

Foreword Publication Underwritten by Review Enrichment (PURE)

Ted Selker

What does the future of publication hold? The scientific publication environment has changed over the last few years. PURE is meant to create scientifically archival work through a transparent online mentoring/ peer review that includes more community engagement, and produces more depth of analysis of a publication is contemplated.

Where did scholarship come from and where is it going. Formal scientific community writing had a very small community until the 1800s. We now see it as the force that creates technology and innovation that drives the economy. Meanwhile the members of the communities want their newest work to be used and are putting it into new products and patenting it at unprecedented rates. In 1981 Kornfeld and Hewitt imagined a world in which all publication would be additive so we could see the way new ideas evolve. As we cover such topics, this paper also muses about how social media can infiltrate the hallowed process of scientific publication to make it more transparent, inclusive, and more thoughtfully produced.

How have we been finding information?

Until the digital age scientist grew up searching author, title and topic card catalogs. We also browsed ... books, peer reviewed journals and conference proceedings, popular magazines and newspapers. Printed on non-archival paper, newspapers are materials that came out today – not vetted and full of opinion and positions. The monthly popular magazines were glossier but produced by writers not experts in the topics they were concerned with. The conference proceedings included late breaking news in a particular field, vetted by the community but not the last word on a topic. The Journals compiled what seemed to be more lasting but not as fresh reviews and deep studies that were crowning value that included prestige for the author. Books compiled the older and more assuredly valuable knowledge that an expert might find useful, but not the latest or controversial results. Andy reference books compiled the even more accepted and easy to digest way of looking at things. A balanced diet of information might come from spending hours in the stacks pouring over how things had changed since the most recent materials in the updated book. After getting tired of this academic depth, we might retire to the reading room to glance at the popular press in the scientific American or even read the newspaper and find a “newsworthy item” about the topic we are interested in.

Such a continuum from new and broad to vetted and narrow to tested and disseminatable gave readers ways of deciding how deep to go. It might take hours to weeks of work to do primary research, but starting with an article in an encyclopedia could give you a road map of what to expect were topics in the area. We are in the biggest time of change for publication and university scholarship ever. Today the unvetted is twitter, and other social media. Wikipedia is often edited by experts a first stop, but can be pushed by minority or opinions and isn't always completely correct. The pace of science is breathtaking and conferences are often the place to look for the best work with Journals now seeming a bit dusty. As well, books aren't so much for historical perspective as they used to be, but more used as personal perspective.

Whether in print or a website, a magazine is a collection of articles that are timely and useful to a particular audience. Historically magazines are developed from mass media products towards niche and specialized audiences. A quorum of approved editors agree on articles contributed by journalists and create these to be readily published. Thus, the process of creating a magazine starts with journalists gathering background information to create a written piece of information consumed by the audience. This process was sequential in the past, but moved towards a more interactive and audience driven form. More now than ever journalists do not solely gather background information, journalists might read audiences' blogs, get direct user feedback and the process becomes more dynamic, where the final artifact 'article' is informed by of all sorts of sources, which we might describe as 'fluid publishing'.

Not surprisingly the prepublication conversation is heavily influencing domains of scientific publishing, where ideas accumulate through scientific publication forums. We try to take a look at the process as such form an information aggregation, and value perspective. In the center of consideration are scientific works accumulating their ideas and interest through several forms. The process is a collaborative one, where ideas are shared, multiple authors work on one artefact, and attribution of ideas is conducted through references. Indeed we don't see peer review scientific publishing as a static system but as a surprisingly new and evolving system.

How have we been creating Scientific Publication?

Scientific review and publication is historically tied to relationships with scientifically recognized society and now universities.

Until recent times scientific discovery and even publication was usually made possible by patronage. Publishing was an expensive extravagance and difficult to arrange. In the late 1700s to mid-1800s Alexander Humboldt for, example ran through his families fortune to publish his more than 30 books. Even for him being a scientist meant being under a very uncomfortable relationship to King Frederick Wilhelm III of Germany for much of his adult life- Certainly, it the fact that Humbolt was probably the most famous, discussed and discussed with of the natural

scientists of his time that caught his funders eye. As important was that his reputation of tying his natural discoveries in the new world with policy opportunities. The peer review process then was a very social one with people reading each other's work, mentoring each other and discussing it at parties.

Indeed, during the patronage, Humboldt lived away from Germany as much as possible, mostly in France. Even today, we are still somewhat beholden to our sponsors and only rarely - when an organization has sufficient endowment given to - ignore pressures from funders. Some lucky organizations have so many funders with no explicit statement of constraints that they too promote that they act with scientific freedom and autonomy. One of these examples is the MIT Media lab, which has traditionally attempted to sell sponsorship that includes the core value of not taking direction from the sponsor, 'if you direct us you will not be getting outside idea and you might as well do it in your own organization'.

In Britain the early and influential Royal Society was an early arbiter of scientific value and publication. Many cases are described where a person was not in the society or wasn't of sufficient education stopped their publication. One many-decade fight of this sort occurred around the refinement of the clock being created by a dedicated but self-made John Harrison, not wealthy or connected or classically educated inventor. Surprisingly even today some conferences refuse to take submissions would be authors not having appointments with a university. Another hurdle for non-academics contributing with scientific works is publishing culture. Publications tend to have a very particular form of writing, which might even require years to learn. Contributions not following these norms, are typically rejected.

In the 1800s, Humbolt worked hard to nurture scientific community. He was central to a scientific letter writing exchange of ideas. His gathering, some say, was the first formal scientific conference. It was a time when many scientists could and did work across most known disciplines of physics, philosophy, mathematics, and biology. Some say that this was the beginning of the critical publication approach we continue to evolve. Later in that century the Nature journal became started as a refereed and curated publication of all scientific materials. Thomas Edison was jealous of the English publication and started Science Magazine, a second pan-scientific domain peer reviewed journal. Due to these publications breadth, the reviewers needed to come from different disciplines and background reducing the power of any one individual in the processes of evaluating the science, the timeliness, the publication worthiness and the provenance of the work.

Today the process varies. Scientific American magazine chooses authors by reputation and accomplishment to team up with fantastic editors and graphic artists. Science magazine takes submissions that must be earth shatteringly new and again works hard with authors to assure super high-quality text, graphics and work to choose the best moment to publish. Top Journals, too use editing iteration rounds with top scientific or reviews and compilations from the masters. The bread and butter top conferences do things differently. With goals of under 30% acceptance and must cull through thousands of hopeful submissions needing 10, 000 reviews for a conference is not unusual. They might allow submissions from anyone and have 4 reviewers who self-report their depth in an area. Typically, these publications have deadlines are hard like 5PM Monday GMT. The more papers are

turned down the higher the prestige, and the reviewing revels in turning most papers down. I heard a reviewer bragging: “if I see something that should be in the discussion section in the conclusion section I throw out the paper if I see bad punctuation, I throw out the paper, if I see misspellings it shows sloppiness so I throw out the paper” . As these conferences might be the all-important recognition that is needed to even be in the field, success in the is field is defined by passing this bar.

The, “section reviewer” might override the several “expert” reviews, but typically the number of submissions is such that any reason to discount and leave out a paper is looked for. Who and how you refer to other work, which references you use can be a game breaker in getting papers accepted. The conservative paper that references everything perfectly succeeds, the brilliant idea, not so much.

And what is the forum for provocative new ideas then?

As one moves down through the hierarchy of publication quality venues many are found to have loose or no controls on what they publish. Many large conferences allow anyone to apply to run a session however they wish. The sessions then become a matter of this person soliciting from people papers to fill it. Complete inconsistency can reign within a conference and even cases where no one read the paper besides the author before it being included in the session or conference proceedings book. After flying around the world to go, to such a conference, it can be common for the audience to point out that the work is not unique, or is flawed. This too is not scholarship of value. As well, these conferences are teaming with publishers working to compile such =papers into Journal publications or books to help the academic careers of the authors towards their tenure promotion cases.

The academic book market is also complex. Career promotion cases, are said not to consider books, as they aren’t formally refereed. Still there is a hierarchy of value with the most careful and serious scientists making books like super famous books like Grays anatomy (edited today by the top anatomist in the world Shane Tubbs) Norvig and Stewart’s AI book, Halliday and Resnick’s, and Walker’s Fundamentals Phphysics or Knuth’s 3rd volume The Art of Computer Programming of the that change or define a field, but there is not a simple way of evaluating this... These don’t have the refereed system, there is a hierarchy of publisher “prestige” and there is the public endorsement reviews by top scientists and other publications that help promote the books voracity and value. Still at the bottom of the scale are publishers that simply publish anything an author says is a book in 2016 for example I know of an author that published 6 “scientific books” through one publisher. Some publishers make their money by standing on contracts with libraries. Such publishers then are incented to publish volumes of work. And now we have people simply blogging their ideas. In some cases, such as the newest deep learning techniques these scientific discoveries that change performance of a fast-moving technology moves ahead of the publication cycle. Even the prestigious yearly AI conferences are now known to be publishing work in deep learning and tensor flow

that might have already been spread virally and is already in common use by time of publication.

Where do modern tools for writing and reading lead the scientific community?

Huffington Post Facebook and so many information venues are geared towards the moment or like Wikipedia, trying to record history. Scientific literature on the other hand is about building a case for something new and attributing who thought of it, how it evolved and recording this archivally.

We imagine a periodical could become more of a statement of the community and quality of the articles than a monthly, quarterly or yearly proceeding. The articles that are seen to be part of a publication might be the group of such that are accumulated by a quorum of approved editors agreeing that something is ready to be published.

Ideas articulated in writing can accumulate interest in several ways. Experts might support an idea by learning about it and telling others (attribution and recognition). They might recommend it for publication giving it increased value. The system would allow recognizing their remarks and would allow a reader to see how the final product responded. They might criticize it and encourage its authors to offer improved analysis, or experimental support for their thesis. They might edit it to give it more value creating a version with their additions that might itself accrue value, they might invest in it in other ways paying the author for some portion of the future profitability it will have. Non-experts can find the comments and relationships between experts around an Idea to be the value that gives them confidence in the people and ideas. The ability to observe positions (monetary and intellectual) in ideas are part of what can replace today's publication model.

Many new opportunities occur as paper publication becomes obsolete. Speed, continuing evaluation of impact, record keeping of time of idea presentation and utility, and more diverse ways of dissemination come with the digitization of publication. We suggest that accountability of scholarship, timeliness of dissemination and continual improvement can be supported by new digital publication approaches. As we move forward models of scientific dissemination most certainly will continue to change, still attribution and accountability of factualness are central to any of it helping scientific endeavors and the people that support such work

The solutions of today might flexibly celebrate ideas, authors, timeliness and support better progress of a field. They can also give broad access to the best scientific results faster than ever. They can reduce the friction, frustration, irregularities and perversion of scientific and pseudoscientific efforts.

What would a Publication Underwritten by Review Enrichment (PURE) paper be like?:

We can start by having an idea that we share with another, it can be experiments or prototypes. It can be anywhere along the continuum from dream to -paper-prototype to worked out approach to - performance tested system to -demonstrated solution. Such an idea is shared in a variety of ways to move it forward. Typically, a mentor mentee relationship exists in development of ideas these might come in the form of a professor student, collaborator, scientific boss and scientist, scientist and intern, etc. Because of fighting for resources in any organization, many find their collaborations across institutions more palatable and powerful and less fraught with politics than internal collaborations. In any case. The development of ideas is a critical time for understanding these ideas development and attribution that can be squandered as private and lab lore that is sometimes revisionistically created. This doesn't have to be true, we can make great tools for attributing ideas and building on them that make clear how ideas progressed.

As a proto version of a paper is ready to be reviewed, why don't we let that happen organically, If we have a way of knowing how much to trust a person in an area, we can recruit them or they can self-recruit to review something, it can and should be done in ways that don't include pressure from "friends". A robotic approach for choosing appropriate people to read new work is akin to subscribing to blogs or feeds: the difference should be that a feed is not from a person, but about a stage that a topic mater is in that you are interested (late breaking haptic development news for example).

What would a PURE review be like?

Making drafts of work available at this early stage, the readers might be tallied to understand also where they took their "new" ideas from. The readers should and can remark on the paper. These reviews, like edits in Wikipedia could live with and enrich the publication

The writer then should read the comments and ideas for revision and improve the paper. In the process it becomes important for an author to have some recourse and control of what goes into the paper and even for example if they want to add another coauthor...If they make bad decisions about these changes, fewer people will refer to this paper, if they make better decisions, more people will read and I review it. . Reading the eventual archival product could allow a reader to review the rebuttals, enhancements, improved experimental designs and better analysis of data that go into improving a piece of work.

The question of what happens as the paper improves with rewrite and expansion becomes the essential issues of what is publication.

When enough blue-ribbon reviewers state that it is complete and worthy, it might become included in the "published" papers of quality. In this way a paper might become a hit that gets up to some level of support in its scientific community.

This level of support for a version of the paper helps the author decide how much more to do to improve it towards higher publication.

One can see a system where publications like Science magazine are simply all the articles that got to a level of maturity and support of the top people in their area at a specific time... and indeed, this is somewhat what happens with such a broad publication today.

Making such a system work in the fastest moving fields could help the scientific community progress. Hopefully publication not be limited by any arbitrary thing but by the interest and efforts put into an idea.

What would a PURE publication be like?

The publications then will come as a consequence of the interest and support that are given. These will be based on the efforts to articulated well worked out scientific work and to improve it with criticism

The criticism itself can be linked with the articles giving the reviewers standing and voice as well. Certainly we all know of people who will criticize the criticizers and a Wiki like structure of history of comments and edits of comments can be kept to enrich the perspective on the ideas there sources their development, their impact and there dissemination.

What would PURE dissemination be like?

Finally, dissemination becomes deeper than scientific citation index of today. With this scientific community publication system, the readers, the people that cite the work and even the reviewers become part of the structure of the dissemination.

And if PURE sounds like social media, that is no surprise, Science is a social and critical process. The relationship between people and their ideas should always be the core of a scientific community. This forward presents a story about how writing and reading publications may change to use the directions that WIKI and social media are moving to improve collegiality, access to mentorship and, scientific depth. The PURE approach marries the reputation of commenters to their influenced and notoriety as they help improve the scientific value and accessibility of publications.

Prof. Ted Selker

Sources

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