

CONFLICT MANAGEMENT PROCESS FOR VIRTUAL COMMUNITIES

Juliana de Melo Bezerra and Celso Massaki Hirata

Computer Science Department, Instituto Tecnológico de Aeronautica, S. J. Campos, Brazil

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Abstract: Through the participation on collaborative tasks in virtual communities, members can express their divergences during discussions, which characterize conflicts. Conflicts can contribute positively creativity, innovation and quality of decisions. However, if not managed, conflicts can negatively impact community performance and members' satisfaction. We propose a conflict management process for virtual communities. The process is useful to design new virtual communities because it allows to bring conflict management mechanisms, and also to improve mechanisms of existent virtual communities by correctly addressing the causes and consequences of conflicts.

1 INTRODUCTION

Virtual community is a group of people, who come together for a purpose online, and who are governed by norms (Preece, 2000). To accomplish the online tasks collaboratively, members are in general involved in discussions, where conflicts can arise. Virtual communities are likely to experience greater coordination and communication restrictions, due to the missing of context and social cues on online environments (Cramton, 2001). This fact can contribute to misunderstandings during discussions, and consequently it can lead to conflicts.

Conflict is a disagreement, both manifest and latent, among members and implies incompatible goals and interests (Robbins, 1974). Conflict is practically intrinsic to the life and dynamics of groups. Conflicts can be beneficial, because they contribute to creativity, innovation, and quality improvement of decisions. Conflicts can also be dysfunctional, when they produce tension and distract members from performing the task (Medina, 2005); in this case, impacting negatively on community performance and members' satisfaction. If conflicts are managed properly in virtual communities, the community can take advantage of the benefits of conflicts and reduce the negative impacts. So, a process of management conflicts in virtual communities is of interest. A better understanding of the factors that contribute to

conflicts and the related impacts can help the conflict management.

A conflict can have many causes, which are driven by human and task factors. Liu et al. (2008) discuss about factors that contribute to conflicts in work groups, such as group diversity and conflict resolution styles. Paul et al. (2005) study the use of distinct conflict resolution styles during the decision-making processes in virtual teams. Kankanhalli et al. (2006) propose that, besides the human factors, some task characteristics, such as interdependence and routeness, also contribute to conflicts. The related work is mainly concerned about the factors that contribute to conflicts, and not to the conflict management. Conflict resolution styles refer to behaviors that a member can have during a conflict. It is an individual response of a member. We are concerned about responses made by the community itself, in order to manage conflicts accordingly.

In other research (Viégas et al., 2004; Kittur and Kraut, 2008), conflicts in virtual communities based on wikis, which have Wikipedia (in English version) as the application, are investigated. Wikipedia is a free online encyclopaedia driven by volunteer contributions. It has been studied by many researchers due to its popularity. Viégas et al. (2004) use a visualization method to study cooperation and conflict between authors of articles. Kittur and Kraut (2008) suggest that conflicts depend not only on the number of contributors involved, but also on the

density of members in an information space. Their work characterize conflict by reverts in articles, which represent how competing perspectives negotiate their differences. We are particularly interested on the conflicts that arise during the discussions among members, and how the community manages them.

We propose a process of conflict management in virtual communities. The proposal is based on the processes of risk management in projects, described in PMBoK (2004). The objective of the conflict management includes an early recognition of conflicts and their causes, and an appropriate level of intervention, aiming to advance the quality of discussions in virtual communities. We believe that the proposed process is useful for designing new virtual communities and re-evaluating existent ones, in order to define and improve, respectively, mechanisms of conflict response.

The article is organized as follows. Section 2 provides a discussion about conflicts, describing the human and task factors that can contribute to conflicts. In Section 3, we propose a conflict management process for virtual communities, and explain it using examples of conflicts investigated in Wikipedia. Section 4 concludes our work and indicates future work.

2 CONFLICTS

Conflict refers to the awareness by various parties of their differences, discrepancies, incompatible wishes or irreconcilable desires (Mannix et al., 2002). Jehn (1995) distinguishes two types of conflict: task and relationship. Task conflict is generally task oriented and arises from differences in judgement and perspective. It reflects disagreements in viewpoints, ideas and opinions concerning to tasks and decisions. Relationship conflict is emotional and arises from incompatibilities or disputes among members, which typically includes tension, friction and animosity. It involves personal issues such as mutual dislike, personal clashes, and annoyance among members.

Task and relationship conflicts are positively correlated (Amason, 1996; Kankanhalli et al., 2006; Medina et al., 2005), and in this article we consider both types of conflict. Below we discuss about the two factors that can contribute to conflicts: human and task factors.

2.1 Human Factors

The human factors that can contribute to conflicts are group diversity and individual conflict behavior.

Group diversity is defined as any attribute that people use to tell themselves that another person is different (Pelled, 1996). It involves surface-level and deep-level dimensions. Surface-level diversity is related to demographic characteristics, such as age, sex, ethnicity, education, and function. Deep-level diversity includes cognitive and relational diversity. Cognitive diversity reflects differences in beliefs and preferences of group member about group goal. Relational diversity is based on psychological perceptions of interpersonal relationship (Liu et al., 2008).

Group diversity is intrinsic to virtual communities, because members can be from different countries or regions, and have distinct interests and experiences. Sometimes the diversity is not explicit in virtual communities, especially when members use logins to represent their identity and do not detail their profile, as occurs in forums and Wikipedia. Group diversity stimulates creativity and allows a variety of skills to be brought during discussions, however it can also reduce group cohesion and increase conflict (Kankanhalli et al., 2006).

Other human factors that can contribute to conflicts are the individual behaviors under conflicts. It means the distinct forms of behavior that members involved in discussion can perform individually. It is also known as conflict resolution styles (Paul et al., 2005) or conflict management behaviors (Liu et al., 2008). Typically members respond to conflict by using one of the five modes: avoiding, accommodating, competing, compromising, and collaborating (Thomas and Kilmann, 1974).

Avoiding behavior refers to intentional withdraw from a conflict situation. Accommodating behavior seeks for agreement by attempting to smooth out differences. In competing behavior, member enforces the own view on others. Compromising behavior includes to find a middle ground solution or a common solution that addresses members' interests. Collaborating behavior concerns to the achievement of the best solution, by integrating all views in order to generate a creative new one (Paul et al. 2005; Foundation Coalition, 2010).

None of these individual behaviors is wrong to use, but there are better times to use each depending on the situational realities (Liu, 2008). During discussions in a virtual community, members can opt by these distinct individual behaviors. Due to

group diversity and the chosen behavior, the way that members express themselves can lead to misunderstandings and aggravate the conflict.

2.2 Task Factors

Kankanhalli et al. (2006) propose that, besides the human factors, some task characteristics (interdependence and routeness) are also factors that contribute to conflicts. Interdependence is intrinsic to the collaborative characteristic of virtual communities. Routeness appears in tasks depending on its type and life timing. In this article, we discuss three main aspects of a task as contributors to conflicts: timing, subject and level.

Task timing is related to the timeline of the task being developed by members. There are some moments that are critical to the task accomplishment, requiring the involvement of members in discussions of important issues and decisions. It can occur, for example, due to the approximation of the deadline for the task conclusion. In these critical moments, the occurrence of conflicts can be accelerated.

Another factor that can contribute to conflicts is the task subject. Depending on the subject being debated, conflicts are more likely to occur, for instance, polemic themes, such as religion and politics can easily generate controversy. In general, these conflicts are part of the quotidian of members, and are also debated in the virtual world.

The last task factor is the task level. The identified levels are operational, procedural and normative. The operational level includes the activities developed in community and aligned to its main objective. The procedural and normative levels refer, respectively, to procedures and norms of community. As norms regulate the people relationships and activities, a change in a norm affects the community. Besides the norms, there are the procedures, which detail the operational participation of the members in order to guide the accomplishment of norms. The task level factor is particularly interesting to a special kind of virtual communities called self-organizing virtual communities (Bezerra and Hirata, 2011). In self-organizing virtual communities, members are expected to participate not only in the execution of the community operational activities, but also in the definition of norms and in the accomplishment of related procedures. To execute activities, members are involved in discussions and conflicts can happen.

3 CONFLICT MANAGEMENT PROCESS

In this section we propose a conflict management process, which aims to both take advantage of the benefits of conflicts and reduce some dysfunctional effects of them.

We conjecture that risk management processes as described in PMBoK (2004) are a sound basis to conflict management. The reason is that conflict as well as risk is a situation that has to be planned before occur, in order to be correctly addressed. However, there are some differences. For instance, identifying conflicts depends on considering human factors, such as culture, experience, and behavior of members, which are essentially abstract factors. We believe that the processes and activities are not that different. We elaborate the customization on the descriptions of the conflict management activities. We also conjecture that similar inputs, tools, techniques, and outputs described in PMBoK can be used for conflict management. For example, the techniques to collect information, such as brainstorming and interviews can be widely used.

The proposed activities for the conflict management process are: Identification of Conflicts and Causes, Analysis of Conflicts, Conflict Response Planning, and Monitoring and Control of Conflicts. It is important to understand that the three first activities are concerned to planning. The last activity is related to manifested conflicts that occurs in community and they are generally handled according to the planning made before.

We perform a study about conflicts in Wikipedia in order to gather examples to better explain our process of conflict management. Wikipedia is an online encyclopaedia where content can be added or changed at any time by anyone on Internet. During the process of content edition, there can be some discussions among members, which are held in the talk pages associated to the content pages. There are also discussions regarding the edition of norms and the accomplishment of procedures, due to the self-organizing characteristic of the community (Bezerra and Hirata, 2011). As consequence of active discussions, conflicts can happen. Conflicts are known as disputes in Wikipedia. In the next sections, we explain each conflict management activity.

3.1 Identification of Conflicts and Causes

The Identification of Conflicts and Causes activity

refers to the determination of which conflicts are likely to occur in virtual communities and which are the potential causes for them. It can be made using lists of conflicts and causes previously identified in other similar analysis. It can also be made through an inquiry into the factors that contribute to conflicts, which are human and task factors described in Section 2.

We analysed twenty conflict cases in Wikipedia from the human and task factors' perspectives. The conflicts about general articles in Wikipedia, we retrieved from those reported in a mechanism called "Editor Assistance". For further reference, we provide a code to identify each analysed conflicts, namely: *A query on space Quest 4* (A1), *Stealth Game' reverting disputes* (A2), *Maine Gubernatorial election, 2010 candidate* (A3), *Anna Nicholas* (A4), *Album genre disputes* (A5), *Geoffry Thomas* (A6), *Share international article citations* (A7), *Lanark-Frontenac-Lennox and Addington* (A8), *COI and addressing inaccuracies* (A9), *Seeking dispute resolution* (A10), *Copy-editing of everclear (alcohol)* (A11), and *Dispute regarding quotations from the Australian politician Adam Bandt* (A12). The conflicts about the definition and maintenance of norms, we retrieve from the discussions about the *Civility* norm in Wikipedia. For further reference, we provide a code to identify each analysed conflict, namely: *Don't be a dick* (N1), *Merge with WP:LIE* (N2), *Blocking for incivility* (N3), *Polite provocation* (N4), *Changes to this policy* (N5), *Is there any consensus for this addition?* (N6), *Policy or guideline?* (N7), and *Drop this principle* (N8).

Through the investigation of conflict cases in Wikipedia, we identified seven main conflicts, which are shown in Table 1. We also identified some causes of conflicts, which are listed in Table 2. Some discussions regarding the lists are provided below.

The task level factor (operational, procedural, and normative) helps the identification of conflicts. In the operational level, conflicts can occur frequently, because the members diverge about the content of the article being edited (C1). This kind of misunderstandings can happen between general members, but can also involve members in administrative positions (C3). We call administrator a member with any administrative function, which include the following roles in Wikipedia: "administrators", "bureaucrats", "stewards", "checkusers", "reviewers", "account creators", "oversighters", and "rollbackers". An example of conflict C3 is the case A4, where a member argues

about a new page that he created and was deleted without further explanation. The other cases A1 to A3, and A5 to A12 are examples of conflict C1.

Table 1: Conflicts in Wikipedia.

Id	Conflict
C1	Divergence between editors about the content of an article
C2	Divergence between editors about the presentation of an article
C3	Divergence between editor and administrator about the content of an article
C4	Divergence between editor and administrator about the presentation of an article
C5	Divergence regarding the decision to be taken during the execution of a procedure
C6	Divergence about the content of a norm
C7	Divergence about the presentation of a norm

In the procedure level, there are difficult cases to handle and consequently critical decisions to make, which can contribute to conflicts (C5). For example, "Articles for Deletion" is a board that discusses if a page has to be deleted; and "Administrators' Noticeboard/Incidents" is a board that discusses cases about incorrect conduct of members, such as vandalism and uncivil behavior.

In the normative level, discussions about changes in the content of norms (C6) can have divergences, and consequently conflicts, because norms affect substantially the community. The following cases are examples of C6: N3, N4, N5, N6, N7 and N8. For instance in N3, members discuss about a change of the way the blocking for incivility is performed. Another example is N8, where a criticism regarding the norm provoked an inflamed conflict.

The conflicts C1, C3, and C6 comprise of divergences regarding content. However there are also divergences about the presentation of articles and norms. The presentation includes text comprehension, text formatting, and organization of subsections. This fact leads to the identification of conflicts C2, C4 and C7. Some examples of C7 are the cases N1 and N2.

The human and task factors also help during the identification of the causes of conflicts. It is important to observe that a conflict is not driven by just one cause. Many causes can contribute to a conflict. For instance, A3 is an example of conflict C1. This conflict involves a polemic theme, politics, which characterizes the cause CA13. This conflict also has signs of incorrect use of emphasis during

the discussion, as illustrated in the comment (1), which characterizes the cause CA10.

“If you're going to scream at me via edit summary, you could at least be more specific. I have no idea what "YOU CAN'T!" is referring to.” (comment found in A3) (1)

Table 2: Causes of conflicts in Wikipedia.

Id	Cause of conflicts
CA1	Missing of explanation about taken actions
CA2	Distinct interpretations about contents
CA3	Distinct interpretations about norms
CA4	Difficult to explain the issue to be discussed
CA5	Lack of context
CA6	Persistence when expressing opinion
CA7	Difficult to express an opinion
CA8	Missing explanation about an opinion
CA9	Missing member identification
CA10	Incorrect use of emphasis
CA11	Personal attacks and judgments
CA12	Critical timing of task accomplishment
CA13	Polemic subjects

Some discussions about the identified causes of conflicts, presented in Table 2, are provided next.

Members often complain when someone else reverts or changes what they have made without making clear the reason (CA1). Conflict can happen due to differences in interpretation of the issue (CA2). It can be explained by the group diversity factor that impacts the understanding of contents, due to ambiguities in text, cultural singularities in language, and differences of members’ experiences. In Wikipedia, it can also be verified regarding the interpretation of norms (CA3).

The group diversity influences the way people express themselves in spoken and written language. It can be noted in Wikipedia by the name of the topic discussed that sometimes does not reflect the real problem to be handled (CA4). There are cases where the discussion title is adequate, however the problem to be handled and the initial proposal is not clear (CA5). It can generate misunderstandings and even the loss of direction in discussions. To express persistently the same opinion (CA6) can be perceived by other members as a competing behavior and negative reactions can occur, which generates conflicts.

During discussions, it can be difficult to understand ones’ opinion (CA7) without reading all the conversation, especially if the sentence mentions some particular point of the conversation. So, some misunderstandings can occur, consequently contributing to conflicts. Besides a member correctly expresses an opinion during a discussion, it is desired that he explains his point of view (CA8). The explanation of opinion can enrich the discussion, by giving additional information. It can help to reduce conflicts, because an opinion without a reason can be interpreted as a tentative to impose someone’s view in a competing behavior.

Conflicts occur among members. It is important for members to know the contributions of each participant of the conflict, in order to be able to analyze the distinct views and form an opinion. So, the correct identification of the contributions is desired (CA9). The heated discussions, characterized by personal attacks and judgments (CA11), are particularly related to conflicts, because they are used to criticize, offend and expose members.

The use of emphasis, such as capital letters, italic format and quotation marks, in written language can contribute to conflicts, when they are used to express negative feelings (CA10). For example, a sentence in capital letter can be understood as a scream, and the italic format can express angry. The use of emphasis is not always harmful, for example capital letters can be used to write an abbreviation, and quotation marks can be used to identify the name of an article section.

To reason about the timing factor in conflicts, the number of archived discussions regarding the *Civility* norm in Wikipedia was analysed according its life cycle. The high number of comments in discussions indicates possible conflicts during a period. We observe a peak of possible conflicts during 2008. In this period some inflamed discussions can be identified, for example N4, N5, N6, and N7. It is not clear the reasons for this intense period. It can be related to the crescent number of articles and members in Wikipedia (Kittur and Kraut, 2010), which can have caused the need of additional discussions about this norm and its application. It characterizes the cause CA12.

The timing factor is also noted in Wikipedia by analysing the number of visualizations of a page. We analyse the number of accesses to an article called “Maine gubernatorial election, 2010” since its creation. This article is about an event happened on November/2010. Two peaks of visualization in 2010 were identified: one near July/2010 and other near November/2010. There is also a reported conflict in

A3. The first peak can be related to the preparation and final adjustments of the article for the event; and the second peak can be related to the event occurrence itself. It also characterizes the cause CA12.

In Wikipedia, the task subject factor is represented by the article subject. There can be conflicts when members discuss about any subject, for example, A1 to A12 illustrates cases of conflicts about games, politics, music, place, etc. However, there can be a high number of conflicts about specific subjects, in general polemic subjects (CA13) as politics, religion, and war.

Although the identified conflicts and causes are for a particular community, the Wikipedia, we believe that they are quite general and can be used as suggestions for the conflict management of other communities. With the conflicts and causes identified, we can proceed to the next activity of the conflict management process.

3.2 Analysis of Conflicts

This activity includes methods to prioritize the identified conflict for the Conflict Response Planning. We understand that the community can improve its performance by focusing on high priority conflicts. The priority of conflicts can be evaluated considering two main aspects: the probability of occurrence and the impact in community if the conflict occurs.

The probability of occurrence of a conflict is related to the probability of occurrence of its causes, which were already identified in the previous activity of the conflict management process.

Some identified impacts of conflicts are on performance and members' satisfaction (De Dreu and Weingart, 2003). Performance is mostly related to task quality and effectiveness. Reduced quality of tasks can expose the community credibility. The dissatisfaction of members can provoke hard consequences, such as disturbance of members' trust on community, reduction of members' participation, and even the loss of members. For example, in comment (2) a member reports the displeasure of being in an endless conflict and criticises the community. It reveals a negative impact on the confidence and admiration of members on community. In the comments (3) and (4), members, who reported the conflict, became so unsatisfied that mention to not contribute anymore. It represents a negative impact on the commitment of members in community.

“Let us end this petty, ridiculousness which makes Wikipedia an ugly rather than useful place.” (comment found in A3) (2)

“Well since you put it that way, I think I'm done with this article.” (comment found in A1) (3)

“I was hoping to expand upon this article, but I'd like to know ahead of time if it's going to be a waste of time.” (comment found in A2) (4)

The probability and impact of each conflict has to be evaluated. The definition of the distinct levels of probability and impact depends on each community. There can be defined a relative scale of probability, including for example the levels “not probable”, “probable” and “high probable”. It is also possible to use numeric probabilities, for instance 0.1; 0.3; 0.5; 0.7 and 0.9. The scale about impact has to reflect its importance, and it can be relative or numeric. PMBoK suggests a matrix of probability and impact, which we adopt for prioritizing conflicts for the Wikipedia analysis. It is illustrated in Table 3. The prioritization is made according to zones: high priority (hard gray), medium priority (light gray) and low priority (medium gray).

Table 3: Matrix of probability and impact (PMBoK).

Probability	0.90	0.05	0.09	0.18	0.36	0.72
	0.70	0.04	0.07	0.14	0.28	0.56
	0.50	0.03	0.05	0.10	0.20	0.40
	0.30	0.02	0.03	0.06	0.12	0.24
	0.10	0.01	0.01	0.02	0.04	0.08
		0.05	0.10	0.20	0.40	0.80
	Impact					

Using the conflicts in Table 1, and the probability and impact scales in Table 3, we make an analyze of conflicts in Wikipedia. The result is shown in Table 4. For each conflict, we indicate probability, impact, and priority. It reflects our interpretation about the conflicts in Wikipedia.

Table 4: Analysis of conflicts in Wikipedia.

Conflict Id	Probability	Impact	Priority
C1	0.90	0.40	high
C2	0.50	0.10	low
C3	0.50	0.20	medium
C4	0.30	0.10	low
C5	0.50	0.20	medium
C6	0.30	0.80	medium
C7	0.30	0.10	low

The conflict C1 is very probable considering the number of contributors, because many members are involved in the edition of contents, which is the main activity in Wikipedia. C1 has a considerable impact, due to the direct relation with the quality of articles, and consequently with the credibility of the community. Besides, C1 can impact members' motivation to contribute.

The conflict C3, although similar to C1, has an important difference that is the involvement of an administrator in the conflict. This kind of conflict occurs mainly because a general member does not agree with the attitude or guidance of the administrator. The impact of C3 is the decrease of confidence of members on the community, because general members see administrators as community representatives. In discussions of the procedure level, it is common for the members to express an opinion in a clear way using statements as "oppose", "support" for the initial proposal. This practice helps to reduce the probability of the conflict C5. The impact of C5 is related to the confidence of members on the decisions made during the procedure execution.

We consider a low probability for conflict C6 due to the high maturity of the community, which already has established its norms. However, the associated impact is very high, because modification of norms can configure a significant change in the way the community operates, so conflicts regarding this topic are critical. The conflicts C2, C4, and C7, regarding the presentation of articles and norms can occur, however they have low impact to the task quality. The low impact contributes to the low priority of these conflicts.

One technique to evaluate the probability of a conflict is to evaluate the probability of its causes. A conflict can have many causes with distinct criticality. Besides, some causes are likely to generate a specific conflict. The evaluation of causes' probabilities is not trivial due to the correlation among the causes, for instance CA4 is in general correlated to CA5. So this evaluation may require the assistance of experts in community. Given a conflict, we can assign the probability of occurrence for each cause listed in Table 2, and then define the probability of the conflict.

The probabilities of some causes are particular interesting to discuss. The cause CA1 (missing of explanation about taken actions) is quite probable in C1 due to the nature of the community that is to edit the content without a previous validation or discussion. The same cause in C6 is less probable, because members in general discuss the proposal

before change the norm. Although the fact that in Wikipedia the identification of members in discussions is not required, members are used to provide this information. It contributes to the low probability of CA9 (missing of member identification). In C3, C5 and C6, CA9 is rarely perceived, however in C1 it can occur. Causes with high probabilities for all conflicts are in general concerned about how a member informs the community what he desires to discuss (CA4 and CA5), and how he express and justify his opinion (CA7 and CA8). Other critical cause is the presence of personal attacks and judgments (CA11). The cause CA12 (critical timing for task accomplishment) is very probable in C5, because decisions have to be taken in a short time in order to address the cases promptly, for example cases of vandalism require a quick response by the community.

The prioritization of conflicts allows to list which conflicts have to be addressed first. The relation between a conflict and its causes is useful both to evaluate the probability of the conflict, and also to address the response for the conflict. The Analysis of Conflicts activity is not a trivial activity, because it needs a considerable understanding of the members' roles and community work. The next section details the forms to respond to conflicts.

3.3 Conflict Response Planning

The Conflict Causes Response Planning refers to the development of options and the determination of actions to reduce the occurrence of conflicts. It deals with conflicts considering their priority. In general it is necessary to choose some suitable responses among all the possible ones. We present three approaches for conflict response, namely avoidance, transference and mitigation, based on the strategies for risk response in project management proposed in PMBoK (2004).

The avoidance approach refers to the impediment of the emergence of conflicts, for example by blocking discussions. During the investigation of conflicts in Wikipedia, a mechanism of the avoidance approach is identified. It is called page protection mechanism and it is responsible for blocking changes in articles. By eliminating new editions in articles, the mechanism eliminates disagreements among members and consequently avoids conflicts. It is important to note that an adopted mechanism may have other consequences on the community. In this case, for instance, other members who are not involved in the conflict may

not agree with the adopted mechanism (page protection), because they desire to contribute to the article while the editions are blocked.

The transference approach is to assign to an entity, outside the virtual community, the negative impact of a conflict as well as the right to give to it a proper response. For example, if a conflict involves serious threats, such as death threats, some justice entity outside the virtual community can be called to investigate the case.

To mitigate a conflict, it is possible to reduce its probability and/or to reduce its impact. The reduction of the conflict probability is related to the reduction of the probabilities of the causes that generate the conflict.

In Wikipedia some actions are perceived aiming to decrease the probability of conflicts. One example is that some expert members help general members with the article edition, trying to improve content and assure quality. These expert members have more experience in Wikipedia and can contribute to the interpretation of general contents (CA2) and norms (CA3). For instance, in comment (5), an assistant of the “Editor Assistance” mechanism remembers the importance of the contributions made by the member X (the real identification is omitted).

“Please see the latest comments on the article talk page by X, an experienced Wikipedia editor and administrator.” (comment found in A12) (5)

Other way to mitigate conflicts in Wikipedia by decreasing their probabilities is the existence of specialized boards to discuss critical themes (CA13). An example is provided in (6).

“I would suggest that you ask this question at WT:WikiProject Electoral districts in Canada as they are probably best placed to proffer useful advice.” (comment found in A8) (6)

The mitigation approach to conflict includes mechanisms to address and reduce impact of conflicts. One example is to inform the community the status of a task that is under conflict, in a way to indicate its reliability. In Wikipedia an article can receive templates that indicate unsolved conflicts about the content. The templates have associated symbols and notes. Some examples are: *POV* (Symbol: balance. Note: *The neutrality of this article is disputed*), and *Pp-dispute* (Symbol: lock. Note: *This page is currently protected from editing until disputes have been resolved*).

Some mitigation mechanisms can be used to help members in conflicts to reach a conclusion, which aim to reduce the negative impact of members’

dissatisfaction. Some examples of such mechanisms are facilitation, mediation, and arbitration (Lewicki et al., 1992). A voting system in some decision making process can also be used. In Wikipedia we identify the following mechanisms: “Editor Assistance”, “Third Opinion”, “Request Comments”, “Mediation Cabal”, “Mediation Committee” and “Arbitration”. Each mechanism has its own characteristics, which defines how cases are accepted and dealt. For example, “Third Opinion” mechanism is indicated to disputes between two editors with observance of good faith and civility. Other example is “Arbitration” mechanism, which is the last step of dispute resolution on Wikipedia, and has the authority to impose binding solutions to disputes between editors.

We identify that some mechanisms could be proposed to mitigate the identified conflicts by addressing the probability of related causes in Wikipedia. For instance, the explanation of a change performed by a member in an article or norm could be required. Members should be obliged to explain the issue to be debated, providing the proper references to establish the context. Members should provide their opinion and explanation in an organized way during discussions. The identification of members should be required during discussions. The use of personal pronouns (which can indicate personal attacks and judgements) and language emphasis (which can be used to incivility) should be regulated.

Depending on the severity of a conflict, a mechanism cannot be effective, so it is necessary to use other mechanisms. In Wikipedia there are evidences the use of multiple mechanisms to a conflict, for example in (7) and (8) an assistant of “Assistance Request” mechanism comments that the conflict should be handled by the “Request Comments” mechanism (also known as WP:RfC or just RFC). In comment (8) there is also a mention regarding the previous submission of the issue in conflict to a specialized board called WikiProject.

“Well probably an WP:RfC is the next step.” (comment found in A10) (7)

“Not an easy dispute... And it looks like it's gotten involved on the WikiProject talk page too... I'd suggest starting an "arbitrary break" subsection and proposing that an RFC be started.” (comment found in A3) (8)

The community should propose response mechanisms to cover all the conflicts and their relevant causes, especially the conflicts with high

priorities. It is also important to evaluate the cost to develop such mechanisms in order to choose the appropriated ones. In the next section, we detail the last activity of the process that deals with manifested conflicts.

3.4 Monitoring and Control of Conflicts

This activity deals with real instances of conflicts that occur in the virtual community. In order to deal with manifested conflicts, we propose two activities: monitoring and control. Monitoring refers to the detection of the conflict, and control consists in addressing the correct response to the conflicts, in this situation the previous planning made can be used.

When a conflict arises in Wikipedia and cannot be handled by the involved members, some member requests the use of a mechanism. So, there is no automatic detection in the monitoring phase in Wikipedia. Regarding the control of conflicts in Wikipedia, frequently the own members are aware of the adequate mechanism to help them during conflicts, as reported in comments (9) and (10), where the “Third Opinion” and “Mediation” mechanisms are respectively mentioned. However sometimes members are really confused about which is the suitable mechanism to manage the current conflict, as illustrated in (11).

“I am fine with seeking a definitive 3rd opinion on the issue.” (comment found in A3) (9)

“I assume this issue is not resolved, so I'm going to research how to start a dispute mediated by someone on Wikipedia.” (comment found in A7) (10)

“Also, I oppose bringing in a binding third-party; I think the informal, unbinding Mediation Cabal would be a much better start.” (comment found in A3) (11)

If a higher instance resolution mechanism is required, the need of additional intervention by members during the transference from the lower instance to higher has to be analysed. For instance, in Wikipedia when another mechanism is needed, the involved members have to agree with that and submit the case again to the new mechanism, and sometimes it requires extra discussions and opens the possibility to new conflicts.

The control activity should have tasks to track a conflict in order to know its status and the mechanisms used during its life cycle. This track in Wikipedia may be difficult, as expressed by the

comment (12) of an assistant who has doubt about the real situation of the conflict A3.

“Not sure what's going on presently in this situation.” (comment found in A3) (12)

The suitable response for a conflict is based on the mechanisms planned in the previous activities of the conflict management process. The mechanisms have to work properly or handle conflicts in an acceptable deadline. Not addressing conflicts properly and promptly can damage the members’ trust in the community mechanisms. So, some additional recommendations are to monitor the efficiency and efficacy of the mechanisms.

4 CONCLUSIONS

During discussions in virtual communities, conflicts can arise due to divergences among members. Conflicts are part of communities’ life and are more likely to occur in virtual communities due to the communication restrictions. Unhandled conflicts can impact negatively in community.

We proposed a process for conflict management with the activities considering the identification and prioritization of conflicts, the response planning for the critical conflicts, and the monitoring and control of conflicts when they occur in community. As new situations can occur due to the community evolution, generating new kinds of conflicts not already identified, it can be necessary to review the planning and adapt response mechanisms along the community life cycle.

In order to describe the proposed process, we used it for Wikipedia. The investigation leads us to some future work, which includes the study of automatic mechanisms to both reduce the probability of occurrence of conflicts and detect conflicts during the monitoring activity.

As conflicts are beneficial to communities, due to the presence of distinct contributions to enhance the decision, the participation of members in discussions has to be stimulated. Then, we believe that the study of incentive methods to increase members’ in discussions is also an interesting future work.

To experiment the proposed process in a real community is not a simple task, because it depends on the community objectives and maturity, as well as individual characteristics of members. So, a future work is to use multi-agents system in order to simulate the proposed process for conflict management.

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