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Comment

SPECIAL ISSUE ON PEER-TO-PEER AND USER-LED SCIENCE: INVITED COMMENTS

Shirky and Sanger, or the costs of crowdsourcing

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ABSTRACT: Online knowledge production sites do not rely on isolated experts but on collaborative processes, on the wisdom of the group or "crowd". Some authors have argued that it is possible to combine traditional or credentialled expertise with collective production; others believe that traditional expertise's focus on correctness has been superseded by the affordances of digital networking, such as re-use and verifiability. This paper examines the costs of two kinds of "crowdsourced" encyclopedic projects: Citizendium, based on the work of credentialled and identified experts, faces a recruitment deficit; in contrast Wikipedia has proved wildly popular, but anti-credentialism and anonymity result in uncertainty, irresponsibility, the development of cliques and the growing importance of pseudo-legal competencies for conflict resolution. Finally the paper reflects on the wider social implications of focusing on what experts are rather than on what they are *for.*

Introduction: wikis and expertise

Internet technical protocols were established by organisations such as the Internet Engineering Task Force. IETF "hackers" were computer engineers and students influenced by the counter-culture, and therefore resistant to traditional forms of hierarchy. The founding belief of the IETF was that the legitimate basis for authority was autonomous technical excellence: "We reject kings, presidents and voting. We believe in rough consensus and running code", said David Clark.[1] That Internet expertise should be autonomous from state or business contexts was confirmed by the development of free software, where the high number of participants and the unequal nature of their contributions means remunerations must be symbolic.[2] In today's mass "Web 2.0" projects, respect and responsibilities also derive from the work accomplished for the common good. Do these developments mean citizens are establishing new relationships to science, based on more democratic and participatory processes? Or are we simply witnessing a new form of scientific elitism which may not be based on the credentials bestowed by a prestigious institution, but is nonetheless exclusive and closed to outsiders?

Over time, the distinction between scientists and non-scientists has been fluid and shifting. Scientists have used non-science as a foil, as a way of protecting their purity, and the boundaries of science have always been "ambiguous, flexible, historically changing, contextually variable, internally inconsistent and sometimes disputed".[3] What is new in the contemporary period is that the production of knowledge and expertise can be radically dis-individuated, becoming the result of anonymous collective work, of "crowdsourcing" involving small teams of dedicated contributors as well as loose coalitions of thousands of participants. But this opening up of online production to non-hackers has brought with it high uncertainty, as the qualifications of participants are not always easily discernible. This is particularly the case in collaborative encyclopedic projects such as Wikipedia.

Wiki means "quick" in Hawaiian. The core principle of a wiki archiving system is that anyone can create a page on the website, modify an existing page or change the site's structure by creating or removing hyperlinks. Editors who register an identity on Wikipedia, even if it is pseudonymous, can set up a personal page listing their accomplishments and interests as well as a "watch list", a page which automatically lists any changes made to articles they are interested in. This last capability stems from a wiki's built-in failsafe mechanism: any modification to a page generates a new version of this page and archives previous ones. Editors can consult the history of an article's creation as well as easily revert to an earlier version if problems arise. The result is a vast proliferation of articles, known as "mainspace".

Each article, policy or personal page comprises a "talk" page where editors discuss article content and site policy. Articles are never signed, contrarily to the debates on talk pages.

Mass peer production, based on transparent communication between participants, cannot abide the isolated stance of the traditional expert. Wikipedia's co-founder and chief spokesperson, Jimmy Wales, wrote in June 2008 that an open encyclopaedia requires a "ruthless precision in thinking" because, in contrast to the "comfortable writers of a classic top-down encyclopaedia", people working in open projects are liable to be "contacted and challenged if they have made a flawed argument or based [their] conclusions on faulty premises".[4] In other words, Wikipedia relies on interactions between individual authors and a massively distributed peer community. A vocal advocate of this model is Clay Shirky, who has argued that "Wikipedia's success dramatises a change in the nature of authority, moving from trust inhering in guarantees offered by institutions to probabilities created by processes".[5] An alternative perspective has been put forward by Larry Sanger, Wikipedia's other co-founder, who left the project in 2002 after clashing with participants who rejected his claim to greater authority (he holds a Ph.D). According to Sanger, traditional expertise is not incompatible with the freedom and fluidity of peer production processes. In 2006, on the occasion of the launch of Sanger's Citizendium encyclopedic project, which gives more weight to the opinion of experts than Wikipedia, Sanger and Shirky engaged in a spirited dialogue about the merits of expertise in collaborative projects. This discussion forms a useful starting point for an evaluation of crowdsourcing. An examination of the relative importance of traditional (or credentialed) expertise and of peer produced expertise within Wikipedia and Citizendium enables me to determine the costs of crowdsourcing when it is applied to encyclopaedia-building.

Citizendium, or the cost of deference

Collaborative knowledge production has been celebrated in a series of popular books such as Don Tapscott and Anthony Williams' *Wikinomics*, James Surowiecki's *The Wisdom of Crowds* and Clay Shirky's *Here Comes Everybody*. Its first core principle, already alluded to, is the rejection of credentials in favour of the public performance of competence. In 1984 Steven Levy defined the "hacker ethic" as the commitment to the free access of computers and information, the mistrust of centralized authority and the insistence that hackers be evaluated solely in terms of technical virtuosity and not "bogus" criteria such as degrees, age, race or position.[6] By and large, these precepts still inform online collaborative work. A second tenet of Internet knowledge production is that it is a collective endeavour – at the simplest level, anyone can authorise themselves to comment in a thread on an email discussion list, at the risk of seeing their contribution dismissed or aggressively challenged ("flamed") if it is deemed irrelevant.

On Wikipedia, expertise is thus no longer embodied in a person but in a process, in the aggregation of many points of view. This is why the inclusion of draft articles, known as "stubs", no matter how rough, was encouraged: because there was always a chance that they could be collectively edited and become pearls of wisdom. For wisdom to emerge, the crowd needed to be there in the first place. To ensure that recruitment was massive and remained constant, the Wikipedia experience had to be fun, that is to say immediate, with the key concept being "You can edit this page right now". The advantage of this development model is that projects can grow very rapidly. For example, it has been empirically borne out that the quality of a Wikipedia article improves following a reference to this article in the mass media, which brings in new contributors.[7]

For Clay Shirky, Wikipedia offers significant benefits in relation to the traditional Britannica encyclopedic model. Its online situation means it can easily link to sources: verifiability is enhanced. Because it is on the open Internet, the measure of the "possible virtues of [an] encyclopaedia now includes free universal access and unlimited reuse"; the Britannica model, "you pay us and we make an encyclopaedia", has become obsolete.[8] Britannica supporters argue instead that correctness, not access or reuse, is the cardinal virtue, pointing to such infamous examples as the charges laid against William Connolley.[9] When Connolley, a Wikipedia editor who in his day job was a climatologist at Cambridge University's British Antarctic Survey, attempted to correct mistakes on Wikipedia's climate change article, he was accused of "promoting his own POV [point of view] and of having systematically erased any POV which did not correspond to his own". His anonymous opponent brought him before Wikipedia's court of last resort, the Arbitration Committee, where Connolley was, for a time, duly punished: he was only allowed to make one "revert" a day, apart from cases of vandalism. Though this sentence had more to do with breaches of etiquette, with Connolley's not suffering fools gladly, than with

the promoting of a biased perspective, the case resonated deeply as it highlighted what can befall respected experts who wade into controversial wiki-waters.

This was the kind of incident which Sanger warned against in the early days of Wikipedia. Citizendium was established to remedy what Sanger viewed as Wikipedia's main defect, in contrast to Wales and Sanger's original, expert-based Nupedia project, of which Wikipedia was an offshoot: the lack of deference towards expertise. Citizendium aimed to combine the energy of wikis with the competence of identified specialists. Experts on Citizendium ("Editors") would self-certify by providing résumés and links to online supporting material such as academic homepages. They would then work together with "ordinary folk" (whose real names would be required) according to open-source principles. Experts would be tasked with "guiding" articles, mentoring anyone who wished to contribute, as well as with adjudicating disputes.[10]

In a series of exchanges with Sanger on the *Many To Many* weblog, Shirky voiced his objections, affirming for example that "the costs of certifying experts and deferring to them (…) will sandbag the system, making it too annoying to use".[11] Sanger's response was that Citizendium would be different from other environments because people would "self-select for the ability to defer".[12] In contrast, Shirky argued that in Wikipedia deference is shown to contributions, not to contributors, because the project does not recognise expertise in the first place; deference is manifested through "the survival of edits".[13] Several years later, it appears, in the first instance, that Shirky's criticism was well-founded: while Citizendium articles are of reasonably good quality, they are not very numerous. New participants to Wikipedia know that their contributions will have a significant audience; becoming a Wikipedia editor is trivial and instantaneous; since it lacks this immediate quality, Citizendium failed to attract the crowd. In addition the task of building a complex project does not just require experts, but also people willing to monitor progress and outline the work that needs to be done, for example by establishing and maintaining to-do lists of missing information. The result is that in January 2010 Citizendium listed 65 editors and 3,492 authors, while the English Wikipedia listed 1,700 administrators and 11,380,900 registered users (which no doubt comprise alternative identities, popularly known as "sockpuppets").

Direct costs of crowdsourcing in Wikipedia

What are the drawbacks of anonymous crowdsourcing? The costs for Wikipedia consumers and producers of doing away with editorial or expert oversight can be separated into two main categories: costs directly affecting the quality of the product, and indirect costs which divert resources from the task of building an encyclopaedia. I will summarise each of these in turn, starting with direct costs such as uncertainty, lack of perspective and irresponsibility.

Uncertainty: The "wisdom of the crowd" is not foolproof: the *possibility* that an event will happen does not mean that *it will in fact happen*: there is simply no guarantee that the eyes of the crowd will correct all the errors. As a result, Wikipedia articles lack consistency. Some are excellent; some are terrible. Readers can never be assured that information is accurate. Hackers affirming that their solution is the best are quickly subjected to their peers' evaluation: either the code runs, or it doesn't. In the case of Wikipedia, editors are not necessarily equipped to assess the accuracy of contributed information. Persistent fanatics can simply wear their opponents down to impose their views. And anonymity attracts propagandists, as revealed by the WikiScanner analysis of which corporations were manipulating information on Wikipedia.[14]

Lack of perspective: Information may be perfectly accurate, yet trivial. The absence of expert editorial oversight can result in a failure to distinguish the superficial from the profound, a collapsing of what is historically momentous and what is "just for the fans". In May 2009 the English Wikipedia entry on "Democracy" had 9,550 words, whilst the entry on the TV series "Lost" had 11,380 words, for example. By January 2010 "Democracy" had shrunk to 9,055 words, whilst "Lost" had expanded to 13,151 words.

Irresponsibility: If the crowd is in charge, no-one is accountable. The Seigenthaler incident of 2005 (whereby a vandal's satirical modification of a living person's biography was not discovered for several months) highlighted a troubling aspect of the Wikipedia model. Once the hoax had been revealed, commentators on the article's talk section did not express much sympathy for the victim, John Seigenthaler. Indeed, many were indignant that Seigenthaler, reputedly a free speech advocate, was now threatening Wikipedia: why had he not simply re-established the truth himself? Passing off the responsibility for dealing with the failings of software or information *onto the user* may be an adequate response when people *choose* to participate in a venture, as is the case with free software projects. It is absurd when people have no say as to whether they are being written about.

Critics would charge that these failings validate the notion that the *quality* of the eyes examining an encyclopedic project ultimately trumps their *quantity*. But are things really so different on Wikipedia? In reality, homegrown forms of classifying and credentialling participants have blossomed in the free encyclopaedia. For example, it is very common for Wikipedia editors arriving on the site of a discussion or dispute to check the volume and frequency of an interlocutor's edits.[15] More importantly, it is doubtful whether there really is no deference to traditional expertise on Wikipedia – if there wasn't, why would the Wikipedia senior editor known as Essjay have bothered to impersonate an academic?.[16] In a recent paper, Larry Sanger also suggests that traditional expertise plays an important role in Wikipedia: first, all the information featured must be based on expertise (in the form of "reliable sources"). Second, deference to expertise can be detected in specific areas of the project.[17] On Wikipedia "hard" science articles are less prone to controversy, as they are specialised, technical, non-ideological. There are exceptions - see climate change - but in general no one has any interest in deforming a Wikipedia article on plant morphology or on high-voltage circuit breakers. Such articles are usually written by authors who are competent. Technical experts who create quality content command the respect of their interlocutors, and it is only when non-technical topics are discussed that deference breaks down, edit wars erupt and manipulation becomes possible.

Indirect costs of crowdsourcing in Wikipedia

The main indirect cost of anonymous crowdsourcing, as practised on Wikipedia, is many-to-many fighting. Shirky's calculation of costs and benefits does not take into account this unavoidable consequence of a situation in which scientists, interested amateurs, consumers, advertising agencies, and industry spokespersons come together to debate the proper definition of reality with no clear means of telling who is an expert. In their survey of the patterns of conflict on the French Wikipedia, Auray et al. identified several factors which contribute to fighting, such as the number of participants (when there are more than ten, discussion increasingly moves to the talk pages of users, and is more likely to degenerate into insults); the location of disputes (current affairs involving inter-ethnic or inter-faith conflicts and "scientific" categories with low academic legitimacy such as homeopathy); and the identity choices of participants (suspected "sock-puppetry" or using alternative identities is a source of conflict; people who have not registered on the site and instead just use an IP address are more likely to be involved in semi-protected articles which is where disputes and insults typically occur. IPs are also more likely to insult others, so there are suspicions that IPs are registered users who use "socks" to engage in insulting behaviour which they would not dare to do under their registered identities).[18]

Administrative authority on Wikipedia is applied to the management of edits (should they be reverted?), of articles (should they be protected, deleted?) and of people (should they be counseled, warned, banned?). The absence of centralised editorial oversight, when combined with somewhat fuzzy conventions such as "notability", has resulted in a proliferation of micro-authorities with their own take on the rules. In addition, since the project's development relied in part on the constant entry of enthusiastic "newbies", the subsequent herding of these novice autonomous content providers by administrators along normative policy lines could not but generate resentment and the feeling of injustice, in the shape of participants who felt they had been ill treated, or even humiliated, by registered editors and admins. Unfairness can be hard to evaluate, as both sides in disputes invariably feel they are in the right, so a generic example will best illustrate the issue: creators of articles set its tone. Because of a "first-mover advantage", the initial text of an article tends to survive longer and suffer less modification than later contributions to the same article.[19] It is to be expected that article creators who maintain an interest in the article would put it on their watch list and, despite the project's injunctions, would experience feelings - if not of ownership - at least of heightened sensitivity and possible unhappiness if someone attempts to "improve" their baby. This problem is compounded when editors have administrative tools at their disposal.[20]

If editorial conflicts cannot be resolved, disputants can appeal to the supreme conflict-resolution body on Wikipedia, the Arbitration Committee. As the mastery of the socio-technical forms of evidence presentation enables experienced editors to present convincing cases, dispute resolution on Wikipedia has increasingly become affected by the mastery of this pseudo-legal culture.

In addition to time spent "wikilawyering", the management of disruptive users such as "sockpuppets" (who take advantage of anonymous editing's capacity to multiply identities) parasites the process of

collective knowledge production. Uncertainty over identity engenders high monitoring costs, requiring extensive police and judicial work. This does not only represent a diversion in terms of process and energy, but also in terms of recruitment and growth. Controlling identities has significantly contributed to the documented increase in the proportion of policy and regulatory discussion in relation to mainspace content;[21] it also means that the work of different categories of users is not being treated in the same way.

Casual users who add high-quality content have less chance of their edit surviving, as can be seen in the case of the lack of regard for people who have not registered on the site and instead just use an IP address: more than half of the text inserted by "IPs" on the French Wikipedia was deleted.[22] An increasing resistance to new edits was also found in Suh et al's study: the percentage of reverted edits in the English Wikipedia went from 2.9% in 2005 to 6% in 2008, and there was an increasingly higher likelihood of edits by unregistered editors or ordinary editors being reverted than edits by members of the administrative elite.[23] This disparity of treatment may be having a chilling or discouraging effect on recruitment, as the tremendous increase in numbers of participants appears to be tapering off.[24] Suh et al. have proposed a Darwinian explanation, whereby a diminishing amount of resources (in the form of creatable articles) results in increased competition (in the form of reversions).[25]

Conclusion: the significance of crowdsourcing

Were we to adopt the economics-based approach favored by Clay Shirky, we could say that the community management of anonymous expertise, as practised on Wikipedia, results in *extraordinary costs*, in the form of uncertainty and flawed perspectives for users; irresponsibility and increased judicial and police work for producers; to say nothing of the consequences of the resulting concentration of legal competencies.[26] The rise of participatory semi-scientific projects such as online encyclopaedias could perhaps be framed in terms of an increased social recognition for what Collins and Evans call "interactional expertise", fluency in a field in the absence of contribution, over "contributory expertise", real embodied skill acquired through immersion in a practice. These authors warn against the collapse of the idea of expertise.[27] In reality, the notion that amateurs are somehow "taking over" is untenable: expert authority is the foundation on which amateurs work.[28]

What discussions around expertise point to is to a questioning of the exclusive right of scientists to speak with authority. This reminds us of the conundrum posed by radical critics of technocratic industrial society such as Jacques Ellul and Guy Debord: how can "ordinary people" who have no idea about how to operate (say) an electricity grid, a hospital, or an airport, be expected to have an opinion as to the costs and benefits of these systems? In the end then we should not be asking what an expert *is*. The answer is clear enough: someone who knows what they are talking about (though new forms of verifying qualifications may need to be created). What we should be asking is *what experts are for*. In other words, what is the social purpose of expertise?

In 1970 Alexandre Grothendieck, one of the greatest mathematicians of the 20th Century, wrote that the social responsibility of scientists is to the common good. His condemnation of the links between research and the military-industrial complex was accompanied by an ecological epiphany, and by the realisation that both these issues were connected to the notion of *survival*.[29] Forty years later, the amount of time spent discussing the proper collating of knowledge (should the collators be credentialed or not? etc) needs to be related to the fact that in advanced societies expertise is the basis of social domination: the organisation of the social order is dependent on people in positions of authority being able to say what reality is, and on that basis, what the proper policies should be. It would be absurd to blame experts for all the ills that industrial capitalism and imperialism have visited on the biosphere. But the rising interest in democratising expertise can be interpreted as a response to the feeling that scientific expertise has failed to deliver good progress. Whether this feeling spreads, whether crowds engage with experts to produce policies and infrastructure, not just encyclopaedias, remains to be seen.

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