, it is still, as Lewis points out, a terribly small percentage of the total scholarly output. In another study, green OA fared better: Twenty-one per cent of articles published in subscription journals were available as self-archived versions.[15] However, this still leaves nearly 80 per cent of subscription articles behind access barriers; further, this study does not indicate how many of these are pre- or postprint versions of the published material.

Even more disappointing is the fact that indexing and discoverability of the Green OA articles that *do* exist is still imperfect and therefore makes finding these works challenging. If we assess OA's success strictly according to what percentage of total scholarly output is available through open access, it is not succeeding in making all or even a majority of scholarly communication openly accessible.

We would be missing the point, though, if we failed to realize how the current adoption rates of OA fit within the larger movement of scholarly communication and market changes. No, OA has not made everything freely available to users; but it is still not out of the question to predict that it eventually will. In this sense, the BOAI's ten-year anniversary comments are correct—we have not reached the end of the OA road yet.[16] Lewis's projections, based on two extrapolations, predict that 90 per cent of scholarly articles will be published in gold OA journals either by 2020 or, according to a more conservative estimate, by 2025.[17] Those statistics are much more in line with the revolutionary sweep that has been suggested by OA advocates. Significantly, though, Lewis makes the important distinction between the impact of green and gold OA. His predictions apply to the latter and, we think, rightly so. Lewis reminds us:

> Green OA sits beside the system of subscription journals; and, while it is of concern to many established publishers, they tolerate it as long as it is not a fully adequate replacement for their products.... It continues the system that many view as dysfunctional.[18]

His logical conclusion—the one that we think Harnad missed—is that we do not need green OA in a 'fully Gold OA world,' since it simply becomes redundant.[19] Green archives are more legitimately a preservation method and a showcase for faculty work at a given institution.

Considering the fact that hybrid OA models allowing green OA after embargo periods remain a popular compromise for publishers, the current state of OA looks even more dysfunctional. The BOAI, BSOA, and Suber all proclaimed that embargoed OA is not fully OA.[20] True OA articles are immediately available free of charge to users upon publication—not after a twelve-, eighteen-, or twenty-four-month waiting period. Proponents have suggested that these embargoes may be acceptable as a transitional method, but they do not meet the OA goal of immediate access. Considering all the issues listed above, we think it is safe to say that OA has not achieved full success in attaining its principal priority.

Another problem with the original model is sustainability. We will argue, though, that the problem lies mainly with the long-term sustainability of green OA, not gold OA, compared to the original objectives. Overall, OA was touted as eminently sustainable; and experimentation with new OA business models initially showed promise. What we think the supporters failed to parse out was, again, the distinction between green and gold. Gold OA has a working business model; green OA, for all intents and purposes, does not. Therefore, to lump the two strategies together is to make the oversimplified claim that OA, as a whole, is categorically sustainable. Joseph Esposito, in one of his regular contributions to the popular blog *The Scholarly Kitchen*, has anticipated the sustainability problems presented by green OA self-archiving.[21] He likens Green OA to the 'ouroboros, the snake that eats its own tail.' He provides an apt comparison, only without the regeneration that the ouroboros implies. Esposito goes on to explain, very much like Lewis briefly does, that as green OA gets more sophisticated (as indexing and discoverability improve), it is more likely that budget-starved librarians will decide to cancel subscriptions to journals that are fully available in institutional repositories.[22]

The risk of cancellation is higher for journals that lie outside the university's core programs; the indispensability of core journals protects them from cancellation for now. Admittedly, green OA is not the only factor that leads to cancellations, as Esposito is quick to point out.[23] Ware and Hoskins found that price, usage, and faculty needs still outranked OA availability among cancellation factors.[24] At the same time, the reason for this — namely that librarians do not view unofficial pre- and postprint versions of published articles as adequate substitutes — points back to the problems with the green OA system. Since many self-archived articles are pre- and postprints, this makes the pool of acceptable substitutes even smaller. In addition, imperfections with discoverability, also mentioned by Esposito, were found to contribute to the concern over reliance on institutional repositories.[25] But, again, this highlights the critique that green OA offers only a temporary and flawed backdoor to OA that doesn't solve the deeper underlying issues with journal subscriptions.

If we assume that the OA movement exerts enough pressure on the subscription model to force its collapse, gold OA journals will be able to keep operating using the alternative funding upon which this model is based. Over the last decade, author fees have become the standard

way to support OA journals. Perhaps a better term would be 'review and dissemination fees' since that is what they are used for and need not be tied to authors' pockets. Critics of gold OA have suggested that using this model is in fact *un*sustainable because author fees are not any more affordable than subscription fees. Duke University, in an early example, would have paid the same amount on author fees for reports published in 2003 by their social science and science faculty in PLoS as they did on their entire journal subscription budget in the prior year.[26] This scenario does not, therefore, make sense in terms of budget efficiencies. It is reasonable to question, too, whether it may actually cost the library (or whomever) *more* to foot the bill for author fees than for subscriptions. If it does actually cost more, then early OA advocates were a little off the mark in saying OA would cost substantially *less* than subscriptions.

It is important to point out, though, that the cost of author fees has a greater impact on large research institutions than on smaller schools. Large research universities are more likely to have a high percentage of faculty who regularly publish in their field, which would drive up the costs of OA that the university might pay. Faculty at smaller institutions publish less, particularly since the focus at these schools is often on teaching rather than research. They still, however, need to access the research of others. Because the faculty at smaller colleges and universities usually publish less, their institutions are also less likely to be encumbered by the costs of OA author fees. In the end, they may benefit much more from gold OA than large universities. Authors who choose gold OA may also benefit from having their research available to scholars in these smaller schools that are often unable to afford expensive traditional journal subscriptions.

At the same time, universities (whatever their size) need not necessarily assume the entire burden of author fees. As the BOAI's list of funding possibilities suggests, there are a number of other sources of funding that authors can consider. Funding agencies can set aside some of the funding for research projects to cover the cost of publishing the end results. This is a relatively common funding source, but universities and libraries have also considered setting up funds to assist researchers with author fees. The latter can be seen as an investment in the resources to which the library will need access once they are published. Author fees are paid once by a single entity after which they grant perpetual access to everyone. Even if one year's worth of gold OA journals equals a similar

sum as subscription fees for that same year, at least with the OA articles libraries do not have to pay maintenance fees to access them over and over again each year. This result would be true, of course, only if the library were able to cancel most of its paid subscriptions.

Hopefully, this type of collection development sounds familiar; it is much more in keeping with the way libraries used to spend their budgets on print material—paying once under the first-sale doctrine. Even better, only one entity needs to pay for each OA article before it is then accessible to everyone. Couple this with the fact that funding for research itself is a practical source for covering fees, and we find that universities don't have to pay those full author fees (or perhaps any portion of them) themselves. Research funding is a justifiable source too, since there is little point to research if it is never shared through publication.

Some question the ethics of author fees. Opponents point out that most authors cannot afford to pay these fees out of pocket. They also bring up the issue of fairness between disciplines, since scholars in the humanities and some social sciences seldom receive outside funding. In response, let us first consider that many OA journals have relatively low author fees (in the $300–800 range) or do not charge fees at all.[27] Moreover, journals that do charge higher author fees also tend to publish within the STEM disciplines (science, technology, engineering, and medicine), where there is more research money to begin with. Not surprisingly, outside support for gold OA fees is lacking for researchers in disciplines like the humanities that often do not receive research funding, researchers from developing or otherwise economically underprivileged countries, and graduate students, unemployed PhDs, and adjunct faculty who feel pressured to publish to increase their odds of being hired for a tenure-track position. Undeniably, researchers in these groups may very well be at a disadvantage in using gold OA. However, this problem is addressed by many OA journals with policies that waive the fees for disadvantaged researchers.[28] The perceived fairness of author fees and the question of who should be responsible for covering the costs of scientific and scholarly publishing is a whole discussion unto itself—one that we will leave, for the purposes of this paper, for another day. The point is that, regardless of their fairness, the author fees associated with gold OA make the gold route more sustainable overall than green OA.

The third and final major claim of advocates was that OA has the potential to solve the scholarly communication crisis by offering access

via means other than subscriptions and by introducing competition to traditional publishers through gold OA. In an unforgiving economy, this may be the most hoped for consequence of OA among librarians today. Have libraries been able to cancel subscriptions based on the availability of articles via OA? Have subscription prices dropped because of the pressure on the market from OA journals? The answer to both questions is emphatically 'no.' We have already touched on some of the elements contributing to OA's role in solving the communication crisis. For example, we have already seen that research has found that factors relating to price, usage, and the needs of faculty take precedence over the question of OA availability when librarians weigh which journals to cancel.[29] Findings also show that the lengths of embargo periods for aggregated content are important to librarians' decisions over which aggregated journals to cancel—only three-month or shorter embargos are viewed as acceptable.[30] Librarians still want the final versions of published works, immediate access, and access to all or most of the material published by individual journals. The desire for final versions of published articles alone rules out many green OA deposits as substitutes. Furthermore, only a small fraction (2 to 4.6 per cent) of all published articles are OA.[31] Librarians are no closer to cancelling even a small number of serials subscriptions based solely on OA availability because there simply are not enough OA articles to substitute for these paid subscriptions.

OA has not done any better with solving journal price problems. Subscription-based journals continue to exact ever more expensive prices from library budgets. The largest publishers wield their pricing power with the knowledge that their core journals are essential for libraries and risk almost no danger of cancellation. Publishers feeling a bit skittish about protecting their revenue streams from OA competition (many of them are—both large and small) shore up their defences by employing sizable embargoes. Springer, for example, recently expanded their twelve-month embargo, which previously applied only to articles deposited in 'funder-supported' repositories, to cover articles in *all* types of repositories.[32] Emerald, likewise, has instituted an excessive twenty-four-month embargo on all articles deposited due to OA mandates.[33] On the other hand, Emerald still allows authors who voluntarily deposit their articles to do so without embargo restrictions. We might consider this policy generous. In reality, as Sutton adeptly phrases it, basing 'embargo policies

on a farcical juxtaposition of voluntary versus "mandated" depositing of manuscripts' misses the 'essential voluntary aspect to funder open access policies.'[34] Slice the embargo pie whichever way you wish, it still satisfies only the publisher appetite for protecting access-based revenue which, in turn, pre-empts any OA efforts to decrease subscription fees.

We will go out on a limb and take a somewhat heretical stance in the library world: Compared to green OA, we believe that the gold OA model, despite its imperfections, is doing a better job of fulfilling the original goals laid out for the OA movement. To recall some of the key reasoning for this judgment, let us summarize by comparing the two models. First, gold OA journals provide immediate and full access to research upon publication; green OA does not necessarily do this and thus fails at fulfilling one of the most basic tenets of OA. Second, gold OA journals use a sustainable business model (whether or not librarians think the model is fair does not make it any less financially viable); green OA, in contrast, works in tandem with the subscription journals that OA is essentially trying to counter.

The third issue produces no 'winner': Neither green nor gold OA has solved the serials crisis by bringing down subscription fees. But we would cautiously venture that gold OA, if properly monitored by scholars and libraries, could be less costly in the long run than paying for subscriptions. Indeed, making efforts to keep gold OA viable should not be overlooked. Commercial publisher manipulation of gold OA to supplement subscriptions as a new source of profit is an issue to watch. A widespread adoption of this behaviour could eliminate the good intentions of cost savings and added impact initially behind the gold model. Lately, in particular, it seems that this behaviour may be on the rise as publishers react to the disruptive innovation of gold OA coupled with new OA mandates. In regards to this, Sutton makes a good observation about Emerald's recent policy changes to allow voluntary, but not mandated, self-archiving without fees:

> It is interesting to note this change was in conjunction with the launch of new gold open access options in Emerald journals that will publish an article open access for a fee of $1,595 per article. As a result, Emerald authors who work at institutions with open access policies or receive research funding from agencies with open access requirements can either pay up front for immediate open access or endure a two-year embargo.[35]

The way in which these policy changes coincide suggests that publishers are getting in on the gold OA market in a way that strengthens rather than weakens them and that does not resolve the problems with the current scholarly model for libraries. Thus, checks and balances and strategic placement of library support for various players and systems will be quite important as we move forward.

Still, if green OA ever gets to the point where libraries can cancel subscriptions because enough content is archived in repositories, the green system collapses in on itself—of that we are pretty confident. In the meantime, we are still skeptical as to how much OA contributes to making final versions of articles openly available *immediately* upon publication (which is even harder now with increased publisher restrictions). Green OA articles can also still be hard to find via any single search engine. Google Scholar and more advanced indexing are remedying this technical problem somewhat, but it is especially challenging if a searcher has incomplete bibliographic information. Even when a searcher does have complete bibliographic information, the desired article is often buried far down the list of results. While specialized search engines exist for OA materials, such as WorldCat's OAIster, OAJSE (Open Access Journals Search Engine), and CORE (a UK-based engine), they do not index all such materials. This is not to say that green OA has not increased access to research over the years. We know from our own search habits and research needs that we have a great deal more access to academic publications than previously. However, OA certainly has not made everything available. We would still prefer long-term results to visibly immediate but temporary solutions.

CONCLUSIONS

Clearly OA has so far achieved only mixed success. The movement has indeed grown by bringing in increasing numbers of new supporters from the academic and public communities each year. At the risk of sounding more like power publishers than librarians, we argue that gold OA journals are doing (or are poised to do) the things that advocates said OA should do. Green OA, in a few overlooked but important ways, is not faring as well—in spite of the incredible growth of institutional repositories in recent years. The revisited BOAI is right: The OA movement is no longer in its infancy or at its end—it is indeed 'solidly in the

middle.'[36] As we move forward, all librarians interested in the future of scholarly communication need to consider the first goals that the OA movement created for itself and weigh them against new knowledge and experience gained since the introduction of the original BOAI. Libraries must also ask how our needs and expectations for OA have changed. What do we want from it, why do we need it, and do these needs fit with the old ones? We agree with the BOAI's assertion that the original goals still hold true. The means to those goals, on the other hand, need more critical evaluation and revision.

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