Community, Consensus, Coercion, Control: CS*W or How Policy Mediates Mass Participation

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ABSTRACT

When large groups cooperate, issues of conflict and control surface because of differences in perspective. Managing such diverse views is a persistent problem in cooperative group work. The Wikipedian community has responded with an evolving body of policies that provide shared principles, processes, and strategies for collaboration. We employ a grounded approach to study a sample of active talk pages and examine how policies are employed as contributors work towards consensus. Although policies help build a stronger community, we find that ambiguities in policies give rise to power plays. This lens demonstrates that support for mass collaboration must take into account policy and power.

Categories and Subject Descriptors

H.4.3 [**Communications Applications**]: Bulletin Board Systems; H.5.3 [**Group and Organization Interfaces**]: Computer-supported cooperative work

General Terms

Human Factors, Design

Keywords

Wikipedia, collaborative authoring, community, policy, power

1. INTRODUCTION

Wikipedia is a collaborative effort to develop a free online encyclopedia, in which all are invited to edit articles or create new ones. Wikipedia's exponential growth reflects its position as arguably the largest collaborative authoring project in the world. Contributors to Wikipedia participate with different perspectives and ideas about how collaboration should proceed [12]. As Wikipedia becomes a popular and legitimated reference (e.g. [7]), the contest between viewpoints is increasingly apparent on the article pages. Kling [10] noted that social relations are multivalent, including conflict, coercion, competition, conviviality, combat, coordination, caution and control. A CS*W system that supports mass participation must accommodate behaviors spanning these multivalent social relations.

Wikipedia includes both technical and social mechanisms that provide a framework within which contributors work through Kling's various *c-words*. Policy is the central mechanism that Wikipedians have established to mediate and bound user activity, enabling the collaboration to move forward despite differences of opinion. These policies are dynamic and evolving – participants invoke, debate, and create policy in much the same way as they do when editing and creating encyclopedic articles.

Our research focuses on how Wikipedia participants apply and interpret policies on the talk pages that accompany each encyclopedia article. Through this lens, we find that consensus-seeking is the fundamental collaborative work that Wikipedians engage in and that policies are essential to that process. Unfortunately, some researchers unfamiliar with the CSCW literature still consider these critical aspects of collaborative work "costly" or, worse, "unproductive" (c.f., [9]). Groupware systems should seek to support rather than eliminate work related to consensus-seeking.

A body of policies is not a silver bullet for negotiation amongst diverse perspectives. While Viegas *et al.*'s argument that hyperlinks to policies make it "easy for moderators to point users to the precise rules they might be breaking" [19], we find more complex dynamics at play. Contributors may interpret a situation differently and draw on different policies to substantiate their views. A precise rule may not even exist. In this ambiguity, we find many examples of complex power plays that contributors make to control content and coerce others during the consensus process. At the same time, the ambiguity of the consensus process and its shared language, the policy environment, draws the community together. This is essential for maintaining social cohesion as Wikipedia undergoes mass participation. Our research indicates that adding consensus and community to Kling's list of c-words is important for informing the design of tools to support mass participation, in particular awareness tools and reputation systems.

We begin by describing relevant aspects of Wikipedia, followed by a review of related work. We then define a sampling technique used to focus our analysis. Next, the role of policy is described with the help of several long vignettes from our sample that illustrate how policy use cuts across the 'c-words.' We conclude by discussing design implications.

GROUP'07, November 4–7, 2007, Sanibel Island, Florida, USA.

2. ANATOMY OF WIKIPEDIA

Wikipedia pages are organized into subsets called *namespaces*. The principle encyclopedic *articles* of Wikipedia are in the *main* namespace. Associated with each article is a page dedicated to discussing the content; these *talk pages* exist in the *talk* namespace. A set of administrative pages belong to the *wikipedia* namespace, including pages that describe policies and guidelines. The *user* and *usertalk* spaces contain personal pages of registered contributors. A more detailed overview can be found in [14].

When one views a page in Wikipedia they are looking at a particular *revision* of that page. Each page has a *revision history* of every modification made to that page. This history consists of the revision time-stamp, user name of the contributor who made the change, and a comment. The Wikipedia interface allows users to view the full history of any page. If a user finds certain edits unacceptable, they can *revert* the page to any earlier revision. When participants disagree, they will sometimes go back and forth reverting each other's changes in an *edit war*.

Every Wikipedia user is considered a *contributor*. Contributors add content to Wikipedia either anonymously or though a registered account, but all contributions are logged. Anonymous users are logged by their IP address, while registered users have unique user names. Among registered users, a smaller group of *administrators* is granted privileges to protect pages, delete pages, block troublesome users, ban selected IP addresses and take other administrative actions. A registered user can become an administrator after being nominated for adminship by other administrators who recognize the significance of the user's contributions and adherence to Wikipedian principles. A panel of administrators then reviews each nomination, examining the candidate's contributions and hearing testimonials from the wider community. There are currently just over 1000 administrators.

Talk pages do not look like traditional discussions in Usenet or in email. There is no threading mechanism. A discussion often begins with a section heading and some text written by the first person to start a topic. Subsequent replies are entered below the heading, sometimes interlaced with prior posts and other times entered below all posts. Indentation is often used to indicate a reply, but this is not technically enforced. It is considered good etiquette to sign a reply with four tilde characters, which are automatically replaced with a time-stamp and the user's login name or IP address.

3. WIKIPEDIA POLICY ENVIRONMENT

We use the term *policy environment* to cover a hierarchy of policy types. At the top of the hierarchy are official policies, which are applied frequently by participants and carry the weight of legitimate authority. These policies are the most clearly defined and have the fewest exceptions. Violation of such a policy is grounds for user sanction such as being banned from the site. Next in the hierarchy are *guidelines*. Guidelines are less official than policies, but violation of a guideline still carries consequences. Guidelines are more open to debate and likely to have exceptions.

The policy environment includes a semi-formal proposal process for developing new policies. Policies can start out as *essays* that express the opinion of a small number of contributors. If there is enough support from the community, an essay can become a guideline and eventually a policy. Policies and guidelines can also be declared by the Wikimedia Board of Trustees or Wikipedia co-founder Jimbo Wales.

Name	Description
Verifiability	Sources need to be cited and reliable.
Blocking	Administrators may block users to protect Wikipedia and other contributors.
Civility	Be respectful and civil to others.
Ownership	Others can edit the content you write.
Disruption	Don't disrupt Wikipedia to illustrate a point about problematic policies.
Be Bold	If you notice an error, take action.

Table 1: Example policies (top 4) and guidelines (bottom 2).

Currently there are 42 official policies, 24 guidelines, and several hundred essays. Table 1 provides a few examples. We will not elaborate them here, but we will refer to and explain relevant policies in our analysis. We will use the term *policy* in the general case to mean policy, guideline or essay. When the distinction is important, we will use the more specific term.

Policies serve a critical role in structuring collaboration on Wikipedia. At the most simple analytical level, the policy environment provides new users with a resource from which to learn editing and behavioral conventions [19]. When a new user violates a convention, an experienced user can refer to an existing policy, serving to socialize the user in acceptable practices and reduce the burden on experienced users. Appeals to policy also give contributors a shorthand method to validate actions taken in response to trolls.

Violators of policy are subject to formal sanctions. Aside from administrators' ability to ban or block users for violations, there is a dispute resolution process that Wikipedians are supposed to follow when conflicts escalate. The first step in the process is to make a "request for comment." This brings the conflict to the attention of the wider community that can help diffuse the situation. If the conflict continues to escalate, participants can make a "request for arbitration." An arbitration hearing is a formal proceeding in which contributors are judged by an elected board of arbitrators based on their adherence to policies. If the case is accepted, the conflict is reviewed, a decision made, and policy violators are blocked, banned, or put on probation.

Policy can have a strong impact on behavior in mass participation. For example, Buriol *et al.* [4] performed a quantitative analysis of reverts and discovered that reverts were cut in half in the months following the institution of the `three-revert rule`, which bounds the number of times contributors may revert each other's changes in an edit war.

A contributor can reference Wikipedia policy in different ways. One common method is to create a hyperlink to the relevant policy page in the wikipedia namespace. The user can both name the link and point other users to the specific text of the policy. Such a link allows for a contributor unfamiliar with the policy to easily learn about it. In this paper we use the `typewriter` font to indicate a policy link shortcut. In the example below, contributor U2 relies on policies to educate user U1 regarding the proper use of hyperlinks to external sites. We use the notation [U1] to indicate the user U1's signature.

> If there is a site that is updated many times a day... is that a good external link to have?... [U1]
>
> The link in question has Google ads. It's been my `WP:SPAM` experience that the more someone objects to a link's removal, the more likely it is that the intention of adding the link is to generate traffic and revenue to that site. `Wikipedia's external link policy` discourages non-notable, ad-heavy sites... [U2]

In this example the respondent uses `WP:SPAM` to link directly to a policy. The "WP" indicates that the page is in the wikipedia namespace and "SPAM" is a shorthand name for the policy. All policies can be referenced with this notation. The example also contains a traditionally named hyperlink `Wikipedia's external link policy`, which links to a guideline describing criteria for determining appropriate websites to reference in an article.

4. RELATED WORK

Conflict – and how to handle it – is both a practical and theoretical concern for collaborative systems. Usenet bears a particular resemblance to Wikipedia. Both systems are home to a wide variety of topics. Wikipedia talk pages, like newsgroups, are populated by mini-communities that are a subset of the wider community. Both systems are open, in the sense that anyone may participate, but a cadre of "regulars" often dominate discussion. While both systems include heated discussion, Wikipedia presents the extra challenge of the shared production of an encyclopedia.

Conflict in Usenet. However welcoming a community might be, a community must establish boundaries. One boundary mechanism for newsgroups is the scope of acceptable topics. Community leaders curtail discussion when they feel it has strayed, often through informal policies about acceptable questions and topics. At the same time, it is precisely these leaders who, because of their status, may push the boundaries of what is an acceptable topic [8].

Usenet's tradition of Frequently Asked Questions (FAQs) often established principles for the community. Like policy use in Wikipedia, FAQs helped newcomers quickly learn the rules of the community, and gave members something to point to when conflict arose. Simply citing policies or FAQs, however, does not lead to smooth resolutions of all conflicts. Kollock and Smith [11] point out that although successful communities must have rules, the rules of Usenet are difficult to enforce. Our analysis of policy use in Wikipedia confirms this and extends the result.

Conflict in Wikipedia In recent years, researchers have moved from Usenet to study conflict in Wikipedia. Using History Flow, Viegas *et al.* [18] examined the history of 70 articles and found that edit wars, a symptom of conflict, are quite prevalent and not limited to controversial topics. Moreover, they noted that these edit wars tend to be connected with increased activity on the discussion pages.

In a follow-up study, Viegas *et al.* found that talk pages play a key role in coordinating article creation [19]. They coded sections of 25 talk pages spanning a variety of subjects and popularity, and found that coordination requests and suggestions for changes were the most prevalent type of discussion on talk pages. They also found that references to policy were present in 8 percent of posts. Their analysis revealed that between mid-2003 and late-2005, the number of administrative pages grew at a rate nearly 8 times that of the main article pages, suggesting the growing prominence of policies. Although they did not focus on policy use, Viegas *et al.* conclude that "there was never a [heated exchange] that could not be controlled by the community and its collective resolve in pointing contributors to official Wikipedia policy pages" [19]. We use this as a point of departure: we have found numerous instances where fundamentally different interpretations of policy have led to a breakdown of consensus and policy references does not lead to resolution. We find that Wikipedians are engaged in complex power relationships that do not necessarily reflect collective resolve.

Recent work by Kittur *et al.* [9] claims that the amount of "direct" work (work that leads to new article content) is decreasing and that Wikipedia is experiencing rising costs in coordination and conflict resolution. They base this claim on the finding that contributions to non-article namespaces are proportionally decreasing. They employ a machine learning classifier trained on controversially marked pages in Wikipedia (see 5.1) to find that the number of revisions to a talk page is the most predictive metric of a page being marked as controversial. While it is not the most significant indicator, the classifier identifies that the number of unique authors of an article is negatively correlated with controversially-tagged pages. They conclude that focusing community attention on controversial pages helps to resolve conflict. In retrospect, their classifier has actually identified Wikipedia's existing formal mechanisms (*i.e.* dispute resolution or even a review for feature article status), which results in more editors being asked to review and modify an article.

Kittur *et al.* also created a tool to analyze a page and identify a network representation of contributors. Links among contributors represent reverts done to each other, in an attempt to identify conflict amongst contributors. They acknowledge that reverts are not the only indicator of conflict, but that it provides a useful proof of concept. Reflecting yet again on their claims, their network perspective is reflecting the "in-group" and "out-groups" of a given article. That is, the visualization is potentially a lens into the set of individuals who have, for the time being, claimed legitimate authority over the article and are able to enforce their own changes and those whose changes are likely to be rejected. However, Kittur *et al.* do not unpack the social practices reflected by their tool, apply their visualization analytically to further our understanding of how conflict unfolds, or describe how their visualization may help the consensus process. Our work describes the practice of policy use and identifies consensus-seeking as a rich domain for tool support.

Pentzold *et al.* [14] frame discursive practices in Wikipedia using Foucault's discourse theory. In an analysis of four months of comment history for a single article, they find policy to be an important factor for *rules of limitation*, which "delimit the sayable, define legitimate perspectives and fix the norms for the elaboration of concepts" [p.65]. Our study provides a different lens. First, we examine talk pages – while conflict is evident in both the comment history and on talk pages [18], Bryant *et al.* found that Wikipedians consider talk pages to be their primary means of communication [3]. Second, we employ a grounded approach to analyze a purposefully sampled set of talk pages across a range of articles. Third, our treatment of power differs significantly. Although we agree with Pentzold *et al.* about the connection between power and knowledge production, we approach the collaboration problem differently. Our approach follows from Giddens' criticism of Foucault – that

his approach overemphasizes the power of the institution and neglects the actions of individuals that collectively and recursively generate such structures [6, pg 145-161]. In contrast, we examine *power plays* – how groups of contributors claim legitimate control over content through the discourse of policy.

5. STUDY METHODOLOGY

In this section, we describe how we purposefully sampled for active discussions and analyzed the articulation work [15, 16] from a Grounded Theory perspective [17]. We conducted our analysis with the November 2006 English language Wikipedia data dump.[1] All talk pages were parsed to mark each hyper-linked occurrence of a policy. This allows us to distinguish discussions with many references to policy from those in which policy use is less prevalent.

5.1 Finding Active Discussions

The first step of our sampling procedure was to focus our attention on pages with the most discussion (*tail sample*), and then hone in on the most active parts of those pages (*critical sections*). The discussions that we analyze are sampled from these critical sections.

Tail sample. Nearly all measurable metrics within Wikipedia follow a power-law distribution [20, 2, 21], indicating that most editing activity can be captured on a few pages. Moreover, Viegas *et al.* observed that edit wars appear to be correlated with increased activity on the talk page [18]. We therefore reasoned that a *tail sample* of pages with 250 or more revisions to the talk page would provide a rich window into conflict in Wikipedia.[2] This tail sample accounts for only 0.3% of all talk pages, yet it covers 28.4% of all talk page revisions.[3] More significantly, it captures 51.1% of all policy links made, indicating that policy use factors especially strongly in active discussions.

Critical Sections. Talk pages in the tail sample often include multiple years of discussion, dispute, and negotiation. To focus our study, we define a *critical section* of a page to be a time period in which there is a large number of revisions to both an article page and its associated talk page.

Consider the revision history H of some page (either an article or a talk page). In order to locate significant parts of H, we group revisions by month. Because using the total number of revisions as the sole indicator of activity is problematic (described below), we define a metric χ to characterize the amount of activity during a given month. Let r be the number of revisions that took place in H during a month m, and c be the number of unique contributors who made those revisions.[4] Then,

$$\chi(m) = \frac{r}{c} \ln(cr) \tag{1}$$

We use this metric for two reasons. First, exponential growth in the number of contributors results in many more revisions in the recent past. However, we do not want to bias the metric against policy dynamics in the early part of a page's history. We therefore use the number of revisions per unique contributor in a given month (the first term of the equation). Second, we want to capture months with a high volume of editing activity. Therefore, we scale χ by the product of the number of revisions and unique contributors. A log factor is applied to this term to offset the exponential growth in the number of contributors.

We then use χ to define the months with high activity. Let M be the set of months since the page was created and μ be the average of χ over all $m \in M$. The set of significant months M' in a page's history includes months $m \in M$ such that $\chi(m) \geq \frac{3}{2}\mu$, or those months for which the activity is significantly above average.

We can now define the critical sections that we will sample from. For a particular page, let M'_A and M'_T be the significant months for article and talk revisions respectively. The critical sections for the page are the sets of consecutive months where both article and talk page revisions are significant ($M'_A \cap M'_T$). Discussions we study are taken from the critical sections of pages in the tail sample.

5.2 Categorizing Discussions

The next part of our sampling procedure creates a classification scheme for critical sections that allows us to purposefully sample from different classes of discussions. We use two natural categories defined by the Wikipedian community and one that we define to distinguish sections that are exceptionally saturated with policy use. These categories were chosen to ensure that we examine policy use across possibly different forms of collaboration.

Natural categories. Each critical section can be categorized with respect to two article-level classifications defined by the Wikipedian community: *featured* and *controversial* articles. Wikipedia regularly confers *featured article* status to articles that characterize exemplary encyclopedic standards. This is regarded as the highest achievement for an article [3]. An article becomes *controversial* if a contributor inserts a particular template at the top of the talk page that marks the page as controversial. Although the use of this tagging mechanism is not always consistently applied, the majority of pages tagged as controversial are ones in which contributors are in dispute. A critical section is considered featured or controversial if it is part of an article that is classified as such. We employ these natural categories in order to capture community-labeled successful collaborations and controversial pages.

Policy-laden. We further distinguish critical sections whose discussions are highly saturated with policy links. For a critical section c, we define a measure of the policy prevalence:

$$\text{policy-factor}(c) = \frac{p}{t} \ln(pt) \tag{2}$$

where p is the number of explicit links to policy in c and t is the number of revisions to the talk page in c. The first term measures the density of policy (cited policies per revision) while the second term adjusts for the volume of policy use. The volume is adjusted by a log factor so that the density remains significant. We define a critical section as *policy-laden* if its policy factor is greater than or equal to twice the average policy-factor across all the critical sections.

[1] From http://download.wikimedia.org/

[2] In the distribution of revisions per talk page, 250 is where the tail of the power law approximately begins.

[3] Wikipedians often archive old discussions. We account for this practice by generating a "consolidated" history for each talk page that includes all revisions in a page's lifetime.

[4] Anonymous contributions are not counted toward c.

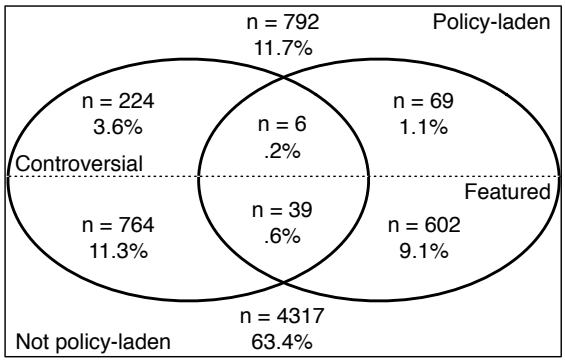

Figure 1: Critical section sampling categories

5.3 Sampling and analysis

Using our method, any critical section can be coded *controversial*, *featured*, or *policy-laden*. The permutations of these codes comprise the *sampling categories*. Figure 1 shows the total number of critical sections in each sampling category. The two ovals in the figure represent the natural categories of controversial and featured critical sections (1033 and 716 critical sections respectively). The dashed line through the middle of the ovals separates policy-laden from the non-laden critical sections. We randomly selected nine critical sections from each sampling category, yielding 69 critical sections for analysis.[5]

We approached qualitative analysis from a Grounded Theory perspective [17], performing open coding and axial coding to identify a range of behaviors and categories that characterize the space of policy-laden discussions as well as what is happening when policy is not explicitly being linked (non-laden discussions). We made special effort to sample and analyze areas where disconfirming evidence might be found (*e.g.* not-featured and not-controversial).

What follows is a description of our findings based on a number of representative vignettes from the critical sections. We do not claim to have exhausted all possible analytic categories; however, we believe that our sampling strategy and analytic categories provide an interesting perspective on how collaborative systems and the policy environment help mediate and enable effective work. We first describe the interpretative role that policy plays and then analyze the power dynamics at work within the ambiguity of the policy environment. We focus our analysis on the interactions between contributors who are not obviously trolls. Some of the discussion excerpts have been slightly reformatted to make them easier to follow. We have also anonymized text that might reveal the original article in order to protect the identities of the contributors.

6. THE DISCOURSE OF POLICY

Policy structures collaboration by providing a common language and strategies for action that contributors can draw on to interpret and apply to difficult or unanticipated situations. For example, in the following excerpt, contributors to an article about a seasonal event discuss whether they can include a value calculated by one of them from a data-set published by the U.S. government. They conclude that they cannot because it would constitute an original synthesis of material, thus violating the `no original research` policy. Note how the contributors will even invoke policy without linking to it simply by writing the name or shorthand for the policy (e.g., "it would be OR, no?").

> Is the mean... not considered original research? [U3]
>
> It doesn't look like it to me, it looks like the original research was done by [Gov't agency] or am I missing something? [U4]
>
> If the [Gov't agency] has not published the actual mean, us "calculating" it would be OR, no? I'm not sure. [U3]
>
> No, why would it be? Extrapolating data from info already available is not OR. [U5]
>
> From `WP:NOR` "articles may not contain any new analysis or synthesis of published arguments, concepts, data, ideas, or statements that serves to advance a position." For what's worth... [U4]

Interpretations of policy, however, are by no means consistently applied. In a different article, two contributors confront a similar question of synthesis but accept a different interpretation. In this passage POV means "point of view" which is often used in Wikipedia as a pejorative to suggest bias on the part of a contributor.

> Your notion is `WP:OR`. I can easily provide... a scholarly article that says that anti-authoritarianism is not central to Panism. You are synthesizing all kinds of ideas here, based on your POV. [U6]
>
> Simple deductive reasoning is not original research. Panism is inherently anti-authoritarian; therefore, an authoritarian economic system cannot be Panist. Which do you disagree with: the premise or the conclusion? [U7]

Decisions about whether a piece of text, link, or image should be included, reordered or rephrased are all grounds for heated discussion. Resolving these disputes through consensus is the most fundamental discursive work that Wikipedians perform. Policies and guidelines support this work by providing a shared terminology for Wikipedians to use while debating their views with the (usually) shared purpose of creating a quality encyclopedia.

But policies are principles, not hard and fast rules – in many situations application of a relevant policy does not translate into an obvious action. Vignette 1 (next page) demonstrates the trouble that contributors have with conflicting interpretations of policy, in particular with applying Wikipedia's policy that articles should express ideas from a Neutral Point of View (NPOV). The discussion concerns a content page about a political blog (PB) that uses strong language to describe those with whom the blog has differences. In this exchange we see how the contributors struggle to write "neutrally" about a polarizing topic.

Policies are used to appeal to authority in order to justify changes to an article or find fault with contributions. Such appeals are part of the consensus process in which intended and executed actions are debated. In Vignette 1, initial exchanges concern the reliability of sources and the neutrality of the text. A second attempt to justify the removal of the anonymous user's entries is made on the basis of it being original synthesis. The dispute next moves in a behavioral direction, with each side accusing the other of violating policies regarding civility and reverting. The dispute even turns to the question of Wikipedia's moral position in describing the PB. Notice that U8's and U9's policy links without explanation demonstrate failed attempts to invoke authority – policies are useful only to the extent that contributors are able to argue for their relevance and saliency as they work through their multivalent social relationships.

[5]Each critical section was between 10 and 100 pages of text.

Vignette 1 Policy-laden + Controversial. Illustrative example of the use of policy during a content dispute

Please do not revert solely to remove references. Just because you don't agree with the references shouldn't mean they should be removed. [ANON0]

> Your edits are not sourced, nor are they NPOV. The word 'radical' for instance is potentially a pejorative term. Your generalization about the anti-[Byzantine] views is also troubling in this regard. The source you cited does not support your claim in that regard. [U8]

The source I cited ([link]) shows protestors advocating peace. The site [PB] refers to them as "terrorist enablers". How is this not radical conservativism? [unsigned]

> ...your edits constitute `original research`, which is prohibitted on Wikipedia. ...However, the issue of original research is really paramount here, rather than issues surrounding [Byzantines]. In order for your edits to conform to Wikipedia policy, you need to find a reliable source which documents that PB is a radical conservative site, and similarly reliable sources for your other edits. [U8]

[U8] has a known history of reverting to remove references (please refer to his Talk page). He has been banned in the past for "revert bombing". He hides behind "NPOV" arguments, when the reality is he's removing information that further substantiates articles...The solution to "questionable" references isn't to carpet bomb reverts. Positive examples of non-hate speech should be put as a counter, if so desired. [ANON1]

> `Wikipedia:No personal attacks`. [U9]
>
> > It's not a personal attack. It's a response to reckless rv'ing and trashing references. Under a guise of "NPOV" these posters ARE shifting it to their point of view. They should be dealt with appropriately. [ANON1]
> >
> > > All I have done is remove rants and unencyclopedic content from the article. [U8]

[W] also engages in revert carpet bombing (and he supports [U8] for doing so – again, see [U8]'s talk page). Unfortunately, as he's inexplicably a Wikipedia admin, I'm not sure there's much we can do about it... - unsigned

> Yes, I'm surprised at the accusation (made by [ANON1]), because I have only reverted this page once, when after attempting to phrase some of the criticisms more neutrally, the partisan ranting was immediately reinserted. ...Wikipedia is not a soapbox...Considering the number of media outlets that have criticized PB, it shouldn't be too difficult to put together a sentence that makes this point in a coherent manner. [U10]
>
> > [ANON1] informs me that he's read the NPOV policy, but he does need to make more of an effort to follow it. It's not OK to say that the site exists in order to stir up hatred, especially when we already cover these accusations later in the article, phrased in a more neutral way. Even the scare quotes around "coverage" are unprofessional. [U8]'s solution, changing "coverage" to "analysis", is good. [U9]

Ask yourself, "what is PB"? You had a large number of references that refered to it as a hate site, and were subsequently removed. You have hundreds of comments ON the site that say "I hate [Byzantines]" and "I'd like to kill them". Why are we trying to sugarcoat hate with "neutrality"? Why are people trying to claim NPOV when they're really just removing references that show the site as it actually is? Why are we doing a disservice to those coming to Wikipedia, looking for unbiased information?...Removing references is a reckless and dangerous practice. [ANON0]

> See `No original research`. [U8]
>
> > Original research definition: "material added to articles by Wikipedia editors that has not been published already by a reputable source". Quotes directly from PB don't qualify as "a reputable source"? By your logic, a politician's quotes wouldn't be permissable in an article about the politician. By the way, these 2-3 word responses don't say much. "See No Original Research", "Don't use scare quotes". Explain your arguments, make your case. Don't just axe content. [ANON1]

7. POWER PLAYS

When an action is out of bounds, a policy invocation can make that clear. However, as we have illustrated, policy invocation can be inconsistent and lead to debate over interpretation. Even within the bounds of policy there will still be contention and conflict when contributors feel that they can influence the outcome. We refer to all such vies for power as *power plays*. A power play is an attempt by an individual or a group to claim legitimate control over an article. Vignette 1 can be interpreted as a series of power plays between the two sides. In this section, we explore some common forms of power play that we found throughout our sample. While our analysis focuses on talk pages, power plays are not necessarily confined to talk pages and are not always instigated through a policy invocation. A power play is frequently intertwined with changes to the article, which might include actions that violate policies (*e.g.* making more than three reverts in a row). These actions, in turn, become the subject matter for reciprocal power plays. We found seven types of power plays to be the most prevalent:

Article scope. Central and peripheral content is strictly delimited by an individual or core group of contributors.
Prior consensus. Decisions made in the past are presented as absolute and uncontested.
Power of interpretation. One sub-community commands greater authority than another.
Legitimacy of contributor. Traits of a contributor (*e.g.* expertise) are used to bolster or undermine a position.
Threat of sanction. Threatening to use sanctioning mechanisms (*e.g.* blocking) or to pursue formal arbitration.
Practice on other pages. Content organization on other articles is used to validate or discredit contributions.
Legitimacy of source. The cited source is discredited.

Due to space constraints, we provide detailed analysis of the first four power plays through representative vignettes. Our explanations will highlight these specific power plays.

7.1 Struggles over article scope

An article's scope is a prevalent focal point for power plays. In Vignette 2, a newcomer has proposed to include some sociopolitical aspects to an article on a frequently debated scientific topic. A core group of contributors defends their decision to restrict the article to scientific aspects of the topic, thus delimiting legitimate article content.

Policies are ambiguous on scoping issues. One of the relevant policies, `Wikipedia is not paper`, states that the main article on a topic should summarize the important subjects and provide links to sub-articles with more in-depth

Vignette 2 Featured. Debate over what themes should be represented in the article

> This page is about paleocentrism as a scientific theory and all other controversies that this theory has with religion does not need almost 1/3 space in the article. . . I do not want to do these changes before getting feedback. . . [U11] [a number of users agree]
>
> . . . consensus is bullshit because I have the facts on my side. I also have the exhortation of Wikipedia to `be bold`. . . deleting a discussion of the Catholic church's. . . view of paleocentrism is not only inaccurate, but violates NPOV . . . .Deleting/emasculating it would violate several Wikipedia policies: `NPOV`, `be bold`. . . If you all want an article just on the scientific theory of paleocentrism, write one yourself. [U12]
>
> We DID write an article just on the scientific theory of paleocentrism, before you showed up. . . You're obviously new here, [U12]. . . arguing based on your reading of `NPOV` and `Be bold` is a bit ridiculous, like a kid just out of high school arguing points of constitutional law. These things are principles that have an established meaning. People who have been here for years understand them much better than you do. They won't prove effective weapons for you to wield in this argument. . . [U13]
>
> The social impact of "paleocentrism" is not "paleocentrism". . . `Wikipedia:wiki is not paper`, we don't need to cram every tertiary aspect of the topic into the article proper, and we don't need to consider it incomplete when we don't . . . [U14]
>
> . . . the first thing the link `Wikipedia:wiki is not paper` says is:""Wikipedia "is" an encyclopedia."" A real encyclopedia like Encyclopedia Britannica has a fantastic section on paleocentrism, including all the social, political, and philosophical implications. [U12]
>
> . . . EB writes a few select articles about important subjects in great depth; fine. That's not what Wikipedia does. The reason why so many people feel that this article should be only about the scientific aspects of paleocentrism is that Wikipedia articles are written about a SINGLE SUBJECT. . . You are proposing to mix two VERY DIFFERENT subjects. . . [U13]
>
> As discussed at `Wikipedia:wiki is not paper`, Wikipedia articles should give a brief overview of the centrally important aspects of a subject. To a biologist like yourself, the centrally aspect of paleocentrism certainly isn't its social implications, but to the rest of society it is.. . . [U12]
>
> . . . What you're talking about isn't "paleocentrism". Central issues to paleocentrism are periodic equilibrium, geomorphous undulation, airation. These are the issues that actually have to do with the process of paleocentrism itself. These "social aspects" you're talking about are "peripheral", "not central". They are "about" paleocentrism, they "surround" paleocentrism, but they "are not paleocentrism". . . [U15]

information. It is then up to the contributors to debate what is considered "important." In Vignette 2, [U12] strives to demonstrate the importance of the sociopolitical topics (e.g. by citing the prominence of paleocentrism in the media and the practice of Encyclopedia Britannica). [U12] even attempts to mobilize the `be bold` guideline to justify his stance against removing the content.

Such struggles over article scope take place even in a hyper-linked environment because the title of an article matters. The "paleocentrism" article is more prestigious and also more likely to be encountered by a reader than an article entitled "the social effect of paleocentrism." An anonymous user articulates this tension in a discussion regarding another article where the same type of power play occurs:

> This is true but the article is entitled "Hyper modulation" not "The Scientific Case Surrounding Hyper modulation." Most people will type in just "Hyper modulation" so like it or not this "IS" the front-piece of the encyclopedia. . . [ANON2]

7.2 Power of prior consensus

Consensus seeking is perhaps the most critical work done on talk pages. By explicitly discouraging voting in favor of discussion, Wikipedians hope to raise the strength of reason over untenable quantitative voting mechanisms. However, the ambiguity of evaluating argumentative merit continually challenges consensus-seekers. Determining which view has achieved consensus is difficult at best. Such tension is evident in one contributor's statement: "Thanks for clarifying your views on the article. Unfortunately most of the editors who work on this article do not share the same view (i hope i am speaking for most of the editors)."

Reliance on consensus leads to a number of temporally-based power plays. The consensus policy explains that "Silence equals consent." Most changes are never questioned, but for popular subjects, this principle forces article authors to vigilantly monitor recent changes to maintain their contributions. Contributors clearly recognize such tension:

> And the thing with WP is, even if you put all the research and writing and annotation work into writing a really good article, you've still got to put it on your watchlist and constantly fight against changes that will degrade the article and you have to maintain this fight indefinitely. . . [U16]

Consensus is never final, what constitutes consensus can change at any time; power plays often operate within this ambiguity. While new contributors struggle against entrenched veterans, those same veterans struggle to maintain the integrity of their work. This dynamic reflects a broader struggle over the ownership of an article. According to the `Ownership` policy, anyone should be able to make contributions to an article. In practice, however, there are often *de facto* owners of pages or coalitions of contributors that determine article content. Prior consensus within this group can be presented as incontestable, masking the power plays that may have gone into establishing a consensus. For example, in Vignette 2, the scientifically-inclined core group who has argued previously the place of sociopolitical aspects in the article present this consensus as absolute: "We DID write an article just on the scientific theory of paleocentrism, before you showed up...." On the other hand, in the face of existing consensus, a dissenting contributor or fringe group can simply wait for the opposition to leave the forum or grow tired of arguing against the same proposals.

Consider the following example where a contributor has just proposed a number of reasons for rewriting an article. In this excerpt from the debate, one of the core contributors rails against the proposed changes, claiming that they rehash old arguments. A member of the fringe group advocating change chastises them for using prior consensus as a tool for excluding the voices of others.

> Most all the stuff [U17] describes below has already been hashed out. . . It's like that game of whack-a-mole: they try one angle, it gets refuted; they try a second angle, it gets refuted; they try a third angle, it gets refuted; *and then they try the first angle again.* [U18]
>
> > It would be interesting to see how many different users try to contribute to this article and to expand the alternate views only to be bullied away by those who believe in [Cosmic Polarity] religiously. . . why don't you consider that perhaps they have a point and that [U19], [U20] and the rest of you drive editors away from this article with your heavy-handed, admin-privileged POV push? [U21]

At issue is the legitimacy of prior consensus. Longtime contributors do not want to waste time having arguments about issues that they consider to be solved. Pointing to prior consensus, just like linking to policies, provides a method for dealing with trollish behavior. On the other hand, newcomers or fringe contributors often feel that their perspectives were not represented in prior arguments and want to raise the issue again.

7.3 Power of interpretation

Wikipedia specifically declares itself to be an encyclopedia first and an online community second. The policy `What Wikipedia is Not` elaborates that Wikipedia is neither a social networking site, a soapbox, nor a democracy, all of which point to how Wikipedia should be different from what are commonly understood as online or virtual communities. However, Wikipedia has definite traits of an online community – contributors share personal experiences, join Wikiproject groups that focus on particular themes, reference participation in other forums (*e.g.* Vignette 1), and talk about joint, communal action (*e.g.* Vignette 2). In fact, Wikipedia can be seen as a federation of porous communities that work on sometimes overlapping sets of articles.

These communities often have different goals, understandings of proper encyclopedic content, and interpretations of legitimate policy use. Working through these differences strengthens the spirit of cooperation and understanding among contributors. However, as Vignette 3 illustrates, tension is also often present. In this excerpt, two Wikipedian administrators U23 and U27 delete material regarding personal experiences of the medical condition "Frupism" from the page, but do not post the reasons for the deletion to the talk page. Contributor U22, a "Frupist", reacts to the deletion and initiates the discussion.

The page in question was primarily written by a tight-knit community of contributors, many of whom are "Frupistic." At the time of this excerpt, however, the page was in the process of becoming a featured article and had thus come under the scrutiny of outsiders to this community. The deletions by administrators represented a violation of what the core set of contributors had come to understand about their article. In their view, statements made by contributors with the condition were valid because they were in a legitimate position to explain how the condition affected their life. Sharing such experiences was integral to how the discussion of the article moved the editorial process forward. On the other hand, the outsiders who deleted content were administrators who had made many edits on other articles; they can be seen as core contributors to Wikipedia as a whole. The administrators' global conception of Wikipedia is markedly different from that of the daily contributors to the page. The administrators' conception of Wikipedia's purpose, legitimated by fluent policy use, trumps the appeals to personal experience that U22 makes. Different Wikipedia communities have different *powers of interpretation*.

7.4 Legitimacy of contributor

Attempts to undermine or bolster the legitimacy of a contributor constitute another class of power play. This type of power play, like questioning the legitimacy of sources or threatening formal sanctions, often accompanies the power plays we have considered so far. The legitimacy of contributor power play can either implicate an external attribute of a contributor (*e.g.* race/ethnicity, expertise, or personal experience) or their status within Wikipedia. For example, the demand by U22 in Vignette 3 that the experience of Frupistic people be represented is an example of a (failed) power play intended to bolster their viewpoint. Likewise, U13's dismissal of U12's usage of policy in Vignette 2 undermines U12's status as a valued Wikipedian. The following excerpt provides another example. In it, U24 draws upon his past contributions to argue against a contributor who is accusing U24 of being unproductive and disruptive:

> Oh, you mean "I" hang around to make a point about the lack of quality on Wikipedia? Please take another look at my edit count!! LOL. I have over 7,000 edits... As you know, I can take credit for almost entirly writing from scratch 2 of the 6 or 7 FAs in philosophy... [U24]

U24 points to his revision count and the number of featured articles (FAs) that he has contributed in order to legitimize his actions. This is a type of power play that a reputation system (e.g. [1]) will amplify.

7.5 Explicit vie for ownership

Until now we have considered power plays that operate within the bounds of established policies and guidelines. One might see the example in Vignette 2 as borderline policy abuse by the scientifically-inclined community, but the policy environment is not completely consistent and this creates room for debate. There are examples, however, where contributors consistently and successfully violate policy without sanction. Their power plays are often successful because their contributions to Wikipedia are highly valued.

Consider an excerpt from a philosophy article talk page in Vignette 4. U25 is new to Wikipedia, while U24 contributes heavily to this article and fervently defends against any changes that he does not initiate. In this case, U26, a longtime Wikipedian but infrequent contributor to this article, mediates between U25's first edits and U24's condescension. U26 has proposed an alternate wording and Vignette 4 begins with U24's rejection of the change.

U24 makes several blatant "us or them" vies for power: if U25's actions persist, he will leave. By the end of the episode, U25 has acquiesced to U24's ownership, whereupon U24 acknowledges some of U25's suggested changes and commits to fixing them himself. Such actions clearly violate policies against article ownership, civility toward other contributors, and treatment of newcomers. As a newcomer, U25 may not know of these policies, but U26 certainly does. The willing blindness stems from the fact that U24 is a valued contributor to philosophy articles and is not bashful about pointing this out. There is a scarcity of contributors with the commitment to consistently produce high-quality content; the Wikipedian community is willing to tolerate abuse and policy violations if valued work is being done.

8. DESIGN IMPLICATIONS

Policies provide a common language for Wikipedians to interpret new and difficult circumstances and reach consensus amongst a myriad of viewpoints. The policy environment is also flexible and dynamic, changing as the community grows. Policy does not always solve content disputes – we have seen the many types of power plays that contributors make to control content. Such power plays, however, will be endemic to consensus-seeking within the vibrant cross-cutting communities that we have observed.

Vignette 3 Featured + Controversial. Different communities have different powers of interpretation

Can we have an intelligent discussion about what statment you did not like and why instead of scrapping the entire entry? [U22]

The [revision in question] is unsourced (WP:Source) and original research (WP:OR). Furthermore, it's not written in an encyclopedic tone. If you're going to add any new information about treatment options, you're going to need to identify/cite the sources that prescribe that treatment, as there are many schools of thought on the subject. [U27]

Then I am suggesting that a section for personal statements from [Frupistic] people be added. . . [U22]

Sorry, Wikipedia doesn't work like that. Notice that anytime you contribute, the message under under the edit box states "Encyclopedic content must be WP:Verifiable." Other pertinent policies include WP:OR and WP:Reliable-sources. Thanks, [U27]

Still I don't see the need to scrap the entire section without discussing what statements you want referenced. [U22]

The [frupistic] rights issue should be highlighted in the article, and I believe it is. The section we keep deleting violates Wikipedia policy and guidelines on WP:NPOV, WP:OR, and on general style. Wikipedia is not intended to be a forum to debate or resolve contentious issues, only to frame and describe them. [U23]

. . . One of the schools of thought is the [Frupistic] person's perpective. They are all unified in exaclty what I said. This is not just another school of thought. It is the perspective of the [Frupistic] person and it must be presented. [U22]

Vignette 4 Policy-laden + Featured + Controversial. Power play unbounded by relevant policy

Now, let me take it apart very carefully so that everyone. . . not knowledgeable about philosophy can easily get it. "[topic] could be defined". . . violates WP:WEASEL and WP:NOR. . ."Somehow like Hume did" does not constitute a reference. "Moral responsibility could be defined...." same exact thing. The final sentence is obviously a conclusion (erroneously, BTW) drawn from the first two unverified premises. . . [U24]

With all due respect, that didn't answer the question. . . I wanted to know what it was in U25's proposal which was unacceptable. . . His lack of reference etc. is all a fault, sure, but that's why I provided one (Enquiry, section 8). [U26]

. . . this point is already addressed in the article. . . It may need to be expanded a bit. I can easily do that myself when I have time. . . Is there anythin else? Do you also support U25's vie that the article is "poor", that is needs to overhauled from top to bottom, the meanignlsess nonsens that he actually did try to insert above or the other OR that he has stated on this page? Basically, there are two sides on this matter, this article can be taken over by cranks like what's his name, or not? If it does, I go. You can either support me or not. Where do you stand?. . . [U24]

I do not by any stretch of the imagination support the view that the article is poor. In fact, I disagree with many of the things U25 has said elsewhere on this page. . . I'm genuinely sorry if this upset you. [U26]

Ok U24, I see that you consider this article as, somehow, your baby, and you are defending it like a tigress. I can understand that, since you have put a lot of effort in it. But if was a bit harsh on the state of the article, do not take it personally. . . I just say there is still (or again) a serious opportunity for improvement by [specific examples]. I am new here and my attempt to do it was inappropriate but you are certainly able to do it yourself. [U25]

There is some truth in the position that the current article gives a misleading impression that the notion of [topic] is univocal and unproblematic. . . I will work on it bit. [U24]

CSCW researchers have long understood that articulation work is critical for enabling collaboration [15, 16]. We claim that the Wikipedian community is strengthened by the difficult work of seeking consensus and that such work is perhaps the most fundamental articulation work done within Wikipedia. Yet, some researchers still consider these aspects of collaborative work "costly" or even "unproductive" (c.f., [9]). In the early 1980's, McGrath [13] challenged the common psychological notions of "process loss" in group tasks, pointing out that without social and interpersonal support, groups often disintegrate. Clearly, some elements of the coordination overhead can be mitigated. However, a mitigation technology must understand what function the overhead serves and be careful to support it. Simply eliminating the "overhead" can be devastating.

Awareness tools. There is minimal technical support for consensus seeking. Mechanisms in Mediawiki such as revision history, revision comments, and "watch lists" – which alert contributors when selected pages are changed [3] – are a great start, and contributors have cleverly adapted their practice to the technological limitations. For example, some of the more articulate users link to a specific "diff" of a revision to highlight how consensus or conflict ensued.

More explicit awareness tools to summarize behavior could be created to help support the consensus process. In our analysis, we have seen many examples where contributors have difficulty tracking discussions and conflicts as they unfold. This is true for participants engaged in the conflict as well as those who have come to help mediate conflict. For example, a massive amount of text is written and archived on talk pages. Sifting through all this text is "coordination overhead" that could be safely mitigated. Wikipedians already struggle to annotate archives with descriptions of what discussions they contain. A system that annotates instances of prior consensus and who was involved in the process would be highly useful. These summarization tools would help to identify aspects of a conflict over time so that the state of an article could be properly understood.

We see such awareness tools more broadly than traditional text summarization, incorporating, for instance, visualization tools. For example Viegas *et al.* pioneered History Flow [18] to visualize contribution trends to articles as running striations, one for each user; it is useful for detecting edit wars. Kittur *et al.* [9] prototyped a visualization tool that clusters contributors based on their reverts, creating a view of coalitions that revert each others' contributions. If such tools are to help improve awareness, however, their authors need to pay attention to how they might be designed for appropriation [5] by the Wikipedian community.

Reputation System. The idea of a reputation system for Wikipedia has received much attention. A reputation system can incentivize meaningful contributions, but will also encourage competition. Therefore, a critical decision is to define what work is valued and operationalize it effectively.

Not surprisingly, the first reputation system for Wikipedia is purely content-driven [1], based on longevity of contributions to an article. A content-driven reputation system poses the danger of reinforcing a single dimension of legitimate action and may stifle the discussion that is essential to achieving consensus. For example, contributors may begin to chafe at compromising over changes because their reputation may be adversely affected when their contributions are altered. This is certainly an important research direction, however, our analysis suggests that there is much articulation work that also needs to be incorporated.

9. CONCLUSION

We began our study by considering the critical role that policy plays in communities with mass participation. One important issue for CS*W systems that support mass participation is how to mediate conflict when it inevitably arises. Rich policy environments, like that of Wikipedia, serve to facilitate debates around what work is done, how the work is engaged, and individuals' roles.

Though our grounded approach has focused on how the policy environment enables the consensus process, it can also be read in terms of the broader theme of articulation work [15, 16]. Specifically, our analysis begins to unpack three aspects of articulation work: *process*, *content* and *mutual support*. Power plays that relate to prior consensus (*e.g.* 7.2) and how that consensus developed illustrate the work necessary to agree on a specific process or system of production. Power plays dealing with the article and the validity of specific sources of information (*e.g.* 7.1) illustrate the work to decide what it is that the group is to create. Lastly, power plays about individual ownership (*e.g.* 7.5) and legitimacy of individuals' contributions (*e.g.* 7.4) begin to illustrate the articulation work necessary to support individuals within the group. Linking the rich theory of articulation work to our grounded analysis is future work.

As we move from collaborative systems that support relatively small groups to systems that support mass participation, we see a need to support the multivalent relationships present in our everyday interactions. In our study of Wikipedia we have found policy to be an important focal point for facilitating collaboration. It provides a lens into the community that is particularly well suited for examining consensus, coercion, conflict and control. With our results we help frame the range of necessary considerations for designing more effective CS*W systems.

10. ACKNOWLEDGEMENTS

We would like to thank Yaw Anokwa, Danyel Fischer, and the anonymous reviewers for helpful comments on the paper. We are also appreciative of Wikimedia for providing public data dumps. The first author would also like to thank everyone at HP's Information Dynamics Lab for their support in his initial foray into the wilds of Wikipedia.

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