

Improving the peer review process: an examination of commonalities between scholarly societies and knowledge networks

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ABSTRACT

Whilst peer review is the common form of scholarly refereeing, there are many differing aspects to this process. There is a view that the system is not without its faults and this has given rise to increasing discussion and examination of the process as a whole. Since the importance of peer review is based on the primary way in which quality control is asserted within the academic world, the concern is what impact this is having on an ever increasing diversity of scholarship, in particular, within and between science and engineering disciplines. The peer review process as is commonly understood, and increasingly considered as a conservative approach which is failing to adequately deal with the challenges of assessing interdisciplinary research, publications and outputs.

Keywords: community of interest, community of practice, Scholarly societies, interdisciplinary research, knowledge networks.

1. INTRODUCTION

The peer review is still regarded as a useful editorial gateway for assessing the quality of scholarship, and creating a form of formal record, but is far from being a foolproof process. With regards to the review process experienced through an interdisciplinary and/or hybrid discipline (where the topics discussed do not comfortably align with established discourse), the process can often produce a split outcome where by opposing feed back loops battle to claim the emergent concepts being put forward. In these cases, the process of double blind peer review is only useful if there are more than two reviewers. Whilst the author may be requested to submit again, this does not exclude the bunny eared outcome to re-occur. This experience of the “split outcome” has been observed with (some) regularity, where the concepts lie between paradigms. The difficulty of obtaining positive reviews early on in the process would apply in particular to difficult work and/or in emergent fields.

This paper will examine recent literature reviews that have been carried out regarding the role of peer review in

scholarly societies and the commonalities that can be drawn between knowledge-based organizations and communities of practice behaviour (as they are both membership based groups). The importance of the similarities displayed between scholarly societies and communities of practice, features capabilities that are common and fundamental to building sustainable economic, social and learning network systems. Examining the aspects of both scholarly societies and knowledge networks may increase our understanding as to what scholarly societies could offer for interdisciplinary or emergent scholarship peer review.

The peer review process whilst having its critics is still regarded as the traditional form of assessment. The difficulty then lies in examining what other ways may be used or incorporated to better serve emergent interdisciplinary and/or hybrid disciplines, creating a more holistic community based process to improve overall review outcomes.

2. A HISTORICAL SNAPSHOT

The first international congress on Peer Review in Biomedical Publications encouraged a systematic examination of journals [9]. The congress highlighted issues across a wide spectrum of experiences, disciplines and journal and that whilst there was general agreement of peer review not be abolished, there are still questions regarding validity and usefulness [19]. Over time the empirical approach to peer review has led critics to describe the whole system as generally allowing conventional work to succeed whilst discouraging innovative thinking [9]. There are many differing aspects to the social life of the peer review process. To expand on the concept of the social life of peer review, Knoll [9] discusses the study of peer review as ... “a social process, not a technical one; that it differs from time to time and place to place; and that so far no precise empirical means exists to choose ‘the best’ method of peer review”.

The lack of faith regarding the peer review process has not prevented the adoption of the process becoming a metric which academic scientists need to adhere to in order to maintain and build careers, ensuring grant funding. The groups of scientists

that are working to produce papers and are also involved with the peer review process are in some ways working on a couple of different levels (at least).

3. PEER REVIEW PROCESSES VIEWED AS SOCIAL KNOWLEDGE NETWORKS

In more recent times “peer review has become a powerful social system” [9] which has multiple layers of knowledge networks linking and supporting its members within these communities of practice [6] [14] [15]. There are the established groups which maintain long standing networks, and in relatively recent times, are now emerging as much more formalised and systematic, which points to a more impersonal process over all [9]. Peer review is not by any means a linear process, and like any community which is active and dynamic involves complex social exchanges.

There are many differing types of constraints, both positive and negative which have impacted the emerging development of the current peer review process. The social complex adaptive activities of the peer review can not be dismissed, as journal editors themselves describe the path of the peer review as “as ineffable and subjective, human process... which should be a civil discourse between colleagues”, but this can be at odds with the reviewers themselves [9] [7] [2] [8]. This highlights the difficulties involved with assuming that the approach to peer review has clear and definable “definitions” to adhere to.

The perceptions of traditional forms vs non-traditional forms varies between disciplines and groups of scholars, for example, refereed journals, books and monographs are generally viewed as standard publications. Online publications however, are viewed as newer forms of publication which have not been as rigorously peer reviewed, if at all [8]. Through their research, King, Harley [8] discussed how more senior were less likely to use newer forms of publication outlets. Other aspects of King, Harley’s research highlighted comments made by interviewees that “dispite the hesitance expressed about online (only) publications, many aspect of online communication and publishing appealed to several of the interviewees:

“The newer ways of doing it are the kinds that I’m really interested in... I like the dynamism of the digital publication. So, for instance, publishing a paper as a PDF, and then distributing it through a website to me is a really interesting way of doing it”.

There are many layers of peer review which includes the perceptions of all those involved. Increasingly the current “usage” of peer review by scholars (and even more so by institutions) is one of “endorsement” or measurement for promotion and grant funding, but editors site a more communal approach, while some reviewers can engage the process from the point of view of validation. Also adding layers to peer review process are particular various editorial, house styles and procedures of the journals themselves, and the communities that sustain these activities.

The journal process and the organizations that produce them (with their specific disciplines) and are in effect, complex systems with networks to wider connections to the academic and publishing community and beyond [9] [10] [15] [16]. However, this community is not a single entity, rather it is a collection of networks interacting within multiple communities that is constantly evolving.

These communities are dynamic and simultaneously engage in a multitude of functions and operations that have developed specific characteristics. Knowledge transfers for individual communities are particularly organizational specific within highly operational or project orientated environments [11] [12] [4] [6]. With regards to sustainability of communities, general methodologies developed for supporting organizational communities could be applied to the peer review community, and the following key aspects could include:

- Dynamic methodologies that consider the nature of the interactions within their disciplines as complex organizational systems.
- Such methodologies need a holistic approach; reductionism alone as an approach will not work for understanding complex systems.
- Scalability is a fundamental aspect of a holistic methodology, and in also understanding different levels within a system such as the scope and vulnerabilities.
- Integration of human based systems and the physical organizational operational processes and their networks are crucial as a basis for a holistic methodology.
- The areas of expertise required as part of a holistic methodology combines socio-technical and systems thinking (bringing together practice, physical structure, purposes and constraints, people, processes, infrastructure).
- The areas of expertise which are needed in order to attempt a holistic methodological approach specifically designed with communities in mind would include;
 - Knowledge networking that focus on the practical implementation aspects.
 - Knowledge network systems that support the formulation of community development strategies.

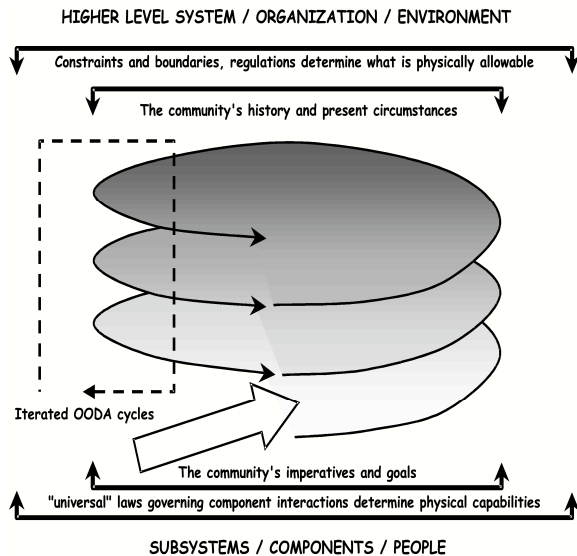


Figure 1. Emergence of an autopoietic community of practice places Nousala's [14]. spiral knowledge exchange model in the complex systems hierarchy of an autopoietic organization. Dynamic activities of entities at the focal level within the triad are enabled by laws governing interactions of subsystems and constrained by conditions imposed by the supersystem [20] [4].

4. COMMUNITY KNOWLEDGE NETWORK PRODUCTION

Scholarly societies reflect much of the behaviour of communities of practice (these being established communities, as opposed to communities of interest (CoI) which are still in formation).

Harley [24] discusses journal publishing programs that, "frame the development and scope of knowledge in the field. The peer-review process establishes and develops fields by creating peers that can work together to advance new knowledge or the application of new techniques ...[1]. Many journals, particularly those run by scholarly societies, serve to circulate reviews of research, conference information, bibliographies, and other information in the field".

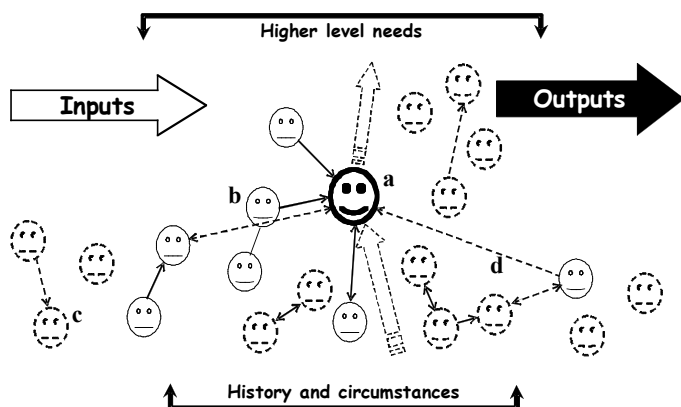


Fig. 2. A social network created by a "human attractor" within the organization. "Faces" in these figures correspond to people/actors belonging to the organization at the level of subsystems/components (see Figs 2 & 3). **a.** A "human attractor" seeking knowledge to address a high-level organizational imperative or need. **b.** Other seekers socially transferring knowledge relating to what the "human attractor" seeks to know for the benefit of the organization. **c.** Other actors in the organization who are not connected to the seeker's current interest. **d.** A knowledge transfer between individual actors. Line weights indicate strength of the connection. The open vertical arrows indicate the possibility that the community may assemble and generate knowledge that will be valuable in addressing organizational needs [15] [6].

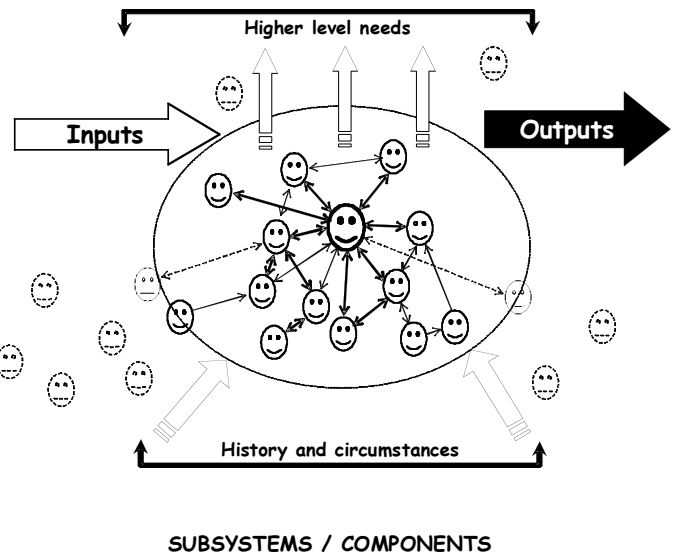


Fig. 3. The coalescence of a community of interest (CoI) around a "human attractor". The human attractor seeks knowledge to solve organizational needs addressing high level imperatives and goals. Bright smiley faces represent people/actors receiving organizational/social rewards for their involvement in addressing the organizational need. Such rewards reinforce the individuals' involvement in addressing the corporate need. Open vertical arrows indicate the value/importance of the assembled, ordered and directed knowledge in addressing higher level organizational requirements. The light dotted line surrounding the attractor's network indicates that participants and others begin to see the network as a specialized community addressing particular needs [15][6].

In the case of the scholarly society, the human attractor is generally a key editorial individual (or individuals) that are "attracting" others to interact in relation to the needs of the members and that of the society (as explained in figure 3, the bright smiley faces representing organizational social rewards). In figure 3 the light dotted line which surround the attractor's network would be reviewers and authors that are participating and others that are wanting to interact with the community's specialization and particular needs.

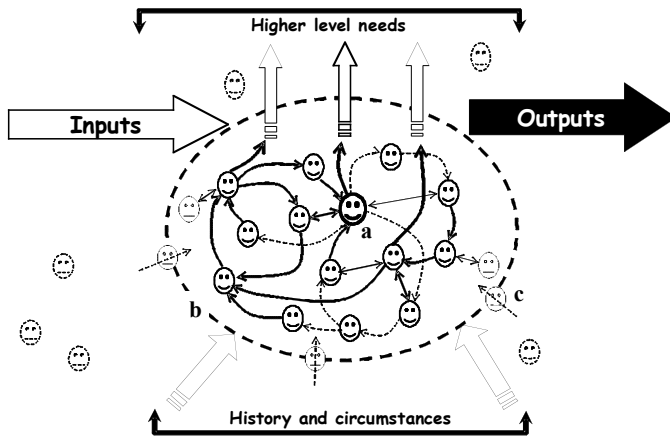


Fig. 4. Stabilization around a human attractor. Emergence of processes within a stabilized community of interest. Dashed arrows represent control processes. Solid arrows represent knowledge production processes. Knowledge about how to form and sustain the community is still emerging. **a.** Community facilitator. **b.** Emerging boundary between the system by those who identify themselves as participants in the community (for the purposes of the community only) and others in the community. **c.** Faces crossing the boundary are people in the process of being recruited and inducted into the community [15][6].

Nousala and Hall [15] discuss the coalescence of the community continuing as is the situation illustrated in Fig. 4. arising with the development of specific tacit procedures and routines necessary for sustainable development and maintenance within the community. Specific tacit procedures and routines represent tacit structural knowledge “at the level of the community as an entity in its own right [10]”. “It is at this point where the borderline of autopoiesis is reached [6] [15]”.

A key factor (amongst others) for the transition from community of interest (CoI) to a community of practice (CoP) is “if individuals receive personal and social rewards they value as a consequence of belonging to the community they may take active roles in maintaining community goals and aspirations, This diminishes the need for a particular personal attractor to coordinate organizational survival and growth. Thus, the community becomes more autonomous [6][15]”.

5. SCHOLARLY SOCIETIES AS COMMUNITIES OF PRACTICE

Societies have traditionally been key to the peer review process for its members. They have been well placed to maintain, develop and operate resource platforms for their members. Scholarly societies like all knowledge-based communities are highly complex systems that evolve and mature through the phased emergence of new features and capabilities. Development and support of successfully sustainable communities needs to be based on a better understanding of how these features and capabilities emerge. To comprehend the impact of emergent behavior within and beyond communities requires an understanding of the social or sociological aspects of a system in relation to the explicit formal/physical structures in the communal entity. The following figure 5, is a visual representation of the social or sociological aspects of a system

in relation to the explicit formal/physical structures in the communal entity displaying knowledge based activities of scholarly societies.

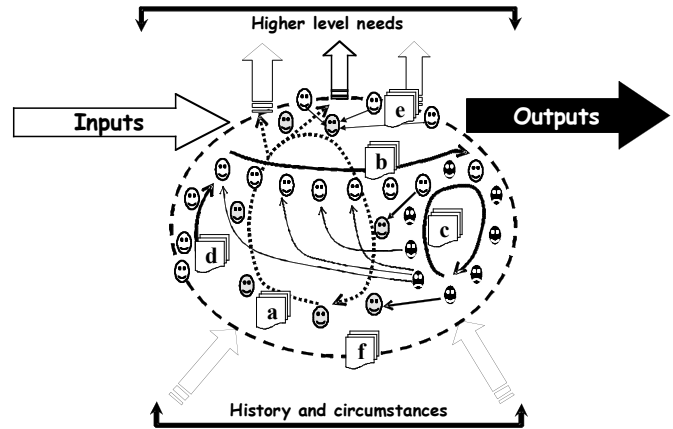


Fig. 5. Semiotic autopoiesis. State where the practices to form and maintain the community have been objectified and documented (as indicated by the records icons). Grey faces – those following codified knowledge (a.) about to manage internal and external monitoring processes providing overall feedback control. White faces – those following codified knowledge (b.) about the production process. Black faces – those following codified knowledge (c.) about the product quality control cycle. **d.** codified knowledge about induction process recruiting new individuals into the community to satisfy new needs and to replace attrition. **e.** codified knowledge about environmental monitoring processes. **f.** codified knowledge about how to establish and sustain the community itself [15][6].

Scholarly societies like any human organization, are hierarchically complex adaptive systems. Within these systems knowledge exists at many different levels in tacit or objective forms. This knowledge is necessary for the survival of the organizational system. Individual and organizational knowledge is held in a variety of forms. These different forms of knowledge range from tacit organizational routines belonging to internal communities [10] to physical layout of plant and offices [10] and corporate documentation [5][13][16].

The theory, which informs the discussion regarding communities of practice, is in part based on the Popper’s three world model [18][17]. The exchange between tacit and explicit and the individual (or community) and their larger knowledge networks occurs between “World 2 and World 3” as shown in figure 1.

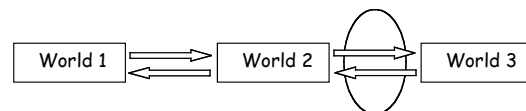


Figure 6. Modification of Popper’s three worlds diagram to show cyclical movements, The circle emphasizes cyclic exchanges between world 2 and world 3 as world 2 attempts to represent and interact with world 1 [14]

Harley [24] discusses scholarly societies as having “traditionally been major players in the publication and peer-review process”. Societies are key to managing, editing, maintaining, developing and operating resource platforms for their membership. Harley [24] argues that, “societies are thus well-positioned to managing several editorial and peer review functions. Harley [24] discusses the following as possible functions that scholarly societies could provide, including:

“The creation of *overlay journals*, minimalist journals that provide peer review but not a publishing platform [22]. Still fairly speculative at present, an overlay journal would mine self-archived “raw” author manuscripts from repositories and carry out publishing functions such as peer review management, editing, and perhaps branding [23]. The actual published content would continue to reside in the repository, perhaps with an updated postprint reflecting any revisions and updated metadata reflecting the journal/society brand that carried out the peer review. The overlay journal would then link to the content via a Table of Contents.

The creation of other outlets to aggregate and filter published content. For example, virtual journals published by the Joint Institute for Nuclear Astrophysics aggregate articles from other publication outlets for easy consumption [3]. Likewise, society-specific RSS feed aggregators could bring various types of publications together for scholars (similar to functions provided by H-Net listservs in some humanities and social sciences)”

Scholarly societies face obstacles from dependency on revenue to carry out a range of activities, including publishing. Other obstacles include scholars working in interdisciplinary and emerging areas may find it difficult to align themselves to a single society [24].

Organizational sustainability requires positive and negative constraints within the dynamic structure of the organization to support the emergence and sustenance of learning cycles. “Organizational learning cycles” [6] [10] begin with and involve coordinating the learning cycles of organizational individual members, who then share, combine and extend personal knowledge to build organizational knowledge.

6. CONCLUSION

For organizations to maintain themselves against entropy, change and competition, they must assemble, deploy, preserve and replicate knowledge to respond. Knowledge in the organizational context is any kind of information that has survival value [11][13][15][6][4][16].

Without the foundation of sustainable practice and processes, the build up of the internal knowledge networks will not occur. Instead, there will only be information systems and management, which do not function in the same way and can not take the place of tacit knowledge networks [11][12][16][25][6][13].

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