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Development of Disruptive Open Access Journals

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ABSTRACT

Open access (OA) publication has emerged, with disruptive effects, as a major outlet for scholarly publication. OA publication is usually associated with on-line distribution and provides access to scholarly publications to anyone, anywhere–regardless of their ability to pay subscription fees or their association with an educational institution. The article overviews the growth and impact of OA publication in Canada and elsewhere. The article also presents a case study of the evolution over its first nine years of the International Review of Research in Open and Distance Education (IRRODL). IRRODL has become the most widely read and widely cited journal in the distance education and open learning community, yet it continues to struggle for recognition by some academics, funding, and rating organizations.

In this article IRRODL's editors document the challenges involved in leading the charge for equal support for open access journals from Canada's research funding organizations and for review and accreditation from commercial and non-commercial review services. In its literature review section the article looks at scholarly works documenting and comparing on-line journals to ones that publish in paper only, or in which access is restricted behind the walls of licensed use.

The article also documents issues related to various innovations, including production of articles in both text and audio formats, and the challenges of incorporating more interactive media into a scholarly, peer-reviewed journal. Data is produced demonstrating the ways in which

influence and impact for open access journals can be measured, including hit rates and citations reference data from Google Scholar. The article concludes with a description and discussion of the advantages and challenges of using review and publication management tools such as Open Journal System in the production of open access journals.

RÉSUMÉ

Les publications en accès libre (AL) ont pris une importance de premier plan pour la publication savante, et cela a entraîné des perturbations importantes dans le milieu de l'édition. En général, la publication en accès libre est associée à la distribution en ligne et elle offre un accès à des publications savantes à n'importe quel individu sans égard pour sa capacité de payer des frais d'abonnement ni pour son affiliation à un établissement d'enseignement. L'article fait le survol de la croissance et des conséquences de la publication en AL au Canada et ailleurs. L'article offre également une étude de cas de l'évolution du International Review of Research in Open and Distance Education (IRRODL). Cette revue est devenue la revue la plus largement lue et citée par la communauté de chercheurs en éducation à distance et en apprentissage ouvert. Par contre, elle continue à se lutter pour une reconnaissance parmi certains organismes académiques, de classement et de financement.

Dans cet article, les rédacteurs de IRRODL documentent les difficultés rencontrées dans leur lutte pour un soutien équitable des revues en accès libre parmi les organismes de financement canadiens, ainsi que les difficultés d'obtenir une inspection et une accréditation faites ou accordées par des entreprises commerciales ou des organismes non-commerciaux. Dans sa section consacrée à la littérature existante, cet article passe en revue des travaux d'érudition qui documentent et comparent des revues en ligne avec des revues en format imprimé, ou avec des revues dont l'accès est limité par des contraintes de licences.

L'article traite également de questions liées à diverses innovations, y compris la production d'articles dans des formats à la fois textuels et audio, et les difficultés rencontrées lors d'une plus grande intégration de médias interactifs dans une revue savante avec évaluation par les pairs. Des données produites démontrent comment l'influence et l'impact d'une revue peuvent être mesurés, y compris le taux d'offense et des données sur les citations tirées de Google Scholar. En conclusion, l'article décrit et discute des avantages et des limitations lorsqu'on utilise des outils de gestion d'évaluation et de publication pour la production de revues en accès libre, en particulier celui du « Open Journal System ».

OPEN ACCESS AS A DISRUPTIVE TECHNOLOGY

The now familiar concept of a disruptive (as opposed to a sustaining) innovation was first promoted by Clayton Christensen (1997) in his book *The Innovator's Dilemma: When New T echnologies Cause Gr eat Firms to Fail* . According to Christensen, disruptive innovations are those that incite change in an organization because they challenge the existing administrative, production, or marketing systems by providing existing or new customers or users with radically different solutions to current problems or products. Christiansen distinguishes between "low-end" disruptive innovations, which allow a new set of users to access the product or service because of much lower costs for equivalent service (for example the replacement of parchment by paper – a less durable good but at very much reduced costs), and "high end" disruptions that provide a whole new genre of service that is initially very expensive and is appropriate only for elite users, but begins to become more accessible as it becomes more affordable–in the process destroying interest and need for the original, non-augmented product. The innovator's dilemma is to introduce innovations even when the existing customer base may not want or know about, and may even resist, the innovation. We shall argue that open access (OA) publications represent a low-end, high-end, and a new market disruption to scholars, existing scholarly publishers, and government funding bodies.

The capacity to manage, review, publish and read articles on-line has drastically altered many aspects of the scholarly publication. On-line or e-journals make the content accessible globally, searchable and archiveable by both scholarly indices and general web search engines such as Google. Further, on-line production reduces distribution costs to almost nothing. On-line production also reduces (but does not eliminate) costs associated with text and graphic production. Finally, on-line distribution allows for a host of new communications capacity among and between readers, authors, and publishers to include audio, graphics, video components, and interactions into their publications. OA publishing is almost always, but not necessarily, associated with on-line production. Together, these affordances (defined by Norman, 1988, as capabilities made possible by the user's knowledge and the artifact's technical capacity) of on-line production allow for very significant reductions in costs, allowing many more subscribers access to the journal materials and thus constituting a low-end disruptive innovation. However, typical of low-end disruptions, many consumers and producers of the original service are often not excited about the innovation. For many academics, the world of paper articles and paper books was a defining feature of their profession and they are loath to give up the familiarity and sensual pleasure of seeing, displaying, and handling their intellectual output as it is instantiated in paper format. Reading and studying on-line text also presents challenges, especially when read through older technologies not optimized for screen reading. Finally, some librarians and other custodians of paper artifacts see electronic distribution and archiving as taking away their livelihood by allowing end users to aggregate, evaluate, and redisplay intellectual products.

OA publishing is also both a high end and a new market disruptive technology. On-line production is inherently multi-media capable. Simple animations, full color, user-selectable font size, audio output, and many other features that are impossible, if not prohibitively expensive in paper format, are produced on-line very economically. Thus, new users who are dependent upon images and sounds (artists, musicians) or those who have become accustomed to media enhancements (so called net natives) are now attracted to this form of scholarly output. A second new category of readers is composed of scholars and students from developing countries, whose institutions cannot afford to subscribe or pay postal delivery charges for paper based journals. A third new category of readers is the non-institutional reader who due to physical and social restrictions on access has not been able to easily and economically have access to scholarly production. This newly found access to hard-to-find resources was instrumental in the re-emergence of the amateur expert (Grove-White, Waterton, Ellis, Vogel, Stevens & Peacock, 2007) and the birth of open science (Lyon, 2009).

In the case study that follows we describe how the International Review of Research on Open and Distance Education (IRRODL) disrupted the lives of scholarly publishers and the Social Sciences and Humanities Research Council (SSHRC), a funding agency. At the same time we demonstrate how IRRODL has enhanced the opportunity and access to scholarship on a global scale and has risen to become the most popular and oft-cited journal in its discipline.

THE CASE FOR OPEN ACCESS PUBLICATION OF SCHOLARLY WORKS

According to Ware (2006), in 2006 there were over 23,000 scholarly journals, publishing 1.4 million articles a year, and creating a $5 billion industry that employs approximately 90,000 persons. Over 90% of these journals are available in on-line formats, although the majority of them can be accessed only through subscription fees to publishers and publisher aggregations. Most of these publishers are for-profit companies, although university presses and scholarly societies combined account for nearly one third of the publications. The number of open access journals is expanding rapidly from an estimated 5% of the published articles in 2006 (Ware, 2006) to an estimate of 20% in September 2008 (Morrison, 2008). The largest directory of open access scholarly publications, the on-line *Directory of Open Access Journals*, listed over 4,700 titles, as of February 2010, and the number of journals has increased by an average of 24% per year compound growth over the past four years (Morrison, 2009).

The arguments for and against open access publishing have been ongoing for over a decade. Davis (2009), in a study of media frames and arguments on the issue, notes, "proponents of free access to the research literature have routinely framed their arguments in terms of transparency and accountability." Such strategies have found sympathetic audiences in both the general public and the funding and research community. However, resistance from publishers (often with pecuniary interests) and from scholars and librarians worried about

the lack of visible business models for open access publication have cast a spell of skepticism on these publications that is proving hard to remove.

In the introduction to his book outlining the case for open access, John Willinsky (2005) tells the heartwarming story of the Kenya Medical Research Institute. In 2001 the Institute had been forced to cancel all but five medical journals, severely compromising its capacity to train and teach, much less undertake research. In that same year, the Health InterNetwork Access to Research Initiative was formed and now provides on-line access to over 2,000 journals. This example is encouraging and importantly was facilitated by the altruistic release of content by commercial publishers. In an Asian context, Gaule (2009) found that "Indian scientists (1) have shorter references lists, (2) are more likely to cite articles from open access journals, and (3) are less likely to cite articles from expensive journals," thus, demonstrating the need for increased access to the world's collective knowledge.

In this article we provide a brief case study on an open access and non-commercial journal. The contrasts between different business models for journal production and distribution indicates that dissemination of scholarly research is a complicated task motivated by pecuniary interest as well as by a desire for personal aggrandizement. At the bottom of the many models of open access is a recurring theme, as Wilinsky (2005) notes: "A commitment to the value and quality of research carries with it a responsibility to extend the circulation of such work as far as possible and ideally to all who are interested in it and all who might profit by it" (p. xii). Willinsky's choice of the word *prof t* seems only to confuse the issue, but the logic and power of this call drives efforts to increase access to all scholarly work.

The case for extending access to developing countries and to those amateurs and professionals throughout the world who are not associated with a university or government research library is both compelling and obvious–the more widely knowledge is circulated, the more likely it will be applied to solve problems and enhance quality of life on this planet. But open access has equally powerful beneficiaries within the academic community.

Academics (and their employers) are very interested in ways of measuring the impact of their research. It is very challenging to measure this impact since accurate figures on reading, downloading, and especially finding use and value in any published work are either not available or expensive to gather and often vary greatly across disciplines. Two of the major publishers, Elsevier (Scopus) and Thompson (World of Science), as well as the specialized search engine Google Scholar attempt to measure this impact by counting the number of times other academics have cited individual publications. Much of the early research studies on the impact of open access publishing sought to compare citation numbers between open access publications and those published in proprietary formats. These studies (Antelman, 2004; Harnad & Brody, 2004; Norris, Oppenheim & Rowland, 2008) generally found that open access publications were cited more often than those not distributed via open access. However these

studies show different advantages for some disciplines–notably computer and other sciences, and less advantage for humanities OA publications. These finding resulted in some early researchers claiming a causal relationship–publishing open access causes more citations and thus greater impact. However, recently many commercial publishers are allowing authors to post their work openly on institutional databases, thus making some copyright materials readily available, and in some disciplines preprints of articles are published openly and then followed by locked down versions in paper. These create conditions in which closed publication has considerable "open characteristics" making comparison challenging. In addition Craig, Plume, McVeigh, Pringle, and Amin (2007) in a critical review of these studies note that there is a selection bias whereby more prominent authors choose to publish in open access–perhaps because their reputation allows them to publish where they like regardless of the publication impact factor. In any case, the fact that prominent scholars are choosing open access publication is perhaps an explanation, but hardly a challenge to the higher citation ratings of OA publications. Finally we are seeing that there are differences among OA citation rates across different disciplines. Despite the challenges of measurement, Harnad et al. (2008) make the claim that "Research impact is becoming increasingly measurable; the growing number of rich and diverse research impact metrics include citation counts, download counts, co-citations, hub/authority metrics, growth and longevity metrics, interdisciplinary metrics, and semantic metrics." They also note that restricting access impairs the capacity to measure the impact of research dissemination.

These difficulties notwithstanding, various compelling arguments support open access publishing: accessibility to developing countries and non-institutional readers, evidence from the literature that open access publication is associated with increases in citation impact, and, being electronic, production that is faster and at lower cost and lower environmental impact than traditional print processes.

OPEN ACCESS BUSINESS MODELS

In academic publication it is always the taxpayer who pays. Traditionally, the taxpayer has given money to universities and libraries to allow them to purchase journal subscriptions from commercial publishers. More recently, libraries have been cancelling individual subscriptions and instead subscribing to online aggregations of articles that are licensed to staff and students of fee-paying institutions. In the case of a small university such as Athabasca University, this cost is currently over $350,000 a year. These database aggregators provide access to at least 90% of the articles that most academics find of interest. The availability of proprietary content tends to lull scholars from developed countries into assuming that such access is available to all. However, the high cost of these subscriptions means that for the global majority, this access is denied. The largest excluded group is lay researchers who have no affiliation with a fee-paying institution. Equally distressing is the exclusion of those employed at

universities that are located in the developing world and for whom this amount of fund transfer from the poor to the rich countries is neither sustainable nor morally acceptable.

In a continuing effort to liberate these publicly funded information and knowledge resources from private restriction two strategies have evolved. The first, termed by Harnad et al. (2008) as the "gold strategy," is for authors to refuse to give copyright to commercial publishers but instead to publish their scholarly works only in open access journals. Partially in response to this threat many commercial publishers have granted authors permission to self-archive their research publications on institutional websites, thereby creating a second best but arguably satisfactory "green solution" compromise. The commercial publishers retain all rights to the publication but allow access to individual articles (not collections) on publicly accessible websites run by the author or their institution. According to Canada Research Chair Stephen Harnad, a zealous advocate of this green standard, the gold standard is not sustainable and the green standard is perfectly adequate to sustain open access. Harnad, Carr, and Gingras (2008) claim that over 90% of journals now allow self-archiving (sometimes after a 12-18 month embargo) and therefore support the green standard. Harnad has developed his own open source software to facilitate the self-archiving of materials and uses his blog and peer review outlets to argue for both the moral necessity and the practicability of this solution.

Sustainability of any venture that gives its product away, at no charge, is always a challenge. The approach favored by a number of the commercial publishers is to substitute revenue from subscribers with revenue from producers. Typically authors are asked by the commercial publishers to pay about $3,000 to "free" their articles, but the uptake on this model has been very slow (Björk & Hedlund, 2009). Advocates of this author-pay model argue that institutions could pay for the publication of researchers instead of paying for consumption of the published product. In some disciplines research granting councils are prepared to pay these costs as an integral part of dissemination of research results. However, in other disciplines such funding does not exist and thus funding under this model is problematic. It is interesting to note that commercial publishers have difficulty adapting to the many and diverse ways in which open access, on-line publishing reduces costs. In contrast to the $3,250 charged by commercial publishers such as Taylor and Frances, Fisher (2008) provides details of the costs of open access publishing that range between $64 and $76 per article, a long way from the estimated costs from commercial publishers.

The second most common model for the gold standard of open access publication is the sponsorship of the journal by an institution, a discipline, or a professional society. Under this model subscription is often given as a perk of membership in the society, but restricting access to members defeats the open access ideal. A growing number of public research granting bodies are now directly subsidizing scholarly publications, though they rarely fund amounts to pay for true professional publication and thus most open access journals

operate on the volunteer labour of members or journal supporters. It should be noted that the tools of the Internet also allow for much easier collaboration and participation in the production of scholarly publications, from editorial board meetings to distributed copy editing to management of the peer review process. Thus, through crowd sourcing (Brabham, 2008) and using the distributed efforts of many collaborators, cost-effective production systems can and do evolve. A few open access journals are also experimenting with on-line advertising or links to commercial companies or products as means to generate revenue.

IRRODL'S BATTLE FOR LEGITIMACY AND PUBLIC FUNDING

IRRODL was founded in 2001 by Peter Cookson and his colleagues at Athabasca University. The journal was supported by Athabasca University, which bills itself as "Canada's Open University" as a strategic move to enhance its image and productivity in research and scholarship related to open and distance education. IRRODL was founded as an on-line production, with no paper edition. However, the original editorial board was diligent in making the journal equivalent to a paper-based journal, most importantly by rigorously adopting a double-blind peer review process and by having the content organized and distributed in issues and volumes, with text articles, book reviews, and editorials of a format, length, and style associated with traditional scholarly publication. IRRODL targeted an international market, distinguishing itself from competitive journals that are mostly funded by or associated with national perspectives (for example, *The American Journal of Distance Education*).

For its first eight years of production, IRRODL's peer review and publication were done with ad hoc systems consisting mainly of email and hand coding of HTML pages. In 2007, IRRODL switched to the Open Journal System (OJS), an open source suite of tools created and distributed by the Public Knowledge Project at Simon Fraser University. The OJS system provides powerful tools to automate, store, and manage work flow of both reviews and publication, and it adds reader tools to each article including RSS feeds, searches to related articles, and many other services discussed in more detail later. As a further benefit, the OJS system tracks management data such as number of downloads, accept/reject rates, and time from submission to production. The OJS system has allowed the publishers not only to save time and effort but also to increase the quality of production.

Over its nine years of publication IRRODL has produced 24 issues with an average of 10 peer-reviewed articles per issue. During these years IRRODL has become the most widely read and cited journal in this field. In a 2009 article, Elbeck and Mandernach identified 46 scholarly journals deemed to be advancing the knowledge base in computer-mediated learning. These journals were ranked by popularity (Google search indices), importance, and prestige. The overall rankings for IRRODL were the highest and surpassed the rankings of much older journals.

Research comparing open access and proprietary publication indicates that there is a great variety of acceptance, alternatives, and interest across disci-

plines. Looking at the discipline of distance education in this case study shows the Distance Education community is served by both proprietary and open access journals. Table 1 provides descriptive details on arguably the 5 most influential of over 30 journals in the field. The year 2007 was chosen arbitrarily to provide data on the number of publications and the number of times the top 10 articles from that year were cited by other authors in peer-reviewed journals or books (according to data obtained from Google Scholar on May 22, 2009). From this data one can conclude that IRRODL was the most prolific publisher in 2007 and likely continues that leading publication role to date. Moreover, the high number of publications is matched by a high number of citations, indicating that the articles are being read and cited in other scholarly work. Table 1 does not seem to reveal a pattern indicating that the proprietary journals are more or less prolific or cited as compared to the two open access journals.

Table 1
Description of Five Most Prominent Distance Education Scholarly Journals

Name of Journal	Research Articles Published in 2007	Publisher Type	Annual Cost per Individual Subscription	Total Number of Citations in 2007	CITATIONS Per Paper (2007)
IRRODL	22	Open Access/ University Sponsored	Free	182	4.44
American Journal of Distance Education	12	Proprietary	$68	69	2.88
Distance Education	19	Proprietary	$122	156	4.00
Journal of Distance Education	10	Open Access / Association Sponsored	Free	35	1.74
Open Learning	12	Proprietary	$104	101	3.37

Note: Data collection using Google Scholar in November, 2009. For more in-depth evaluation of 12 distance education journals, see Zawacki-Richter, Anderson & Tuncay (submitted for review).

Table 1 shows that IRRODL articles are more widely cited than any of the other distance education journals. We are not able to argue that these higher ratings are due to the higher quality of IRRODL articles. However, we do argue that the increased accessibility and much lower costs result in IRRODL being more widely accessible and affordable than most of its competitors. The main IRRODL site receives requests for downloads of articles from approximately 6,000 unique visitors per month.

It is surprising to see the lower rates of the *Journal for Distance Education* (JDE), another open access journal. The rate may be reflected in the indexing quality of Google Scholar, especially in regard to French language articles, which appear regularly in JDE while all other journals publish only in English.

Besides the work of dedicated editorial and production staff and volunteers, producing a quality product is increasingly associated with the use of powerful networked tools, to which we next turn.

THE OPEN JOURNAL SYSTEM ADVANTAGE

The Open Journal Systems (OJS) is one of a number of Open Access Tools produced and supported by the Public Knowledge Project–a collaboration of scholars and technicians at Simon Fraser University and the University of British Columbia. In addition to speeding up production and to providing a stable, locally hosted platform for the Journal's activities, the main advantages of using OJS from IRRODL's perspective include the following:

1. Automated work flow. One hundred percent of authors submit their papers using OJS. As well, IRRODL has constructed a database in OJS of over 300 reviewers, and the peer review process is almost fully automated. This results in more equitable distribution and equity to assignment of reviewers as the machine provides lists and contact details for those with both expertise and rated experience as IRRODL reviewers. In addition, the automated review reminders sent to tardy reviewers save considerable editorial staff time.
2. Web-based archive. All submissions and published articles are archived and searchable on IRRODL's website. The system maintains a dated record of all events and decisions related to each submission. Furthermore, all reviews are archived, which allows editors to see/rate each reviewer's history and body of work.
3. Customizability. The editors and system administrator are easily able to customize the prepared (template-based) emails and the review steps. Further the look and feel of all communication and services provided to the reader by the Journal can be customized.
4. User-friendliness: IRRODL works internationally and at a distance with special issue editors, reviewers, and authors, some of whom are not fluent in English. However, each one has been able to adapt to the system with little or no assistance.
5. Variety of formats to engage readers. IRRODL publishes articles in a variety of formats (HTML, PDF, MP3, and recently EPUB) and has linked to Elluminate recordings and YouTube presentations in its Table of Contents. Publishing various formats is a straightforward procedure in OJS, performed by (non-technical) editors. The reading tools, including links to learn more about the author(s), find the author's email address, conduct searches for similar material, etc., add to the reader's engagement with the article and the author(s). The Journal looks forward to

new features (presently being tested), such as linking and annotation tools, which are designed to promote active reading and to increase interaction among readers.

Any complex system, including OJS, necessitates overcoming learning curve problems and troubleshooting. Some of the problems encountered by IRRODL in its use of OJS are outlined below:

1. No prepared emails (templates) for editor's decisions. The editor copies and pastes prepared text to inform authors that their submissions have been accepted or declined or that the manuscript requires revisions. It would be helpful to have a prepared email for each editorial decision.
2. Inflexibility of the recommendation feature. If a reviewer does not make a recommendation by selecting one of the options from the system-generated drop-down menu, the review stays active instead of being recorded as complete then archived. Until a recent house-cleaning, there were "active" reviews lingering in IRRODL's system (in some cases, several years old), which the reviewer had completed but delivered in a way other than the system-prescribed method. Also, after a reviewer has made a recommendation, there is no way to make changes or additions. One conscientious reviewer sent additional comments, but because he had submitted his recommendation using the system, the process was recorded as complete and it was impossible to add his afterthoughts to the review.

A final observation about working with OJS concerns the isolation of the several hundred users who are registered on IRRODL's website. Each user can log in to OJS to communicate with the Journal and to view his or her own work; however, the users cannot see or communicate with each other (except in relation to a published article if comments are enabled). It is conceivable that authors, readers, and reviewers are interested in enhanced interaction or in using the system to access an expanded level of detail; for example, there could be an option to publish and view users' profiles, or to view the number of website hits for a particular article, or to participate in a pre-publication open review process, or even to search an archive of blind reviews. The addition of transparency and social networking features might enhance the functionality of OJS so that it moves from "merely managing the discrete correspondence" between editors and authors/reviewers towards facilitating new levels of open access "as scholarly communications becomes more concerned with process rather than just end product" (Maxwell, 2007, p. 8).

Overall, IRRODL rates the usability of OJS as high. However, the increased capacity enabled by OJS can lead to complications. As mentioned above, OJS does not restrict publishing articles to text; however, multi-media publishing can be troubling. For example, IRRODL experienced a challenge to the production of its MP3 articles. To produce articles in MP3 format, the Journal uses Text-Speech Pro (free-of-charge) and a computer-generated voice from NeoSpeech. To publish the computer-generated voice, IRRODL pays an audio distribution

licence fee; however, in early 2009, the vendor raised this fee significantly. The editors investigated alternatives and discovered that two companies dominate the computer-generated voice market. After negotiations between NeoSpeech and AU Press and discussion among the IRRODL editors and editorial board about the costs and benefits of MP3 articles, the Journal agreed to pay an increased audio distribution licence fee. There were two reasons for the decision: approximately 15-20% of IRRODL's website audience downloads the MP3 version of an article (see Table 2), and it was concluded that publishing its articles in MP3 format is a distinguishing feature of IRRODL and a way of adapting to and optimizing the electronic publishing environment.

Table 2
Comparison of Downloads of IRRODL Research Articles from the IRRODL Website by Format for One Issue (Six Months after Publication)

Article title	HTML	PDF	MP3
On line Learning in Higher Education in Sub-Saharan Africa: Ghanaian University students' experiences and perceptions	1,204	1,619	465
Predictors of Learning Satisfaction in Japanese On line Distance Learners	1,130	1,307	601
Beyond the Theoretical Impasse: Extending the applications of Transactional Distance Education Theory	1,126	1,612	620
Connectivism: Learning theory of the future or vestige of the past?	2407	2174	619
Post-Secondary Students' Purposes For Blogging	1,101	1,145	554
Distance Education and Academic Achievement in Business Administration: The case of the University of Akureyri	891	1,080	421
A Framework for Process Reengineering in Higher Education: A case study of distance learning exam scheduling and distribution	1,476	1,108	414
Meta-Analysis: The preferred method of choice for the assessment of distance learning quality factors	1,235	1,466	562

Table 2 also shows that the PDF and HTML versions of IRRODL articles are accessed in roughly equal numbers. The provision of both formats offers readers access and flexibility; for example, as Felczak, Lorimer, and Smith (2007) write, HTML is "more readily accessible by those with limited access to bandwidth." Of course, there are conversion costs involved to publish multiple formats (see Table 3), and a balance must be struck between managing costs and disseminating open scholarly research. Table 3 outlines technical production costs for one issue of IRRODL at a rate of $50 (CAD) per hour.

Table 3
Technical Production Costs (at $50/hr.) for One Issue of IRRODL

Hours/Costs	HTML	PDF	MP3	EPUB	**Total**
Hours for each article	2	1	2	1	6
Cost for each article (CAD)	100	50	100	50	300
Cost for an average of 10 articles per issue (CAD)	1,000	500	1,000	500	3,000

A final concern related to format is that those who access the PDF articles from IRRODL's website may be choosing not to read from the site and are instead printing the document or reading it from their desktops. Readers doing this are not able to access OJS's web-based reading tools. OJS provides users a selection of configurable reading tools and is planning to introduce more, which enable readers to link to related email lists and networks, cite items, add comments, etc.

RESEARCH AGENCY SUPPORT FOR OPEN ACCESS

Like colleagues globally, Canadian scholars and agencies established to support scholarship have been watching for some time the growth and evolution of open access publication of research. In 2000 the Humanities and Social Sciences Federation of Canada sponsored a two-year study, The Credibility of Electronic Publishing (Siemens, 2002). As a component of this study a questionnaire was completed by 336 Canadian scholars in 2000 on their attitudes towards on-line and open access publications (Rockwell & Siemens, 2002). The survey revealed that 86% still felt that "publishing in non-electronic outlets is more credible than publishing in electronic outlets." Reasons cited for the lack of credibility included the following:

- The dynamic character of the World Wide Web where documents can be altered easily.
- The long-term accessibility and archiving of electronic publications.
- The lack of peer reviewed electronic publications or the lack of visibility of those that are there.
- The lack of publications that bear a reputable imprint or the lack of visibility of those that are there.

This perception of lack of credibility has dogged IRRODL since its inception. The concern with documents being too easily altered is mitigated by the credibility of the publisher and the more robust and commonplace use of the web for a variety of legislative and press publications today. Long-term accessibility and archiving is also a diminishing concern as electronic publishers and archiving databases continue to increase, partially in response to the continuing reduction in cost of electronic storage. As noted earlier, the steady increase in the number of on-line publications that retain strict blind peer review policies has diminished the perception that on-line publication is inherently either

associated or not with strict peer review. Finally, since this survey in 2000 the number, quality, and exposure of on-line journals coupled with scholars being able to benefit first hand from the relative advantage provided by on-line accessibility have reduced the fear.

In Canada, each of the three research granting agencies has programs to support scholarly journals, rationalizing that this is an effective outlet for the dissemination of research results. The Aid to Research and Transfer Journals program has been established for some years, and their guidelines from 1998-2005 based funding on the number of paid subscribers. The 2004 competition listed that, to be eligible, the journal had to have at least 200 paid subscribers or the equivalent. IRRODL had over 7,000 unpaid subscribers, and we mistakenly assumed that these 7,000 unpaid subscribers would be equivalent to 200 paid ones. We completed the application and were confident that we met all criteria. However, in order to be sure, we contacted program officials at SSHRC three weeks before the competition due date to confirm our understanding of subscriber equivalence. We were shocked to find that 200 subscribers or equivalent meant 200 subscribers–nothing else counted. In response we put out an emergency call to our subscribers, urging them to become paid subscribers at a one-time fee of $10. Within 10 days we had 280 paid subscribers and so confidently completed our application. Unfortunately, the application was refused, the official reason being "subscription irregularities." An appeal to the SSHRC president was encouraging but resulted in no reversal of their arbitrary administration of their own guidelines. But even SSHRC seems to be growing aware that open access was not only viable but could actually improve scholarly dissemination in Canada and globally. In 2006 SSHRC sponsored a one-time, one-year project to which only open access publications could apply in order to test a new funding formula. The 2008 competition eliminated the 200 paid subscription criteria, challenged editors and publishers to build a case for the impact of their publication, and presented a formula for funding based on the number of peer reviewed articles published. Obviously, we were elated by this change of policy and felt that our efforts at challenging SSHRC were one of a number of factors forcing change to discriminatory policies.

CONCLUSION

Open access scholarly publication has become common in all disciplines including the distance education domain detailed in this article. The intrusion of open access publications has had disruptive effects on the publishers, authors, and readers. Publishers of course have most to lose financially as they attempt to develop business models that do not rely on subscriptions or sale of data bases of articles. Author's are increasingly being forced to submit to electronic journals and must decide not only on impact factors calculated by publishers when choosing a publisher, but must examine their own consciences to determine if it is still ethical to publish in closed publications. Gideon Burton (2009) has argued that "Open Access is more than a new model for scholarly

publishing; it is the only ethical move available to scholars who take their own work seriously enough to believe its value lies in how well it engages many publics and not just a few peers." Finally those in developing countries and the learned amateurs are enjoying the disruption that arises from poverty to abundance of scholarly material made available through OA publication.

These disruptions have also affected scholarly organizations that publish journals, forcing them to reduce costs, most commonly by eliminating paper production. In some cases these organizations have developed agreements with commercial publishers that undertake the production process (paper and/or online). Commercial publications have become expensive, even by richer countries' standards, and though the commercial publishers have made considerable effort to bundle their products in ways that libraries can easily subscribe, and on-line versions are experimenting with alternative ways of funding such as authors paying to "free" their article, the high costs of access, especially to non-university readers or those in developing countries, is problematic. We have made a personal commitment to discontinue support by submitting publications only to OA journals (Gold Standard), by placing our materials in open access repositories, and by ceasing to review for or edit closed access publications. We believe that we need continuing efforts to disrupt the proprietary and closed publications models, and we work diligently to develop alternatives that recognize both the paid and the unpaid labour and production costs of scholarly production. Funding models must evolve that combine government, institutional, private, and professional society support along with volunteer labour to maximize the impact and expand the distribution of scholarly works.

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