The Meaning of Power Users in the Wikipedia Working Environment

Sebastian Skolik
Management Faculty, Częstochowa University of Technology, Poland

sebastian.skolik@wz.pcz.pl

Abstract: One of the most popular sites to observe collaborative content creation on the Internet is Wikipedia. A significant part of the publication devoted to this encyclopaedia focuses on special forms of collaboration, such as WikiProjects, which allow to effective work sharing. The aim of the paper was to identify power users working in public spaces of Wikipedia, especially in WikiProjects, and to determine their importance for this form of cooperation in knowledge sharing. The research question was: what is the meaning of the Power Users in Wikipedia? The methods used in the paper were content analysis of activity logs of Wikipedians and participatory observation. The author presents the results of his own research on the total number of WikiProject users in the two language versions of Wikipedia: Polish and Korean. The research presented the existence of power users in the Polish and Korean versions. There was a moderately strong relationship between the length of time one remained active on Wikipedia and the time of joining as a Wikipedian, and a weak relationship between seniority and the number of WikiProjects in which the user was active. In turn, participatory observation identified the roles of power users, mainly as initiators of action in Wikipedia. The presented research results could be used mostly for coordinators of online communities, but also for the initiators of the new undertakings in cyberspace.

Keywords: Content analysis, Knowledge management, Knowledge sharing, Variability in online communities, Wikipedia power users

1. Introduction

In the history of mankind, it is possible to point to many projects that have been created by thousands of committed members of various societies, ranging from monumental buildings to the largest internet projects. It was not uncommon for these to be based on the collaboration of a small number of professionals with non-professional volunteers, as was the case with the creation of the Oxford English Dictionary (Stvilia et al, 2008), or the Geographical Dictionary of the Kingdom of Poland (Parucki, 1955). The advent of the internet has greatly accelerated operations and enabled many more people to work together. This includes Wikipedia, which Jemielniak called the greatest project ever created by humans (Jemielniak, 2014).

The speed of content creation and the size of the project, however, do not mean faster knowledge completion. Compared to traditional encyclopaedias, the language versions of Wikipedia elaborate on certain topics at the expense of others that are not described (see: Żurek and Skolik, 2009). This is due to the adopted Bazaar model, in which no initial plans are made, no rigid tasks are set and no time is set for their completion (Raymond, 2001). Over time, the formalization of operating procedures contributed to collaboration between Wikipedians becoming closer to the opposite model, referred to as the Cathedral model (see: Arazy et al., 2019). Such a hybrid approach to the collective management of knowledge sharing processes is particularly visible in WikiProjects. These are special pages dedicated to cooperation within particular thematic areas and they are also the result of the existing division of labour.

The development of Wikipedia was made possible by reaching a certain critical mass. The critical mass theory assumes that there is a shift from the dispersed actions of individualists, to identification with the group and to the realisation of group interests (Oliver, Marwell, & Teixeira, 1985). Since a user entering the community is usually not familiar with the value system of Wikipedians (Wikipedia users), he/she may push his/her own point of view. However, his/her encounter with certain inconsistencies with relation to his/her own values allows him/her to accept a change more easily in terms of his/her own point of view. Experimental studies have shown that this phenomenon occurs if the level of such incompatibilities is moderate (Jirschitzka et al., 2017). The greater one's seniority, the more frequent such experiences are, while it is easier for Wikipedians to adopt a neutral point of view. Some researchers assume that the critical mass is not so much a great number of users, but precisely the core of the community, referred to as power users (Solomon & Wash, 2014).

The aim of this paper is to define the role of power users with relation to collaboration between Wikipedians. As this collaboration can occur in many fields, the research was limited to the space of WikiProjects. WikiProjects are special pages, which bring together teams of people who want to interact with each other in a specific field of knowledge. This publication is also an extension of previous research on WikiProjects, which focused on other aspects of their participants' activities (Skolik, 2022). Then it was noticed that the majority of

people operating in WikiProjects are users who joined Wikipedia prior to 2010. A certain incentive to continue research in this area is also the search for reasons for the regression of WikiProjects, observed by the author for almost a decade. Thus, the question was asked as to whether power users could have an impact on developing or blocking other peripheral initiatives related to knowledge sharing.

The literature review identified the state of research on the phenomenon of critical mass and the different roles of power users in their relationship with the Wikipedia community. The methodological section outlines how the empirical material was collected and formulates the research hypotheses. The quantitative research encompassed both the Polish and Korean versions, while the qualitative research exclusively related to the Polish language version. Thanks to the research conducted, the author at hand initially defined the role that power users can play in the context of developing and maintaining initiatives in Wikipedia.

2. Literature Review

In subject-related literature, power users are defined as individuals who, by engaging with the community, contribute disproportionately to the rest of the community. According to the 'law of participation inequality', in sites that are open to collaborative content creation, 90% of users remain passive consumers (lurkers), 9% are contributors to the site and only 1% are frequent users (Nielson, 2006). Wikipedia has an even more skewed distribution. 80% of changes are made by only 2.4% of users (Crowston & Fagnot, 2018, p. 90). What is more, power users engage in activities in different areas simultaneously (Bright et al, 2020). Users clustered around a narrow topic generally perform less activities than those who try to engage in more than one WikiProject (Skolik, 2022).

The high level of skewness of the distribution of participants' activity implies great inequality in another respect as well. Some participants have a low entry threshold, which means it is very easy to get involved. Others only get involved when they see that a particular venture is popular (Huang, Suh, Hill, & Hsieh, 2015). The ease of engagement may occur amongst people who, by taking many initiatives, become more visible and thus build their prestige. In Wikipedia, this behaviour is referred to as edit counting and sometimes leads to rivalry. Wikipedia users regularly post rankings of the most active people (see 'List of Wikipedians by Number of Edits', 2023). Clear differences between power users and peripheral newcomers can also lead to an imbalance in decision-making. The most active users may pursue vested interests and display 'territorial' behaviour, which in turn may discourage newcomers from getting involved (Brandtzaeg & Heim, 2011).

Whether internet users will engage may be influenced by initial interactions with the community. Advanced forms of supporting the adaptation process are associated with more active Wikipedia users and their increased productivity (Karczewska, 2022). Furthermore, if users try to search for errors at the start, the likelihood of them staying on Wikipedia increases threefold (Crowston & Fagnot, 2018). It may be assumed that the more active individuals are those who try to find a suitable niche for their activities themselves.

With a high level of inclusivity linked to the ease of performing activities in the community, issues of skills and leisure budget are irrelevant (Bright et al., 2020). In such a situation, the number of participants can steadily increase, and power users can motivate more individuals to try out the opportunities to become part of the community. One can speak of positive feedback here. Clear correlations are also noted between the Wikipedia experience and support for open collaborative knowledge creation models (Aibar et al, 2015).

However, learning the new skills necessary to operate in a project takes time. At the same time, the lack of experience does not guarantee that the first edits in the encyclopaedia articles will not be rejected by the community. Thus, power users change their roles from motivators to gatekeepers. This has been experienced, among others, by researchers trying to help develop Wikipedia. The people who communicate with them initially are usually Wikipedians who specialise in tracking changes made and catching vandalism. It is not uncommon to see frustrated users reacting harshly to a lack of knowledge of the rules (see Konieczny, 2021). It is much easier to involve people who will not feel the need to prove again that they have a lot of experience in a particular area of knowledge. Supporting postdocs and young academics (Kennedy, 2021, p. 175) is indicated as a solution to this impasse.

Adaptation to Wikipedia's virtual environment may depend on the length of time it has been online. In the initial stages of development, there are no clear structures of rights and no clear polarization. After about 60-80 months, there is a phase transition in which a linear relationship is observed between the number of editors, editions and new entries. At the same time, the number of new registered users (Castro et al, 2019) starts to fall with this phase transition. This could mean that Wikipedia reaches stability at this point and is no longer dependent on the influx of newcomers, which translates into greater restrictiveness. Great involvement

in organizing the work related to the creation of Wikipedia articles, therefore, leads to limiting the potential of knowledge sharing.

As Solomon and Wash (2014) point out, in the case of Wikipedia and the WikiProjects created within it, group identity is not necessary to achieve a critical mass effect. Indeed, users have a high intrinsic motivation to get involved in the development of the encyclopaedia entries. In order to act longer, it is necessary to accept the rules established within, and therefore to identify with the community's value system. However, far-reaching homogeneity does not serve productivity. If a group is heterogeneous, its members can complement the content by referring to other sources of information, for example. If there is more turnover among users, greater sustainability may be achieved. This, in turn, is more likely to encourage newcomers to join (Dabbish et al, 2012).

The growth of WikiProjects, which are deliberately designed collaborative spaces, is more pronounced when 1) a lot of Wikipedians join initially and 2) the communities that form are more heterogeneous. WikiProjects are also more attractive when those joining can see first and foremost what there is to do on a particular topic and when they can develop WikiProject tasks (see: Solomon & Wash, 2014). Power users can both foster the generation of critical mass in the early stages of the development of WikiProjects and limit diversity by imposing an organisational framework.

The author of this paper assumes that the observed regression in the performance of WikiProjects (see: Luyt, 2018) in the various language versions is linked to a decline in the inflow of new power users who could engage communities in collaboration. In order to determine this, it was decided to identify the existence of power user groups and to investigate the general trends in participation in WikiProjects.

3. Materials and Methods

Both qualitative and quantitative research methods were used in the study. The quantitative research was conducted in 2022, while the selection of language versions for the quantitative study was carried out in several stages. Firstly, versions were selected in which declarations of WikiProject affiliation on Wikipedia pages could be easily identified. A particular category existing in 34 language versions was used for this purpose. In the next step, the language versions of Wikipedia in which a Wikiproject space existed were selected as follows: Spanish, French, Esperanto, Polish, Korean, Japanese, and Romanian. Due to the time-consuming nature of acquiring results, two of them were chosen for further research, namely: Polish (plwiki) and Korean (kowiki). In the following, for the sake of brevity of the paper, the author uses the abbreviations adopted in the Wikipedia community, plwiki and kowiki, respectively. Both versions were selected in previous research projects (Skolik 2022). The usefulness of the research conducted was assumed amongst the same population in the context of referring to previous findings.

At a previous stage, the number of edits made in individual language versions of Wikipedia was examined in February and March 2022. In addition to this, changes in activity among Wikipedians joining at different periods of the project's development were observed by analysing user page ID numbers (Skolik 2022). In order to define the number of editions conducted by a Wikipedian, including the number of editions in the particular types of pages (among others, WikiProjects), while also the time of the first and last edition, in which the XTools were availed of (‘Edit Counter’, 2023). With additional measurement, it was possible to determine the relative time of staying in the project, which allowed further research hypotheses to be constructed. Data was again collected in June and July for 2330 declared WikiProjects participants in plwiki, and in November for 795 WikiProjects participants in kowiki. Correlations between variables were tested using Spearman's ranking due to high skewness, in particular with regard to the number of edits made by Wikipedians.

Qualitative research was netnographic (Kozinets, 2015). These mainly included participatory observation, which has been conducted since 2005 in Polish-language Wikipedia. Participation also meant taking an active part in editing pages, while also undertaking and initiating discussions on collaboration issues, as well as co-creating collaboration strategies. Active participation in these discussions facilitates familiarization with the relationship between particular Wikipedians and the constantly recurring problems. Thanks to quantitative research, a group of the most active Wikipedians who could potentially discover the roles of power users was identified. However, by analysing the content of discussions in which they participated in the past, an attempt was made to define the role for each of them in the context of activities aimed at creating areas of cooperation. The focus was mainly on archival discussions, in which important community initiatives were decided, including those regarding the condition of WikiProjects. The author also considered his own interpersonal relationships with these users.

In order to answer the questions put forward, the following hypotheses were formulated:

H1: In the preliminary years of the development of Wikipedia, Wikipedians who joined are more active than those who joined later.

H1a: Users who opened their account earlier on Wikipedia conducted more editions throughout the period of their activity than users operating later .

H1b. After more than twenty years of the functioning of Wikipedia, the most active users are still those who joined in the first years of Wikipedia existence.

H2. Among the users of the greatest level of seniority and maintenance of a high level of activity, a significant group plays a significant role for the activation of areas of cooperation.

H3: The longer the users remain active in Wikipedia, the greater the number of WikiProjects they take part in.

A positive verification of H1 would facilitate the definition of Wikipedians as potential candidates for power users. The number of editions performed however, does not signify that the user remains constantly active. Taking this into account, it was assumed that the number of editions performed is correlated with the time of joining Wikipedia, while also in the case of users who are still active. The current activity signifies the performance of editions at a maximum of one month prior to the time of conducting research.

For the purpose of verifying H2, information accumulated by the author as an insider conducting systematic and longstanding observation of the participants was used, in which there was a particular concentration on the discussions on the subject of cooperation, while also the creation of regulations, modifications to the interface, etc. This section of research exclusively referred to plwiki. The formulation of this hypothesis was essential as maintaining activity for years is insufficient in order to state that a Wikipedian plays a significant role in controlling the activities of others, while also initiating actions or blocking them. Some Wikipedians focus almost exclusively on editing the content of articles and limit their influence to the principles of knowledge sharing in Wikipedia. In turn, expressing approval or disapproval on the part of those recognised in this environment may have an impact on the decisions of others – among others, engagement in WikiProjects.

H3 is the expansion of a similarly formulated hypothesis in the previous research project, in which the time of remaining active in Wikipedia was not taken into account. This hypothesis was established due to the observation of the phenomenon of declaring participation in many WikiProjects by newcomers while their activity was low. Sometimes the activity of newcomers was limited to copying declarations of participation from other users to their own user pages, and then their activity expired. At the same time, among the most engaged users who have been active in Wikipedia for a long time, a significant number is related to one or two fields of knowledge, while some of the oldest ones do not declare belonging to WikiProjects at all.

4. Results

In parts of the quantitative research, the assumed hypotheses were verified. The formulation of H1 was preceded by a preliminary analysis of the distribution of activities of the users with relation to the time of registration of their accounts. In the scatter graphs (Figure 1, Figure 2), it is possible to note a large number of participants of WikiProjects of very low numbers of ID. The points on both of these graphs created by two clear lines indicate the following: 1) users that are active until the moment of research at the top sections of the graphs, while also 2) users who withdrew from further editing not long after registering their account in the lower sections of the graphs. The concentration in the top left section of both graphs is created by users who could initially be referred to as power users.

In order to verify H1a, the correlations between the number of editions conducted by users and their ID numbers were checked. In the cases of plwiki and kowiki, a negative correlation existed between the ID of the users and the number of editions performed, namely, $p<0.05$, yet the power of the statistical dependency was only slight. In plwiki, Spearman's rho correlation equals -0,244645, while in kowiki -0,143454. H1b assumed that the correlation would exist between the ID of the users and the number of editions performed also in the case of wikipedians who were active in the year of 2022 (during the time of conducting research). In this case, not only did the statistically significant dependency exist between the variables, but the power of this dependency was greater. In terms of plwiki, Spearman's rho correlation equals -0.331070, whereas in kowiki -0.363558.

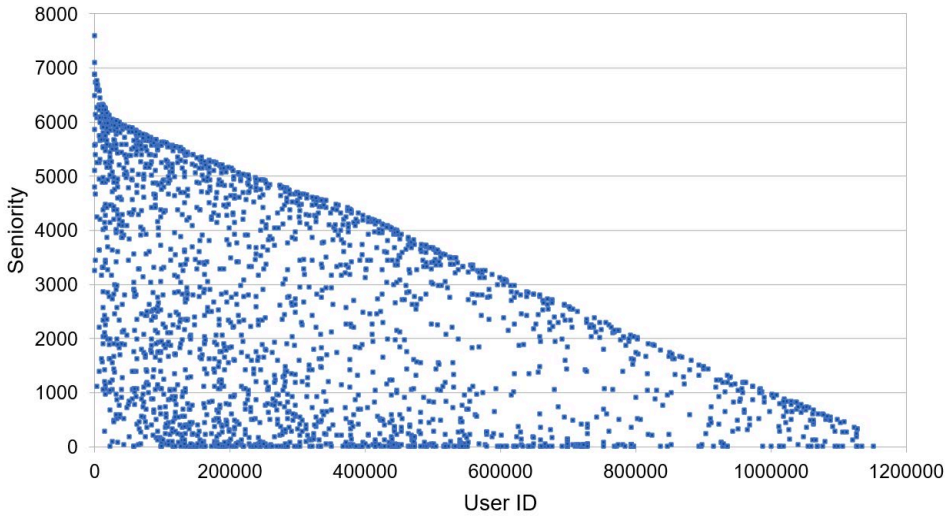

Figure 1: Relationship Between Seniority (number of days between the first and last edit made) and WikiProjects Participant ID Number in plwiki

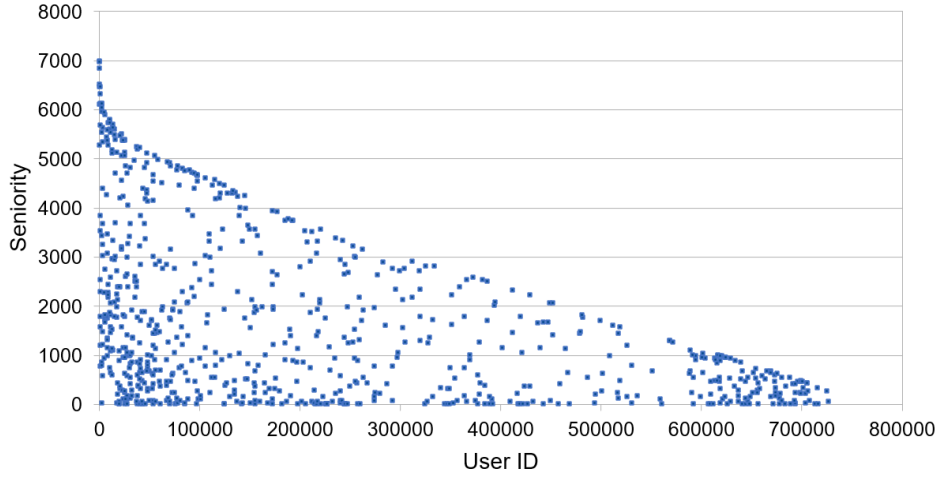

Figure 2: Relationship Between Seniority (number of days between the first and last edit made) and WikiProjects Participant ID Number in kowiki

In order to illustrate the initially observed phenomenon of over-representation of users of a relatively high level of seniority, histograms were also prepared for both versions. They present three categories of users as follows: 1) users who resigned from editing Wikipedia within the first day, 2) users who remain active, while also, 3) inactive users who edited longer than one day. Amongst the wikipedians who left the project the fastest, this time amounted to only several hours (Figure 3), whereas in multiple cases it was a case of only minutes. As regards the participants of the project who edited longer, yet were not active during the course of conducting the research, there were also the majority of users who edited over the shortest time span and their number dropped together with the increasing level of seniority (Figure 4). In turn, in the case of the remaining users, there were certain differences between plwiki and kowiki. In terms of plwiki, there was a prevalence of people who joined after several years following the commencement of Wikipedia, whereas in the kowiki, the majority related to people who had a lower level of seniority, yet it was possible to note the drop in the number of people who joined in the second decade of the 21st century, namely between 1000 and 4000 days prior to conducting the research (Figure 5).

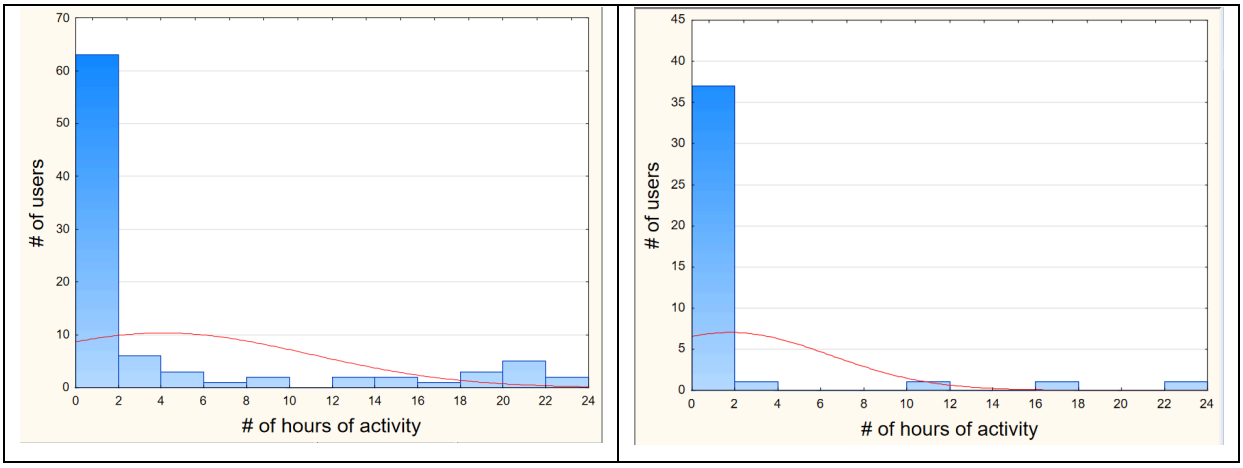

Figure 3: Distribution of Numbers of Users Resigning from Editing with Reference to the time in Which they Were Active. On the Left is the Histogram for plwiki, While on the Right for kowiki

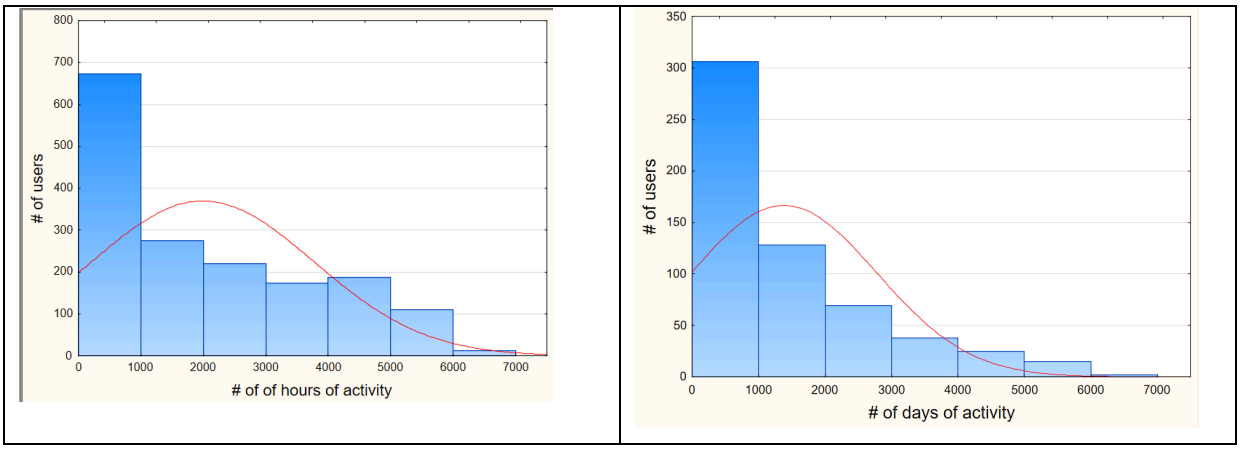

Figure 4: Distribution of Numbers of Inactive Users who Edited Wikipedia longer Than one day. On the Left is the Histogram for plwiki, While on the Right for kowiki

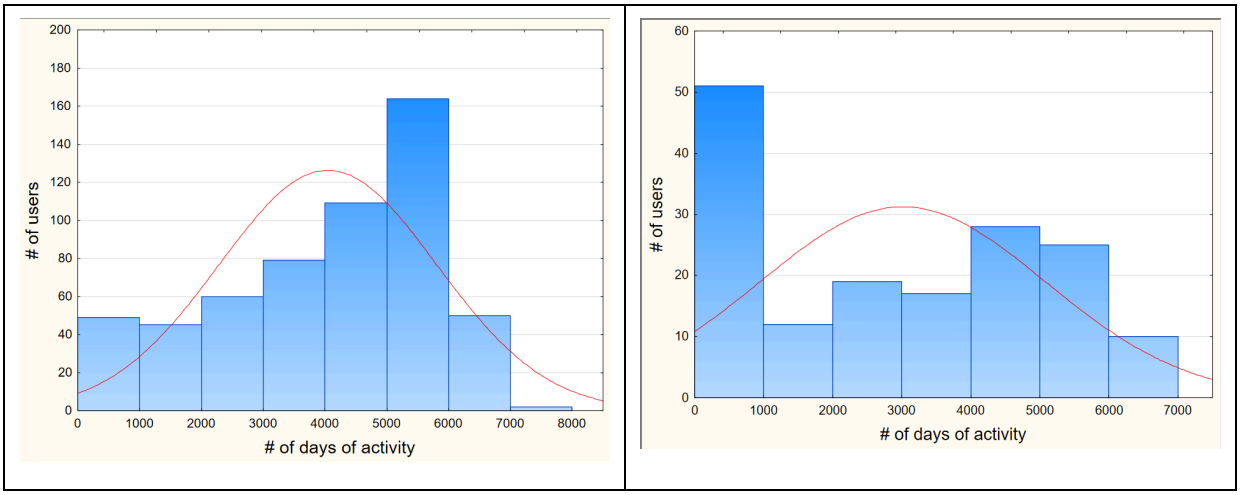

Figure 5: Distribution of Numbers of Users Remaining Active in Wikipedia. On the Left is the Histogram for plwiki, While on the Right for kowiki

It is possible to acknowledge that a clear over-representation of people operating longer in the project among active members of WikiProjects exists in plwiki, whereas in kowiki a stratification is more evident. Users with the lowest level of seniority are more active, while also operating in the preliminary years of the functioning of Wikipedia. Likewise, H1 was verified positively only with relation to plwiki. In both cases, however, it can be assumed that it was much easier for people who joined the formalizing project to lose their enthusiasm for

sharing knowledge. Meanwhile, senior Wikipedians spend more time on their substantive work than on socializing with new WikiProjects members. This may be due to the tiredness of the routine of transferring knowledge about the rules that prevail in Wikipedia.

The verification of H2 was possible for the author due to the systematic observation of the participant, as well as the possibility of interpreting the discourse in the native language. In order to define the role of power users in terms of their impact on the areas of cooperation in sharing knowledge, 128 accounts were first of all selected among the active members of WikiProjects in plwiki. These were accounts of users who started to edit Wikipedia prior to the year of 2007. Subsequently, with regard to each individual (account), their activity was defined with regard to the community and whether these people have an impact on the community by means of participation in general discussions.

Among the chosen accounts, 13 still had a large impact on decision making, while 15 people had a greater impact in the past, yet now only a slight one, whereas the subsequent 16 people had an impact on the activities of others that were restricted to certain areas of the functioning of Wikipedia. Among these groups of users, 25 people had the function of an administrator (authorized to block the possibilities of editing users or deleting pages). This was a very high percentage as the number of people with such authorizations in plwiki at the moment of publication amounted to 95. Furthermore, 36 people belonged to 500 of the most active users in 2022, of which 12 occupied places in the ranking of activity from 13 to 78. As was indicated by previous research projects, 2.4% of users conduct 80% of the modifications (Crowston and Fagnot, 2018, p. 90), whereby the numbers provided above indicate a very high degree of involvement of people with a high level of seniority.

The definition of the role of power users was very intricate. Some wikipedians were for instance, creators of WikiProjects, yet were involved only to a small degree in terms of inviting others to joint editing of slogans. Some organised actions of joining with others from an external environment, but the acceptance of their activities in the community was low. Certain users tried to maintain the *status quo* and blocked new reformatory initiatives, whereas in other cases they adopted the role of sceptical gatekeepers. Of the 39 people who were possible to define as having clear roles associated with influencing cooperation, 27 people previously initiated areas of cooperation or acted on behalf of its promotion, while 32 people were previously or currently engaged in maintaining activities of various types of initiatives, while only 8 blocked new initiatives, or strived towards closing existing areas of cooperation.

To verify H3, editorial seniority (the number of days from the first to the last edit) was compared with the number of declarations of affiliation to different WikiProjects on user pages. Significant statistical relationships were shown in plwiki and kowiki. In terms of plwiki, Spearman's rho correlation equals 0.194268, and in kowiki 0.276423. This could indicate that there is more pressure in kowiki to contribute to WikiProjects or that in plwiki, the effectiveness of WikiProjects is assessed more critically.

5. Discussion

In the cited previous studies, the assumption was made that skills and having a larger leisure budget did not matter for online activity (Bright et al., 2020). However, other publications have pointed out that more difficult activities significantly reduce co-operation. An example of this is the expansion of data tables found in individual articles. Although entries are edited by many different users, in as many as 35% of cases the tables are only developed by the people who created them (Bleifuß et al, 2021). A similar situation occurs when developing keywords to be placed on the homepage as featured. Typically, such an entry is expanded by one user, with others making only minor corrections (Feldstein, 2011). In such cases, it is possible to identify a distinct core and extensive periphery of social networks.

Individual WikiProjects tend to be created by small communities and it would be difficult to define core and periphery. Globally speaking, however, attitudes towards group collaboration are important. In this study, it was shown that there is a category of users who dominate the majority of WikiProject members in terms of seniority and activity. One drawback is that the first declarations of affiliation posted on Wikipedia pages started to appear a few years after the creation of Wikipedia and the first WikiProjects. Thus, the data presented does not include participants in WikiProjects who left before there was an option with the posting of such declarations. On the other hand, there are also quite a few power users who refrain from “decorating” their user pages with declarations.

The statistical dependency between the seniority and activity of Wikipedians turned out to be moderately strong in the case of people who still remained active. Thus, it is a significant premise to acknowledge seniority

as an important factor in terms of identifying power users. In turn, the weak dependency between the seniority and the number of WikiProjects, which an individual engages in may certify to the scepticism of power users with regard to this form of cooperation. After all, they had been able to develop their own collaborative paths for several years prior to the creation of WikiProjects, and this new form was not necessary for them. In addition, the groups creating WikiProjects often set their own guidelines for a particular area of Wikipedia, which was not always in line with the generally accepted policies. In 2011, plwiki started to monitor the activity of WikiProjects more closely and archived those that were no longer active due to not reaching a sufficient critical mass. This may certify to the demobilizing role of power users, yet in the case of wikipedians from plwiki, who actively attempted to "reform" Wikipedia by means of eliminating inefficient areas of cooperation, they were also critical with relation to other forms of cooperation. These were more often than not people who commenced activities later, who became very active and also quickly became burnt out.

Studies cited earlier indicate that there is a phase transition of approximately 60-80 months after the launch of Wikipedia, accompanied by a relative decline in the number of new users (Castro et al., 2019). Perhaps this phenomenon is more common and also applies to WikiProjects. The apparent increase in the number of WikiProjects being set up is from 2005 to 2007, with the plwiki being from 2006 to 2007 (see: 'Wikipedia:Wikiprojekt', 2022). In contrast, the first drop-in activity is seen in terms of those who joined in 2013. If WikiProjects reached a critical mass during this time, they were allowed to continue operating, while others were deactivated. The author's participatory observation allows him to acknowledge that achieving a critical mass became much easier if several power users were involved in the WikiProject and at the same time remained active for many years. The deactivation of Wikiprojects is not so much the result of a decrease in the involvement of power users. Rather, it was the WikiProjects themselves that became the rigid framework that enforced routine operations. Meanwhile, the investigated power users were involved at an early stage not only in terms of editing, but also significantly in the broader free culture movement. This movement, in turn, was focused on the freedom to share knowledge and engage external actors to achieve the effect of critical mass.

6. Conclusion and Limitations

The research carried out indicates that power users may be identified and that there are certain associations between their activity and engagement with WikiProjects. The quantitative research, however, did not clearly identify the roles of power users for the collaborative space on Wikipedia. Nevertheless, qualitative research was restricted to only one language version. This requires additional qualitative research, particularly an analysis of the contributions of individual power users and a discourse analysis of the operation of WikiProjects. What would be particularly valuable would be research conducted by several groups of researchers from different national cultures, which would facilitate a more complete analysis of Wikipedia content in different languages.

So far, a lot of valuable research has been done on Wikipedia as a whole, especially in terms of its English version. However, the spontaneous spaces of cooperation in knowledge sharing, their formalization and the effectiveness of cooperation at the micro-sociological level are still not sufficiently studied. As these phenomena are constantly changing, it is also necessary to develop new methodological approaches in order to be able to obtain enough data for further analysis.

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