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Realizing the Power of Extelligence: A New Business Model for Academic Publishing

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Abstract: The limitations of traditional academic knowledge exchange systems such as conferences and peer-reviewed journals result in discipline-based scholarship that is feudal in nature and can only dissipate as cross-disciplinary research expands. The next evolutionary step is democratic online knowledge exchange, run by the academic many rather than the publishing-oligarchic few. Using socio-technical tools it is possible to implement an academic publishing business model that maximizes the power of "extelligence", or knowledge realized through the collective gifting of information. Such a model would change the roles of journal editors and peer reviewers from knowledge gatekeepers to knowledge guides, and change the competitive yet conforming behaviors of academic researchers seeking publication to behaviors that reward collaborative activity that engages research communities in the act of knowledge exchange. We argue that socio-technical systems, social systems sitting on a technical base such as the Internet, can provide effective ways to motivate people to increase knowledge that research communities can share. By employing a hybrid of wiki, e-journal, electronic repository, micro-commenting and reputation systems for readers and writers, along with other socio-technical functions common to social computing such as social book-marking and reader recommendation, we can move from our traditional print publishing model in which prestige is established through public-ation in slowly produced, expensive and virtually unread journals to a vibrant, online knowledge exchange community built upon the foundations of legitimacy, transparency and freedom.

Keywords: Academic Knowledge Exchange, Academic Publishing, Socio-Technical Systems

I N 2000, THE iconic HCI visionary Ted Nelson made his way from Japan to New Jersey Institute of Technology in Newark, NJ. After giving a brief talk, the subject of a possible faculty position at NJIT came up. The discussion is said to have gone something like this:

University: "What would you teach?"

Ted: "Teach? I wouldn't teach."

University: "Then what benefit would you bring?"

Ted: "Well (pause), NJIT would be known as the place where Ted Nelson is."

COMMON
GROUND

For Ted, academic institutions are, foremost, social centers where smart people and novel ideas gather, grow and synergize. A significant byproduct of this interaction is reputation, both of the individual and the institution itself, enabling it to attract smart new students and staff, if not also to activate existing, dormant ones. Reputation, in Ted's sense, is related to the concept of intelligence, but in a novel way. If intelligence is "the key internal feature of the human brain/mind" (Stewart and Cohen, 1997), and is therefore restricted to the individual, then Ted's concept of intelligence is really something more. Ted's intuition had something to do with the social component of intelligence, of what happens when the internal features of human minds and brains are shared.

Stewart and Cohen call this concept "extelligence." It is the "external features" of intelligence. It is, as they put it, that which enables individuals to add to the existing stock of information and knowledge in a given culture. In this sense, extelligence is a form of "cultural capital" (243). If intelligence is the ability to use one's own mind, then extelligence is the ability to tap into the minds of others in order to generate knowledge collaboratively. While many university administrators are not oblivious to the quirky idea of prioritizing reputation above teaching load and research output (think star faculty), the system they work under is primarily output driven rather than process driven. We will argue that what drives the power of extelligence is not the accrual of cultural capital *per se*, but the process of paying it forward, with the "it" being the gifting of one's ideas to others in the process of their development. In this sense, we will argue that extelligence should serve as the foundation for academic information exchange and the basis of a new business model for academic publishing. "Open access" may be all the rage in terms of work product delivery, but the Internet has far better capabilities than replicating print journal and peer review systems online. Social computing demonstrates these capabilities every day. Online socio-technical systems that are fashioned to enhance extelligence promote the ultimate goal of intelligent minds: producing collaborative knowledge that in turn promotes social goods.

In the rich discussion about academic publishing, we have already proposed a model for the production and implementation of a democratic online knowledge exchange system (KES), run by the academic many rather than the publishing-oligarchic few (Whitworth and Friedman, 2009a; 2009b). Using socio-technical tools it is possible to deploy the power of extelligence – that is, knowledge realized through the collective gifting of information – not only to revitalize innovation in the generation of knowledge, but also to revamp the academic publishing business model to effect changes in the roles of journal editors, peer reviewers and the academic publishing system itself. We argue that socio-technical systems – social systems sitting on a technical base such as the Internet – motivate people to increase discipline-based and cross-disciplinary interaction to provide knowledge that research communities can share and that practitioners can use to innovate, create artifacts and enhance public services.

Such knowledge sharing has been occurring for quite some time through personal websites and discipline-based archives. However, even though the publishing elite of science, technology and engineering have begun to embrace open access and collaborative concepts, the inertia of the status quo, in conjunction with the rapidly increasing costs of journals, has buttressed their protectiveness over established publishing turf. In this paper, our focus is on generating and exchanging ideas (i.e. the process) rather than publishing them in the traditional sense (i.e. the product). We suggest that by tying the process of extelligence to fundamental principles of socio-technical systems, concepts of gift culture, and open source

methodologies, the groundwork can be set for the collaborative creation and dissemination of new ideas to and from the widest audiences possible.

The Concept of Extelligence

The concept of "intelligence" makes us think of a human facility or aptitude for understanding, an individual's ability to harness the data and sensory experience that is traveling inbound to his or her mind. Intelligence is the ability to abstractly process information from the world in a way that leads to valid understanding, useful knowledge and successful decisions. It is distinct from the ability to change the world; one can be intelligent enough to see the answer to a problem yet not be able to carry it out. Equally, intelligence in this sense is distinct from moral capacities. Of course, even intelligence in this narrow sense is of great value. There is no getting around the need to process information accurately and critically.

On this definition of intelligence, one could talk about "social intelligence" as a group's ability to analyze the information around it to survive and succeed (Albrecht, 2005). Similarly, one might think of "collective intelligence" as the information amassed by a collection of individuals (Malone, 2008). But neither of these terms captures the concept of extelligence. More than Stewart and Cohen, we think of extelligence as a property of individuals who think in a particular way, who utilize a particular *process* of thinking. Extelligence is the ability of an individual to think, not just with his or her own mind, but with the minds of others as well. We are not speaking about merely sharing information with others, nor are we speaking about some sort of mystical collective "group mind". We are thinking about individuals sharing thought in the way that the two hemispheres of the brain collectively share the process of creating thought. In everyday life, we are thinking about the way that a couple can complement each other, mixing strengths and weaknesses in order to collectively create a good team.

Of course, not all couples make a good team. To create extelligence requires a certain kind of skill. In the academy, this skill involves reviewing and giving suggestions in response to others' ideas. Our aim is to make this mutual exchange of ideas which takes place in every academic setting more frictionless. Thinking is a process, not a product. It is a process that requires not only the use of intelligence – of people using their own brains – but a process that requires extelligence too – of the social use of others brains as well.

Too often, we think of knowledge as nothing more than the accumulation of information. On this view, knowledge is "in the head" of individual knowers. Knowledge is the product of the "bare" bits of information our sensory organs detect and the meaning our minds give to those bits of information. This view, with its roots in the thought of Immanuel Kant and his philosophical legacy, has been challenged in a number of important ways by philosophers. In our view, this challenge has arisen because scholars have come to realize that meaning is embedded as much "out there" in the world as it is embedded in our individual minds. Within philosophy, variations of this view are known as externalism. Semantic externalism, for example, is the view that the concepts available to thinkers are derived from their environments and not from the innate structures of the mind.[1] Similarly, mental content externalism is the more radical view that the very mental states we experience are dependent upon our relationships with the world around us.[2] Most relevant for our purposes here is externalism

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[1] The canonical statement on semantic externalism is Putnam (1975)
[2] See, for instance, Burge (1979)

about *social meaning*. This is the view that the very condition of possibility of *knowing anything* about the world is being involved in it, practically speaking, with others.[3] Meaning resides within the shared space created by the social practices of communities. On this view, then, knowledge could be understood as the formalization of this shared social meaning. It is what we make explicit, share, examine, and critique. It is how we use our shared social meanings.

The concept of extelligence is meant to capture the intuition that knowledge and information are derived from collective social practices and can be collectively shared in progressive knowledge exchange systems. Extelligence grounds the conceptual justification of the KES we have already proposed. The social inertia that new models of academic publishing face will be undone not only by new tools but also by new ways of thinking about those tools. At the heart of this new way of thinking is the idea that knowledge exchange systems are tools for *making shared social meanings explicit*. These shared social meanings underpin the methods, questions, styles, norms, presumptions, etc. of autonomous academic fields. (Psychologists, for example, operate with certain shared assumptions about mental representations, about experimental methods, etc.) These shared social meanings are not in the heads of individual scholars; they are rather, features of the social space scholars engaged in collective enterprises share. Interdisciplinary and multidisciplinary research proceeds when these (often unstated) assumptions, norms, etc. are made explicit and examined in light of one another. An extelligent publishing system is one aimed at supporting this process. Our goal is not to undermine the autonomy of academic fields. It is, instead, to create a KES that facilitates the sharing *of* the shared social meanings which create the autonomy of those fields. By externalizing social meaning in this way, the production of new forms of knowledge can be promoted and can win the acceptance of existing scholarly communities.

The Practice of Extelligence

Often, we begin with an inchoate idea, or perhaps a sharply negative reaction to an idea we have read, something posited as rational and factual that strikes us as irrational or wrong. If the issue is the result or the interpretation of an experiment, we may be tempted to attempt the experiment ourselves. Likewise, if the subject matter is theoretical, we may look for flaws in its logic or in the evidence leading to whatever conclusion has been found. In any case, we are individual agents intent upon marshalling the evidence at our disposal to demonstrate our intelligence.

Now imagine a statement, some supposition proffered to the world in a discussion forum. For the sake of discussion, imagine someone you don't know claiming that the academic publishing system that we know today is actually a series of ever-increasingly difficult gates through which new ideas must pass in order to be exposed to the public at large. At the first gate stands an acquisitions editor who checks to see if the author's credentials are valid – that there is credible reason to believe that the author may know something about the subject of the paper she has submitted. At the second gate that editor is applying a second set of criteria, this time having to do with the subject matter of the paper. Not only will the question

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[3] Charles Taylor provides the clearest statement to this effect. See Taylor (1985) and Taylor (2005). Many of Taylor's views about social meaning are derived from the philosophical work of Martin Heidegger and Maurice Merleau-Ponty. See Heidegger (1962) and Merleau-Ponty (2002).

of its relevance to the scope of the journal come up; the nature of that relevance will depend in large part on the number and identification of previously accepted intelligent actors cited in the paper. If the citations are present as a sort of scaffold, the author has used her intelligence by amassing representations of others' presentation of intelligence. This is one step in the direction of extelligence, in that a single individual has digested and redeployed facts toward new ends. This idea can be taken further still. More complete forms of extelligence come about as a result of collaboratively created ideas and not just as revisions of previously formed inputs. In this case, others' ideas shape our ideas at their very conception, so that the process of moving from an inchoate notion to a recognizable and useful argument is truly shared. Collective input is offered in this sense without expectation of remuneration, without expectation of a benefit returned in kind or in promise. The input is a gift, and its acceptance by the author of the original idea is not only a demonstration of her intelligence, but also of the power of extelligence. It is nothing more than the willingness to consider, if not accept or refine, a suggestion or comment, an addition or possible correction, from someone who has no vested interest in that idea beyond the possibility of engaging it to exercise one's own intelligence.

Today, we are just beginning to grapple with the democratic voice of "the interested" which is taking form in blog responses, wiki development, listserv conversations and reader ratings. Imagine an academic research community using technologies that promote *social synergy*, where the benefits produced by the community outnumber those that would be produced by its members working alone (Whitworth, 2009a). Ideally, the traditional peer review system works toward this goal, but the realities of peer review and journal production preclude us from reaching it. Once an article is submitted to a journal, the opportunities for synergy reduce precipitously. A general editor makes a unilateral decision to farm the article out to a specific associate editor; in essence, moving the product down the line one station, without conversation with the author or potential reviewers but with the confidence that the AE will see the positives the chief has identified. An associate editor is charged with finding qualified reviewers who will take on, for little personal gain, the task of reading, critiquing and filing advice and suggestions for improvement, but this all happens without conversing with the author or other reviewers. The same text is traveling down multiple silos, reacted to by, more often than not, like-minded readers with comparable agendas. Reviewers establish their bona fides by protecting the turf of the journal for which they have agreed to review and assisting editors in making selections for inclusion and rejection. The daring reviewer is open to allowing new ideas through, as long as they are premised on an established base, but these incursions are rare. More often, we contribute our own work to review by an ever increasingly specialized yet closed loop of researchers to publish in journals peer reviewed by colleagues and like-minded editors who are themselves invested in the knowledge production systems that take form in journals and conference panels. All of this looks frighteningly like the snake swallowing its tail. Eventually, the author may receive comments and suggestions from possibly three reviewers, but not comments that would have had the benefit of questions asked and answered among all the interested readers during the development of the paper itself.

To the contrary, the concept of extelligence suggests that each of us benefits from our interaction with others, but the combined knowledge, experience and opinions of the many will yield new insights only if we're open to them in the right way. An online working group of volunteers seeking to refine and improve an idea generates synergy from the social inter-

actions that unfettered input allows. As group size increases arithmetically the number of interactions increases geometrically. In large groups *non-zero-sum synergy gains* increase the productive pie more than zero-sum gains increase the individual slices (Wright, 2001). In very large groups, as technology now allows, synergy effects dominate, e.g. in businesses like E-bay, which work better the bigger they are. Today's social computing tools make this possible without diminishing the value of editorial comment. The benefit these tools bring to bear is the enormous number of potential commentators – intelligent and experienced, but unknown commentators – who are reading and considering your ideas because they share your interest.

The size factor changes the core economic model from one of value created by individuals to one of value created by communities. By employing a hybrid of wiki, e-journal, electronic repository, micro-commenting and reputation systems for readers and writers, along with other socio-technical functions common to social computing such as social book-marking and reader recommendation, academics can move from the traditional print publishing model in which prestige and advancement is established through publication in slowly pro-duced, expensive and virtually unread journals, along with post-publication citation counts and impact factors, to a vibrant, online knowledge exchange community built upon the foundations of legitimacy, transparency, freedom and collective action. Indeed, what Bill Cope and Mary Kalantzis refer to as the 'social web' (2009) is the infrastructure to support radical changes in the development, exchange and reward structures for academic knowledge.

Gift Culture

Bergquist and Ljungberg (2001) claim that, "Gift cultures differ from exchange cultures in that the latter are characterized by scarcity and the former by abundance" (305). In a gift culture, power and prestige are generated by the type and amount of gifts one presents to others. When dealing with something as ineffable as an idea, even our exchange culture has the potential to reverse the scarcity/abundance balance. The university, while presenting itself as benevolent, altruistic and honorable, must also traffic in the currency of ideas, but ideas as product, which are produced in a closed system, quite unlike the ethos and dynamic of open source software development and other collaborative endeavors.

Raymond argues that social status is determined "not by what you control but by what you give away" (Raymond, 1999, 99), and this is the primary driver for those who participate in open source activities such as software development. If Raymond is correct in suggesting that the social relationships of gift cultures are created and maintained based on the economy of gift exchange, and Bergquist and Ljungberg are right in arguing that "Gift giving . . . creates social interdependencies and becomes a web upon which social structure is organized," (2001, 308) then we need to take the next step in advancing academic knowledge exchange by building the socio-technical systems that provide any and all interested readers with the ability not only to read, but to comment in small and substantive ways, to hold side-bar conversations with authors, to collaborate with them should the desire mutually exist, and to bring others, even journal editors, into these conversations. To do this, academic publishing needs to concentrate on the process of knowledge production and dissemination instead of mining ideas from paper submissions that by and large bolster established theories.

Extelligence and Socio-technical Design

We suggest that adherence to a few basic tenets supports a socio-technical system to achieve a "democratic dimension" of sharing in the collaborative creation of knowledge, rather than to those tenets underlying the centralizing control of traditional academic publication systems.

- **Legitimate rights**. A people that governs itself will naturally give itself legitimate rights, interactions that benefit society and are fair to the parties involved (Whitworth et al., 2003).
- **Transparency**. Justice requires not only that it is done, but also that it is seen to be done. Like wikis, in a transparent KES others can see what one is doing, and this community-watching encourages good behavior.
- **Freedom**. While we normally associate freedom with exercising rights, when a system imposes, not just restricts rights, onto its citizens, we move away from democracy and toward slavery. Technology systems should be designed to offer people choices, not to take choices from them (Whitworth et al., 2008). Online freedom is why participation is the main success yardstick for socio-technical systems.
- **Order**: As physical society supports order by systems of "justice", so socio-technical systems need defenses against anti-social acts. Extelligence provides for knowledge exchange that increases productivity but is also more open to hijack. Therefore, remembering that while some will try to cheat the rest, as in physical society, good citizens – in this case, academics contributing to each other's ideas – keep things in check and thereby avoid social collapse.

An extelligent academic publishing system will take advantage of socio-technical tools that help shape new social practices, which in turn foster the growth of novel social skills and competencies. Catalyzed by Web 2.0 technologies, many tools have been used to promote the open exchange of knowledge with varied levels of success. These include wikis, (e.g. Wikipedia), blogs (e.g. WordPress), electronic repositories (e.g. Los Alamos bulletin board, arXiv.org, and CiteSeer), and democratic publishing systems such as Scribd. Academic knowledge exchange has been enhanced by e-journals, Scholarpedia, and discipline-specific systems (such as the open Atmospheric Chemistry and Physics journal of the European Geosciences Union), which specifically foster the development of knowledge from the discussion stage through the publication of results.

Though some current academic KES's effectively exploit online technologies, we need to shift the balance of social power to the community of knowledge consumers and make better use of the power of extelligence. Journals and e-journals both utilize small groups of experts to review full-length submissions, but this is a slow process that misses opportunities for wider review by experts and potential readers. To support and sustain a "meta-disciplinary network" of open knowledge exchange, four elements are required: an egalitarian review process, support for micro-contributions as well as full-length review, immediate feedback on the relevance and utility of contributions, and a distributed structure where all participants benefit from network effects when new organizations join the exchange. The objectives of an extelligently-oriented publishing system are to 1) create a conceptual design for a socio-technical system, through collaborative design with research cohorts, that meets key quality attributes identified by prior research and stakeholder needs, 2) construct the system, using

a hybrid of existing tools, to conform to the conceptual design, 3) deploy a system modifiable for use by any community of stakeholders, and 4) maintain analysis of user behaviors and outcomes to assess the system's relevance, adequacy and performance of its functional elements. Such a socio-technical system blends traditional technical (hardware and software) needs with not only HCI requirements like usability but also community requirements like fairness. This increases the demands facing an STS but also increases its potential impact, as hundreds of millions of online users of Facebook, Myspace and Wikipedia testify. When designing such a socio-technical system, we must first define human and social requirements, then design technology to fit, taking into account technical requirements. This ensures the system performs successfully at its highest level. In contrast, "technology driven" design produces a socio-technical gap, between what society wants and what the technology does (Whitworth et al., 2004).

Academia demands attribution, the naming system that credits a work's creator(s) and appears whenever it is published or quoted. Scholars give copyright ownership of their work to publishers, but retain attribution rights, that is, their name stays on the published paper. Attribution allows social accountability; the credit for a work accrues to its creator. This in turn lets academics freely give away their research work to others. Their university rewards them for work credited to their name by promoting them, if others find it of value. It also promotes the university's reputation. Innovative development, quality discrimination, effective dissemination, democratic participation and author attribution are extelligent academic KES requirements that can change the nature of peer and promotion review processes. Imagine an algorithm comprised of socio-technical systems functions such as the number and extent of reader comments, an individual's reputation rating, a paper's instances of social bookmarking, reader rating and value rating of links provided in that paper (see Figure 1). How valuable might the accretion of reviews, audit trails and source data sharing be in the work of tenure and promotion committees? Aggregating micro-contributions over many papers can recognize the contributions of those who amend as well as those who create, also contributing to an increase in reputation. If one of the primary reasons for the academic peer-review and publishing structures we have today is advancement through faculty ranks, reliance on extelligence indicators could easily provide far more information for performance reports than the traditional promotion mechanisms provide for today, and the socio-technical systems designed to accrue and measure these functions would be as easily assimilated into the P&T process as a librarian's citation count.
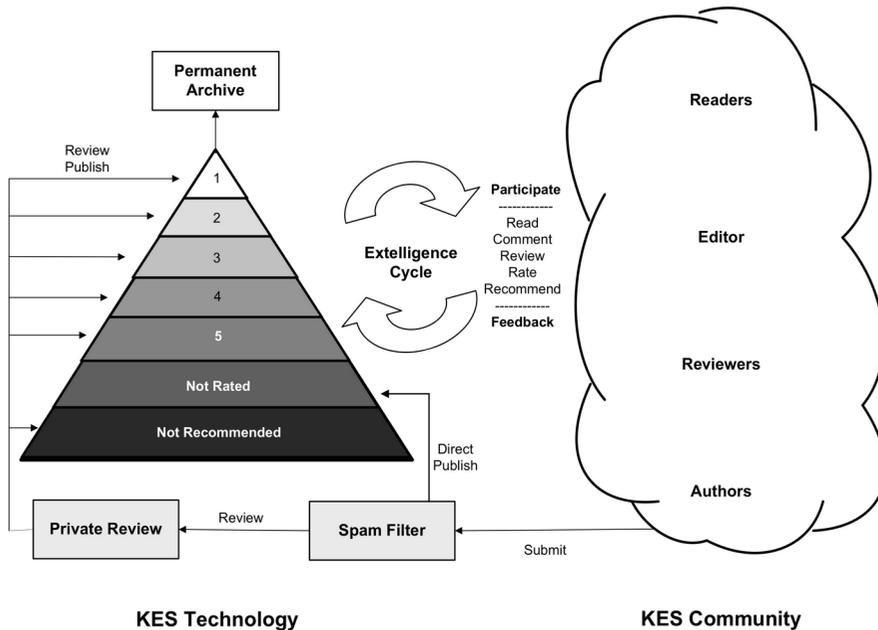
Figure 1: The Extelligence Cycle

Open Access

In 2003, John Willinsky pronounced that, "for all that the Internet promises to do for scholarship, I would hold that open-access publishing possesses the radical potential to change the nature of this work. I do not see open-access offering some idealistic form of universal access to knowledge, but as part of a historical development, in which innovations both technical and social have expanded the range of intellectual participation in research and scholarship. Open-access could well prove to be another step, following on all that the printing press and penny post, public libraries and schools have done to improve the democratic circulation of knowledge, and all that this increased access has done for the state of that knowledge" (Willinsky 2003). Just a year later, in a *First Monday* article, Joe Esposito suggested that, "Open Access will come about not through a revolution in the world of legacy publishing, but through upstart media built with the innate characteristics of the Internet in mind. An unanticipated outcome of this situation will be that the overall cost of research publications will rise, though the costs will be borne by different players, primarily authors and their proxies" (Esposito 2004). Six years later it's clear that both Willinsky and Esposito were right, even though they were suggesting different outcomes. Our point is that easy access to and availability of information and interactivity through blogs, wikis, and listservs facilitates a communal culture that will not only change academic research culture, but also affect the continued proliferation of socio-technical systems that will eventually bring down the costs of both generating and providing information. These socio-technical tools make possible an

entire reconceptualization of what Cope and Kalantzis call "textual agency." "We call this rebalancing of agency, this blurring of the boundaries between authors (and their authority) and readers (and their reverence), 'the social web'. If print limited the scope for dialogue, the electronic communications web opens up that scope" (Cope and Kalantzis 2009).

Esposito's definition of open access is: "it's the Web and it's free: OA in a nutshell" (Esposito 2004). A veritable library of articles and opinions on OA and its variant forms has flourished, along with the tools and networks that facilitate knowledge growth. Whether the reader pays directly or is provided access to proprietary publications through association with a university or professional organization or institution, or the author pays, the idea that academic scholarship is "free" is not realistic, as nothing is really free. There are instances of commercial enterprises adopting open source method to produce both better products and profits (Boehm and Ross 1989; Lerner and Tirole 2002; Nambisan and Wilemon 2000; von Hippel and von Krogh 2003; West 2003). Journal publishers might give serious consideration to promoting the marriage of extelligence with open source software development practices through knowledge exchange systems, simply as a way of staying alive and viable.

Conclusion

When academics start thinking of ideas and innovations as things to give and share, and prestige and advancement are derived from the breadth of their dissemination and the reputation that the use value of those gifts provide, the research climate of academia will allow for more innovation and more cross-disciplinary research. Not only this, but the proprietary publishing model and its Internet-based cognate, the open access movement, will undergo a shift from serving as an infrastructure resting on knowledge gatekeepers to one providing the welcoming hand of knowledge guides. Our aim is to encourage a change in the competitive yet conforming behaviors of academic researchers seeking publication to behaviors that reward collaborative activity that engages research communities in the act of knowledge exchange. Stewart and Cohen remind us, "Extelligence cannot get going without intelligent individuals to create it and respond to it. But once it does get going, the resulting complicit feedback loop drives both intelligence and extelligence even faster, even further" (270). As academics, we can accomplish this change by participating in knowledge exchange systems, ones whose functionalities adhere, along with our own behaviors, to the basic socio-technical tenets of legitimate rights, transparency, freedom and order.

The traditional business model of academic publishing inhibits interdisciplinary and multidisciplinary approaches to the creation and exchange of knowledge. We have suggested that some of the technical tools already exist to move beyond the traditional business model; additionally, we have proposed a new kind of socio-technical tool for academic knowledge exchange. It is noteworthy that open-access publishing models, wikis, repositories, etc. have nearly unanimous *abstract* support among scholars. That is, few academics argue in favor of traditional print models on principled grounds. New models for academic publishing are challenged instead by social inertia and the autonomy of established academic fields. For example, it is useful, convenient and safe for a philosopher to know that if she publishes in the journal *Mind*, there will always be a job for her in a philosophy department somewhere, as her reputation hinges on that journal's reputation. The sort of change we propose to academic publishing therefore needs not only technical support in the form of a coherent, feasible

and sustainable business model, but conceptual support as well in order to be socially accepted. This is why we suggest exploring the practical applications of the concept of extelligence.

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