Poster: Dissemination through Disintermediation

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ABSTRACT

Thus far, the Web has had a disruptive impact on a range of industries, including academic publishing. But in many respects, it is business as usual; journal publishers control a significant portion of the market and charge significant fees for the content they provide, yet this content is produced, validated and consumed by the academic community, providing a perfect opportunity for disintermediation. Using practical-led sciences as a case study, this paper examines the hold journal publishers have on academic dissemination and how these factors may be exploited in encouraging disruptive innovations. Sourcing ideas from a range of literature, including game theory, knowledge management and collective behaviour, this paper goes on to propose some requirements from a system that might be used to encourage dissemination among scholars, before concluding on future work that may put some of these ideas to the test.

Categories and Subject Descriptors

H.4. [**Information Systems Applications**]: Communications Applications

General Terms

Management, Economics, Human Factors

Keywords

Academic publishing, disintermediation, game theory, knowledge management, collective behaviour

1. INTRODUCTION

The disruptive nature of the Web has made its presence felt across a range of sectors. The entertainment industry has seen a dramatic change in the production and consumption of music and films; and newspaper publishers have adapted to new technologies and compete directly with the citizen journalist; to name just two examples. The impacts of disintermediation and perfect competition that the Web imposes can be very disruptive.

Academic publishing has been significantly affected by the Web. Open access (OA) publishing is a disruptive innovation changing how scholarly works are accessed and distributed. However, as observed by Clay Shirky, summarised by Weller [9], it is function that matters, not the form (for example, the function of journalism which takes form in newspapers), when considering technological innovations. Whilst OA has caused some disruption, and looks set to continue impacting upon the academic publishing environment,

OA alone does not disrupt the function of academic research, it simply changes its distribution and accessibility. The function - the dissemination of research - remains largely unaffected, with PDF articles replicating their paper counterparts and online journal websites and repositories performing similar roles as hardcopies of journals. Practical based sciences would stand much to gain from innovations in academic dissemination. They are typically practical-led, generate vast amounts of varying data and frequently involve collaborations, creating complex networks of stakeholders. The aim of this paper is to examine why the Web has failed to have a disruptive effect on the communication of research, which in turn affects the practice of research itself; and to propose recommendations which may elicit a positive, disruptive influence on the dissemination of research.

2. JOURNALS & DISINTERMEDIATION

Journal publishers are powerful players in the market of scholarly communications, a role they have inherited from a time when publishing in journals was the only method to disseminate findings. The Web makes this role obsolete, yet journal publishers continue to charge significant fees for subscriptions to their journals, which it has been argued are limiting the progress of science. Harvard University recently claimed the scholarly communication environment is "fiscally unsustainable and academically restrictive" [3]. The journal publishers' persistence can be attributed to their publications' impact factors; indices which attribute a degree of quality to a scholarly work and a metric used to ascertain the success of a publishing academic.

However, it is arguable that impact factors, which are heavily dependent on citations from other papers, are a flawed metric which should not be so influential. For example the ISI Impact Factor does not accurately reflect the quality of all articles found within a journal: "the most cited half of the articles are cited, on average 10 times more often as the least cited half" [10]. The worth of the values given varies across disciplinary boundaries, complicating inter-disciplinary work; and journal impact factors also leave much scientific endeavour unaccounted for, with an estimate of 90% of scientific output being missed by impact indexes [8] as more work is published in Web-based outlets.

There is a clear scope for disintermediation in this field, with academics responsible for all major steps in the dissemination process: they produce the content, validate it through peer review (another aspect of the publishing process which is considered by some to be flawed [6]) and ultimately consume it. At the heart of the problem lie researchers themselves and it is their concerns that need to be understood and addressed. The Web can be used to create models that go beyond the economic advantages of OA, allowing for peer-to-peer methods of networking and dissemination, placing researchers at the centre of dissemination.

3. PROPOSED REQUIREMENTS

Using a range of literature on subjects such as epistemology, knowledge management, game theory and collective behaviour; alongside observations from questionnaire participants and

interviewees from the University of Southampton chemistry department, a number of potential "requirements" has been elicited for a disruptive innovation, as described below.

3.1 Streamlined, Technical Solution

Reasons for individuals not wishing to pass on knowledge to the wider community are various, including the time and effort required in formally committing knowledge often being greater than informally sharing with peers [1]. Research shows that technical solutions tend to be the most effective way of encouraging people to disseminate and exploit knowledge and the processes should be integrated with pre-existing tasks [2].

3.2 Local, Context-Sensitive Networks

To encourage collaboration and the sharing of research outputs, the network in which these interactions takes place should be small and manageable. Collective behaviour theory highlights the importance of individual preferences alongside aggregate actions, with the decisions individuals make being determined by a threshold value based on the proportion of others who make similar decisions [4], determining individual actions as part of a larger group. In such a network, "instigators" [4] can be used to encourage others to disseminate work. This also helps to minimise the feeling of intimidation that may prevent potential contributors from making their knowledge more widely available [2]. Academics report that the use of small-scale networks already takes place, albeit on a much more informal scale, for example using a shared network drive to distribute academic papers. A greater degree of collaboration would require more flexibility and for contributions to be easily accredited to individuals. This is also essential for tit-for-tat behaviour to emerge, in which actors respond in kind to the actions of others; a strategy that fosters a trustful, cooperative environment [7].

3.3 Negotiated Openness

Questionnaire respondents have indicated that retaining control over the distribution of their work is a key requirement. On the topic of informally disseminating work, researchers responded: *"Other researchers might steal your ideas before you have chance to publish them", "It should not be enforced, as some of the work is novel and commercial",* highlighting the competitive nature of the field and its ability to yield profitable findings. However the potential value and its derivation (it may have monopolistic or synergetic value for example [5]) of a research outcome may change over time and thus authors may wish to exploit this shift appropriately. Therefore the extent to which the work is "open" should be manageable, with its access being made more or less broad when demanded. One questionnaire respondent commented: *"Only those who I have selected to view my research should be able to see it, at least until my research was complete"* Therefore contributors should be fully aware of who on the network has access to their resources and how the connections between actors may reflect access permissions and potential purposes for the data.

3.4 Precision Citable Content

Game theory indicates that for researchers to disseminate their work, the value gained by sharing it, must be greater than the value of hoarding it for oneself [5]. By making it easier for work to be citable and allow smaller contributions to be cited, it is more likely that disseminating an item of work will improve a researcher's status in the community and better reflect the variety of approaches to impact.

4. CONCLUSIONS & FUTURE WORK

Ultimately, the proposed ideas are designed to make as much work available to the appropriate audiences as possible. In many cases this audience may be small, but by utilising the long tail effects of the Web, a powerful scholarly resource can be created that has a significant aggregate impact. Having modelled the current approach to dissemination, making comparisons among a range of practical disciplines, a new framework will be proposed which will act as a basis for future disruptive technologies that leverage this long tail potential. Prototype systems will be developed and demoed to focus groups for qualitative feedback. Work will be conducted into examining different approaches to presenting complex research outputs, which will also allow for finer access control and citations; with a virtual canvas being one possible approach. Research will also look at networks in which actors have greater awareness of the connections and interactions that exist among their peers and how this may be implemented to encourage efficient dissemination. These various strands will be brought together to provide scholars with new utilities, that will integrate within the research community to improve approaches to dissemination and collaborating with colleagues, providing open access to scholarly work not through publications or repositories, but directly through professional collaborative networks.

5. ACKNOWLEDGMENTS

6. REFERENCES

[1]   Ardichvili, A. et al. 2003. Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*. 7, 1 (2003), 64–77.

[2]   Cabrera, A. and Cabrera, E.F. 2002. Knowledge-Sharing Dilemmas. *Organization Studies*. 23, 5 (Sep. 2002), 687–710.

[3]   Faculty Advisory Council Memorandum on Journal Pricing: 2012. .

[4]   Granovetter, M. 1978. Threshold Models of Collective Behavior. *American Journal of Sociology*. 83, 6 (1978), 1420–1443.

[5]   Loebecke, C. et al. 1999. Co-opetition and Knowledge Transfer. *The Database for Advances in Information Systems*. 30, 2 (Sep. 1999), 14–25.

[6]   Peters, D.P. and Ceci, S.J. 1982. Peer-review practices of psychological journals: The fate of published articles, submitted again. *Behavioral and Brain Sciences*. 5, (Feb. 1982), 187–255.

[7]   Trust and the Prisoners Dilemma: 2007. .

[8]   Uncovering the world's "unseen" science: 2012. *http://www.scidev.net/en/science-communication/opinions/uncovering-the-world-s-unseen-science.html*. Accessed: 2012-08-01.

[9]   Weller, M. 2011. *The Digital Scholar*. Bloomsbury Academic.

[10]   Woodside, A.G. 2009. Journal and author impact metrics: An editorial. *Journal of Business Research*. 62, 1 (Jan. 2009), 1–4.