Before the Sense of 'We': Identity Work as a Bridge from Mass Collaboration to Group Emergence

Arto Lanamäki
Interact research unit,
University of Oulu
PO Box 8000, FI-90014 Oulu
arto.lanamaki@oulu.fi

Juho Lindman
Applied Information
Technology, University of
Gothenburg / Chalmers
SE-41296 Gothenburg
juho.lindman@ait.gu.se

ABSTRACT
Individuals engaged in mass collaboration in Wikipedia may join to work recurrently with the same partners. It may well be that a significant portion of Wikipedia content is produced this way. Therefore, it is important to study how such groups emerge. In this paper, we argue how such recurrence may involve identity work that creates a sense of 'we-ness.' We provide a case from Wikipedia, focusing on how individual Wikipedians came together to work on a collaborative Feature Article task. Furthermore, the same people came together in other content collaborations, and they identified themselves as a group. The findings suggest that identity work can bridge mass collaborations to the emergence of smaller-scale sustained groups. Our theoretical contribution brings together research streams on mass collaboration, group dynamics, and identity. This offers interesting pathways for further research.

Author Keywords
mass collaboration; stigmergy; identity work; group emergence; Wikipedia

ACM Classification Keywords
H.5.3 Group and Organization Interfaces. Computer-supported cooperative work.

INTRODUCTION
Open digital mass collaborations (in our example, Wikipedia) are characterized by voluntary task assignment and modular task composition. In such a modular structure, contributors can work individually while their achievements become linked together [3, 35]. Individuals make quick ad-hoc contributions to create content [8]. Zammuto, et al. [40] argue that a major benefit of mass collaboration is in the

facilitation of temporary organizations (p. 756).

Another stream of literature emphasizes the stability of collaborations in established social structures such as groups. Forte and Lampe [10] argue that such contexts involve "stable enough communication flows between participants to support the emergence of social structures that can adapt over time as needed" (p. 521). In much of the literature, these social structures have mainly been seen as part of community governance.

In this article we connect these streams of literature and argue that a content-creating group as an emergent state [37] can be a consequence of identity work during mass collaboration. We empirically explore one unique case of how mass collaboration leads to more long-term, group-based collaboration. We thus seek to answer our research question: How do groups emerge in online communities? In particular, we focus on identity in the transformation from mass collaboration to group emergence.

This article is structured as follows. The next section provides the theoretical backgrounds of mass collaboration and group emergence, section three presents the research method, and section four describes the findings of this study. Finally, we close the article with the concluding discussion section in which we provide a theory of how mass collaboration is an antecedent to group emergence.

BACKGROUND
Mass Collaboration and Stigmergy
'The wisdom of the crowds' refers to many individuals making small, uncoordinated contributions [34]. During the early years of Wikipedia, its primary mode of action was regularly portrayed using this concept [17, 34]. According to the Oxford Dictionary of English, a crowd is "a large number of people gathered together in a disorganized or unruly way." Thus, the "wisdom of the crowds" argument emphasizes the "long tail," a myriad of individuals loosely connected in the periphery, perhaps for a short period.

Wisdom of the crowds is what many came to label "mass collaboration" [35]. Zammuto, et al. [40] defined mass collaboration as "the process by which people interact on a many-to-many basis via the Internet" with the goal of creating "information seen and used by unknown others." In this way, mass collaboration is seen as involving

passerby contributions from relatively random encounters. Joyce, et al. [16] define Wikipedia as a deliberative mass collaboration bureaucracy. That is, Wikipedia successfully combines open participation with a rule-constrained bureaucratic structure.

A core feature of mass collaboration is that it involves granular tasks that are compatible in a modular way. Benkler [3] defined modularity as "a property of a project that describes the extent to which it can be broken down into smaller components, or modules, that can be independently produced before they are assembled into a whole." This helps independent work without coordination: "If modules are independent, individual contributors can choose what and when to contribute independently of each other" (Ibid.).

Mass collaboration bears many similarities to the notion of stigmergy [7, 22]. Stigmergic accumulation refers to a cumulative long-term form of collaboration in which participants add to previous work without directly communicating [22]. Similarly, Elliot [7] writes:

> "As stigmergy is a method of communication in which individuals communicate with one another by modifying their local environment, it is a logical extension to apply the term to many types (if not all) of Web-based communication, especially media such as the wiki. The concept of stigmergy therefore provides an intuitive and easy-to-grasp theory for helping understand how disparate, distributed, ad hoc contributions could lead to the emergence of the largest collaborative enterprises the world has seen."

Zoologist Pierre-Paul Grassé introduced the stigmergy concept in 1959. Grassé, an expert on termites, was the first to formulate an explanation for a seemingly paradoxical observation: "In an insect society individuals work as if they were alone while their collective activities appear to be coordinated" [36]. Theraulaz and Bonabeau (p. 111) summarize the idea of stigmergy as follows: "Individuals do interact to achieve coordination but they interact indirectly, so that each insect taken separately does not seem to be involved in a coordinated, collective behavior."

The absence of collective behavior has crucial implications for how identity is viewed in mass collaboration. The lack of direct communication makes mass collaboration and stigmergy individualistic. Identities are seen as individual properties that are engaged in a loose, networked structure.

Group emergence and identity work
In addition to sporadic collaborations, malleable social structures are initiated and sustained in Wikipedia [10]. Descriptions of these social structures concern community-level issues such as governance [4, 11, 18], often discussing various levels of (de)centralization [11, 27].

Within group dynamics literature [23, 24], a stream of thought that is building on symbolic interactionism focuses on how groups emerge from interactions between people. A recent review of group dynamism [37] identifies four distinct research streams on emergent states: global, ostensive, novel and coherent. Once interactions between specific people become recurrent, the group emerges as its own entity. This entity is called an emergent state. In the global research stream, emerged states are conceptualized as arising from lower-level components. The novel research stream assumes that emergent states cannot be fully reduced to their components, and it focuses on features that have not been observed in the lower levels. The ostensive research stream posits that groups themselves are able to sense the emergent wholes. The coherent research stream discusses how emergent wholes are able to sustain their identities even though there might be variation.

Mcgrath [23] defined groups as "complex, intact social systems that engage in multiple, interdependent functions, on multiple, concurrent projects, while partially nested within, and loosely coupled to, surrounding systems." This definition is quite well suited to real world, decentralized online collaborations such as Wikipedia [9]. In much of the literature on group work in Wikipedia, however, the focus has been on "WikiProjects" and similar subcommunities and their nested collaborations [9, 25, 26]. WikiProjects are thematically dedicated project pages that support specific topics. Normally, one such WikiProjects activity is that a group of editors interested in specific topics work together on editorial guidelines [25, 26].

In digital environments, the modular and granular tasks of mass collaboration facilitate recurring interactions between the same participants. This may allow contributors to see how working together provides synergies that are absent when working separately. In turn, this may eventually lead to group emergence.

In contrast to mass collaboration, an emergent group has qualities that cannot be reduced to its individual members. While each member has an individual identity, the group can additionally act as a unit. This unit has its own identity.

Previous studies have focused on group work as nested collaborations occurring in a coordinating page (i.e., WikiProjects). We are also interested in nested collaborations, but not the kind that start from a coordinating page. Our focus is on groups that emerge from interactions in content production without deliberate coordination (see Table 1). In this type of collaborative work, individuals grow a sense of togetherness towards fellow collaborators. Unlike in Wikiprojects, then, groups are not "formed" but they emerge in action due to identity work.

As discussed previously, mass collaboration literature treats identity as a property of each individual. This has been a tendency in the larger organizational identity literature, as demonstrated by Gioia, et al. [13] in a recent review. Identity has also gained interest for the students of

technology use [5, 29]. However, identity is often portrayed as an entity rather than a process, and the individual level is emphasized at the cost of the collective [5].

	Fluid mass collaboration	Stable social structures
Content production level	Zammuto et al. 2007; Kittur & Kraut 2008; Surowiecki 2005	- coordinated groups with pre-existing identities (e.g., WikiProjects) Forte et al. 2012; Morgan et al. 2014; Morgan et al. 2013 - a group identity emerging from interactions (our research gap)
Community governance level		Butler et al. 2008; Forte et al. 2009; Konieczny 2010

Table 1. Existing research on fluid mass collaboration and stable social structures. Research on fluid mass collaboration is focused on the content-production level of activities, while scholarship on stable social structures targets also the community governance level. We posit our research gap within the stable social structures on content-production level.

In turn, the group dynamics literature treats identity as a more social construct. To bridge these two viewpoints, we see mass collaboration and group work in the same continuum. The bridge between these two ends, we need to position identity work as a transition enabler.

This leads us in using identity-as-a-process [30] as the lens to understand the transition from mass collaboration to group emergence. In particular, Sandberg, et al. [30] have argued that there are five types of process orientations in identity studies. Our study aligns with the stance of identity as narrative coproduction [30]. In this view, identity "[...] is seen as a relational, multi-voiced, linguistic construct that is recreated and positioned through narrating and negotiating the self across time, different sites, and discourses." Furthermore, identity is "socially achieved . . . something generated in interaction with others" (Ibid.).

Identity-as-a-process requires identity work from the individuals. Identity work is seen as a lifelong process of construction [14, 38]. As defined by Alvesson and Willmott [1], when people are doing identity work, they are "continuously engaged in forming, repairing, maintaining, strengthening or revising the constructions that are productive of a precarious sense of coherence and distinctiveness."

In the section that follows, we describe our methodology and empirically present an example of identity work –based group emergence. We then analyze and contrast it with earlier literature.

METHODOLOGY

Our study is rooted in a qualitative inquiry [34] in the spirit of phenomenon-driven research [35, 36]. We have made two methodological choices. We have conducted interviews with Wikipedians in two rounds. The interviews allowed us to employ trace ethnography [12], for tracing group collaborations within Wikipedia. Placing practice as the unit of analysis fits well with the spirit of trace ethnography as well as with interviews. Our process has been iterative. Our data collection and analysis have mutually informed one another.

Interviews were planned according to the seven steps defined by Kvale and Brinkmann [19]: thematizing, designing, interviewing, transcribing, analyzing, verifying and reporting. As semi-structured qualitative interviews, the focus is on knowledge expressed in normal language without an attempt at quantification. The purpose of the interviews was getting to know the worlds of the interviewees: how and why they collaborate within the Finnish Wikipedia community.

Initially, we used the 'top 100 list of Finnish Wikipedians by number of edits' as a starting point to contact potential interviewees. We assumed that users with the highest number of edits have the most in-depth knowledge about Wikipedia, and therefore capable of reflecting on social dynamics.

Those on the list who had enabled the emailing feature on Wikipedia were the first to be contacted. 51 interview requests were sent between November and December of 2009. Of those contacted, 28 did not reply, 8 answered but declined to participate, and 16 accepted the request. The interviews with three of them could not be arranged because of scheduling conflicts.

The semi-structured interviews were conducted in early 2010. Each interview followed the same interview guide, and lasted between 1.5 to 3 hours each. The purpose was to let interviewees speak openly about their Wikipedia membership and usage. Interviews started with general-level introductory questions and moved on to follow-up questions and probing questions. In the latter part of the interviews, we asked more direct and structured questions.

The interviews were tape recorded and transcribed. After each transcription, a short summary of the interview was written containing information that could not be read in the transcript, including how transcribers experienced the transcription process and their general perception of the content and validity of the interview. These transcriptions comprised about 300 pages of data in total. From these interviews, we identified that a Featured Article (FA)

collaboration that had occurred in 2007 in the "Whooper Swan" Wikipedia article, was very important for the actions of later group work. The focus of this paper is around this foundational article.

FAs represent the highest quality Wikipedia content, and they have been of great interest to researchers [39-42]. In English Wikipedia, about 4400 articles – that is 0.1% of total articles – are 'featured.' FAs are marked by a star in the upper-right corner. In Finnish Wikipedia, two other quality levels exist as well: "Promising" and "Good."

We conducted a follow-up interview in 2014 with two key informants. This interview helped us to involve our informants in co-constructive theorization [43]. We offered our interpretations to our informants, and they provided their views back to us. We also received updated information on the group activities that occurred between 2010 and 2014. After the follow-up interview we had email correspondence with the informants for a couple of weeks.

We also conducted trace ethnography in Wikipedia, by following the principles of Geiger and Ribes [12]. The first principle notes that "documentary traces abound in today's technological systems" (p. 1). Second, "documentary traces are the primary mechanism in which users themselves know their distributed communities and act within them" (p. 1). Trace ethnography is in "stark contrast" to traditional quantitative analyses, as traces "can only be fully inverted through an ethnographic understanding of the activities, people, systems, and technologies which contribute to their production" (p. 1). This included studying the article edit history, article content, and "back narratives" such as talk pages, user talk pages, Wikipedia discussion forums, etc.

We also applied several tools that helped us trace, quantify, and visualize the content in Wikipedia. A list of tools is available on https://en.wikipedia.org/wiki/Wikipedia:Tools.

We have described the research process in more detail in another research paper.[21] The method section of that paper includes information about respondents, edits counts, and related FA projects.

FINDINGS

In this section we describe our empirical case of the process by which a group ("Natural Science Enthusiasts," "NSE") emerged through collaborative work on Finnish Wikipedia. This process includes identity work during which mass-collaborating individuals developed a sense of "we-ness" in action. This identity work is therefore a key ingredient in the construction of a group as an emergent state.

Phase 1: Mass collaboration
The first stage of NSE's history was traditional mass collaboration: different individual editors contributed to different articles in Finnish (and other language editions of) Wikipedia in an ad-hoc manner. In fact, during the mass collaboration phase, the group did not exist yet. However, it can be retroactively interpreted as a phase of "proto-group work," in which working together was incidental and unplanned, but some sense of who-is-working-on-what was present.

One group member, Tappinen, reflected on these early stages in February 2014 during an interview. She stated that she "wouldn't have suggested [the first] collaboration if MiPe, Tikkakit and me hadn't already worked on bird articles together. I knew that these are the people who enjoy working on these topics" (Tappinen, February 10th, 2014).

The contributors who later became members of the emergent group had worked on a number of Wikipedia articles on their own. During those individual efforts, they had largely stumbled into each other by accident. Of these mutual projects, we focus on the Finnish Wikipedia article, "Whooper Swan".

The "Whooper Swan" article was retroactively identified as the foundational project of the NSE group. The group began in the year 2007, yet the article itself had already been created in early March of 2004. Its development was slow from 2004 to 2005, but one of the few contributors at that time was Tappinen, a future NSE member. In the year 2006, the article's development remained rather modest. Among the 16 users who edited the article just once during the year 2006 was a user with the pseudonym MiPe.

Phase 2: Emerging group
"The inspiration for the "Whooper Swan" collaboration originated from the recurring Pope [Featured Article] nominations, and Tikkakit's outburst about it" (Tappinen, on February 10th, 2014).

Until October 19th, 2007, content development of the "Whooper Swan" article could have been characterized as slow, occasional, and sporadic. There were only 24 total edits until then, with no sign of dedication from any user. There was also no discussion on the article talk page.

A turning point occurred on October 20th, 2007. One user had investigated the list of Featured Articles in Finnish Wikipedia, and he made a profound observation. Out of 119 FAs, 15 (12.6%) concerned the Catholic Church: popes, The Vatican, and St. Peter's Basilica. The user arrived at the Wikipedia forum to ask this provocative question: *Is Finnish Wikipedia a voice of the Vatican?*

This soon resulted in a lively conversation. Discussants explained that there is no Catholic conspiracy, but any "bias" is just a result of individual contributors' enthusiasm towards this topic area. Instead of targeting *against* this set of articles, users should make Finnish Wikipedia more versatile by writing high-quality contributions on a broader variety of topics.

On the next day, user Tappinen came up with a practical suggestion. As at the time, Finnish Wikipedia had only one

FA about birds, Tappinen initiated a bird-oriented article collaboration. She asked others whether they could work on one of the three bird articles she saw had collaborative potential: "Whooper Swan," "Greenish Warbler," or "Spotted Crake."

The offer was soon accepted. "Whooper Swan" was picked because it is the national bird of Finland. This opened a phase of active group collaboration. In the remaining eleven days of October 2007, the article was edited 55 times by eight different users, of which just one was anonymous and none were bots. Tappinen and Tikkakit were the two most active contributors, with 33 and 14 edits respectively. The other users contributed once or twice. Among the names were two future NSE members: albval and QWerk.

Year	edits	Minor edits	(%)	
2004	4	3	75.0	
2005	21	5	23.8	
2006	56	26	46.4	
2007	210	55	26.2	
2008	36	15	41.7	
2009	34	18	52.9	
2010	28	12	42.9	
2011	18	10	55.6	
2012	56	17	30.4	
2013	29	8	27.6	
2014	11	3	27.3	
2015	10	3	30.0	
2016	4	1	25.0	
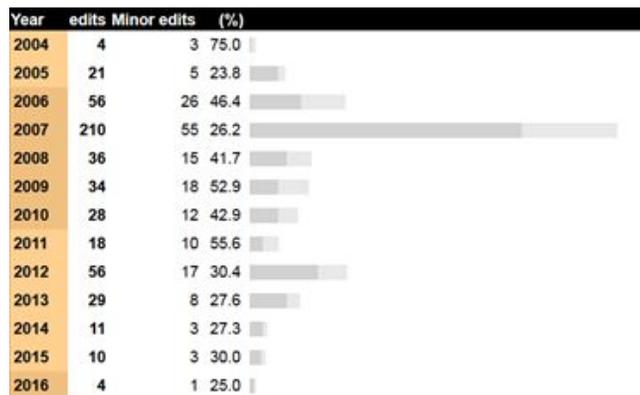
Figure 1. Edits per year in "Whooper Swan" (adopted from Wikipedia Page History Statistics [http://vs.aka-online.de/cgi-bin/wppagehiststat.pl] on April 28th, 2016)

Phase 3: Emergent state
In Figure 1 (above), we can identify the active periods of the development of the article (2006-2007). The year 2007 clearly stands out, as it involves the peak of collaborative production and the article gaining Featured article status. The maintenance activities after that period have mostly been about cancelling edits made by vandals.

The talk page of the "Whooper Swan" article became an active arena of coordination and reflection from October 2007 onward. Tappinen and Tikkakit had a dialogue for coordinating the tasks and direction of the article. The two started weighing in on the possibility of initiating peer review, which is a mandatory process for achieving Featured Article status.

The peer review took place from October 28 to November 15, 2007. The editing activity of the article increased during this period, which brought in new contributors. The peer review page was commented on by 11 different users who gave evaluative and constructive comments. Right after the peer review period ended, Tappinen moved the "Whooper Swan" article to the Featured Article nomination process, which lasted for two weeks. The nomination process resulted in 26 votes for and 1 vote against the nomination. During the process, users gave very positive feedback. For

example, user Tosalmi stated that he had "followed how this article had developed, and had nothing to add to it." User ukas said that he had "read it twice because it is that good." In addition to the nomination votes, there was discussion about the style and content of the picture gallery in the article. By Christmas of 2007, the article became "featured," and it now has a star in the upper-right corner.

The members of the emergent group put much effort into moving the "Whooper Swan" article toward the FA status. This status was reached in December 2007. The contribution activity for the "Whooper Swan" article slowed down after it reached Featured Article status (Figure 1). Yet, for the natural science enthusiasts who had made this effort, it was just the beginning.

Phase 4: Sustained group
In retrospect, the active coordinated effort between late October 2007 and early December 2007 provided an important change after the "Whooper Swan" article. This was important for the emergence of NSE and Finnish Wikipedia's natural science content in general. This period led to new methods of teamwork and established the group. This collaboration built the foundations for many future natural science projects. In other words, the collaborative performance on the "Whooper Swan" project offered a sense of "we-ness" that was achieved through the identity formation the contributors did while working together. Eventually, the group became "ostensive," meaning that the members not only *acted* as a group but also *referred* to themselves as a group. For example, this is apparent in one interview conducted in 2010:

> "We have a close circle with a couple of other users. There's *MiPe*, and then there's *uvainio*, a physicist who has moved to Germany from Finland. And then there's *albval*. He studies biology at the University of Turku. (...) And then there's *Tappinen*. (...) We had a meeting last fall, but I couldn't make it. Yes, it was last fall in Helsinki. They organized it. I had my grandpa's 70 year birthday party, so I couldn't attend." (QWerk, on January 18th, 2010)

After the "Whooper Swan" project was completed with the achievement of Featured Article status, the NSE contributors moved on to new challenges in 2008. They started to act as a collective unit, collaborating on different natural sciences projects. In 2008, they worked on the article "Meningomyeloseele" and got it "featured." In 2009, they had five different projects: "Snow," "Porcini," "Puffer Fish," "Sulphuric acid," and "Mosambik." All of the projects started with collaborative identification of an incomplete but potential article and then working on it until the community granted it the "featured" label. We have described NSE's longer trajectory in another paper [21].

While the "Whooper Swan" was instrumental to the emergence of the group, there was no single moment at

which the group formed. During the interviews, the respondents could not identify one such moment. Regardless, the group became relatively coherent. Tikkakit quit his Wikipedia career quite shortly after the "Whooper Swan" project, but others such as Tappinen, MiPe, albval, qWerk, PtG and Tanár, continued on to several subsequent NSE projects. Some members have now remained with the group for almost a decade.

DISCUSSION

In this article, we have argued how mass collaboration can be an antecedent phase of group emergence. Our phenomenon-driven study [32, 39] was conducted on Wikipedia. However, group emergence probably occurs in other open collaboration collectives as well.

We bring together three bodies of literature and demonstrate that it is the process of identity work that makes group emergence possible. First, mass collaboration literature shows that people's individual work is pieced together in a modular manner. This implies an individual-level notion of identity. Second, group dynamics literature views identity as a social construct. The third body of literature, and the one that glues these together, concerns identity work. In particular, we adopted the view of identity as narrative co-production [30].

In the next sections, we first discuss the process by which mass collaboration leads to an emergent group. Then we discuss the implications for identity studies.

Mass collaboration and enduring social structures

The literature on mass collaboration tends to equate it with particular digital platforms and types of (open, digital) online participation. For example, the popular Wikinomics [35] book portrayed Wikipedia as an example of mass collaboration, and Open Source collaborations are often grouped under mass collaboration as well [2]. Later studies have provided a more dynamic view, stating that "malleable social structures" are possible within mass collaboration [10]. However, such social structures are often seen as community-level governance mechanisms [11, 18] separate from the moment-to-moment content production.

When Wikipedia research literature has touched on group work, it has often done so in the context of "WikiProjects" [9, 25, 26]. These nested structures are thematically dedicated project pages that support collaboration on a predefined topic. In the WikiProjects approach, contributors assign themselves as members of a project before they commit to a collaborative task. Our study shows a different dynamic. A collaboration emerges *in situ*, not as planned. Consequently, the contributors develop a sense of group belonging while working together.

Our study shows that the work done as mass collaboration can transform into coordinated group work. During the process of working together, the contributors are doing identity work. They see who the other contributors are, they notice the recurring contributions of other contributors, and they remember who shares an interest in common topics. The wiki talk pages and other discussion arenas facilitate coordination. When the collaborative activities are reinforced between the same people time and time again, they consider themselves as one collective unit, an emergent group.

Reflecting on the particular case of Finnish Wikipedia, we speculate that mass collaboration works as it does—as an uncoordinated, ad-hoc project of networked individuals—when the pool of potential contributors is relatively high. The need for group emergence is prevalent when the pool is limited. Once contributors who share a mutual interest come together by chance, they may recognize the uniqueness of the mutual benefit gained from such collaboration. This in turn makes them want to coordinate their work as a group.

Identity is a central process that facilitates the transition from mass collaboration to group emergence. In this sense, mass collaboration can be seen as proto group work. The group starts to emerge from mass collaboration, and we thus observe how the individual identity is accompanied with a forming group (social) identity.

Forming a group does not have to end mass collaboration among individual participants. Rather, participants may also contribute to article production in other mass collaboration projects.

The four phases of group emergence

When characterizing the transitional process, our analyses identified the following theoretical phases of group formation: 1) mass collaboration, 2) emerging group, 3) emergent state, and 4) sustained group. This transition carries out through identity work as narrative coproduction.

We notice how the shared identity of the group develops through different identified phases. In mass collaboration, individuals contribute to different articles as themselves without coordination, collaborating only indirectly and by chance. During the emerging group phase, individuals note others who share an interest in a common topic. This triggers the process of identity work, which is the starting point of group emergence. Then, the group emerges from joint article collaborations in the emergent state phase. In our case, the group work was targeted at improving the natural science content of Finnish Wikipedia to reach "Featured Article" status. Finally, the group sustains, it continues to exist and act as a coordinated collective unit. Group members begin to refer to themselves as "us," and may even meet each other face-to-face. In fact, this whole study would not even have occurred if, in individual interviews in 2010, several contributors had not identified themselves as members of the emergent group of natural science enthusiasts

Achieving group identity through identity work

The third stream of literature to which our study contributes is the study of identity. Identity is a core construct [13]. We argue that our study provides three contributions to the field of identity studies. First of all, identity has often been seen as an entity [5, 13], but we adopted a process-view of this phenomenon [30]. In particular, Sandberg et al. [30] argued for five variations of identity-as-a-process. Of their categories, we chose "identity as narrative coproduction" for our study, as it fit the phenomenon at hand.

Our study supports the recent interest in Information Systems for studying how IT affects identity processes [5]. We have argued that identity work occurs within collaborative work and is a key ingredient of transformational and emergent phenomena. Identity work is a useful construct for studying transitional processes in open digital collaboration collectives.

Finally, we have viewed how group identity is constructed between individuals when they work together. We strongly emphasize (non-dualistic) coexistence between individual and social levels of identity. The collaborative work that the subjects of our study did was just one way they participated on Wikipedia. Thus, group identity did not take anything away from their individual identities but added to them. This coexistence of levels is a generative perspective toward cautionary views of collective identity [5, 28].

Limitations and future research

This work has several limitations. This is a unique and explorative qualitative case study. The strengths and weaknesses of the study should be seen in the light of this genre [31, 33]. We have focused on one content-creating group that emerged from interactions on one encyclopedia article in Finnish Wikipedia. It is likely that similar phenomena exist elsewhere in Finnish Wikipedia, in Wikipedias in other languages, and in other open digital collaboration collectives.

Future research needs to pay attention to the multiplicity of varieties of collaborative forms of work in Wikipedia – as well as in other content-production online communities. In order to study how groups emerge from mass collaboration, many types of research methods need to be applied, especially quantitative analyses. Formal hypotheses can later be formulated and tested using statistical methods. Additionally, the research of social dynamics needs to be accompanied by more design-oriented research, enabling the creations of effective online platforms in the future. One challenge is the identification of groups and suitable tasks to work on [6, 15].

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