

OPINION FORMATION IN WIKIPEDIA THEORY, MEASUREMENT, AND FINDINGS

by

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The paper discusses several aspects of Wikipedia as an online community. It analyses the role of public opinion in discussions, disputes, and the solution of conflicts among the users of the online encyclopaedia. Noelle-Neumann's (1974, 1984) Theory of public opinion as social control is used as a theoretical background to analyse three levels of public opinion in Wikipedia: The meta-level, the discussion-level, and the article-level. The use of the Mediawiki-software for content-analyses is discussed and illustrated by a qualitative analysis of a case study. Subject of the case study is a fierce dispute about design and content of user pages in the German language version of Wikipedia.

KEYWORDS

Public opinion, spiral of silence, Wikipedia, online community

INTRODUCTION [1]

The present paper deals with Wikipedia as an online community. It analyses the role of public opinion in discussions, disputes, and the solution of conflicts among the users of the online encyclopaedia. A theoretical frame-

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work will be made up and methodological challenges and advantages of wiki-technology for an empirical approach to Wikipedia and public opinion will be discussed. One example for public opinion in Wikipedia will be analysed in greater detail to demonstrate the methodology and to give an impression of its power to yield quantitative findings.

WIKIPEDIA, THE ONLINE ENCYCLOPEDIA [1.1]

When Wikipedia was founded in 2001, it was different from other web projects in many ways, especially with regard to the community behind it and the scope of the whole project. The project started to grow rapidly from 2002 on, when more and more contributors added more and more articles to the online-encyclopaedia (cf. Voß 2005). Today (2007), Wikipedia is one of the most popular web sites in terms of the number of visitors and page requests,¹ more than 100 servers handle 10,000 to 30,000 page requests *per second*.² There are about 250 language versions of Wikipedia, with English (en.wikipedia.org) as the largest section (about 1.65 Million articles) followed by German (de.wikipedia.org), containing more than 600,000 articles.

Wikipedia is an online community (cf. Preece/Maloney-Krichmar 2005) which can be described as an *Open Community Contribution System*. It aggregates efforts of many persons from different places toward a common task (cf. Bos et. Al 2007) – the development of a free encyclopaedia. Independently from certain language versions exist three major user-groups: So called *IPs*, ordinary *Users* and *Sysops* (also called *Administrators*). When an unregistered or not logged in user contributes to Wikipedia, his contribution is registered with the IP-address of his computer. Ordinary users are registered, logged in users; most of them write under a pseudonym, some natural persons use more than one pseudonym for their work on Wikipedia (so called *Sockpuppets*). *Sysops* are elected by the community and have additional technical measures, e. g. to delete an article or to lock users who have been found guilty of the breach of the peace or of vandalising articles. Therefore *sysops* are in charge not only of technical aspects of the online encyclopaedia, they play also an important role in the social structure of its users.

¹ Cf. http://www.alexa.com/site/ds/top_sites?ts_mode=global&lang=none 02-21-2007

² Cf. <http://hemlock.knams.wikimedia.org/~leon/stats/reqstats/reqstats-monthly.png> 02-21-2007

Wikipedia is organised in namespaces by the wiki-software (cf. Voß 2005: 4 f). The most used namespaces are the article-namespace that contains the text of the encyclopaedia, the user-namespace that contains the personal profiles of the users and the Wikipedia-namespace with all the organisational things and meta-discussions. Every page, independent of its namespace, has a discussion page for the exchange of remarks and additional information with the aim to improve the content of the according page (usually an article). Consequently, the discussion pages are the part of Wikipedia, where most conflicts between users or user groups become manifest.

PUBLIC OPINION [1.2]

The present paper uses the term public opinion in a way that is oriented towards Noelle-Neumann's concept of public opinion (cf. Noelle-Neumann 1974; 1984). In short, the theory is made up by seven theses (cf. Noelle-Neumann 1991: 260):

1. Society threatens deviant persons with isolation.
2. Most people fear isolation from others continuously.
3. The fear to be isolated from others causes individuals to assess the climate of opinion (the perceived distribution of opinions among the public) at all times.
4. The results of this estimate influence behaviour in public, especially the open expression or concealment of opinions.
5. People tend to remain silent if they see their own opinion (on emotional and publicly discussed issues) as losing public support.
6. The less support is publicly visible for a position, the more people fall silent ("spiral of silence").
7. One result of this process of public opinion formation is the integration of a community or society.

To analyse the role of social control, of minorities and majorities and of decision-making within Wikipedia, this concept of public opinion is very useful, at least more useful than the understanding of public opinion as elite-opinion or as mere opinion distributions or other concepts from the wide area of public opinion research (cf. Glynn et. al 1999; Childs 1965). Noelle-Neumann's concept of public opinion is especially suitable for the

subject of the present paper, because the Wikipedia community fits some of the requirements for the functioning of public opinion as social control:

1. Wikipedia contains articles about subjects with a strong emotional potential; in terms of Noelle-Neumann's (1991): They are 'morally loaded', e. g.: Abortion, religion, war, terrorism and other well known hot spots of social and online conflict such as political extremism (cf. Roessing 2006; Roessing/Siebert 2006).
2. Most users of Wikipedia are either anonymously, or at least pseudonymously contributing to articles and discussions. They do not form a group of individuals that know each other, but they act in face of an anonymous public of other users and, of course, the general public of read-only-users of the online encyclopaedia. With publicness and anonymity, two more conditions for processes of public opinion are fulfilled.
3. There are plenty of conflicts, not only between single users or single users and the rest of the community but between different camps. Examples from the German Wikipedia are the continuing conflict between right- and left-wing users or between users with different opinions about the development of the Wikipedia project itself (*inclusionists* versus *deletionists*).

With conflicts and opinion camps, publicness and anonymity and with the emotional potential of many issues discussed in Wikipedia, Noelle-Neumann's theory of public opinion (especially its most prominent part, the Spiral of Silence) seems appropriate for an analysis of social processes among *Wikipedians*.

THEORETICAL BACKGROUND OF OPINION FORMATION IN WIKIPEDIA [2]

There are three levels of public opinion in Wikipedia.

THE META LEVEL OF PUBLIC OPINION [2.1]

The meta-level of public opinion in Wikipedia covers discussions among users that concern the structure, organisation, and the distribution of power in the Wikipedia project. These discussions exist in all language versions of Wikipedia, but the language versions differ in many ways. Cultural Differences precipitate in the way, collaborative authoring of Wikipedia works (cf. Pfeil/Zaphiris/Ang 2006). The following analyses are based on the German language version of Wikipedia; in some cases links to English counter-

parts of German pages are additionally given. The applicability of the conclusions for other versions will be discussed in the discussion-section of the present paper.

An old, long-term and nevertheless fierce conflict is the one between *inclusionists* and *deletionists* (or *exclusionists*). The two camps foster different views on the question which articles are suitable for an encyclopaedia and which are not – and therefore are object to deletion by sysops.³ Central meeting ground for both parties is the candidates for deletion-page,⁴ the list of criteria for relevant subjects,⁵ some related areas,⁶ and the according discussion pages. The emotional potential of the conflict becomes evident by mutual verbal insults: Some deletionists accuse inclusionists of supporting garbage-articles in the Wikipedia,⁷ deletionists are sometimes called “deletion-fetishists”.⁸ Both camps of public Wikipedia opinion maintain propaganda-sites: An inclusionist petition *against a strict deletion-policy*⁹ and its deletionist counterpart,¹⁰ as well as a tongue-in-cheek *deletionists’ club*¹¹ that despite its ironical nature stirred much irritation among inclusionist wikipedians.¹²

Another meta-discussion that heated the minds of many Wikipedia-contributors was called *the great babel-war*. *Babels* are small text-boxes with a logo that are used by many wikipedians to indicate their preferences and

³ Cf. <http://meta.wikimedia.org/wiki/Inclusionists> [retr. 2007-06-17]; Cf. <http://meta.wikimedia.org/wiki/Exclusionist> [retr. 2007-06-17]

⁴ Cf. <http://de.wikipedia.org/wiki/Wikipedia:L%C3%B6schkandidaten> [retr. 2007-06-17]; Cf. English: http://en.wikipedia.org/wiki/Wikipedia:Articles_for_deletion [retr. 2007-06-17].

⁵ Cf. <http://de.wikipedia.org/wiki/Wikipedia:Relevanzkriterien> [retr. 2007-06-17]; – English: <http://en.wikipedia.org/wiki/Wikipedia:Notability> [retr. 2007-06-17].

⁶ E. g. the quality improvement pages (<http://de.wikipedia.org/wiki/Wikipedia:Qualit%C3%A4tssicherung> [retr. 2007-06-17]) and the deletion revision (<http://de.wikipedia.org/wiki/Wikipedia:L%C3%B6schpr%C3%BCfung> [retr. 2007-06-17]).

⁷ E. g. http://de.wikipedia.org/wiki/Wikipedia:L%C3%B6schkandidaten/5._August_2005 [retr. 2007-06-17]; – http://de.wikipedia.org/wiki/Wikipedia:L%C3%B6schkandidaten/15._Juli_2006 [retr. 2007-06-17].

⁸ Cf. http://de.wikipedia.org/wiki/Wikipedia:L%C3%B6schkandidaten/28._Mai_2005 [retr. 2007-06-17].

⁹ Cf. http://de.wikipedia.org/wiki/Wikipedia:Unterschriftenliste_f%C3%BCr_eine_liberale_L%C3%B6schpraxis [retr. 2007-06-17].

¹⁰ Cf. http://de.wikipedia.org/wiki/Wikipedia:Unterschriftenliste_gegen_eine_liberale_L%C3%B6schpraxis [retr. 2007-06-17].

¹¹ Cf. http://de.wikipedia.org/wiki/Benutzer:Gardini/Verschw%C3%B6rung_f%C3%BCr_voreiliges_L%C3%B6schen [retr. 2007-06-17].

¹² Cf. http://de.wikipedia.org/wiki/Benutzer_Diskussion:Gardini/Verschw%C3%B6rung_f%C3%BCr_voreiliges_L%C3%B6schen [retr. 2007-06-17].

opinions on their user-pages. This conflict is subject of the case study in section 4 of this paper.

The most prominent effect of conflicts between parts of the users (and it should be kept in mind that Wikipedia-users are in most cases also authors and contributors of articles) can be found in the elections for the sysop-privilege.¹³ Sometimes a candidate receives a fair amount of votes for or against him, because he is an inclusionist or deletionist or because he collects babels on his user-page or rejects doing so. Additionally, there are effects on the collaboration on the actual articles of Wikipedia, for example, when authors try to save an article from deletion and therefore try to make it deletionist-proof. This effect is part of the next level of public opinion in Wikipedia, the article discussion level.

THE ARTICLE DISCUSSION LEVEL OF PUBLIC OPINION [2.2]

Articles are usually debated on their according discussion pages. The discussion pages of many articles are empty; this indicates that there has not yet been demand for discussions about the content and structure of these articles. Some articles have relatively small discussion pages with short remarks concerning particular pieces of information or the formulation of sentences or sections. On the other hand, some articles have huge discussion pages with hundreds or thousands of contributions. Many of these heavily discussed articles belong to the already mentioned area of value-laden subjects. Both the vehemence of the discussion and the subject of the article, and additionally the content of the contributions of the discussion play an important role for the conception of a content analysis of Wikipedia and will be discussed in greater detail in chapter 3 of the present paper.

Sometimes the most vehement discussions about articles grow into other areas of Wikipedia, e.g. when the opponents calumniate each other as vandals on the page for reports of vandalism.¹⁴

THE ARTICLE LEVEL OF PUBLIC OPINION IN WIKIPEDIA [2.3]

It is very probable that in many cases the article discussion – and indirectly the meta-level too – have an impact on the formulation, structure and con-

¹³ Cf. <http://de.wikipedia.org/wiki/Wikipedia:Adminkandidaturen> [retr. 2007-06-18]; – English: http://en.wikipedia.org/wiki/Wikipedia:Requests_for_adminship [retr. 2007-06-18].

¹⁴ Cf. <http://de.wikipedia.org/wiki/Wikipedia:Vandalismmeldung> – Engl.: http://en.wikipedia.org/wiki/Wikipedia:Administrator_intervention_against_vandalism

tent of the actual Wikipedia articles, which are read by many more people than the Wikipedia users who are involved in the development of the online encyclopaedia (“*wikipedians*”). This is because the particulate vehement discussions in most cases do not come from mere desire for discussion but from the feeling of some users that their point of view (POV) is correct and opposite opinions are not only wrong, but morally reprehensible. When one camp prevails over the other, its POV will govern the overall message of an article. As a matter of course, many articles are difficult to bias, therefore the number of users trying to write their POV into articles about, for example, guinea fowls¹⁵ is very small and many articles as unbiased as articles in printed, traditional encyclopaedias. But a fair number of articles – of course again the same which were earlier mentioned as laden with emotions and well-equipped with lengthy and vehement discussions – can be expected to contain some bias. The following section of this paper will discuss how those biases, if they exist, can be detected and measured by means of content analysis. Subsequently, methods have to be developed which can be used to gain some data about the sources of bias, which are expected to be found in the other two levels of public opinion in Wikipedia.

METHODOLOGICAL CHALLENGES AND ADVANTAGES OF A WIKI-BASED COMMUNITY [3]

The internet is a difficult terrain for content analyses (cf. Roessing 2005). This is especially true for dynamic content management systems. Additionally in the case of Wikipedia, the wiki-system that allows anyone to add or alter pages at any time, constricts any stable measurement of content. Nevertheless, some aspects of public opinion can be measured by classical means of content analysis. These include issue, size, and bias of articles and discussions.

The history-function of the mediawiki-software provides the researcher with additional tools for the analysis of Wikipedia’s content (cf. Pfeil/Zaphiris/Ang 2006), but there is little experience with the use of these tools for public opinion studies. On that score the new possibilities add to the challenges of internet content analysis.

¹⁵ Cf. <http://de.wikipedia.org/wiki/Perlhuhn>

VARIABILITY OF THE CONTENT [3.1]

Variability of the content is a popular argument when content analysis of web sites is discussed among communication researchers. In the case of Wikipedia it is a small issue anyhow. Nearly every page of Wikipedia has a link to a permanent version and through the "History"-button every previous version of every article or discussion can be retrieved. It would be no problem to define e. g. "All articles and discussions belonging to the category 'Nuclear Power'¹⁶ in the version of June 15th 2007, 3pm" as units of analysis.

CONFLICT AND EMOTIONAL POTENTIAL [3.2]

As mentioned before, conflict and emotional potential are prerequisites of processes of public opinion. Their existence must be proved empirically, not just assumed. This is difficult even for classic printed or broadcast media. And so it is in Wikipedia, but there the scientist is confronted with an additional problem. As explained in the second chapter of the present paper, public opinion manifests itself on different levels of Wikipedia. To determine the vigour of a discussion or the emotional involvement of arguments and discussants, the coders have to track an issue over a sometimes large number of discussion- and metadiscussion-pages. Serendipitously the wiki-software provides means and information to cope with the problem:

I. The history-page lists time, author, scale and an optional comment to every edit that changes the content of an article- or discussion-page.

II. A difference-page can be used to compare any versions of a Wikipedia-page.

III. System-links in the navigation bar (for example the "what links here?"-feature) and wiki-links implemented by users connect related articles, article-discussions and meta-discussions.

For example, to determine the vigour of a discussion or a conflict about an article, the history-page provides support for measurement. The vigour of a discussion can be measured as edits per time or as the median time between edits. The article discussion of the article about the German leftist party "Die Linke"¹⁷ for example, received 25 edits in the 48 hours between

¹⁶ Cf. http://en.wikipedia.org/wiki/Category:Nuclear_power (retr. 2007-06-23)

¹⁷ Cf. http://de.wikipedia.org/wiki/Die_Linke (retr. 2007-06-23)

10:17, June 23rd and 10:17, June 25th (1.92 edits/hour) from seven users (two IPs and five registered users). The median time between the 25 edits is 11.5 minutes (mean 12,38 minutes). Especially the last measures can be used to compare discussions with different potential for conflict. The median time between the last ten edits of the article discussion of “Wasser”¹⁸ (Water) is 2051 minutes (mean 15,980.89), indicating the lesser potential for discussion of the water issue. Further indicators for the intensity of a discussion can be derived from these data by calculating the average number of edits per user or vice versa and the standard deviation of the edit-distance to investigate the homogeneity of the discussion process (the discussion about the article of the Leftist Party is with $s=283.3$ more homogenous than the discussion about “Water” ($s=27,129.5$)). The number of verbal insults and the number of meta-discussions about misbehaviour of participants can be used as indicators of the emotional potential of an issue or a discussion between wikipedians. Today, there are some online tools ready for use that are capable of automatic measurement and can even provide functional graphs and tables.

CHANGES OF ARTICLE CONTENT [3.3]

While the mere extent of changes is easily extractible from the history-pages, the change of the content is to be measured by coders looking at the difference-pages of each article. For example, there is a conflict among German wikipedians about the question if and where the assessment of a political organisation as ‘extremist’ by the authorities should be mentioned in the according articles. To measure the development of such a conflict, it is not sufficient to count the number of edits and the number of users involved. It is necessary to code the direction of the edits and the opinion that becomes visible in the edits, edit-comments and other contributions of the users involved.

CASE STUDY: THE GREAT BABEL-WAR [4]

As mentioned before, one of the biggest conflicts in the German version of Wikipedia was the dispute about small information-boxes (“babel-boxes” or “babels”) on user pages in the user-namespace. The boxes were originally used to provide information about users with special language-skills, that is why they were named *babels*. Later, some users invented funny boxes to tell

¹⁸ Cf. <http://de.wikipedia.org/w/index.php?title=Diskussion:Wasser&action=history> (retr. 2007-06-25)

visitors of their profile sites all sorts of things about themselves – often in a very ironic way. Some other users held the opinion that these babels were too much fun and nonsense and therefore not compatible with the idea of writing a serious encyclopaedia. Some sysops shared this opinion and many babels were deleted in an number of deletion-waves. Despite lengthy discussions in which a majority voted in favour of a moderate use of babels¹⁹, a minority still fights them, backed by the technical power and the social support of some sysops.

The history function of Wikipedia allows the researcher to exactly determine the point in time when the conflict became manifest. In this case, beginning with 17:30, 17. Sep 2006 (CEST), a user started to request the deletion of babels which this user considered to be sexist.²⁰ Requests for deletion are usually discussed for seven days before an administrator decides whether an article is to be kept or deleted. But in this case the disputed templates were deleted by an administrator about four hours after the request²¹, and another administrator started to delete other babels, which were never requested to be deleted. These activities resulted in a complaint which received 216 Edits in 27 hours and 8 minutes (after this period no more edits concerning the conflict were made) which leads to an average time between edits of 7.5 Minutes. This is an example of a fierce conflict between two opinion camps made up of altogether 52 Users.²² A closer look at the content of the contributions reveals that there are three types of contributions: The first type includes arguments of people who oppose the free-style deletion of the user-boxes (and mostly like or at least accept their use). The second type accordingly includes arguments of those who favour the deletion (and mostly refuse the use of babels at all). The third type consists of ad-hoc statements, mostly commenting other people's arguments, that cannot be directly attributed to one opinion camp or the other. Unfortunately, quantitative data on the content of a discussion is not as easily available from the

¹⁹ Cf. http://de.wikipedia.org/wiki/Wikipedia:Meinungsbilder/Zul%C3%A4ssigkeit_von_Babel_vorlagen and http://de.wikipedia.org/wiki/Wikipedia_Diskussion:Meinungsbilder/Zul%C3%A4ssigkeit_von_Babelvorlagen [retr. 2007-06-18].

²⁰ http://de.wikipedia.org/w/index.php?title=Wikipedia:L%C3%B6schkandidaten/17._September_2006&oldid=36590488

²¹ Cf. http://de.wikipedia.org/w/index.php?title=Benutzer:Raubfisch/Vorlage:Gegen_Zensur&action=edit

²² Data analysis was supported by the online tool available at <http://vs.aka-online.de/cgi-bin/wppagehiststat.pl> [retr. 2007-10-15]

software like the data on the structure of the article. For economic reasons, this paper therefore remains on a rather qualitative level of analyzing the content-aspect of the discussion.

The conflict about the use of babel-boxes from September 2006 was followed by an official community-decision (“Meinungsbild”, an election style poll), but the decision was never accepted by some people (among them a large fraction of the administrators of the German Wikipedia).²³ There still are some sporadic quarrels about this issue, including further undiscussed deletions. The issue has partly become a taboo (Hahn 1991), because many users feel that the mere mentioning of the word “babel” could cause another manifest conflict among Wikipedians. In fact, the cited discussion can be understood as a manifest indicator for the latent (Noelle-Neumann 1991) community-conflict between those users who stress the scientific encyclopaedia approach of Wikipedia and those who at least incidentally enjoy the community and recreational aspect of Wikipedia.

SUMMARY AND DISCUSSION [5]

Previous sections dealt with public opinion and Wikipedia. On the basis of the German language version of the online encyclopaedia features of the research object itself (articles, discussion pages, and users) and three levels of public opinion in Wikipedia were presented:

1. Meta level (discussions not directly belonging to certain articles)
2. Article discussion level (discussions belonging to certain articles)
3. Article level (possible biases in the content the ordinary reader of Wikipedia is confronted with).

The next chapter discussed the methodological challenges and advantages the mediawiki-software holds ready for the researcher.

The present paper demonstrated that a quantitative approach will work for the analysis of public opinion in Wikipedia. While the mediawiki-software provides easy access to quantitative data concerning the structure of a conflict, some of the analyses of the content remained rather qualitative. Future studies should try to quantify also the content-data using classic code-book-coder techniques, in order to make the data on different articles completely comparable.

²³ Cf. http://de.wikipedia.org/w/index.php?title=Wikipedia:Meinungsbilder/Zul%C3%A4ssigkeit_von_Babelvorlagen&oldid=35464743 and the according discussion-page.

Further methodological, pure, and applied research is recommended and partially already under preparation by the author. Content analyses of Wikipedia should be combined with surveys among users of the online encyclopaedia. Figure 1 illustrates the three Levels of public opinion in Wikipedia and the according approaches for research.

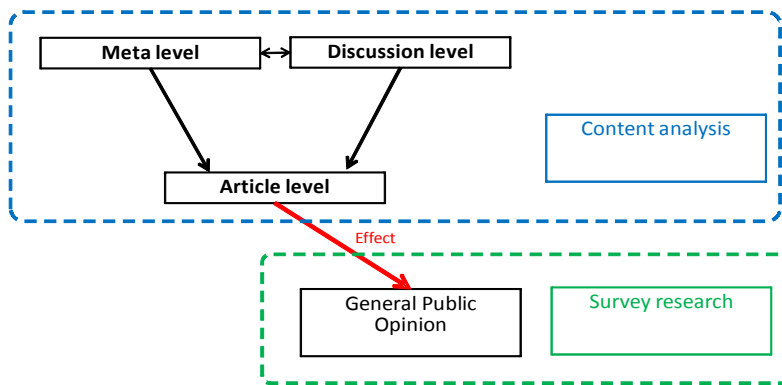


Figure 1: Three Levels of public opinion in Wikipedia approaches for empirical research, source: Own drawing.

Further research should also include a comparison of different language versions of Wikipedia. While the phenomenon of public opinion can be found in all cultures of the world, the actual issues of public opinion and people's reactions to it are usually different in different nations and cultures (cf. Noelle-Neumann 1984). It is a plausible hypothesis that this is also true for online communities. All in all, a program for further research should include the following aspects:

1. In-depth analysis of a single issue over a longer period of time (e.g. [[Abortion]] from 2005 to 2007)
2. Comparison of articles on different issues

3. Comparison of articles on the same issue(s) in different language versions of Wikipedia, e.g. [[en:Nuclear power]] and [[de:Kernenergie]]
4. Combined analyses of content analyses of wikipedia, content analyses of other media and, of course, survey data.

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