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Interdisciplinarity in Recently Founded Academic Journals

Jerry A. Jacobs

University of Pennsylvania, jjacobs@sas.upenn.edu

Rebecca Henderson

University of Pennsylvania, rhen@sas.upenn.edu

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Abstract

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Principal findings:

- Roughly 25 percent of peer-reviewed journals established in 2008 claimed interdisciplinarity as part of their mission;
- Interdisciplinarity varies substantially by primary subject classification, from less than 10 percent in mathematics and physics to a majority of journals in public health and communications;
- Despite the prominence of biology and biomedical fields in discussions of interdisciplinarity, few of the new journals in these fields are interdisciplinary in focus.
- Paradoxically, many interdisciplinary journals are highly specialized; that is, while they span more than one field or one approach (basic research, clinical applications), their span of inquiry needs to be understood as focused on a highly delimited topic area.
- A typology of six types of interdisciplinary journals emerges from the data.
- While some high-status interdisciplinary journals, eg Science and Nature, are tremendously valuable in facilitating cross-disciplinary communication, the proliferation of comprehensive interdisciplinary journals would most likely hinder rather than facilitate scholarly communication.

Keywords

Academic Disciplines, Academic Journals, Academic Publishing, Bibliometrics, Growth of Knowledge, Interdisciplinarity, Open Access, Peer-Review, Scholarly Communication, Specialization

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Jerry A. Jacobs is Professor of Sociology at the University of Pennsylvania.

jjacobs@sas.upenn.edu

Rebecca Henderson is a Research Assistant in sociology at the University of Pennsylvania.

Introduction

The substantial growth of research interest in interdisciplinarity (ID) (Jacobs and Frickel, 2009) has focused on the ostensible barriers to interdisciplinary collaboration and the pitfalls that arise when interdisciplinary collaborations do occur (Froderman, Klein and Mitchem, 2010). Relatively neglected in these investigations has been an analysis of interdisciplinarity in the context of the academic journal system.

A limited literature has explored role of internet in promoting ID communication (Weller, 2011; Esma, Brassard and Paquet, 2005; Barjak, 2006; Porter and Rafols, 2009), while other studies have tracked journal growth (eg., Mabe, 2003). This paper, however, represents the first systematic study of new interdisciplinary journals.

One noted observer of interdisciplinarity suggests that “Almost all academic journals, in their mission statements, now claim to be ‘interdisciplinary’;...” (Moran, 2009, p. viii). If this hypothesis were true, it would be especially true of newly formed journals.

This study places questions about interdisciplinarity in the context of a scholarly communication system with more than 28,000 peer-reviewed journals.¹ In this paper, we ask a series of questions about peer-reviewed, academic journals whose self-described mission is to span disciplinary boundaries. How many new journals are interdisciplinary in their mission statements? What do these journals mean when they purport to be interdisciplinary? In other words, do different journals have different types of interdisciplinary objectives in mind? Finally, we consider whether a system with thousands of interdisciplinary journals will facilitate or hinder trans-disciplinary communication.

1. Context: The Growth of Peer-Reviewed Journals

In this section we consider the imperative for specialization when researchers are confronted with tens of thousands of academic journals. Taken as a whole, the volume of new research is overwhelming. No single person can possibly keep up with all of the new information pouring into research journals, not to mention books and other outlets. A basic

¹ A major discontinuity in Ulrich’s journal counts occurred during 2011. At that time, a journal publishing a print copy and an electronic copy began to be counted as two separate journal entries rather than one. Consequently, the count of academic peer reviewed journals jumped to 53,000. The analyses reported here were conducted before this change was introduced.

indicator of the extent of research is the number of peer-reviewed academic journals. In the following analysis we have drawn on data on academic journals compiled by Ulrich, which currently tracks over 28,000 peer-reviewed academic journals. An assessment of periodical indices concludes that Ulrich's periodical index is far more comprehensive than the main alternative, the Serials Directory (Bachand and Sawallis, 2003). New journals are regularly added to the list: one third of all research journals have been founded since 2000. At the current rate of growth of approximately 3 percent per year, it will take less than 25 years for the number of journals to double.

As Derek de Solla Price (1963) noted, it is foolhardy to project continued growth indefinitely as a straight line. At some point an inflection point will be reached. While we cannot predict the distant future with any precision, a few conclusions and informed estimates about short-term trends in this area may be warranted. First, the growth in the number of journals in recent years continues unabated, although at a somewhat slower rate than was evident in earlier years. The average growth rate in the number of journals in the 1950-1980 period was approximately 4.5 percent year; since 1990, the growth rate has averaged 3.0 per year.²

Second, the majority of the new journals are being published outside the U. S. in educational systems that are continuing to expand. Since 1980, roughly 30 percent of new journals have been published in the U. S. The substantial growth in systems of higher education throughout the world (Schofer and Meyer, 2005) suggest that there may be impetus of additional new journals. As educational systems increasingly seek to compete for international recognition, publication rates have become an increasingly central indicator of recognition or prominence. The drive to have journals in each subject area in each country of the world will continue to contribute to the expansion in the number of journals for some time to come.

Third, there are good reasons to believe that Ulrich's list understates the growth in journals published outside the U. S. For example, the Ulrich list of 28,200 peer reviewed academic journals includes 692 journals published in China, but only 102 new Chinese journals published since 2000. Yet Eastview Information Services (2011) boasts of a list of 7,000 Chinese journals. Not to be outdone, the China Academic Journals Full-Text Data (2011) claims over 8,700 journals published in China since 1994.³ Thus, the conclusions offered here thus must be

² Authors calculations based on the number of new journals included in the Ulrich data base by decade. These figures represent net additions; in other words, they reflect newly created journals per decade that are still active. A small number of peer-reviewed journals cease publication in a given year. More analysis can be done on the timing of these terminations. For a long-term study of journal growth rates, see Mabe, 2003.

³ These marked differences in the number of Chinese journals may reflect differences in the nature of the review process, which does not fully conform to the western blind-review system (Guobin Yang, personal communication). In other words, there has been a substantial growth in

offered in recognition of the possibility of incomplete coverage of newly-formed journals outside the U. S.

Fourth, a new mode of publication -- open access -- has become a powerful force contributing to the expansion in the number of journals. Open access takes advantage of electronic communications in order to give free access to anyone around the world who has access to a computer and the internet. For example, The Open Sociology Journal states that it is "an Open Access online journal, which publishes original research articles, reviews and short articles in all areas of sociology...The emphasis will be on publishing quality articles rapidly and freely available worldwide."⁴

In 2008, 40 percent of newly-formed journals were released in this format. In a number of instances, it seems that the open-access modality has become a significant contributing rationale for the formation of new journals. Thus, it is quite likely that the number of academic journals is likely to continue to grow for some time, especially to the extent that our analysis understates the growth on journals in countries such as China and India. Nonetheless, this trend must one day come to an end.⁵

2. New Journals: Prevalence of Interdisciplinarity

We began this review of journals with the assumption that the very number of journals is antithetical to a grand interdisciplinary syntheses. The scale of specialized knowledge makes the challenge of interdisciplinarity integration or synthesis hard to tackle as a practical matter. Nonetheless, the creation of new journals represents a research opportunity. What light will an examination of new journals shed on questions of specialization and interdisciplinarity? How many of these new journals emphasize interdisciplinary perspectives? Is interdisciplinarity being driven by the intellectual currents, as reflected in journals, the particular pressures of campus life, or some combination of the two?

We examined the set of 789 new academic, peer-reviewed journals founded in 2008. We restricted the analysis to the 740 journals that were published in English or had abstracts in English and which had accessible websites. We took a 50 percent sample of the largest fields in order to make the coding process more manageable. The number of journals coded was 400. Results presented are weighted to reflect the sampling design.

a number of academic journals in China, but only a small minority of these are fully peer-reviewed.

⁴ References to journal websites are provided in the bibliography.

⁵ There is considerable support for open-access publications, although there are also questions about the sustainability of the open-access business model, especially in the context of the social sciences and humanities.

We were particularly interested in how many of these new journals are ID in the orientation. The answer is quite a few in the social sciences, but surprisingly few in such major growth areas as biology. In some relatively new fields such as environmental sciences, interdisciplinary journals are the norm, while medical journals are often interdisciplinary in a rather narrow form as discussed in more detail below.

[TABLE 1 ABOUT HERE]

Table 1 lists the number of new journals by field (as defined by Ulrich) along with the percentage of journals that take an interdisciplinary approach. The principal criteria for classifying a journal as interdisciplinary is whether this term (or the term 'multidisciplinary') is used in the mission statement on the journal's webpage. In a modest number of cases, we classified journals as interdisciplinary even when this term was not explicit in the journal description. It had to be clear that the mission referenced multiple disciplines and modes of research as within the purview of the journal.

In terms of the number of new journals, medicine and biology represents the largest groups, followed by business and economics. Some relatively new fields appear on the list, such as environmental studies and communication, as do some long-established fields such as mathematics and physics.

Overall, roughly one quarter (24.2 percent) of new journals are interdisciplinary in one form or another. The share of interdisciplinary journals varies sharply by field. Ulrich's subject listings include three generalist journal categories, and a majority of journals that fell under these headings were interdisciplinary in scope by our definition. In a number of substantive fields, the new journals were mostly interdisciplinary. These include communications, sociology, environmental science and psychology. In contrast, new entrants in other fields, such as business and economics, biology, medicine and physics, were much less likely to be interdisciplinary in focus.

While the bio-medical area is one of the main hubs for interdisciplinarity on university campuses, most of the new journals in the field of biology and medicine are specialized and focused on research in specific subspecialty areas. For example, the journal Marine Genomics covers "all structural, functional and evolutionary aspects of genes, chromatin, chromosomes and genomes of marine (and freshwater) organisms." This type of journal is not meant to be read by a general audience and does not specifically reach out to interdisciplinary contributors.

Likewise, the Journal of Innate Immunity "covers all aspects of innate immunity, including evolution of the immune system, host-pathogen molecular interactions in invertebrates and vertebrates, molecular biology of cells involved in innate immunity... mucosal immunity... and development of immunotherapies."

Interdisciplinary journals in the biological sciences in our set of new journals were rare. One exception to this rule is the journal Biosemiotics which describes itself as "dedicated to building a bridge between biology, philosophy, linguistics and the communication sciences... Today, its main challenge is the attempt to naturalize not only biological information but also biological meaning, in the belief that signs and codes are fundamental components of the living world."

Medical journals represent an interesting case with respect to interdisciplinarity. On the one hand, they tend to be quite specific in their orientation toward practitioners in particular substantive areas. For example, The Open Enzyme Inhibition Journal is “an Open Access online journal which publishes research articles, reviews, and letters in all areas of enzyme inhibition studies. Topics covered in the journal include the mechanisms of inhibitory processes of enzymes, recognition of active sites, and the discovery of agonists and antagonists leading to medicinal agents.” In medical journals, the emphasis seems to be on streamlined and specific sources of information geared to immediate application in research and treatment by specialists and clinicians. These journals are not meant to be read by a general audience, but instead are focused to allow those within the field to have easy access to specialized information. Thus, the journal Diabetic Hypoglycemia is “an independent electronic journal dedicated to the advancement of hypoglycemia research and clinical management through information sharing, topical review & expert discussion of all aspects of hypoglycemia. Created and directed by our expert Board of hypoglycemia researchers and clinicians, Diabetic Hypoglycemia is designed to provide a focused, accessible source of new information, practical knowledge and opinion on the rapidly evolving issues in hypoglycemia.”

On the other hand, a number of medical journals do seek to integrate knowledge from a variety of types of approaches, including laboratory studies, clinical trials and practitioners’ observations. Thus, it is also possible to see some medical journals as interdisciplinary in the “specialized interdisciplinarity,” “problem-solving” or “translational medicine” sense; they bring research from a variety of perspectives together in order to address a single problem, in this case a medical condition. As the journal Oxidative Medicine and Cellular Longevity puts it, these medical journals attempt to “translate pioneering “bench to bedside” research into clinical strategies.” In other words, the goal is to connect laboratory research produced by specialized scientists with the work of clinicians and pathologists. As we have seen, this is a particular sense of interdisciplinarity, more limited in scope than the social-cultural comprehensive journal or the ‘academic universal’ journals described below. In this way, medical journals tend to be more interdisciplinary than are journals focused more on basic science issues in biology.

3. Six Types of Interdisciplinarity

Will these new ID journals serve as powerful force promoting more scholarly integration? A perusal of the mission statements of these journals makes it clear that editors and publishers mean quite a range of things when they call a journal “interdisciplinary.” We offer a classification of journals into six distinct types of ID.

One type of ID can be best thought of as “disciplinary plus.” In other words, the journal is focused on a particular discipline but is willing to accept papers from related fields to the extent that they shed light on the core issues. For example, the journal Collaborative Anthropologies states that it is “a forum for dialogue with a special focus on the complex

collaborations between and among researchers and research participants/interlocutors. It features essays that are descriptive as well as analytical, from all subfields of anthropology and closely related disciplines, and that present a diversity of perspectives on collaborative research." In this case, the focus of the journal is anthropology, and related disciplines are welcome to the extent that they shed light on questions central to the mission of this journal, specifically collaborative approaches to anthropology.

A second type of ID can best be thought of as "specialized ID." We understand that this term might seem jarring to those who assume that ID is inherently broad. Nonetheless, it is clear that in many cases, papers from a broad range of disciplines are solicited to answer a rather focused set of questions. For example, the Journal of the North Atlantic (JONA) is "a multi-disciplinary, peer-reviewed and edited archaeology and environmental history journal focusing on the peoples of the North Atlantic, their expansion into the region over time, and their interactions with their changing environment." In this case, the journal is clearly interested in bringing together scholarship from a wide range of fields, but the focus is a particular part of the world at a particular phase of human history.

Similarly, the journal Heritage & Society, formerly Heritage Management, focuses on questions having to do with the preservation of cultural heritage. It is "a global, peer-reviewed journal that provides a forum for scholarly, professional, and community reflection on the cultural, political, and economic impacts of heritage on contemporary society. We seek to examine the current social roles of collective memory, historic preservation, cultural resource management, public interpretation, cultural preservation and revitalization, sites of conscience, diasporic heritage, education, legal/legislative developments, cultural heritage ethics, and central heritage concepts such as authenticity, significance, and value." This journal seeks to bring together disparate scholarship as well as practitioners who work in the area of cultural heritage.

A third and broader type of interdisciplinary journal endeavors to cover the entire terrain of social and cultural phenomenon. We call this type of journal "social-cultural comprehensive." For example, the Journal of Cultural Economy is concerned with "the role played by various forms of material cultural practice in the organisation of the economy and the social, and of the relations between them. As such it will provide a unique interdisciplinary forum for work on these questions from across the social sciences and humanities."

Another example, Theory in Action, "is an interdisciplinary, peer-reviewed journal, whose scope ranges from the local to the global. Its aim is to provide a forum for the exchange of ideas and the discussion of current research (qualitative and quantitative) on the interconnections between theory and action aimed at promoting social justice broadly defined." This represents a more expansive notion of ID, and is perhaps closer to what some advocates of ID have in mind. Whether such a journal is able to obtain cutting edge contributions from economics, statistics, political science and other fields remains to be seen.

An even broader approach to ID sets out as its terrain as not only the social sciences but also the sciences and humanities as well. Thus, The International Journal of Research and Review "is an international, refereed, and abstracted journal that publishes empirical reports in the various fields of arts, sciences, education, psychology, nursing, computer science, and business." The scope of this and similar journals is comprehensive. The goal is to truly cover

everything. Perhaps this (fourth) type of interdisciplinarity could be called “academic universal”.

The goal of this type of journal is to facilitate the development of interdisciplinary connections. In other words, by juxtaposing contributions from diverse sources, the hope is that scholarly connections will be made that will jumpstart advances that would not otherwise be possible.

This approach might seem to be an efficient approach to publication— one stop shopping, with everything located under one roof. And perhaps the leading science journals such as Science and Nature do help to serve this role. But as the number of interdisciplinary journals increase, surely journals that span the entire gamut of academic inquiry reduce the efficiency of the scholarly search for new research. A key article might be located anywhere across a broad spectrum of such academic-universal journals.

Our fifth type of interdisciplinary journal focuses on a particular public issue or social problem. This “problem solving” approach is designed to bring together research that addresses diverse aspects of a given social issue. For example, the journal Ethnicity and Inequalities in Health and Social Care (2011) seeks to “promote race equality in health and social care. It is a vital source of information with its themes clearly located in practice and includes coverage of:

- identifying and preventing inequalities
- access to services
- support, care and quality of service provision and outcome.”

This type of journal does not necessarily expect any given paper to be interdisciplinary in approach. Instead, the assumption is that there is an interdisciplinary audience which shares a concern about the same issue, problem or topic, and is willing to learn from diverse disciplinary and substantive approaches to the shared area of concern.

Other journals seek to address not just a single set of issues but social problems more generally. For example, the International Journal of Society Systems Science describes its goals as follows: “ Society faces many significant challenges nowadays: pollution, poverty, pain, terrorism, crime, greenhouse effect, war, disease, starvation, road accidents, inflation/deflation, unemployment, pornography, great suffering, ignorance, pesticide poisoning, and falsehood, to just name a few... IJSSS eliminates the following "six barriers":

- * the barrier between social and natural sciences
- * the barrier between theory and applications
- * the barrier between hard decision models and soft ones
- * the barrier between different disciplines in the business world
- * the barrier between government and industry
- * the barrier between the ivory tower and real society”

The goal is quite broad but very different from that envisioned by Theory in Action and other interdisciplinary journals that are not focused on social problems.

A sixth and final type of interdisciplinary journal focuses on a particular theory or approach. In sociology, the journal Rationality and Society seeks to connect broad areas of social behavior under the rubric of rational action. In this way, it seeks connections with similar approaches in economics, political science, management studies and other social-science fields.

In order to distinguish this approach from the others considered here, let us use the term 'theoretical' interdisciplinarity.

In some ways this type of journal may come the closest to pursuing the notion of transdisciplinarity sought after by some advocates of reform. The idea is to unify diverse areas of study under a single, synthesizing perspective. As a practical matter, however, these approaches are often theoretically broad but substantively thin. They achieve breadth at the expense of considering the multi-faceted nature of each topic under consideration. In this way, they are the opposite of problem-solving approach to interdisciplinarity. The emphasis is on expanding the scope of the theory rather than fully examining any particular topic.

One journal in our data set exemplifies this approach: the journal Derrida Today. The mission of this journal is to explore "what Derrida's thought offers to contemporary debates about politics, society and global affairs. Controversies about power, violence, identity, globalisation, the resurgence of religion, economics and the role of critique all agitate public policy, media dialogue and academic debate. Derrida Today explores how Derridean thought and deconstruction make significant contributions to this debate, and reconsider the terms on which it takes place."

This approach is certainly interdisciplinary in scope, as its' domain ranges from politics to culture to economics. Yet it represents interdisciplinarity in a very different sense from the journal that focuses on health care inequalities. The latter seeks to explore every aspect of a particular issue with the goal of redressing a social problem and alleviating a social injustice, while Derrida Today emphasizes social critique more generally without necessarily seeking to lay out the detailed steps needed to fix any particular social problem.

As classified by this schema, journals that take the "specialized interdisciplinarity" approach are by far the most common, comprising just under 50 (48.1) percent of the sample. Together with "disciplinary plus," (13.5 percent), these two groups represent more than 3 in five of the new interdisciplinary journals. The least common were those taking the theory driven approach (1.5 percent), followed by the very broad "academic universal" group at 5.5 percent. Rounding out the list, the social-cultural comprehensive group was more common (at 17.3 percent) than new journals focused on social issues (11.3%).

[TABLE 2 ABOUT HERE]

This typology suggests that most interdisciplinary journals are specialized in one way or another. Whether the journal adopts a "disciplinary plus" approach, a "specialized interdisciplinary," a "problem solving" or a "theoretical interdisciplinarity" strategy, each of these groups of interdisciplinary journals are intended to address a particular audience of researchers.

The "socio-cultural comprehensive" and "academic universal" approaches to interdisciplinary journals are more in line with the goals of interdisciplinary analysts in terms of endeavoring to promote communication and exchange across a wide set of disciplines, but it remains to be seen how successful these journals will be. Why would a team of biologists or engineers submit their paper to a journal which mostly publishes social science and humanities papers? Journal visibility and ranking have a highly self-reproducing quality: researchers

naturally tend to send their best papers to the highest ranked journals because these journals offer the best prospects for visibility for their research. In this respect, all of the new journals have an uphill battle to climb. An interdisciplinary journal with a comprehensive or universal strategy would be likely to face even greater challenges in obtaining high quality submissions and becoming recognized as an important outlet for scholarly communication.

This typology interdisciplinarity parallels that developed by Lattuca (2001). This study provides empirical support for her approach and provides an empirical estimate in one context of the prevalence of each type of ID.

4. Internationalization and Specialization

We were curious about the degree of specialization of journals published outside the U. S. In particular, does the internationalization of publishing tend to promote the publication of broader journals? The reasoning is as follows: the first sociology journal published in Ghana is going to be broader in scope than is the 150th sociology journal published in the U. S. Part of the goal of journals in this category is to help put the intellectual output of scholars from the country on the map. A generalist orientation is more likely to suit this goal. Moreover, the volume of scholarship is likely to be too low to support a wide spectrum of specialist research outlets. Thus, we sought to ascertain how the internationalization of academic publishing might contribute to the growth in the number of ID journals.

It is the case that new journals established in small countries likely to be broad based. For example, the journal Epiphany (ISSN 1840-3719) is a refereed semiannual journal and a publication of Faculty of Arts and Social Sciences of International University of Sarajevo. This interdisciplinary journal focuses on aspects of Bosnia and Herzegovina and also provides an outlet for scholars from this part of the Balkans. The journal started its publication in 2008, and it publishes original articles on arts and social sciences.

A similar pattern may be observed for new sociology journals in Belarus, Slovenia and other countries. But the fact is that there are many more new journals published in larger and more affluent countries, including the U. K., the Netherlands, Australia, and Canada. Consequently, the growth in the number of journals published outside the U. S. does not mean the proliferation of journals from small upstart countries. In short, the trend toward the proliferation of specialized outlets continues apace.

We classified interdisciplinary journals born in 2008 by their country of publication. Journals published in the U. S. were slightly more likely to be interdisciplinary than those initiated in other countries (odds ratio of 1.28). If we take the three leading countries of origin (U. S., U. K., Netherlands), the same patterns holds (odds ratio of 1.34). Consequently, the speculation that interdisciplinary journals are growing because they represent broad new contributions from countries without many specialized outlets does not hold.

5. Interdisciplinarity and Open Access

We expected that the rise of open-access publishing would be a spur to interdisciplinarity. Both interdisciplinarity and open access are powerful forces that are reshaping scholarly communication, and we expected that these two trends may reinforce one another. It is easy to cite examples of journals where the emphasis on interdisciplinarity and open access seem intertwined. For example, the Scholarly Research Exchange “is a peer-reviewed, open access journal that publishes original research articles in all areas of science, technology, and medicine.”

Yet as a general proposition, the connection between open access and interdisciplinarity is open to dispute. In fact, interdisciplinary journals are less likely (actually less than half as likely) to be open access than are other journals founded in 2008 (odds ratio of .45). This result

makes sense when one considers the distribution of journals across subject matter areas. Journals in the natural sciences are more likely to be open access and these are less likely to be interdisciplinary, especially in high-growth areas such as the biological sciences and medicine. Consequently, it is best to understand the trends open access and interdisciplinarity as distinct currents rather than as aspects of the same intellectual movement.

6. Interdisciplinary journals and the splintering of knowledge

Interdisciplinary journals can help to disseminate research across the boundaries of diverse research communities. The leading journals, such as Science and Nature, play such a role. Even less visible interdisciplinary journals can also play a positive role, for example, by helping to foster standards of scholarship that overcome the customs of particular fields of study. However, there comes a point at which the proliferation of interdisciplinary journals must become dysfunctional. By scattering the results of studies across diverse outlets, a sharp increase in the number of interdisciplinary journals will make it even harder for scholars to track down and evaluate current research.

The Ulrichs' subject classification system does not identify ID as a separate subject matter, but it does classify some journals as "humanities: comprehensive works," "sciences: comprehensive works" and "social science: comprehensive works." These three grouping surely understate the total number of ID journals but they nonetheless total roughly five percent of all peer reviewed journals. As we rapidly approach 30,000 peer-reviewed journals, five percent would represent some 1,500 ID journals. As we have seen, most interdisciplinary journals are targeted in one way or another, with only a small minority attempting a broad reach across the social sciences, humanities and natural sciences. But let us consider whether the creation of more journals with truly diverse missions is a good thing. Surely having the gems of new breakthroughs scattered across 1,500 outlets would not serve to consolidate knowledge but would help to insure that it would be splintered. In this case, it is clear that 1,500 specialized journals would help scholars keep up to date more efficiently than 1,500 journals that each ostensibly covered everything.

As we have seen, among new entries, the share of interdisciplinary journals is now roughly 25 percent. Over the next 10-15 years, we can expect the establishment of another 10,000 journals. If interdisciplinary journals maintain their current share, this will result in 2,500 new interdisciplinary journals, to be added to our current 1,500. If these were truly broadly-based ID journals, then research findings would be scattered over some 4,000 interdisciplinary journals. The regular publication of thousands of ID journals would make the task of following the journals themselves exceedingly difficulty if not impossible. At some point the journals themselves become irrelevant – they are just a storage devise to be tracked by search engines.

The future of academic communication is not so bleak because most ID journals are specialized in their own ways. Thus, as a practical matter, the addition of several thousand ID journals will not be qualitatively different than the same number of disciplinary journals.

Conclusion

Mastering the cutting edge research techniques in all fields is simply beyond the reach of any individual; indeed, simply keeping up with the latest developments in over 28,000 journals is just not feasible. Consequently, scholarly life necessarily becomes divided into different fields of scholarship, with specialists focusing on different lines of inquiry.

The continued growth of new journals provides important insights into the trajectory of scholarship. Most new journals are specialized, allowing experts to keep track of developments in particular areas of inquiry. A substantial minority of newly established journals are interdisciplinary, but even these are mostly specialized in one way or another. The review of journals presented here raise questions about the notion that the term “interdisciplinary” is synonymous with “broad.” Interdisciplinary journals often seek to be integrative in one manner or another, but the meaning of the term “integrative” is open to diverse meanings as well. In some contexts, “integrative” represents an attempt to address an important social problem, while in other contexts, “integrative” may represent an attempt to bring diverse phenomenon under the aegis of a single theoretical perspective.

The proliferation of truly interdisciplinary journals would seem to represent more of a challenge than an opportunity for scholars, since it would sharply increase the number of journals that need to be scanned to keep up with specialized developments. At some point, search engines rather than journal titles would become central to scholar’s efforts to keep up with the literature. Perhaps that point has already been reached.

This paper has not explored questions regarding open-access article repositories. The posting papers on line has become an important alternative to accessing research. Major research universities are creating repositories of research produced by their faculty, and subject matter repositories represent an alternative organizational model. The Social Science Research Network has recently boasted of passing a milestone: the growing set of papers in its collection, now over 375,000, have been downloaded over 50 million times (Social Science Research Network, 2012). Thus, access to research reports and scholarly articles is no longer confined to the pages of scholarly journals. However, journals are likely to continue to play an important role because they help to certify knowledge, differentiating approaches and findings that are more likely to trustworthy from other writing that may be more suspect (Mabe, 2009). A full assessment of the future of interdisciplinary scholarly communication will have to take into account the relationship between scholarly journals and the on-line access to research via open-access repositories, authors’ website and forms of online communication.

This report has emphasizes the central role of specialization in the development of new research journals. Yet the march toward specialization does not necessarily doom academia to intellectual fragmentation. Ideas continually percolate between fields. And powerful forces push in the direction of synthesis as well as specialization. The rewards for intellectual synthesis are high, and detailed studies make the most sense when conducted within the rubric of an overarching framework. However, a full assessment of the relationship between forces that promote specialization and those that lead to integration or synthesis is beyond the scope of this report. This theme is taken up in greater detail in my forthcoming book on interdisciplinarity (Jacobs, 2013).

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Table 1. Peer-Reviewed Academic Journals Launched in 2008, by Subject and Percent Interdisciplinary

	Number of New Journals	% of Journals by Field	% ID (total)
Humanities Comprehensive	4	0.6%	100.0%
Social Sciences: Comprehensive			
Works	17	2.4%	88.6%
Sciences Comprehensive	8	1.2%	62.5%
other humanities	31	4.5%	60.0%
Public Health and Safety	26	3.7%	57.1%
Communications	12	1.7%	54.5%
Sociology	12	1.7%	50.0%
Environmental Studies	16	2.3%	50.0%
Other Arts	19	2.7%	44.4%
Other Engineering	15	2.2%	42.9%
Psychology	20	2.9%	40.0%
Other Social Sciences	32	4.6%	35.0%
Applied Social Science and			
Social Welfare	27	3.9%	34.0%
Political Science	13	1.9%	33.3%
Chemistry	17	2.4%	25.0%
Business and Economics	59	8.5%	24.5%
Computers	18	2.6%	22.2%
Engineering	30	4.3%	20.0%
Education	22	3.2%	18.2%
Other Applied Sciences	25	3.6%	16.7%
Law	12	1.7%	16.7%
Biology	64	9.2%	12.5%
Medical Sciences	161	23.2%	9.3%
Mathematics	26	3.7%	8.3%
Physics	26	3.7%	8.3%
Pharmacy & Pharmacology	13	1.9%	0.0%
Earth Sciences	11	1.6%	0.0%
Other Science	4	0.6%	0.0%
Total	740		25.9 %

Table 2. Journals by Type of Interdisciplinarity

Journal Type	Example	Number	Percentage
Specialized Interdisciplinarity	<u>Heritage & Society</u>	64	48.1%
Socio-cultural Comprehensive	<u>Journal of Cultural Economy</u>	23	17.3%
Disciplinary Plus	<u>Collaborative Anthropologies</u>	18	13.5%
Issue-Focused/ Problem Solving Interdisciplinarity	<u>Ethnicity and Inequalities in Health and Social Care</u>	15	11.3%
Academic Universal	<u>The International Journal of Research and Reviews</u>	10	5.5%
Theoretical Interdisciplinarity	<u>Derrida Today</u>	2	1.5%