Normative Self-Regulation in the Emergence of Global Network Institutions: The Case of Wikipedia

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This paper presents the findings of a case study into the self-regulative mechanisms of the Wikipedia. It examines the means by which a volunteer community of heterogeneous actors self-organise and self-regulate to give rise to and maintain a global network institution. Theoretically, the study is concerned with the reciprocal interplay between macro and micro phenomena. More specifically it examines how macro level 'normative' structure emerges from the micro interaction of agents and fold-back to influence agent behavior as revealed through the only coordination mechanism available to them - that of linguistic utterance. A detailed analysis of illocutionary speech acts is undertaken on Wikipedia articles labelled as controversial. This analysis is used to identify the self-organizational and self-regulatory mechanisms at work. Practically, the findings have relevance to the study of computer mediated communication and the interplay between technology, social artefacts and individual agency, particularly in the context of 'open source' global networks. The findings are relevant, therefore, to understanding network organizations (Miles & Snow, 1978; Miles et al., 1997), network governance (Jones et al., 1997) and the so called 'Bazaar Governance' of open source (Bonaccorsi & Rossi, August, 2003; Christley et al., 2004; Lattemann & Stieglitz, 2005; Raymond, 2001). This paper forms a part of a three year EU research project titled 'emergence in the Loop' (EMIL).

Introduction

The World Wide Web has made possible new production processes that are global in scale. A new production model has resulted built around an 'architecture of participation' (O'Reilly, 2004). By exploiting the very low transaction costs of web media, the possibility exists to attract a small contribution from a very large and diverse group of contributors to develop information intensive products and services.

This is the general model which is argued to have made 'open source' possible. The Open Source movement is attracting attention as it represents a form of self-organization of social and productive activity quite different to both command and control and market based governance systems (Demil & Lecocq, 2003; Raymond, 2001). Open Source arguably lacks or has reduced reliance on the more common social ordering mechanisms, relying instead on self-organization across distributed networks (Muffatto & Faldani, 2003). The evidence makes clear that the mechanisms upon which open source relies were not preconceived but rather have been discovered through practice. Theory is struggling to catch up with and to explain the phenomena (see Rossi, 2004 for an overview). Understanding it is important if we are to appreciate how small local contributions can be effectively brought to bear on large scale global problems. How can the loosely orchestrated contribution of hundreds or even thousands of actors self-organise in order to generate a solution to some target issue or problem?

Interestingly, many Open Source projects have their rational beginnings in more traditional organizational and governance models. The Wikipedia is a good example of this. It began as an experimental side project to Nupedia (Sanger, 2005). Nupedia was intended to be a free encyclopaedia, but one assembled by conventionally constituted panel of 'experts' who would produce articles or peer review those contributed by others. It was anticipated that articles submitted on the new and experimental Wiki technology would feed into the Nupedia review process. The intrinsic openness of Wikipedia attracted increasing numbers of contributors and it quickly developed a life of its own, functioning independently to Nupedia and eventually overtaking it. It is, therefore, a genuinely novel emergent global institution and provides a useful case study through which to explore the wider Open Source phenomena as well as the self-organizing and self-regulatory mechanisms which underpin it. What are these mechanisms and how can we both study and model them? What theory and methods appear useful for understanding them?

The case study detailed here represents an initial attempt to answer such questions, focusing in particular on the micro mechanisms. It is part of a wider EU funded project tilted 'Emergence in the Loop: Simulating the two way dynamics of norm innovation' (EMIL). EMIL aims to advance our understanding of emergent social self-organization: Contributing both to conceptualization and furnishing methods for its study. Within EMIL, the target problem is cast as involving two intertwining processes – that of *emergence*; and the reverse process of *immergence*. Emergence is a concept widely used within systems, complex systems and multi-agent modelling communities (Gilbert, 1995; Holland,

1998; Schroder, 1998) to describe the process whereby (macro) pattern emerges from but is irreducible to a set of local (micro) interactions. Its widespread use is not, however, uncontroversial (Castelfranchi, 1998; Gilbert & Conte, 1995; Sawyer, 2001). The term immergence was coined by Castelfranchi (1998) to refer to the reciprocal process whereby (macro) pattern feeds back and influences (constrains, changes) the actions of (micro) agents Within EMIL, this interrelationship is to be examined by focusing on the emergence and immergence of social 'norms'. In other words it brings together a complex systems perspective and a sociological one.

Gibbs (1981) argues that *'Sociologists use few technical terms more than norms and the notion of norms looms large in their attempt to answer a perennial question: How is social order possible?'*. Not surprisingly then the concept has been incorporated into a wide range of alternative and often competing bodies of theory.

The normative literature can be largely divided into two fundamentally distinct groups. In the social philosophical tradition (Lewis, 1969) norms are seen as a particular class of emergent social behavior which spontaneously arise in a population. From this perspective, a 'norm' is a pattern identified by an observer ex-post. The defining characteristic of the pattern is the apparently prescriptive/proscriptive character – people behave 'as if' they were following a rule. By contrast, the view offered by the philosophy of law sees norms as a *source* of social order. This standpoint assumes the prior existence of (powerful) social institutions and posits them as the source of rules, which, when followed, lead to social patterns.

Therborn argues (2002: 868) people follow norms for different reasons. The extremes run from habit or routine to rational knowledge of consequences for the world. Between these lie:

- Identification with the norm or values – linking sense of self (identity) to the norm source (person, organization or doctrine) often leading to in-group-out-group;
- Deep internalization – self-respect – done independently to what others are doing.

Bicchieri (2006: 59) provides a rare hint at the cognitive process involved stating:

"To 'activate' a norm means that the subjects involved recognise that the norm applies: They infer from some situational cues what the appropriate behavior is, what they should expect others to do and what they are expected to do themselves, and act upon those cues."

This suggests a complex process of self-classification (how am 'I' situated with respect to this group and what is the nature of the situation in which 'I' find myself, does a norm pertain to 'me' in this situation and under what conditions and to what extent am I obliged to comply?).

The specific mechanisms by which norms reflect or reveal emergence/immergence, therefore, remain ill defined. To begin to identify which (if any) of these loosely defined mechanisms might be supported by evidence and to aid in the development of a theory of norms helpful for understanding the more general emergence/immergence mechanism, we selected the Wikipedia as a preliminary case study.

Analysis of Wikipedia activity

We began with the observation that the volunteers that have participated in creating the Wikipedia have emerged a set of permissions, obligations, rules and norms which appear to bring it into being and maintain it as an institution. These have been documented as guidelines and etiquettes as well as embedded in technical artefacts such as style bots. However, from a governance perspective there are relatively few means within Wikipedia by which formal control can be exercised using these rules and the community relies instead on the use of informal or 'soft' control. These mechanisms need to be effective in the face of perturbation from 'vandals' (task saboteurs), 'trolls' (social saboteurs), as well as turnover of contributors in the context of a task which can require the accommodation of emotionally charged and value based issues.

At its beginning in 2001 the only rule in Wikipedia was 'there are no rules' (Sanger, 2005). The aim was to live with 'good natured anarchy' until the community itself could identify and posit a suitable rule-set – to grow the rule-set based on experience of what was needed and what might work. Many rules emerged as the community struggled to deal with its exponential growth (Viegas et al., 2007). The need for, the nature of, and mechanisms for enforcement of these rules has, however, been a very controversial aspect of Wikipedia's development (Sanger, 2005, 2007). The founding Editor Larry Sanger has argued that in the early stages 'force of personality' and 'shaming' was the only means used to control contributors and that no formal exclusion occurred for six months, despite there being difficult characters from the beginning. Sanger notes that this took place within the context of a rapidly developing wider wiki culture which was opposed to rules of any kind.

As Wikipedia evolved, items were added to the 'What Wikipedia is not' page. These essentially clarified the aim of producing a credible encyclopaedia and marked out the distinguishing qualities of the genre. This clarification of goal – identifying what Wikipedia was intended to be by comparing it with what it was not – was initially the primary means for steering contributions. Founder Jimmy Wales then added the 'Neutral Point of View' (NPOV) rule which emphasised the need for contributions to be free of bias. The combination of clear purpose and the principle of neutrality provided a reference point against which all contributions could be easily judged.

Wikipedia can, therefore, assist us better to understand:

- The role and contribution of norms and rules to self-organization processes in volunteer on-line communities;

- The range and type of rules and norms used to self-regulate open global volunteer communities where there is little to no hierarchy and limited capacity for formal sanction;

- How these norms and rules are invoked, maintained and modified through communicative and administrative acts and the effectiveness of such acts;

- The relationship between goal, technical artefacts and social structures and the exercise of individual agency in self-regulation in volunteer online communities.

In Wikipedia there are two classes of activity: editing activity; and conversation about editing activity. This study is not concerned with the editing activity but with the self-organising and self-regulating phenomena which make it possible. Insight into this can be gained by examining the Discussion pages which accompany many of the articles rather than the articles themselves. The activity on the Discussion pages comprises a series of 'utterances' or speech acts between contributors about editing activity and the quality of product. On the face of it then, these pages should provide a fertile source of data to support analysis of how social norms operate. Discussion pages associated with articles identified as controversial were chosen as they represent an area of activity where the quality of relationships can be expected to be more critical to goal attainment and where social norms could be expected to play an important role in regulating behavior. We expected to see attempts by editors to influence the behavior of one another through the only means available to them – communicative acts. We anticipated that these may exhibit some regularity which would allow us to examine both the range and type of events that led to the explicit invocation of rules and norms and which revealed emergent influence patterns which were themselves normative. We wanted also to examine what conventions prevailed and how these compared and interacted with the goal of the community and its policies. A convention is defined here as a behavioural regularity widely observed by members of the community. Policies include explicit codes of conduct as well as guidelines (etiquettes) and principles.

Methodology

For the study we randomly selected a sample of thirty five discussion pages associated with controversial articles. At the time of the study (May/June 2007) there were 583 such articles. The preliminary analysis reported here is based on a sub-sample of nine of these articles.

Coding

As the computer mediated nature of Wikipedia communication means that no behavioural cues (other than linguistic) are possible. Wikipedia can be viewed as an institution founded on networks of commitments established, maintained and modified, exclusively in and through computer mediated linguistic exchange. It was anticipated that the process may involve quite subtle use of linguistic cues.

There exist a wide variety of coding schemes for natural speech. We considered a range of these before choosing to use the Verbal Response Mode (VRM) taxonomy (Stiles, 1992). VRM has been developed over many years and used in a wide range of communication contexts. Stiles defines it as *'a conceptually based, general purpose system for coding speech acts. The taxonomic categories are mutually exclusive and they are exhaustive in the sense that every conceivable utterance can be classified.'* (Stiles, 1992: 15). The classification schema has attributes very attractive where there is a need (as here) to capture many of the subtleties of natural language use that derive from and rely on the intrinsic flexibility and ambiguity of natural language yet map them to a more formal or axiomatic system needed for computer simulation.

VRM uses three structural (rather than functional) principles to classify utterances. These are a concern with whether the speaker frames an utterance on the basis of:

- his/her own or the others source of experience;
- presumptions the speaker makes about the others experience (feeling, perceiving or intending), and;
- Whether the speaker presents the experience from his/her own viewpoint or a viewpoint shared or held in common with another.

Using the above principles all utterances can be assigned a unique code. This code is classificatory and does not require a judgement to be made about degree. However a gauge of illocutionary 'force' is available through the resulting modes. The modes are defined by the points of intersection of the three dimensional matrix resulting from application of the three principles.

Mode	Descriptors
Disclosure	Informative, unassuming, directive
Edification	Informative, unassuming, acquiescent
Advisement	Informative, presumptuous, directive
Confirmation	Informative, presumptuous, acquiescent
Question	Attentive, unassuming, directive
Acknowledgement	Attentive, unassuming, acquiescent
Interpretation	Attentive, presumptuous, directive
Reflection	Attentive, presumptuous, acquiescent

Table 1 *Descriptors associated with Verbal Response Modes*
(Source: Stiles, 1992: 63)

The discussion pages were coded using VRM categories applied to both the literal and pragmatic intent. Additional codes were applied to identify: valence, subject of communication, explicit invocation or norms or rules and the associated deontic, whether the receiver/s accepted the illocutionary force of the utterance, and the registration status of the person making the utterance.

Initial Findings

Analysis revealed that utterances which involved a specific invocation of a norm or rule were rare (only 3.2%). Of these, 44% were generated in response to the form or presentation of an article, 28% in response to an editor's behavior, 22% in response to an edit action and 6% an article fact. Sixty three percent of all invocations involved specific Wikipedia rules or guidelines rather than general norms. All Wikipedia rules were invoked by registered users while 33% of general norms were invoked by unregistered users.

Sixty five percent of all utterances were phrased in a neutral or objective manner a further 22% were negative and 14% positive. The most common negative form was 'dismissive' (55% of all negative utterances), while the most common positive utterance was 'encouraging' (39% of all positive utterances). This suggests a convention of using neutral language. The observation that utterances were predominantly phrased in neutral terms should not be interpreted as saying anything about their factual basis. Some quite exotic ideas were expressed in neutral terms.

Twenty one percent of all positively phrased utterances were explicitly validated (accepted) and a further 56% went unquestioned. Only 3% of positive utterances were rejected and 20% ignored. It is surprising then that there was such a low usage of positive style, particularly as many of the Wikipedia etiquette guidelines encourage it. By comparison only 8% of negatively phrased utterances were accepted and 24% unquestioned with 27% explicitly rejected and a further 41% ignored. Negative behavior was clearly punished. The majority (52%) of neutrally phrased utterances went unquestioned, 21% were ignored, 11% rejected and 16% accepted.

Within VRM an utterance is coded twice, once to capture the form and once for the intent. In table two above, the rows relate to the grammatical form of the utterance (its strict literal meaning) while the columns relate to the pragmatic intent of the utterance. A typical utterance may take one form but reflect an alternative intent – for example, the utterance 'could you close the door?' has the form of a *question* but the intent of *advisement* – the speaker intends and listener to close the door. The relation of form to intent is expressed, "in service of" (Stiles, 1992) , in this case question in service of advisement (QA).

Edification in service of Edification (EE) is the most frequent form of utterance – 33% of all utterances were of this mode. The Edification mode is defined as deriving from the speaker's frame of reference, making no presumption about the listener and using a neutral (objective) frame of reference shared by both speaker and listener. This mode is informative, unassuming and acquiescent. As a strategy for influencing others it reflects attempts to convince by neutral objective argument.

The second most common mode is that of Disclosure in service of Disclosure (DD). Disclosure is defined as being from the speakers experience, making no presumption, but being framed using the speakers frame of reference. This is summarized as informative, unassuming but directive. Unlike EE mode, DD mode represents an attempt by the speaker to impose or have the listener accept the speakers frame. Eleven percent of all utterances adopted this form.

Pragmatic Intent

Form	Edific.	Confirm	Qn	Ackmnt	Interpn	Disclosure	Reflection	Adviset	Total
Edification	336	3	3	1	15	17	2	53	430
Confirmation	0	4	0	0	0	0	0	2	6
Question	4	0	55	0	1	2	1	18	81
Acknowledgment	2	2	0	49	0	0	0	0	53
Interpretation	1	0	0	0	30	0	0	4	35
Disclosure	101	2	4	3	7	106	0	53	276
Reflection	0	0	1	0	0	0	10	0	11
Advisement	0	0	0	0	0	0	0	84	84
Total	444	11	63	53	53	125	13	214	976

Table 2 *Verbal Response Mode Form by Intent – number of utterances coded*

The third most common mode is Disclosure in service of Edification (DE). The DE mode represents an utterance which is from the speaker's frame of reference but as if it is neutral or from a shared frame. Ten percent of all utterances used this mode. This is a somewhat neutral mode where the speaker offers clearly labelled personal knowledge as information.

The forth most common mode is Advisement in service of Advisement (AA). AA mode represents speech from the speaker's experience, which makes presumptions about the listener and adopts the speaker's frame of reference. It can be summarized as informative, presumptuous and directive. It commonly takes the form of 'you should….' Approximately 9% of utterances were in this mode. A further 11% of utterances have the directive pragmatic intent of advisement masked by using a less presumptuous form – that of Edification or Disclosure.

Fifty two percent of all questions were ignored as were 42% of all interpretations.

It was apparent from both the coding and the qualitative data that a great many utterances went unchallenged (47%) or were ignored (25%).

Discussion

What is significant about the utterance strategies is that they typically involve an exchange of assertions delivered with a neutral – i.e. non-emotive style. There are very few explicit praises, or put downs and few niceties like explicit acknowledgements of one another. Seldom do contributors refer to one another by name – the exchanges are rather impersonal. This does not tally with what one would expect if the Wikipedia etiquette (http://en.wikipedia.org/wiki/Wikipedia:Etiquette) had been institutionalized. If we assume that the etiquette captures the community's ideal, the emerged conventions do not conform to that 'ideal'. Similarly we see low levels of questioning or of reflection (i.e. feeding back the words of the speaker to check understanding or to come to better understand the others intentions). This is arguably inconsistent with the task needs – the need to reach consensus on controversial topics. The frequency with which utterances were ignored also suggested low engagement by participants in the discussion. Why might this be?

The absence of any expression of intimacy or acknowledgement of emotions and/or similarity of attitude (homophilly) among many contributors suggests that Wikipedia lacks many of the qualities of verbal exchange that would identify it as strong community. It is more consistent with being a place to share coordination of a task.

This could suggest that the goal is the primary orientating point. However, the lack of quality of discourse needed to achieve consensus is more indicative of a brief encounter between different and established milieu's which struggle to find common understanding rather than of a community committed to a common goal (Becker & Mark, 1997). This might suggest that the shared goal may be subordinate to more personal goals by a considerable proportion of contributors. Or it may be that the technology and environment simply will support no more than this. This environment includes the existence of sabo-

teurs who can use the opportunity afforded by the open and anonymous plat-form to use identity deception i.e. to mimic the language and style of an 'expert' or to present as a genuine editor while trying to pursue personal or political agenda hostile to the aims or interests of the Wikipedia. The discussions about controversial articles provide particularly fertile ground for such sabotage. This could have an overall influence on the type of conventions which arise. Editors may, for example, display reserve and suspicion, withholding trust and taking conventional signals of authority and identity (Donath, 1998) as unreliable. The first principle in the Wikipedia etiquette is 'assume good faith'. To do so would, however, leave the process more vulnerable to 'troll' activity. This is more sug-gestive of the convention having arisen as a social artefact based on what works rather than concern with 'unrealistic' explicit codes of conduct.

Utterance strategies between registered and unregistered editors did not vary greatly, although unregistered editors were more likely to use disclosure intent and more likely to ask questions (possibly associated with the increased likelihood that they are relatively new to Wikipedia). There was no significant difference between registered and unregistered editors either on the tendency to use neutral compared to positive or negative utterances.

There was considerable evidence of mind reading (theory of mind) – i.e. editors appeared to form judgements about the intent of others on relatively little information. There was, however, little evidence of the use of utterance strategies to better understand or check these theories of mind. The latter would include the use of questioning, reflection, interpretation and confirmation VRM modes. Editors appeared quick to judge and to then follow response scripts con-sistent with those judgements (e.g. ignoring or accepting utterances of others) on the basis of those judgements. Consistent with this, there were few instances of renegotiated patterns of communication style. Positions and styles stayed relatively constant over the period of the interaction. Only occasionally would an editor modify his/her style significantly if challenged. Of the rule invoca-tions 26% were accepted, a similar proportion were rejected or ignored and the remainder went unquestioned (but generally had no affect on behavior). This is consistent with norms viewed as being triggered by a limited range of cues which allow individuals to locate themselves and select identities appropriate to a context and which then remain essentially stable.

Conclusions and future work

In this study we set out to begin to identify mechanisms which underpin the emergence of systemic self-organization in a volunteer on-line global insti-tution and methods by which they may be identified. The findings have chal-lenged some of our assumptions and expectations, in particular:

- The more detailed and specific behavioural etiquette seems to have little in-fluence on the overall character and style of interaction.
- The overall quality of interaction of editors falls short of the range and qual-ity of communicative style characteristic of a community and consistent with what one would expect given the nature of the task.

Most regulation is achieved without the need for frequent explicit invocation of rules or norms. Rather, behavior seems to accord to a convention which editors quickly recognise and conform to and which minimally accommodates what needs to be done to satisfy the task in a context of somewhat heterogeneous personal goals.

There was a lack of evidence of active negotiation of expectations and standards and convergence of behavior towards a norm. Within the discussion pages there appeared to be an accommodation of a set of conventions and little obvious norm innovation, evolution, adaptation or extension. This suggests that on first encounter with Wikipedia editors read a set of cues as to what constitutes appropriate or acceptable behavior and then accommodate it.

The paper provides an example of how micro-influence processes may operate through the illocutionary force of speech acts and a method for studying how these relate to emergent self-organization in computer mediated institutions.

The research to date has raised a number of questions which require further investigation. We now propose to conduct this analysis for both archival discussion pages (from a period before the rules of Wikipedia became established and of current Featured articles. Our expectation is that in the former we may see more active use of norm invocation as a) editors will be more likely new to the wiki environment and b) there are few situation specific rules to draw on leaving only recourse to wider social norms as a means of checking inappropriate behavior of new users. Features sites reflect sites of high quality and this presumably may be based on effective social coordination of a diverse range of talents. It may be that greater community spirit will be evidenced on these pages.

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