



LUND UNIVERSITY

Janitors of Knowledge: Constructing Knowledge in the Everyday Life of Wikipedia Editors

Sundin, Olof

Published in:
Journal of Documentation

DOI:
[10.1108/00220411111164709](https://doi.org/10.1108/00220411111164709)

2011

[Link to publication](#)

Citation for published version (APA):
Sundin, O. (2011). Janitors of Knowledge: Constructing Knowledge in the Everyday Life of Wikipedia Editors. *Journal of Documentation*, 67(5), 840-862. <https://doi.org/10.1108/00220411111164709>

Total number of authors:
1

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Janitors of Knowledge: Constructing Knowledge in the Everyday Life of Wikipedia Editors

Olof Sundin, University of Borås and Lund University, Sweden

Abstract

Purpose The aim of this article is to explore how trustworthy knowledge claims in Wikipedia are constructed by focusing on the everyday practices of Wikipedia editors. The article focuses particularly on the role of references to external sources for the stabilisation of knowledge in Wikipedia.

Design/methodology/approach The study is inspired by online ethnography. It includes eleven Wikipedia editors, together with the sociotechnical resources in Wikipedia. The material was collected through interviews, online observations, web documents and discussions, and e-mail questions. The analysis was carried out from a perspective of science and technology studies (STS).

Findings Wikipedia can be regarded as a laboratory for knowledge construction in which the already published is being recycled. The references to external sources anchor the participatory encyclopaedia in the ecology of established media and attribute trust to the knowledge published. The policy on *Verifiability* is analysed as an obligatory passage point to which all actors have to adjust. Active Wikipedia editors can be seen as akin to *janitors of knowledge*, as they are the ones who, through their hands-on activities, keep Wikipedia stable.

Originality/value The study develops an innovative understanding of the knowledge construction culture in one of the most popular sources for information on the internet. By highlighting the ways in which trust is established in Wikipedia, a more reflexive use of the participatory encyclopaedia is made possible. This is of value for information literacy training.

Keywords Wikipedia, Credibility, STS, Online ethnography, Knowledge construction

Classification Research paper

1. Introduction

The participatory online encyclopaedia Wikipedia has become an important source for knowledge in people's navigation in and understanding of contemporary life.

Wikipedia's popularity, supported by its high ranking in Google, is well-known. Yet,

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

Wikipedia does not exist as a fixed entity; rather it is constantly being made and remade through the actions of hundreds of thousands editors. In the present article, Wikipedia is explored from the inside. For this purpose it is framed as an expression of contemporary culture, or rather many cultures, for the construction of knowledge. The focus is on the arguments and ceaseless activities of the Wikipedia editors, often called Wikipedians, in relation to Wikipedia's policies, *its* form and functions. It is the information practices that they carry out as a part of their daily lives which constitute Wikipedia, together with the resources they draw on. By practices I refer to repeated "materially mediated arrays of human activity centrally organised around shared practical understanding" (Schatzki, 2001, p. 2).

Everyone is invited to contribute, but according to the Wikipedia policy on *Verifiability* (Swedish Wikipedia, 2010-01-02) contributions need to be grounded in publications from outside the participatory online encyclopaedia. Wikipedia is often used as an example for how traditional expertise is contested in contemporary participatory media and put in opposition to what are considered established media (e.g. Weinberger, 2007). By established media I refer to media within the traditional publication system; accessible, although not necessarily in print format, through libraries and encouraged in schools and universities. Yet, if examined more closely, with its policy on *Verifiability*, Wikipedia is clearly anchored in the ecology of what could be called the established media. From this perspective, Wikipedia can be regarded as a digital place where second-hand (published) knowledge (Wilson, 1983) is negotiated and (re)constructed on an everyday basis (Haider & Sundin, 2010).

To examine more thoroughly how the link between so-called established media and Wikipedia is maintained is an important task. This link is constituted, I propose, in the information practices used for stabilising Wikipedia and its articles by means of finding and adding references to external sources. The overarching question guiding this study can thus be formulated as follows: If we position Wikipedia as a site constituted through its practices, policies, its form and functions, and assume that the process of stabilising Wikipedia is embedded in the daily life of Wikipedia editors, then how are trustworthy

knowledge claims in Wikipedia constructed? Letting the focus shift to these practices of stabilising knowledge claims can contribute to making the labour of constructing trustworthy knowledge claims in Wikipedia visible. Inspired by online ethnography, the following questions structured the research: How can we understand and characterise the daily practices of Wikipedia editors? Which roles do references to external sources play in these daily editing practices? How can these practices be related to the form and functions of Wikipedia, and to the policies and guidelines for the encyclopaedic project?

The study's context is the Swedish Wikipedia. This article intends to contribute to a better understanding of the information practices involved in knowledge construction in Wikipedia, and thus to add to the framing of information literacy training.

2. People, technologies and practices

The theoretical starting point is the interdependence of information practices and technology as developed in science and technology studies (STS) (eg. Callon, 1986; Frohmann, 2004; Latour, 1987; Latour & Woolgar, 1986[1979]). An STS perspective leads to an emphasis on how technologies and other objects are not seen as mere followers, but instead as active co-contributors in the play as reflected in Latour's (2005, p. 46) notion of actors. This concept refers to both humans and non-humans. Accordingly, non-humans are analysed and described as actors, just as humans are, and treated equally in the analysis (Latour, 2005, p. 63 sq.). Within such a perspective, the editors, form and functions, core policies, guidelines of Wikipedia, its millions of articles and discussions, references, and users around the world can all be seen as actors, as they make each other do something; they construct, uphold and transform Wikipedia as we know it.

An actor, for instance a functional feature in Wikipedia called the watch-list, that makes it easier for the editors to scan new contributions, or a policy document, makes other actors act in a particular way. Yet, the ways in which these actions are carried out are not

the result of causality. Latour emphasises how actors relate to each other through translation rather than casual effects (Latour, 2005, p. 108). This also means that actors through translation co-produce the information practices in which they play a part. Some actors have a more central role than others and some of these, if we draw on Callon (1986), are so central that they can be called obligatory passage points. An obligatory passage point can be thought of as a threshold that other actors need to pass or adjust to. They do this through the translation of their strategies, in order to attain the goals of a particular practice, in this case creating a trustworthy online encyclopaedia. Another example could be Google, which has also been described as an obligatory passage point to which other actors, such as web providers and those searching the web, need to adapt and translate their strategies accordingly (Mager, 2009).

In *Laboratory life* Latour and Woolgar (1986 [1979]) show how writings and papers are an integrated part of laboratory work and, as such, a part of hard, detailed, work and routine labour (cf. Frohmann, 2004, p. 160cq.). The many activities of the Wikipedia editors can also be considered from an angle focusing on practical work. To gather, discuss and sometimes dispute knowledge claims are at the heart of the editors' activities and Wikipedia itself. Despite the many differences, knowledge claims in science and in Wikipedia also have a lot in common; most importantly, they share the characteristic of being collaboratively constructed through the situated practices of many actors. A practice approach, explored from an STS angle, has also been used in the research area of scholarly communication (Palmer & Cragin, 2008; Frohmann, 2004).

Latour and others (1987, p. 31ff; cf. Latour & Woolgar 1986 [1979]) describe how facts are constructed in scientific articles. Latour outlines three strategies: 1. "Bringing in friends", 2. "Referring to former texts", and 3. "Being referred to by later texts". The first strategy concerns how an article's factual claims are supported by which allies a text can demonstrate. The number of allies and their positions in various institutions attribute authority to the article. This argument is actually similar to the web 2.0 rhetoric on the wisdom of the crowd (Surowiecki, 2004). The second strategy refers to how factual statements are supported by references to earlier articles, what Latour describes as "the

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

context of citation” (1987, p. 35). Finally, in the third strategy, fact constructing, an article needs to be referred to by the next generation of articles.

In sum, Latour shows how facts in scientific articles are collectively constructed by which allies an author can summon, by the citations and references an article has, and by later texts: “Fact construction is so much a collective process that an isolated person builds only dreams, claims and feelings, no facts” (Latour, 1987, p. 41). In Wikipedia, knowledge claims from published works are drawn on in order to justify condensed versions of knowledge. In a way, Wikipedia can, to draw on Wilson (1983), be seen as a laboratory for “second-hand knowledge”. That is, we are to an increasing extent dependent on knowledge created by others, which makes the question of how authority is attributed to knowledge claims in Wikipedia essential. Just as in the science laboratory (or in the office of humanities scholars), it is possible to see how knowledge is made and re-made in Wikipedia. Facts in general, and more specifically scientific facts, are not restricted to the domain of science (cf. Latour, 2005, p. 118sq). For example, in Wikipedia these facts, once carefully constructed in a different setting, get a new life and what might once have been a stable fact now needs to be stabilised again. Facts constructed on different occasions, for different purposes, and in different settings are brought together, weighed against each other and sometimes even disputed.

3. Research in Wikipedia and Wikipedia editors

When reliability, trust and credibility have been discussed in relation to Wikipedia, this has often been done in order to assess whether Wikipedia is to be trusted or not. One way this issue has been approached is by empirically comparing content in Wikipedia with other encyclopaedias or with what are regarded as external facts (eg. Chesney, 2005; Giles, 2005; Holman Rector, 2007). Another way of approaching the trustworthiness of Wikipedia is from an epistemological perspective, taken from philosophy. Magnus (2009) provides us with an analytical discussion of various strategies for evaluating web documents and traditional encyclopaedias and relates these to Wikipedia. The author is

sceptical of the trustworthiness of Wikipedia and claims that Wikipedia and other participatory media create new philosophical problems which demand new methods for assessing their accuracy. In a similar analytical tradition, Fallis (2008) investigates Wikipedia and claims that Wikipedia has “good epistemic consequences” (p. 1664). By this he means that Wikipedia – despite its problem with accuracy, as the author sees it – has more positive consequences for people than it has negative ones.

In addition, different quantitative suggestions exist concerning the evaluation of Wikipedia articles as being more or less accurate and trustworthy. An often repeated claim is that the more edits an article has, the higher is its quality (Wilkinson & Huberman, 2007). One suggestion has been to place a trust tab on each article for users to click when they find it trustworthy (McGuinness et al, 2006). There is also research on how sentences within a Wikipedia article can get color coded depending on the age of the sentence (Cross, 2006). However, Luyt et al (2008) criticise ideas which build upon a belief that surviving old segments of Wikipedia articles are more accurate. Together with results from Viegas et al (2004), who show that there is a “first-mover advantage”, Luyt and his colleagues argue that any calculation of quality based on the age of text segments is questionable.

Moreover, Wikipedia has also been explored from the participants’ point of view. Bryant, Forte and Bruckman (2005) refer to the theory of *legitimate peripheral participation*, developed by Lave and Wenger (1991), when trying to understand “how users’ motivations and their perceptions of their roles in Wikipedia change as they become more engaged in the community” (p. 2). The article demonstrates how Wikipedia is formed through social norms in the community as well as technology, and how social norms and technology mutually shape each other. Kittur and colleagues (2007) have demonstrated how what they call direct work in Wikipedia has been reduced in relative terms in favour of all kinds of meta-activities, such as discussions and dealing with vandalism. According to the authors, an explanation can be found in the growth rate of Wikipedia and the greater demand for coordination efforts. Nieder & van Dijck (2010) emphasise, with references to, among others, Latour and the concept of sociotechnical ensembles, that

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

social and technical aspects of Wikipedia should be understood as being integrated, sociotechnical, rather than as distinct separate entities. Thereby they consider activities of non-human actors, for example so-called bots, that automatically make certain changes in Wikipedia articles, equally important as human editors in the analysis.

Forte and Bruckman (2005) have investigated incentives to write in Wikipedia. The authors refer to Latour and Woolgar (1986) when they argue how editors, through their article writings and their other Wikipedia activities, create the credibility of their own contributions, "For encyclopedists, it is important [to] write well from multiple sources and reliably assess those sources". They also point out that in this way, the editors of Wikipedia differ from scientists as the former do not carry out any primary research. McGrady (2009) discusses the marginal role of traditional expertise and authority within Wikipedia, even though traditional scholarly expertise can give you an advantage when it comes to finding sources. The common goal of creating a trustworthy encyclopaedia is, according to McGrady, most important in understanding the users' dedication, and any assessment of contributions is made in relation to the social norms of the project.

Francke & Sundin (2010) have investigated how editors in Wikipedia consider credibility in relation to Wikipedia articles. Editors are, in a different way compared to an occasional visitor, able to draw on their previous knowledge of other editors as well as on how Wikipedia works. At the same time, the criteria for credibility assessments, mentioned by the Wikipedia editors, are more in line with those used in traditional media than those often referred to when discussing credibility in participatory media. In this way, editors of Wikipedia seem to use Wikipedia in the same way as other people do. Luyt and Tan (2010) investigate Wikipedia's credibility by researching how editors of history articles support their claims by referring to external sources. Their results indicate that the citing practices of external sources are not always as developed as is demanded by the social norms of behaviours (eg. the policy of verifiability) within Wikipedia. In their articles, Luyt and Tan state, in the line of critical information literacy, that Wikipedia is an excellent tool for demonstrating how knowledge is developed, and as such can be used in information literacy education in order to improve both.

Taken together, much of the previous research has focused on whether Wikipedia is trustworthy or not, and on how quantitative measurements can be used to support the evaluation of specific articles. More in line with the focus of the present article, research has also taken the editors' perspective and underlined the importance of understanding the social norms and how editors create trust in their contributions by means of, for example, citing practices. At the same time, these social norms should be regarded as being integrated with the form and functions of Wikipedia seen as a sociotechnical system. This article contributes to the understanding of Wikipedia by developing the qualitative research strand that explores Wikipedia from the editors' perspectives and doings, in relation to other, non-human, actors. This area is still largely neglected in Wikipedia related research.

4. Method and material

In order to understand the specific culture of Wikipedia, an online inspired ethnographical approach (Garcia et al., 2010) was chosen. This approach includes a multitude of different empirical material, such as interviews, online observations, web documents and discussions, e-mail questions, as well as the specific form and functions of Wikipedia. The field work started with an initial wish to get a better understanding of how the formation of credibility works in Wikipedia. The place as such, Swedish Wikipedia, and the activities there, constituted an initial boundary for the investigation. At the time of writing (July 2010), Swedish Wikipedia had more than 360,000 articles. In comparison, the English language Wikipedia had more than 3.3 millions of articles. This quantitative difference lies not only in the number of articles, but also in the number of active editors. According to Zachte (2010), in January 2010, Swedish Wikipedia had 157 very active editors who made more than 100 edits a month, while at the same time the English Wikipedia had 4,007 editors with the same level of activity.

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

The study combines material that occurs in Wikipedia, including features of the wiki and related software as such, with empirical material from interviews with editors, observations, and e-mail correspondence. Informants were contacted in the beginning of the empirical investigation. I aimed to include informants with different backgrounds and different interests, and a qualitative selection among active editors, who together represented a multitude of approaches to credibility, was made. These editors were most often found on talk pages of controversial articles and at the *Village Pump*, which is a common discussion forum in Wikipedia. Altogether, 20 active editors with user names were contacted by e-mail from their user pages and 11 agreed to participate in the study. The material gathered in relation to these 11 editors turned out to be so rich that no further editor was contacted. A limitation of the study arises from the difficulties I had in getting in contact with users whose writing reflected a minority position and whose editing often was overwritten by others. These users often edited without user names, and accordingly they did not have an identifiable user page, or did not answer my e-mails.

The informants present themselves on their user pages and each user page also has a talk page on which other editors can comment. The *Village Pump* turned out not only to be an important way of finding informants, but also interesting empirical material in itself. Editors of Wikipedia, including many of the informants, gather every day at the pump and discuss Wikipedia topics. Wikipedia also has a number of policy and guideline documents concerning how to behave according to the social norms of the encyclopaedia. These are in many cases included in the study. ‘Ordinary’, mostly non-editing, users are often referred to in the accounts of the informants. Therefore, it could be argued that the ‘general user’ is indirectly present.

The empirical investigation went on from August 2009 to February 2010. During this time, the informants’ whereabouts in Wikipedia, discussions at the *Village Pump* as well as on the talk pages of a few highly debated articles were observed. As a researcher I did not participate as an editor in Wikipedia during the field study. All informants, except for two, were interviewed once for 45-70 minutes through Skype and digitally recorded. I wrote down a number of themes I wanted to talk to them about in advance, but the

interviews were quite open and flexible depending on the experience of the informant. The remaining two informants were instead interviewed by e-mail. I wrote down a number of areas I wanted to talk to them about in advance, but the interviews were quite open and flexible depending on the experience of the informant. The interviews were supplemented with specific questions which emerged during the empirical study. These questions were sent to the participants by e-mail throughout the field work. The material collection ended with an e-mail from the researcher to the informants in which a few additional questions were asked.

All of the interviewees were informed about the purpose of the project and they gave informed consent according to the recommendations of the Swedish Research Council. The online empirical material in Wikipedia – documents, user pages, talk pages, the *Village Pump* and so on – are treated as publicly available (Ess & AoIR Ethics Working Committee, 2002). The informants' user names are not mentioned, thus preserving their privacy. This is also the reason for not linking the interviewee to direct quotations from their writing in Wikipedia. Thus, despite the fact that all material in Wikipedia is publicly available, the material was not treated in a way that allowed the participating informants to be able to be identified (Svenningsson Elm, 2009). Quotations from the informants as well as from Wikipedia have been translated from Swedish to English. Texts in Wikipedia sometimes have links and these have been left out of the translation.

The analysis was carried out alongside and after the field work, in relation to the theoretical framework presented above. The informants, discussions at the *Village Pump*, user pages, features of the software (Mediawiki), various kinds of Wikipedia documents on policies and guidelines can all be described as actors who influence each other by translation (Latour, 2005). Correspondingly, an analysis of all materials, the interviews and the e-mail correspondence as well as online materials in Wikipedia, such as the discussions at the *Village Pump* and policy documents, were undertaken together. Careful and repeated listening to the recorded interviews, transcription of central parts and a close reading of the textual material was undertaken. Lastly, the online observations of the participants' doings in Wikipedia gave invaluable insight beyond the oral testimonies in

interviews and other documents and contributed to the analysis. However, in order to not reveal the involved users' identities, these observations are not quoted in the article. The analysis was guided by an interest in understanding how trustworthy knowledge in Wikipedia is constructed, if we position Wikipedia as a site that is constituted through its practices, policies, form and functions, and also assume that the process of stabilising is embedded in the daily life of the Wikipedia editors. During the analyses a number of themes were deduced. The themes have a focus on the descriptions of how knowledge in Wikipedia is negotiated and emerges in the daily life of Wikipedia editors. The analysis is qualitative, with the aim to understand the particular culture of Wikipedia and its practices, rather than to gain statistical kinds of knowledge. Therefore numbers are avoided in the presentation of the results. Thus, no generalisations can be made based on quantitative measures. The results are presented interwoven with their discussion.

5. At work

Throughout the analysis, it became clear that a leading principle was the routine activities which the informants put a great deal of work into. Hence, metaphors taken from work life feature strongly in my presentation and also undergird the analysis. However, these routines and the hard work are a part of daily life and often regarded as being enjoyable by the informants. The results are presented along with discussions of these results. Let us start with the workplace itself and the people there.

5.1 The workplace and its people

The different functions of Mediawiki, the software on which Wikipedia runs, allows articles to be constructed, contributions to be made, and discussions to be held. At any moment, it is possible for an editor – with or without a user name – to create a new article or to go into edit mode in an existing article and make changes or extensions. Each article – including policy documents, guidelines, user pages and other community pages –

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

has a talk page where discussions about the article and how to develop it are held. Furthermore, each article has a history page where all previous versions of the article can be accessed, and where the current version of an article can be changed back to a previous version.

Wikipedia also has a number of policies which aim at guiding the participation in the project. A policy is an established accepted way of behaviour concerning a certain aspect of Wikipedia contributions, even though they can be changed and developed by Wikipedia's editors. In this case, especially one of these core policies is important; the policy on *Verifiability*:

By **verifiability** it is meant that everything that is written in Wikipedia should be possible to be confirmed by external trustworthy sources. Thus, the articles should not be filled with pseudo facts, or things that only you are convinced of, but only with established facts. Sources which are unsuitable in this respect are blogs, hearsay, discussion forums, and observations made by yourself. Wikipedia is not the place for communicating non-published information, independent of how revolutionary – or banal – it is.

(Swedish Wikipedia, 2010-01-02)

Together with other actors, in particular the guideline on *No Original Research* (Swedish Wikipedia, 2009-12-13a), and the well-known policy on the *Neutral Point of View* (NPOV) (Swedish Wikipedia, 2009-12-13b), these policies take part in the shaping of people's information practices in Wikipedia. At the same time, Wikipedia can be seen as a good expression of the ways in which human and non-human actors co-exist, not least since these policies are constantly being altered by people's editing.

The editors' work on articles, together with discussions on talk pages and discussion forums, are the basic activities in Wikipedia. The 11 informants participating in the study, who except for one all refer to themselves as Wikipedians, have different interests in and

agendas for their participation in the encyclopaedic project. At the same time, they share an interest in working with the Wikipedia project as a whole, and not only with a particular article or subject of their interest. The informants are between 20 and 50 years old and their occupations outside Wikipedia vary; from students in various disciplines and at different levels, blue collar work, cultural work, management and computer related work. One of the informants categorised the editors of Wikipedia in the following way:

There are a few users who are very active in many areas, and then of course there are the few who are very active in a few areas. Then there are many who rarely are like ... who are active, but who rarely end up in the discussion and whom you therefore may not see as much.
(interview)

The informants were primarily to be found in the first group, even if there are examples of informants in the two other categories of users.

Wikipedia relies on the work of many hands, but why do the informants carry out the work they do? One line of arguing is to refer to the common goodness of the project, “you contribute to something larger” (interview). The vast collection of organised information is thought of as being attractive. Another informant finds it “exciting that there is so much information available which you can access and share [...] Because I use it myself it feels like it is close at hand to contribute as well” (interview). In Wikipedia, it seems that participants often become late modern librarians for which Wikipedia is a way to communicate knowledge to the people: “I have a little bit of an adult educator in me” (interview). This can be interpreted as a kind of altruistic *Volksbildung* argument stemming from the notion of encyclopaedism, as developed during the Enlightenment, which attributes to knowledge the power to change the world (cf. Haider & Sundin, 2010), “I think it’s a beautiful project. I realise now that I’ve been interested in knowledge all my life, basically. And this is knowledge and it’s co-operation and it sort of just gets better and better” (interview). Here the utopian notion of Wikipedia seems to be, as in many other interviews, linked to a personal interest in knowledge as such.

The informants underline that they enjoy participating: “I never do anything in Wikipedia because I have to. I do it because I feel like it” (interview). One of the younger informants relates Wikipedia to his participation in other online communities: “all that talk doesn’t lead to anything being accomplished. In Wikipedia, you can look back on what you’ve accomplished and it makes you feel happy and satisfied” (e-mail). To participate in Wikipedia is experienced as doing something that leaves a mark for other people. The combination of a wish to write for others and for knowledge as such is often expressed. “I can express my writing itch and my interest in languages. I also have a great interest in encyclopaedias” (e-mail). Frequently, the informants worked on articles in fields in which they did not have a previous understanding. Yet the wish to get it right, to get closer to perfection, was stated as important, “Perhaps [Wikipedia] satisfies my need to write, you could say, and to create order and correct things that are wrong” (interview).

All of the functions and policies in Wikipedia participate in the shaping of Wikipedia and make editors act in certain ways. The informants consider their participation in Wikipedia as both fun and as rewarding. At the same time, it is also experienced as serious work, one which concerns knowledge in general and preferred knowledge, of getting it right, its organisation and presentation, in particular. Let us continue with the role which Wikipedia plays in our informants’ daily lives.

5.2 Unregulated working hours

When asked about how he worked with Wikipedia on an ordinary day, one of the informants stated: “I open my e-mails and I open Wikipedia. That’s what I always do. That’s the first thing I do, so to speak. It’s part of [laughter] my daily routine” (interview). For most of the informants the watch-list, a function within Wikipedia that helps editors follow the edits made in dedicated parts of Wikipedia, is the starting point for their activities. “I probably log in in the morning right after I have woken up just to check my watch-list if anything that is of interest to me has happened” (interview). The

watch-list is, in line with the theoretical framework, seen as an actor that contributes to the shaping of Wikipedia. Another informant describes his daily activities on a particular day in the following way:

That day started with a bit of fiddling ... corrected the interwiki links on a new article, created a re-direct and corrected a link to the Commons, and added a picture from there to an article. It wasn't in any articles I was involved in myself, but just something I saw in "Recent changes". [...] Then I watched at a film, [NNN], where they look at [XXX]. Then I came to seek information about it and saw that the Swedish article was very brief, and I devoted a moment to extend it by using the English Wikipedia. [...] When I had finished watching the movie I came back, and it was after midnight, and there was much vandalism, so I rolled back the vandalism, blocked and/or warned some vandals.

(e-mail)

The Wikipedia-day for this informant started at 10.30 am and was not over at midnight. After the last edit mentioned above the informant, among other things, created a new article and made a few other edits. Altogether, the informant made almost 50 edits spread out over the same day. The information practices, as described by the informants, sometimes relate to other, non-Wikipedia, activities in their daily lives, such as watching a movie as in the quotation above, but in most cases it seems driven by the activities in Wikipedia itself, where one edit leads to another.

For some of the informants, editing was restricted to the evening, while others described their Wikipedia work as something going on during the entire day, and some, as one informant put it, had "Wikipedia active in the background and have a look once in a while" (interview). It is not only the editing part of Wikipedia which is in focus for the informants. They also use Wikipedia for finding out things, "I'm using WP as a daily reference work, primarily as a fast dictionary for simple facts in biographical articles. Then I put some effort into improving the articles or 'clean up after others'" (e-mail). In

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

fact, searching for information and editing Wikipedia seems so intertwined that the activities are difficult to keep apart.

Wikipedia is integrated in the everyday life of most of the informants and to be a Wikipedian involves much more than article writing. Offline and online activities go hand in hand:

Go (this time) directly to the watch-list. Notice there is a new Wiki-meeting taking place, checking it up, even if I know I won't attend. Take a further look at the watch-list and skip most, scroll down to a quite interesting discussion [...] Exit my log-in in order to continue to cook and to write the minutes of a meeting.
(e-mail)

The community activities surrounding Wikipedia were also considered important. At the same time, some of the informants did also take a "time-out" in which they did not edit at all. These periods were caused by a heavy workload at their ordinary work, hostile discussions with other editors, or simply just a need to relocate their writing efforts to other participatory media.

What becomes clear from the empirical material is that Wikipedia is more than a knowledge database or an encyclopaedia. It seems safe to assume that Wikipedia is also a place for identity construction, where the informants' editing constitutes an important part of their daily lives (Bryant, Forte & Bruckmann, 2005). For Wikipedia editors, to edit is not just something you do, it is also a part of who you are. As shown above, editors carry out a lot of work which in many cases are woven into their other activities in life. For the informants, to take part in the development of Wikipedia is very much hands-on routine work where it is the many small edits that make the difference. And one particular kind of editing seems to constitute the major part of the work – cleaning.

5.3 *Cleaning work*

The informants did of course participate in the writing of articles, but cleaning up after others seems to take up the most time for most of the informants. One informant states that he has not contributed so much to the writing of articles, but instead had to “fight vandalism and correct articles, perhaps polish them a bit and stuff so the credibility and quality of the articles will be as high as possible” (interview). Along the same lines another informant says “Now recently, it has mostly been fiddling. Vandalism very much. Correcting links and language errors and such” (interview). Another informant writes:

I have mostly cleaned, i.e. taking care of vandalism. It’s probably most of what I do in Wikipedia on a normal day, and watching recent changes. Sometimes I find a project to work with, like to re-categorise articles or change a small thing in a greater number of articles.

(e-mail)

Many of the informants mention a change of focus during their careers as editors, from article writing to cleaning work and other administrative tasks,

in the beginning, I think most have been doing pure article writing, and then you go more and more over to what you might call meta-activities – to check spelling, editing techniques, and to be involved in policy debates and such.

(interview)

When it comes to *meta-activities*, the subject of the article seems, according to the informant, not to be of any great importance. Together they all spend a lot of their time in Wikipedia repairing, fixing and rewriting after other, less careful, visitors and contributors. Kittur et al (2007) relates a general growing focus on indirect activities as a result of the need to coordinate a quickly growing participatory encyclopaedia, but it is also important to mention that some cleaning activities are carried out by or together with

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

non-human ‘bots’ that for example take care of spam, detect vandalism, and block users (Niederer & van Dijck, 2010).

Cleaning work seems to be the central activity for almost all of the participants. Yet, for some it is the actual writing of articles which is the central activity. One informant writes: “I am a bit of a dipso, but would probably see me mainly as an article author” (e-mail). Yet another informant states that he does not see the difference between writing content and doing small edits, “I don’t think there is any difference” (interview).

With these exceptions in mind, what shapes the work of the informants seems to be mostly the nitty-gritty daily cleaning work and other small edits, together with community discussions, rather than the actual writing of and on articles, seen as pure epistemological work, even if both activities are present.

5.4 Finding references

One part of the practices of editors is to find sources and to make references to sources which can be added to text segments in articles. To find and add references to sources is a very important activity in Wikipedia, and it is often referred to in the community discussions. For example, there is a category in the Swedish Wikipedia for articles in need of references to sources (Swedish Wikipedia, 2009-04-13). At the time of the study, this category included 11,184 articles – everything from articles on issues of popular culture to scholarly topics. From time to time the number of articles without sources is also discussed as a problem. Competitions for adding most sources to articles in this category are arranged and advertised at the *Village Pump* (Swedish Wikipedia, 2009-11-09). Thus, to find references is an integral part of the Wikipedia editors’ practices. It is not just a question of finding information, as we will see further on; it is here interpreted as a way of creating trust.

Other language versions of Wikipedia and traditional encyclopaedias often function as short cuts to external sources. An informant states that he uses other language versions of Wikipedia and other encyclopaedias as a first step, “you try to work backwards in order to find the primary sources” (interview). Another informant argues in a similar way: “So if there’s something I’m going to write about, I often go to Wikipedia to find... both get a basic understanding of the topic and through the sources I can find other sources that I can use, because it might look better” (interview). Many of the informants seem to use the participatory online encyclopaedia as a way of getting an introduction to a field and as a shortcut to more ‘reliable’ sources, precisely as other, non-editing users of Wikipedia also do (Francke & Sundin, 2010; cf. Sundin & Francke, 2009). Other language versions, particularly the English language Wikipedia, are also used in this way: “Many times when I extend or create a new article I take a look at the English Wikipedia and start from that and the sources which are cited there” (e-mail).

As reference finders – just as any other practice within Wikipedia – editors do not work alone, instead they participate in a practice which includes people, books and other actors. “Here I actually have a little mini-network of people who help me [...] and who send mails with suggestions on sources and references” (interview). The web in general and Google in particular are regarded by most informants as central technologies in their search for sources:

Often it’s the net. Then if there is anything I can’t find on the net, a good source, it’s usually the library. Sometimes I have a book at home that I can use as a source, but it is not like that very often. The easiest course is to find something online and it’s a pretty good source, since others can then check whether what I write about what the source says is correct.
(interview)

Ease of access seems to be the driving force here, but books and libraries also have a place. One informant finds sources “[m]ostly through internet searching. With Google, you can actually find a lot. Otherwise, books are a good alternative” (e-mail). Another

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

informant writes that he “uses, as I said before, largely my own reference library, but also Projekt Runeberg¹, Project Gutenberg, Google Books and so forth” (e-mail). It seems as if the editors build up a kind of reference library in which printed books, encyclopaedias and web resources co-exist, “You gradually build an understanding of where there is knowledge to be found. Both in traditional paper form and on the net” (interview).

If editors know the topic, finding sources is regarded as being easier: “If I roughly know where I should look for this? Let’s say that it is a source of population of a country. Then I know like two or three places where I can find sources for that” (interview). It is possible to argue that editors often lean on traditional academic skills and custom:

The best tends to be to refer to sources. I have a small collection of books on my shelves that I usually use to see if I can get support for what I think. It tends to be most effective if ... in different ways to seek support and I may find articles that have reached credibility on the Internet as well.
(interview)

The editor quoted above has a long experience in finding references and keeps books of particular topical relevance for his Wikipedia involvement in his bookshelf. He also works in academia and knows how to find support for claims through references. The search for references is a search for references that are regarded as ‘trustworthy’ by scholarly criteria, even if ‘new’ tools, such as Google, are used for finding them. Another informant states,

You often use Google to find an article written by a credible source. And a credible source is an established newspaper, research reports and so on.

¹ Project Runeberg (<http://runeberg.org/>) is a Swedish voluntary project on creating free digital access to Scandinavian literature.

There are also books in the library. If there are historical articles that treated it, it is perhaps difficult to find so much on the net, if they are for example local history, but then you have to go to the library to find a book on local history and use it as a source and build on that if you write an article.
(interview)

Here, the demand for citing sources seems to incite the writing of articles starting from a source rather than the other way around. The link between Wikipedia and established media is strong and available sources influence the writing as much as the other way around.

Seen as actors, people, the form and functions of Mediawiki, Google, Wikipedia's policy documents – just to mention a few – jointly contribute to the information practices of finding references. However, all references are not valued equally in Wikipedia. As the quote above illustrates, a reference needs to be regarded as trustworthy and the trustworthiness of references is located in a hierarchy, which is the theme of the next section.

5.5 Negotiating a hierarchy of references

A reference is not just a reference. Rather, it is here suggested that there is a hierarchy of trustworthy genres in Wikipedia, which often mirrors hierarchies of sources as they are treated outside Wikipedia. For example, what can for the sake of simplicity be categorised as 'established media' and 'participatory online media' are not regarded as equally trustworthy. "For example, I don't add a reference to a blog" (interview), says one informant. The quotation echoes one of the guidelines in Wikipedia, *Citing sources*, where it can be read that "Blogs are rarely trustworthy sources" (Swedish Wikipedia, 2009-12-21). Wikipedia guidelines are less regulative compared to policies and they recommend rather than demand certain behaviours (Swedish Wikipedia, 2009-12-15). In fact, according to the same guideline, Wikipedia is itself not valued as source and adding

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

a reference to another Wikipedia article is not appreciated in Wikipedia: “A good rule of thumb is to never refer to any page in a wiki project, but instead use the sources which that page is built upon” (Swedish Wikipedia, 2009-12-21).

Sometimes, the pursuit of references is a process in which more ‘reliable’ sources replace less ‘reliable’ ones. One informant states, “I’m going, well, in several steps. First, you usually find something that is quite accessible. Then you think – is this logical, is it possible? And then you try to either find a source ... or a source that says the same thing and that is a bit more credible” (interview). There is also a so-called essay (no official policy or guideline) on the Swedish Wikipedia, called *Identifying reliable sources*, which reflects the same position on sources and their hierarchies as that adopted by many participants (Swedish Wikipedia, 2009-12-13c). Doctoral dissertations are here ranked the highest in the hierarchy, and personal websites and media that are written from a particular religious or political angle rank the lowest. This hierarchy creates an order of precedence of a flat reference list and turns the different references to value-laden sources.

A part of the editing work is to find and add sources which are higher up in the hierarchy in already existing articles, or even to replace those that are ranked lower: “Sometimes it is someone who has used a source known to be questionable. Then you try to find something that is more up to date, or that is more respectable, and you try to replace it with what it says. Especially if there are incompatibilities between these two” (interview). For the informants it seems reasonable to suggest that established media – printed or digital – play a central role. In the words of one of the informants: “Wikipedia would be impossible to write without access to print sources. It’s the basis for it, you know” (interview). Source hierarchy and easy access are two principles that sometimes contradict each other, but, as stated above, with formal academic training in information seeking sources higher up in the hierarchy can easily be found from the work desk.

The ease with which sources are found makes comparing and assessing sources a demanding task. “You can always find a source which confirms what you think”

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

(interview). Therefore, the same informant claims, “It is not enough that there is a source for saying that’s the way it is” (interview). This fact leaves the editors not only with a demand to find sources in order to support claims, but also with a demand for trustworthy sources, high up in the source hierarchy. Sources are often questioned by other editors: “Yes, it was in fact yesterday. I had used a source taken from *Svenska Dagbladet* [a Swedish morning paper], but it was maybe ... I saw only in retrospective that it was possible so that the ... it was a debate article ... more opinion” (interview). His contribution was challenged at the talk page of the article, on the basis of the low status of a source he referred to. He reacted by finding references to new sources, higher up in the hierarchy.

In line with the guideline on *No Original Research* (Swedish Wikipedia, 2009-12-13a), highest up in the hierarchy are secondary sources rather than the primary ones.

Primary sources which have been published by a trustworthy source can be used (carefully) in Swedish Wikipedia. A person without special knowledge should be able to read that part of the Wikipedia article that cites the primary source and be able to see how that part of the Wikipedia article corresponds to the primary source. Any independent interpretation of the primary source should not be undertaken. If you want to include an interpretation of the primary source, you should cite a secondary source. (Swedish Wikipedia, 2009-12-13a)

On one occasion during the empirical study there was a discussion at the *Village Pump* on how various sources should be valued in relation to each other. Under the label “Knowing and thinking”, many editors discussed sources intensively (Swedish Wikipedia 2009-10-01). One theme in the discussion concerned how the tradition of assessing sources differs between disciplines. Some of the debating editors blamed others for not understanding the role of sources in the humanities. They argued that a publication within the humanities has a different lifetime compared to one in the natural sciences. The cause of this debate was a discussion on a talk page to an historical article where some of the editors, according to others, did not want to accept references to older sources. This

example shows us some of the difficulties in a participatory encyclopaedic knowledge project where the same standard for assessing quality of knowledge is established, regardless of the topic. One of the informants points out in a similar way: “Sure, it’s easy to get hold of old books, they are often posted online, but what is said there is not always that which counts today” (interview). To negotiate and translate the hierarchy of sources is thus a difficult enterprise in a community whose editors come from backgrounds with different understandings of sources.

Negations of sources and their hierarchy is a given part of the construction of knowledge in Wikipedia. Discussion forums, talk pages, policies and guidelines are, together with the references themselves, actors in these deliberations. Along with the editors, these actors constantly make Wikipedia what it is.

5.6 Source carpentry

The importance of referring to sources in Wikipedia is something that has, according to the informants, increased during the last few years and that they sometimes experience as a pressure. Even if the informants are largely positive to this change, it is not without hesitation or complaints:

If you go back only two years, there was not anything like the same requirement to show sources and using footnotes and suchlike, as you are expected to do today [...] In particular with the footnotes, I think that it has almost become inflationary. Given that this is still a sort of popular science database you produce and not a dissertation.
(interview)

Another informant has reacted to the changing demands in the following way: “If I go back to my old articles, which I wrote a few years ago in my green Wikipedia youth, mostly completely without ... I did not understand at all this, that it should be with sources and such” (interview). He now returns to old articles which he has worked with

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

earlier and supplements them with references. Finding references to sources is sometimes also seen as an obstacle: “I usually try to think about sources, even if I’m not very good at finding sources for everything” (e-mail), or “I think sources are a bit too laborious. I realise the value, but I don’t think it’s fun” (interview). The growing demand to refer to published sources can be referred to as a “professionalisation” of Wikipedia, as one of the informants described it (interview).

Let us now proceed to the different ways in which references to external sources are used in Wikipedia.

Relevance for Wikipedia

Attaching a reference to a passage in a Wikipedia article has different functions. First of all, to support an article with references seems to be a way to balance the anonymity of authorship and the fact that anyone, without particular expertise, can edit and thus create trust for Wikipedia among its users.

I don’t think it’s especially important to focus on specific topics. If you find something to write about and you think that Wikipedia needs an article about it you should write it, even if it’s a topic you don’t have much knowledge on. The most important thing is that you present clear and neutral sources of information in the article.

(e-mail)

A reference creates a possibility for users to investigate whether the article is verifiable or not: “It is among the most fundamental things for the credibility of Wikipedia. For any statement that may be considered controversial or questionable should include references to sources” (e-mail). We also find this function in the policy on *Verifiability* (Swedish Wikipedia, 2010-01-02), as referred to above. References to external sources, I suggest, are supposed to anchor claims and arguments to established media. This in return leaves its mark in Wikipedia as a whole and thus creates trust for the encyclopaedic project.

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

The increasing demand to include sources in Wikipedia is expressed in many ways in the Wikipedia community. For example, in order to promote longer and high quality articles, there is a competition called “New Written Articles of the Week”. During my empirical study the competition was complemented with a significant additional aspect:

It is also important to encourage source referencing in articles. **From November 9, 2009**, this requires that any newly created article or expansion which is listed on the page includes *at least* one general or specific reference to sources. (Swedish Wikipedia, 2009-11-06)

Encyclopaedic relevance

Referring to external sources is also a way for editors to make a case in the debate for the “encyclopaedic relevance” of an article. Encyclopaedic relevance is the term used in order to draw a line between which articles to include in Wikipedia and which ones not to include (Swedish Wikipedia, 2009-12-22). There are ongoing debates within the community about whether particular articles should be included or not. These debates sometimes end with a vote. Often, the guideline on *No Original Research* (Swedish Wikipedia, 2009-12-13a) is translated to fit the strategies of certain editors and used in the argumentation.

There is a *Notability* practice in Swedish Wikipedia which discusses relevance in various areas (Swedish Wikipedia, 2009-12-22). For example, in relation to musicians and music groups this document states, “Relevance should be confirmed by for example links to articles in established media” (Swedish Wikipedia, 2009-12-22). It is here suggested that references to established media function as guarantees for the general interest of the article. One of the informants describes how he sometimes digs for sources in order to save obscure articles. He refers to strategies he uses to save articles from deletion: “The best way to convince people in Wikipedia is to have references to different types of works and sources” (interview). Another informant describes, in a similar way, how he sometimes uses sources to save interesting articles from deletion: “Then maybe I go in myself and find out some more facts, and add sources and so on. For it to be kept, if I

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

think it's relevant" (interview). An external reference functions as an argument for a particular article's relevance to the encyclopaedic project.

Arguing for content

If saving articles is one reason for referring to external sources, except for the more general purpose of creating a more credible and trustworthy encyclopaedia, using references for arguing for a particular content is suggested as another reason. The informants talked about how they searched and found sources in order to argue for a particular fact or statement in an article:

The whole thing is built on having sources, and credible sources at that, for what you want to say or what you want to add to an article. If there are credible sources and what you want to add might be a bit controversial, there are usually no problems.

(interview)

Citing what is considered to be trustworthy sources seems to open up the possibility to put forward various knowledge claims. "Of course you get away with quite a lot by citing sources" (interview). To add a reference should, according to Wikipedia's policies and guidelines, not differ depending on the topic, and this position was also expressed by many of the informants. If the function is to support an edit, then it becomes even more important to refer to sources in controversial topics. "I can feel that it may be more important to locate references to sources in those ... which are controversial topics, or if it is just more of this kind of less controversial things if you're writing about a car or things like that" (interview). Another informant argues along similar lines: "Something which I think hasn't been discussed that much is that you have to adjust the demand for sources a little bit depending on the topic" (interview).

When Wikipedia is seen from a perspective focusing on establishing credibility and trustworthiness, one actor, I suggest, stands out as being more important than others – the policy on *Verifiability* (Swedish Wikipedia, 2010-01-02). If this policy is not followed,

Preprint of article appearing in 2011 in Journal of Documentation, 67(5), 840-862. Please cite the published version of the article.

contributions can more easily be changed by other users and articles can even be erased with the argumentation that it is not encyclopaedically relevant for Wikipedia. That is, the practice of citing a verifiable and trustworthy source is the basis for including a knowledge claim (or article) in Wikipedia. This policy on *Verifiability* can be seen as an *obligatory passage point* (Callon, 1986) for other actors. Together with the policy on *Neutral Point of View* (Swedish Wikipedia 2009-12-13b) and the guideline on *No Original Research* (Swedish Wikipedia, 2009-12-13a) they form, it is here argued, the central regulations to which editors have to translate their activities and strategies, in this case the need to refer to established external sources.

Providing references in Wikipedia has similarities to the scholarly practice of providing references to scientific articles where the references participate in stabilising scientific facts (Latour, 1987; Latour & Woolgar, 1986 [1979]). According to Latour, scientific facts are constructed within a network of people, institutions and documents, rather than by an individual author's empirical research. It is "[r]eferences, quotations and footnotes" which distinguish fiction from facts (Ibid, p. 33). While Latour refers to the construction of scientific facts, I am interested in the attempts at constructing a neutral point of view that is, if we also bring in the policy on *Verifiability*, verifiable by going to the sources. Scientists translate their empirical investigations together with earlier scientific publications into literary inscriptions (Latour & Woolgar, 1986 [1979], p. 45) while Wikipedia editors translate, or in many cases rather recycle, text to new text.

6. Summary of findings and conclusions

Earlier writings in Wikipedia have often focused on the question whether Wikipedia is credible or not (e.g. Giles, 2005; Magnus, 2009). In the present article the focus is instead on how knowledge claims are put forward and stabilised. An online participatory encyclopaedia, such as Wikipedia with its grand utopian ideals, is anchored in the detailed information practices of fixing, erasing, voting, changing, proof-reading, and, particularly in focus here, of finding, debating and inserting references to external

sources. The editors involved in these practices might be called *janitors of knowledge* as they are the people who, in relation to the policies, form and function of Wikipedia, through their often daily work keep the construction stable. It is not the individual editors' efforts in writing long contributions on their own which build Wikipedia, even if such efforts of course exist, but the very practical work of active and devoted editors. They own their own house (at least together with the Wikimedia foundation), but – with some restrictions – it is open for everyone to visit and even to reconstruct. The contrast between the great epistemological visions, present in any encyclopaedic project with universal ambitions, and what could almost be considered as the triviality of these everyday doings – with the editors' nitty-gritty activities – is striking.

Wikipedia editors, such as those interviewed in this study, carry out the practices without which Wikipedia would not exist. One of the most essential practices in the establishing of credibility is finding and adding references to external sources (Forte & Bruckman, 2005; McGrady, 2009). I have drawn on STS literature to establish an understanding of the interplay of different – human and non-human – actors (comp. Niederer & van Dijck, 2010). The reliance of references to already published records is an important way of making Wikipedia stable and the references are the results of detailed work, embedded in the daily lives of many. Latour (1987, cf. Latour & Woolgar, 1986 [1979]) and his writings on scientific practice and fact construction has been referred to in order to better understand how knowledge is established, or rather re-established, and stabilised in Wikipedia. I have shown how the central policy on *Verifiability* can be seen as an obligatory passage point (Callon, 1986) for editors in an encyclopaedic project which strives to become as trustworthy as possible for all kinds of users.

References to external sources create trust for Wikipedia among its many users. Wikipedia and its articles do not just 'get' their stability and trustworthiness inside Wikipedia. It is in fact, and more importantly, the links to external sources through references that constitute Wikipedia in a network in which established media and their institutions, such as universities, publishers and libraries, play crucial roles. Wikipedia articles and so-called established media are juxtaposed side by side in the online

participatory encyclopaedia. Wikipedia is stabilised and gains credibility through established media, including popular science, encyclopaedias, and scholarly literature. Referring to external sources also creates trust in the knowledge claims in relation to other editors in the on-going discussions of what Wikipedia should contain. The trust in established media and formal knowledge, developed in traditional institutions, is, I suggest, clearly reflected in Wikipedia. In fact, the policies and guidelines of Wikipedia question the credibility and trustworthiness of Wikipedia articles themselves in favour of established media (cf. Swedish Wikipedia, 2009-12-13c).

An important difference in citation practice in Wikipedia, compared to established scholarly literature, is that while scholarly literature primarily refers to other primary sources, Wikipedia articles are primarily supposed to refer to second-hand publications which lay people can understand (cf. Swedish Wikipedia, 2009-12-21). At the same time, established media also get attention through these references in Wikipedia. It is therefore possible to say that the references to external sources in Wikipedia articles contribute to the credibility of established media among lay people. The interviewed editors' general interest in knowledge and in the communication of knowledge is striking. Wikipedia can definitely be seen as a universal project for *Volksbildung* (it has in fact many similarities with the ideal of public libraries), and its reliance on the institutions of traditional knowledge production and distribution put established media in the centre.

There are of course other differences between science and the Wikipedia practices of stabilising knowledge. One of the ways in which facts are constructed in science, which Latour (1987, p. 35) refers to, is how an article is referred to by later articles. In this sense, a Wikipedia article constitutes a dead end, since Wikipedia articles should not, according to its policies, refer to other Wikipedia articles. Instead, Wikipedia articles need references to outside sources in order to become trustworthy and credible, but outside sources do not need Wikipedia articles to prove their credibility. That is, Wikipedia articles do not get their stability by a next generation of articles as much as established media do, even if there are examples of the opposite. Instead, most Wikipedia articles are left to themselves with their contributors compensating by endlessly updating,

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

rewriting and, not least, adding references to new trustworthy sources. However, they are to some extent stabilised by interwiki links to and from other language versions of Wikipedia and, of course and not to be forgotten, by references from Google Search.

Wikipedia has been called a laboratory for online and participatory knowledge construction and in the Wikipedia laboratory, compared to the scientific one, empirical experiments are replaced by the already published being recycled (cf. Haider & Sundin, 2010). But just as in the science laboratory, it is possible to open up the black box (cf. Latour & Woolgar, 1986 [1979]) by following the construction of articles as well as the constant construction of Wikipedia. The transparency of the knowledge practices in Wikipedia – made possible by the software of Mediawiki together with the policies and guidelines – actually makes it easier to unveil the construction phase than in the science laboratory (but as soon as we follow the references outside Wikipedia we are in the black box of science). This makes Wikipedia excellent for discussing the credibility and trust of knowledge in general as well as in Wikipedia in particular. Lately, information literacy research has stressed the importance of bringing in elements of credibility assessment (e.g. Alexandersson & Limberg, 2003; Todd, 2006), and such discussions are a crucial part of any information literacy training. By shedding light on the link between Wikipedia and established media, a more reflexive use of participatory encyclopaedia can be gained. In a similar vein, Luyt and Tan (2010) argue that Wikipedia can demonstrate the social context of knowledge in information literacy training. The present article develops this argumentation by adding an STS perspective which sheds light on how references to external sources stabilise Wikipedia. Through its ethnographic approach, this article makes visible the everyday work involved in this stabilisation, considering the sociotechnical aspects in the making of knowledge within the Wikipedia culture.

Scientific literature is less concerned with representing reality and Wikipedia articles are less free-floating than one might think. Editors of Wikipedia can be seen as janitors of knowledge at work, whose daily work and unregulated and unpaid labour construct Wikipedia and its articles through cleaning, reference finding, as well as negotiation and carpentry of sources.

Acknowledgements

This article is a report from a larger study on Wikipedia, credibility and trust (see also Francke & Sundin, 2010; Haider & Sundin, 2010). The study is conducted within the project Expertise, Authority and Control on the Internet (EXACT), funded by the Swedish Research Council. The project is part of the Linnaeus Centre for Research on Learning, Interaction and Mediated Communication in Contemporary Society (LinCS) at the University of Gothenburg and the University of Borås, Sweden. The first thank you goes to the informants in the study. Without their participation the article would not exist. I wish also to warmly thank Jutta Haider for her very valuable comments on the manuscript and passion about research in general. I also owe a thank you to Helena Francke, Theresa Anderson and Astrid Mager whose comments helped me to improve the article. Finally, I want to thank the two anonymous reviewers for their valuable suggestions.

References

- Alexandersson, M. and Limberg, L. (2003), "Constructing meaning through information artefacts", *The New Review of Information Behaviour Research*, Vol. 4, pp. 17-30.
- Bryant, S. L., Forte, A. and Bruckman, A. (2005), "Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia", *GROUP'05*, November 6-9, 2005, Sanibel Island, FL, available at <http://portal.acm.org/citation.cfm?id=1099203.1099205> (accessed 10 February 2007).
- Callon, M. (1986), "Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieux Bay", in Law, E. (Ed.), *Power, Action and Belief: A new Sociology of Knowledge*, Routledge, London, pp. 196-233.

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Chesney, T. (2005), "An empirical examination of Wikipedia's credibility by Thomas Chesney", *First Monday*, Vol. **11**, No. 11, available at http://firstmonday.org/issues/issue11_11/chesney/index.html (accessed 10 January 2008).

Cross, T. (2006), "Puppy smoothies: Improving the reliability of open, collaborative wikis", *First Monday*, Vol. 11, No. 9, available at http://www.firstmonday.org/issues/issue11_9/cros (accessed 10 July 2010).

Ess, C. and AoIR Ethics Working Committee (2002), *Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee*, available at <http://www.aoir.org/reports/ethics.pdf> (accessed 16 October 2009).

Fallis, D. (2008), "Toward an epistemology of *Wikipedia*", *Journal of the American Society for Information Science and Technology*, Vol. 59, No. 10, pp. 1662-1674.

Forte, A. and Bruckman, A. (2005), "Why do people write for Wikipedia? Incentives to contribute to open-content publishing", *GROUP'05*, Sanibel Island, FL., available at <http://www-static.cc.gatech.edu/~aforte/ForteBruckmanWhyPeopleWrite.pdf> (accessed 10 July 2010).

Francke, H. & Sundin, O. (2010). "An inside view: Credibility in Wikipedia from the perspective of editors". *Information Research* 15(3), Special supplement: Proceedings of the Seventh International Conference on Conceptions of Library and Information Science, London 21-24 June, 2010, available at <http://informationr.net/ir/15-3/colis7/colis702.html> (accessed 10 October 2010)

Frohmann, B. (2004), *Deflating Information: From Science Studies to Documentation*, University of Toronto Press, Toronto.

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Garcia, A. C., Standlee, A. I., Bechkoff, J. & Cui, Y. (2009), "Ethnographic approaches to the internet and computer-mediated communication", *Journal of Contemporary Ethnography*, Vol. 38, No. 1, pp. 52-84.

Giles, J. (2005), "Internet encyclopedias go head to head", *Nature*, Vol. 438, No. 7070, pp. 900-901.

Haider, J. and Sundin, O. (2010), "Beyond the legacy of the enlightenment? Online encyclopedias as digital heterotopias", *First Monday*, Vol. 15, No. 1, available at <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2744/2428> (accessed 10 July 2010).

Holman Rector, L. (2008), "Comparison of Wikipedia and other encyclopedias for accuracy, breadth, and depth in historical articles", *Reference Services Review*, Vol. 36, No. 1, pp. 7-22.

Kittur, A., Chi, E. H., Pendleton, B. A., Suh, B. and Mytkowicz, T. (2007), "Power of the few vs. wisdom of the crowd: Wikipedia and the rise of the bourgeoisie", *Proceedings of the 25th Annual Conference on Human Factors in Computing Systems (CHI 2007)*, San Jose, CA.

Latour, B. (1987), *Science in Action: How to Follow Scientists and Engineers through Society*, Open University Press, Milton Keynes.

Latour, B. (2005), *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford University Press, Oxford.

Latour, B. & Woolgar, S. (1986 [1979]), *Laboratory Life: The Construction of Scientific Facts*, Princeton University Press, Princeton.

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Lave, J., and Wenger, E. (1991), *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press, Cambridge.

Luyt, B. and Tan, D. (2010), "Improving Wikipedia's credibility: References and citations in a sample of history articles", *Journal of the American Society for Information Science and Technology*, Vol. 61, No. 4, pp. 715-722.

McGuinness, D., Zeng, H., d. Silva, P.P., Li, D., Narayanan D., M. and Bhaowal (2006), "Investigations into trust for collaborative information repositories: A Wikipedia case study", *15th International World Wide Web Conference (WWW2006)*, available at http://www.l3s.de/~olmedilla/events/MTW06_papers/paper23.pdf (accessed 10 July 2010).

Mager, A. (2009), "Mediated health: Sociotechnical practices of providing and using online health information", *New Media and Society*, Vol. 11. No. 7, pp. 1123-1142.

Magnus, P.D. (2009), "On trusting Wikipedia, *Episteme: A Journal of Social Epistemology*, Vol. 6, No. 1, pp. 74-90.

McGrady, R. (2009), "Gaming against the greater good", *First Monday*, Vol. 14, No. 2, available at <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2215/2091> (accessed 10 July 2010).

Niederer, S. & van Dijck, J. (2010). Wisdom of the crowd or technicity of content? Wikipedia as a sociotechnical system. *New Media & Society*, 12, 1368-1387.

Palmer, C.L. Cragin, M.H. (2008). "Scholarship and disciplinary practices, in Cronin, B. (Ed.), *Annual Review of Information Science and Technology*, Vol. 42, Information Today, Medford, NJ, pp. 163-212.

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Schatzki, T.R. (2001), "Introduction: Practice theory", in Schatzki, T.R., Knorr Cetina, K. and Savigny, E. von (Eds.), *The Practice Turn in Contemporary Theory*, Routledge, London, pp. 1-14.

Sundin, O., and Francke, H. (2009), "In search of credibility: Pupils' information practices in learning environments", *Information Research*, Vol. 14, No. 4, available at <http://InformationR.net/ir/14-4/paper418.html> (accessed 10 July 2010)

Surowiecki, J. (2004), *The Wisdom of Crowds: Why the Many are Smarter than the Few and how Collective Wisdom Shapes Business, Economies, Societies and Nations*, Doubleday, New York, NY.

Svenningsson Elm, M. (2009), "How do various notions of privacy influence decisions in qualitative internet research?", in Markham, A.N. and Baym, N.K. (Eds.), *Internet Inquiry: Conversations about Methods*, Sage Publications, Los Angeles, pp. 69-87.

Swedish Wikipedia (2009-04-13), *Kategori: Alla artiklar som behöver källor [Category: All articles which needs sources]*, available at http://sv.wikipedia.org/w/index.php?title=Kategori:Alla_artiklar_som_beh%C3%B6ver_k%C3%A4llor&oldid=8969627 (Accessed 4 January 2010).

Swedish Wikipedia (2009-10-01), *Bybrunnen/Arkiv/2009/September [Village pump/Archive/September]*, available at <http://sv.wikipedia.org/w/index.php?title=Wikipedia:Bybrunnen/Arkiv/2009/September&oldid=10166639> (accessed 5 January 2010).

Swedish Wikipedia (2009-11-06), *Veckans nyskrivna artiklar [The new articles of the week]*, available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:Veckans_nyskrivna_artiklar&oldid=10442100, (accessed 6 November 2009).

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Swedish Wikipedia (2009-11-09), *Veckans tävling / Källor behövs fortfarande* [*The competition of the week / Sources are still needed!*], available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:Veckans_t%C3%A4vling/K%C3%A4llor_beh%C3%B6vs_fortfarande&oldid=10460162 (accessed 4 January 2010).

Swedish Wikipedia (2009-12-13a), *Ingen original forskning* [*No original research*], available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:Ingen_originalforskning&oldid=10675492 (accessed 4 January 2010).

Swedish Wikipedia (2009-12-13b), *Neutral synvinkel* [*Neutral point of view*], available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:Neutral_synvinkel&direction=prev&oldid=10986988 (accessed 4 January 2010).

Swedish Wikipedia (2009-12-13c), *Trovärdiga källor* [*Identifying reliable sources*], available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:P%C3%A5litliga_k%C3%A4llor&direction=prev&oldid=11028634 (accessed 4 January 2010).

Swedish Wikipedia (2009-12-15), *Policy och riktlinjer* [*Policies and Guidelines*], available at http://sv.wikipedia.org/w/index.php?title=Wikipedia:Policy_och_riktlinjer&direction=prev&oldid=10960530 (accessed 4 January 2010).

Swedish Wikipedia (2009-12-21), *Källhänvisningar* [*Citing Sources*], available at <http://sv.wikipedia.org/w/index.php?title=Wikipedia:K%C3%A4llh%C3%A4nvisningar&oldid=10728995> (accessed 4 January 2010).

Preprint of article appearing in 2011 in *Journal of Documentation*, 67(5), 840-862. Please cite the published version of the article.

Swedish Wikipedia (2009-12-22), *Relevanskriterier [Notability]*, available at <http://sv.wikipedia.org/w/index.php?title=Wikipedia:Relevanskriterier&oldid=10731553> (accessed 4 January 2010).

Swedish Wikipedia (2010-01-02), *Verifierbarhet [Verifiability]*, available at <http://sv.wikipedia.org/w/index.php?title=Wikipedia:Verifierbarhet&direction=prev&oldid=10977640> (accessed 4 January 2010).

Todd, R.J. (2006), "From information to knowledge: charting and measuring changes in students' knowledge of a curriculum topic", *Information Research*, Vol. 11, No. 4, available at: <http://InformationR.net/ir/11-4/paper264.html> (accessed 4 January 2010).

Viegas, F., Wattenberg, M., and Kushal, D. (2004), "Studying cooperation and conflict between authors with history flow visualizations", *Proceedings of the SIGCHI conference on Human factors in computing systems*, available at http://alumni.media.mit.edu/~fviegas/papers/history_flow.pdf. (accessed 4 July 2010).

Weinberger, D. (2007). *Everything is Miscellaneous: The Power of the New Digital Disorder*. Times Books, New York.

Wilkinson, D.M., and Huberman, B.A. (2007), "Assessing the value of cooperation in Wikipedia", *First Monday*, Vol. 12, No. 4, available at <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1763/1643> (accessed 7 July 2010).

Wilson, P. (1983), *Second-hand Knowledge: An Inquiry into Cognitive Authority*, Greenwood Press, Westport, CT & London.

Zachte, E. (2010), "Wikipedia Statistics: Very active Wikipedians", *WikiMedia*, available at <http://stats.wikimedia.org/EN/TablesWikipediansEditsGt100.htm> (accessed 7 July 2010).