

Communication process analysis in virtual communities on sustainable development¹

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***Abstract.** Collaboration on sustainable development involves stakeholders and experts from multiple organizations, who often work together in temporary or permanent communities of practice. The potential for joint work has greatly increased with the advent of networking technologies like the Internet. However, successful online collaboration requires a systematic analysis of the often very complex, dynamic and interdependent communication processes, while taking into account many organizational constraints. We present our extended Social Context Model that can be used to analyze and improve communication process support. We apply the model to a case: the worldwide Friends of the Earth network of environmental organizations.*

1 Introduction

The problem domain of sustainable development is vast. Addressing the many problems related to nature conservation, environmental protection, and social justice involves more and more stakeholders from different backgrounds. The emerging networks and communities of stakeholders and decision-makers have to deal with increasing amounts of available and required data, information, and knowledge from many different domains.

Traditional knowledge management approaches are not sufficient, as they are based on a “commodity view” of knowledge, separating “knowledge” and “knower” (van der Velden, 2002). This approach assumes a joint agreement that knowledge can be stored, replicated and distributed without further involvement of the person providing the knowledge.

However, in the area of sustainable development, the setting is different, as a proper distinction must be made between ‘external’ and ‘tacit’ knowledge (Nonaka et al., 1998). Much of the available knowledge and its context of use is hard to document, and sometimes even impossible to codify (as in the case of much “traditional knowledge”), making it hard to properly document “best practices”.

Another complexity is that the value and power associated with certain knowledge (economic or cultural) inhibits “knowers” from being willing to lose control by having their knowledge externalized. Instead, these “knowers” should be brought together to discuss their positions and apply their expertise (Kammaing, 1995). There is a need to mobilize, activate, and combine the experiences, insights,

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wisdom and stakes of people involved in the issue at hand. High quality communication between complex networks of stakeholders in different locations, in order to exchange information and coordinate activities, is becoming a critical success factor.

To unleash this potential, it is essential to provide balanced systems of information technologies to adequately support the subtle web of communication processes (de Moor, 1998). However, the “commodity approach” is propagated even into many Internet-based products to support “communities of practice” or “communities of interest”. Although they usually provide ample facilities to store documents, case studies, best practices, and other “externalized knowledge”, their functionalities are often rather generic, and not tailored to the specific purpose of the communication processes, or the politicized context in which they take place.

In this article, we present our extended Social Context Model, a diagnostic instrument to systematically analyze the quality of communication process support in virtual communities on sustainable development. In Sect. 2, we define what we mean by such virtual communities. Sect. 3 presents our Social Context Model for communication process analysis. Sect. 4 describes the Community Activity Cycle as a way to extend the Social Context Model. We apply the extended model to the case of Friends of the Earth International in Sect. 5. We end the article with a short discussion and conclusions.

2 Virtual Communities on Sustainable Development

Communication among stakeholders is not the result of random interactions. The actual work, and communication, is mostly done in communities of practice. A community of practice is a domain of knowledge which defines a set of issues, a community of people who care about this domain, and the shared practice that they develop to be effective in their domain (Wenger et al., 2002). In such communities, people interact socially for mutual benefit. They help foster knowledge development and creative interactions amongst highly specialized experts, and help to channel their efforts to where they are most needed (Millen et al., 2002; Smith, 2002).

We consider the communities working on sustainable development as a special type of communities of practice. They consist of many experts and stakeholders, often with conflicting interests. The communities are very knowledge-intensive, under high-time pressure, forced to work most effectively and efficiently because of a regular lack of resources, and have strongly evolving sets of goals, workflows, and organizational structures. They are often highly international, interdisciplinary, inter-organizational, and interactive.

Most communities on sustainable development are by necessity also virtual communities, as they are often dealing with global issues and policies, and involve participants from many different locations. Virtual communities describe the union between individuals or organizations who share common values and interests using electronic media to communicate within a shared semantic space on a regular basis (Schubert et al., 2000).

In virtual communities, the common space is provided by a suite of collaborative and communicative information tools, ranging from simple mail functionality to

advanced web applications (Surman et al., 2001). This functionality comes in the form of standard tools, so that information systems development becomes more a process of tool selection than building whole new systems from scratch (Sawyer, 2001). For virtual communities, the right ensemble of tools needs to be selected to serve their requirements. However, choosing the technology to use is not trivial, as there is tremendous variety of design choice, and requirements may even vary within communities in different stages of their lifecycle (Gongla et al., 2001).

Given that communication processes are essential, yet complex to model and support, what we need is an analytical instrument for diagnosis of communication problems. The analysis should include key factors related to communication processes in their community context. The instrument should take into account the different phases in the development of a virtual community. The result of the analysis would be a systematic overview of communication process problems and opportunities. This overview could be used to make a set of recommendations on communication support.

3 The Social Context Model

To assess the effectiveness of tool-enabled communication processes, we need to know the context in which they operate. For example, it makes quite a difference if a discussion process is used for friendly conversations, or as a key element in an official document review. Once these communication processes are charted in their context, it is much easier to set priorities such as which tools to acquire and how to use them in the socio-technical system that is the virtual community. In this way, the socio-technical gap between community requirements and enabling technologies can be reduced (Ackerman, 2000).

In earlier work, while focusing on “authoring processes”, we developed a Social Context Model (SCM) to help make these assessments of the context of communication processes (de Moor et al., 2001; de Moor et al., in press). This model looks at communication processes along a process *context* dimension consisting of communication process layers, and along a process *structure* dimension describing the configuration of the elements of the communication processes.

3.1 The Communication Process Context

The SCM consists of four layers of communication processes, each higher level process providing a context that embeds the lower-level processes. From high to low-level processes these are: collaboration, authoring, support, and interaction processes:

- *Collaboration processes* give purpose to the collaboration activities, discussions, and documents.
- *Authoring processes* produce the structured document or output of the collaboration processes.
- *Support processes* focus on the organization of the discussions between the participants, ensuring that they contribute to the creation and interpretation of the output.

- *Discussion processes* are the actual *exchanges* in which the argumentation between participants takes place.

By embedding the basic discussion interaction process in three top layers, a systematic context analysis can be performed.

3.2 The Communication Process Structure

Each communication process, whether it is a discussion process or one of its embedding context processes, has a structure comprised of certain process entities. First, there are the *process elements* (the elements the process itself is made of). Second, there are the processes constructed out of these elements. These we subdivide into *actions* (which constitute the actual communication process) and *change processes* (meta-processes in which the communication process can be adapted).

- *Process elements* can be divided into at least three types: goals, roles and objects. *Goals* define what the outputs of these processes should be focused on. *Roles* specify in what quality participants can act in processes. *Objects* are the inputs and outputs of processes.
- *Actions* define the workflows of the community and are composed of configurations of process elements. In actions, participants playing process roles generate more complex objects as outputs from simpler objects.
- *Change processes* describe how the evolution of the socio-technical system takes place. To ensure that communication processes and their supporting functionality co-evolve adequately, change processes need to be explicitly defined.

In both actions and change processes, there are *norms* that describe the acceptable behavior in the community by defining the authorizations of the participants in the process roles that they play. All communities have such norms, either explicitly laid down in charters and by-laws, or only implicitly defined, but no less strong in impact (Preece, 2000; Surman et al., 2001).

3.3 The SCM Matrix

Combining both dimensions, we create the matrix below, with examples of context and structural elements, as an illustration of how the model can be used to organize the complexity of discussion processes in their context.

Table 1. The Social Context Model (de Moor et al., in press)

	<i>Process Elements</i> Goals, roles, objects	<i>Actions</i> Workflows	<i>Change Processes</i> Definition of socio-technical system
<i>Collaboration processes</i> (Why is the discussion taking place?)	Collaborative roles (facilitator, judge, expert, keynote speaker) Stakeholder profiles Policy reports Conflict resolution	Facilitation Mediation Conflict resolution Debating Political inquiry	Define goals of collaboration Define rules of engagement Set social norms for roles

	priorities		
<i>Authoring processes</i> (What is produced in the discussion?)	Authoring roles (editor, author, reviewer) Document structure elements (section, position, case, argument)	Editing Reporting Authoring Reviewing Publishing Notification	Change authoring roles Change authoring norms Change authorizations Adapt document structure
<i>Support processes</i> (How is the discussion organized?)	Support roles (moderator, technical facilitator) Discussant profiles Message digests Discussion summaries Archives	Inviting Reminding Registration Agenda-setting Moderation	Set communication policy Agree upon discussion planning Change notification parameters
<i>Discussion processes</i> (How is the discussion conducted?)	Interaction roles (discussant, attacker, defender) Discussion elements (posts, replies, labels) Discussion objectives	Raising issues Replying Creating a position Playing devil's advocate Position taking	Assign attackers, defenders of position Define discussion rules

4 The Community Activity Cycle

In this article, we extend the Social Context Model along the dimension of time. Virtual communities are not static, but continuously change their focus. They grow in a long and often difficult growth process, and over time, priorities with regard to the goals and structure of communication processes change (Gongla et al., 2001). Therefore, the stage of development or operations a community is in, needs to be taken into account in the analysis.

We build upon ideas inspired by the lifecycle of communities of practice (Wenger et al., 2002; Nickols, 2002). Rather than taking the “community life cycle” as phases in a relatively linear fashion, we see a “community activity cycle” as consisting of activity aspects that often occur simultaneously in the community. In practice, however, a community often stresses different aspects in a linear fashion. For simplicity, we therefore assume a sequential model of stages here.

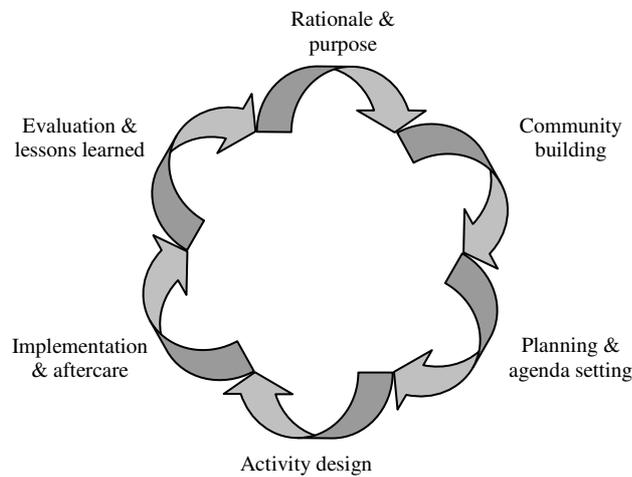


Figure 1. The Community Activity Cycle

Each of the stages in the Community Activity Cycle has an associated Social Context Model. In each of these SCM instances, different elements can be important. The configurations for these different stage models were obtained by analyzing project documents, and observing stakeholders in a number of virtual communities on sustainable development. In this way, best communication process-practices can be recorded and used for analysis, depending on the particular activity that has priority.

4.1 Stages in the Cycle

We briefly outline each the six stages in the cycle. In our case study in the next section, we will show how the filled out social context model looks for the “implementation and aftercare” stage. Similar typical model configurations exist for the other five stages of the Community Activity Cycle. For lack of space, these will not be shown in this article.

4.1.1. *Rationale & Purpose*

This stage looks at the “raison d’être” of the community: what purpose does it serve, who will benefit from it, and how will its effectiveness be monitored. Most specifically, it needs to be very clear how intended or existing participants benefit from being active in the community (for instance, in terms of access to knowledge or political support, personal exposure and profiling, learning opportunities, having an “antenna” in other fields, et cetera).

4.1.2. *Community Building*

This stage looks at ways in which the community holds together. What are the common grounds or stakes around which participants gather, how do community members gain trust in each other and the community, how do they communicate and collaborate? How can a new member become part of the community?

4.1.3. *Planning & Agenda-Setting*

In a “true community”, the members set their own joint agenda of what they want to collaborate on (this of course may sometimes not completely overlap with the reasons for institutions to establish or support the community). Here we look at possibly existing agendas and ways in which they can be set. For temporary communities with a specific purpose, the agenda may be given beforehand.

4.1.4. *Activity Design*

Once an agenda and planning are set, individual activities can be designed. Important questions are: what should the process look like? How will the new activities be integrated with existing work methods, overall policies and processes? Which roles are needed?

4.1.5. Implementation & Aftercare

Individual activities need to be carried out and supported. When dealing with online collaboration, this includes sufficient technical support and helpdesk facilities. Also, the roles defined in the previous stage need to be filled, and the overall process needs to be facilitated. There needs to be an 'aftercare' once the activity is over, to report, wrap up, and close down.

4.1.6. Evaluation & Lessons Learned

The last stage is to see how a community reflects on its own functioning, formulates criteria and derives lessons learned. The output of this reflection can lead to an adaptation of the original rationale and purpose, and feed forward into new activities to build the community, set the common agenda, et cetera.

4.2 Applying the Extended Social Context Model

By extending the SCM with the Community Activity Cycle, it becomes more useful for real-world applications:

- We use the Community Activity Cycle to identify the stage at which the improvement of communication process support is most needed.
- For the identified stage, a detailed Social Context Model analysis is performed.
- Based on this analysis, we can then make a set of recommendations for communication process architectures and specific tools to deploy.

5 The Case of Friends of the Earth International

AIDEnvironment has advised and supported several organizations in various aspects of collaboration and change processes involving virtual communities on sustainable development. These practical experiences were mixed with critical investigation of the existing methodologies and with academic research in this area, resulting in the extended Social Context Model sketched in the previous sections.

In this section, we will describe one case to which we applied our model: the intranet of the network of Friends of the Earth International (FoEI). We will first sketch the project context in which we applied the model. Then we will describe the decision making process of which we did a communication process analysis. We then apply the extended SCM. We end this section with some observations.

5.1 The “Strengthening the Message” Project

Friends of the Earth International is a network of 68 environmental organizations worldwide, each working in its own country with local, community-based groups active in civil society (around 5,000 local groups in total). It is a grassroots network, where decisions are made by consensus, and work and authority are decen-

tralized as much as possible. In the over 30 years of existence, this has resulted in an extensive set of procedures and principles for decision-making and coordination.

The FoEI network forms a “micro-cosmos” in which many of the characteristics and problems around virtual communities on sustainable development occur. The network has grown considerably in the last few years, involving organizations of different sizes and with different resources available. They collaborate in different coalitions in campaigns and projects. The network has to deal with the influences of the “digital divide”, North-South gaps, and barriers in language and culture.

For the past years, FoEI has been working towards enhancing the network's democratic global environmental grassroots character and simultaneously strengthening their capacity to respond quickly and effectively to global environmental challenges. The aim was to leverage their extensive community of experts and activists and become more effective in their international campaigning efforts. As part of an internal project called “Strengthening the Message”, FoEI analyzed their internal communication processes for improvement².

One focus of analysis was the use of communication tools in decision making and coordination of international campaigns. A motivated choice of priorities in online tools and activities to support the network was needed. Rather than comparing feature sets, it was imperative to find an appropriate match with the capacities and needs of the targeted community members and the existing culture and working way of the network. Work on the project started in March 2002, with a first version of the intranet taken in use in June 2003.

5.2 Analyzing Decision Making Processes

FoEI and AIDEnvironment together identified the major decision making processes related to international campaigning. We distinguished four key decision making stages in the lifecycle of a campaign:

- There is a continuous discussion in the network to identify “campaign issues”, areas where FoEI should be campaigning. This discussion is fed by opinions and ideas from around the world. From these discussions, mostly conducted by e-mail, ideas should arise for specific campaigns.
- This leads to a “policy and work-plan” process in which one or a few members of the network will produce a campaign plan with specified objectives, goals, budget and funding. Part of the process is to create political support for the campaign in the network. The campaign plan can be approved in the Bi-annual General Meeting and become one of the international campaigns in the network.
- Within a campaign, the “coordination” process is done by one or more campaign coordinators, based on priorities and decision made in a work-group of all active members in the campaign. The campaign team basically forms a “sub-community” in the network.

² This work was supported by the Ford Foundation under their “Governance and Civil Society” program.

- The formal accountability is done in a “work-plan and reporting” process in which progress reports are submitted for approval to the Executive Committee and the Bi-annual General Meeting.

In a workshop at one of the Bi-annual General Meetings of the network, participants were asked to further investigate the processes above, to come up with an analysis of the main problems and suggestions for improvements.

The main conclusion was that the best improvements could be made in the processes around the work-plan and reporting once a campaign was established. The general feeling was that increased transparency in the decision-making within a campaign, and, most of all, better accountability of the progress made in activities in the campaign would increase the effectiveness and reduce stress and distrust levels in the network.

Some general communication problems reported were that in between the face-to-face meetings, all of the communication processes are conducted over mailing lists, providing basic interaction opportunities, but suffering from poor support for more effective decision-making. There is no separation of management and content information, leading to obfuscation of the management process, and “e-mail overloads” of participants. Many groups, especially those with fewer resources and less staff, found it nearly impossible to follow the e-mail debates and as a result felt excluded from the decision-making process.

5.3 Applying the Extended SCM

In this section, we apply our extended SCM to the case. We first use the Community Activity Cycle to select the highest priority stage. We then analyze this stage using the SCM, use the results of the analysis for some design recommendations, and present some initial results and observations.

5.3.1. Community Activity Cycle: Identifying the Stage

We first took the output of the workshop and matched it against the elements of our Community Activity Cycle. In terms of “community”, the FoEI network already is well established, with many international activities, as well as an extensive Handbook with general principles about the norms and values of the network. Regular regional and international meetings focusing on various aspects of the network work out the joint agenda, partly laid down in around 10-15 international campaigns where member groups and activists work together.

Within campaigns, the campaigner community is basically set up during the “policy and workplan” phase when interested campaigners try to gain political support in the network, and define the initial focus and objectives of the campaign. This also leads to an initial agenda and planning for the campaign.

The main stage that required improvement was considered to be the Implementation & Aftercare. In this stage, coordination of activities and synergy with the rest of the network, transparency of progress, and accountability with respect to the workplan is needed. This stage was considered to be most problematic by workshop participants, as transparency and accountability were perceived as weak. Having it

organized better was considered a prerequisite for the final Evaluation & Lessons Learned stage to become more useful.

5.3.2. The SCM Model for “Implementation & Aftercare”

We illustrate the basic elements in the “implementation and aftercare” stage in our SCM matrix below. The italicized items were the primary focus in our implementation process, as these turned out to be the problematic ones. Note that we renamed the authoring layer of the original SCM into *production* to make this layer more widely applicable.

Table 2. The SCM for “Implementation & Aftercare”

	Elements	Action	Change
Collaboration	<i>Coordinator, campaigner Work-plan and reports repository</i>	Mediation <i>Conflict resolution Evaluating</i>	
Production	<i>Author, reviewer, auditor work-plan, report, budget</i>	<i>Reporting Reviewing Verification</i>	
Support	Support roles (moderator, <i>technical facilitator</i>) <i>Discussant profiles Discussion summaries</i>	Reminding Moderation	Change notification parameters
Discussion	Interaction roles (discussant, attacker, defender) Discussion elements (posts, replies, labels)	Raising issues Replying Creating a position Position taking	Assign attackers, defenders of position <i>Define discussion rules</i>

At the level of collaboration, evaluation of campaign progress was considered very important. As the work-plans, and reports were not readily available, campaigners developed conflicting opinions with respect to the status and progress of a campaign. This resulted in the tendency to over-define reporting and review procedures, creating a bureaucracy that overwhelmed the campaign coordinator.

At the production layer, there was only little support for the authors and reviewers to discuss the work-plan and reports to be delivered, and to monitor the progress and consensus building in writing these documents.

To support improvements in these processes, it was necessary to improve on the technical facilitator. Also, discussant profiles and summaries were deemed necessary to increase trust levels, transparency and efficiency of collaboration. This should also lead to a better insight in the rules and the roles in the discussions underlying the reports.

5.3.3. Design Recommendations

Taking into account the points of attention identified in the SCM analysis, we focused on three main intranet design recommendations.

- Convergence in the discussions was improved by offering an online discussion environment with features for creating documents to reflect decisions made or consensus reached, and to work on progress reports and work-plans. The role of the author of the reports (filled by the campaign coordinator) needed to be supported better.
- Personal profiles should enhance trust and reputation, to make participants in discussions 'real people', and allow others to see what roles a person plays in the network as a whole or in other campaigns.
- Designated document libraries for the formal documents of campaigns provide a single point of reference to monitor progress and accountability in campaign activities, accessible by all members in the network in a simple and direct way.

The intranet should allow participants to keep a focus on the agenda of upcoming decisions, and to help prepare these decisions. As an online tool, e-mail depends upon each campaigner and member organizing their documents and discussions into folders and deleting e-mails not considered relevant due to the constraints of storage space. The intranet, however, has the tools to streamline and organize this information and make management of a campaign or network entity like the Bi-annual General Meeting more collective and coordinated. With the proposed setup, campaigners are better prepared with the documents that are needed for the meetings and can also easily view pre-discussions in relation to a policy development.

5.4 Results and Observations

The proposed intranet has gradually been taken in use. The full impact of the development process and the available tools are still hard to establish, but some interesting observations can be made (FoEI, 2003).

In the application of our model, we placed most emphasis on the collaboration layer in our social context model. The focus was on the implementation of the campaign coordinator role within a campaign, as the person playing this role is responsible for managing the work-plan and progress reports, as well as the discussions in the campaign.

The web-based discussion tool provided far more support to keep the discussion and documents focused. One of the users, however, remarked that he saw how the work of the coordinator became easier, yet the ease of participation as campaigner and document reviewer had diminished. This mainly relates to aspects of the support layer in our model: the current software no longer offers "notification" of new contributions, and does not point users to such contributions on the intranet. Since this was an inherent (and useful) feature in the old e-mail system, it became also the most requested feature for the new system. We should have used the SCM to more precisely identify such successful communication features of the mailing list system in advance, to make sure there is a similar support in the new system.

Our focus on the upper layers of the SCM resulted in an intranet in terms of the collaboration and production processes in the FoEI network. The tools are tailored to these processes and not presented as generic functionality. As a result, the intranet turns out to address a fundamental challenge facing the FoEI network as well as

other networks in the social and environmental realm: the evaluation of the network in terms of its collaboration and production processes. The network as an entity can now see a model and representation of itself in a “cyber mirror”. This should not be seen as an end in itself, but a means to enhance the network’s understanding of itself.

As a result of this “gaze”, the network refined certain norms, for instance around access by members to specific discussions in the “Executive Committee”. Also, our impression is that the intranet has worked as catalyst for the introduction of new communication processes such as regional discussions, allowing them to be more visible as such within the network. The focus in the SCM model on communication processes and ways to support these, rather than tools and features in isolation, has definitely contributed to this more useful view.

6 Conclusions

In this chapter, we presented our Social Context Model, extended with a Community Activity Cycle. The model is intended to enable an efficient analysis of communication processes in collaborative communities, primarily in the field of policy-making for sustainable development (both intra- and inter-organizational). It should help with the diagnosis and prioritization of communication problems and potential improvements.

We illustrated the application of the model with a brief case analysis. The introduction of a new technology for communication in a network as diverse as Friends of the Earth (FoEI) is a political process, and takes time. Within the FoEI community, members attach different values to the social aspects and to the process aspects of their relations. The now fine-tuned practice of decision-making and accountability is the result of a long history of discussions and experimentation with people, technologies, and procedures. “Just” introducing a new technology in exactly this realm would not have worked, however.

Doing an analysis with the extended Social Context Model, it is possible to “grow” rather than “impose” a technological infrastructure that is embedded in the social context and governance structure of a grassroots organization. Essential, yet hard-to-capture organizational requirements such as trust, effectiveness, outreach, accountability, rewards, and so on can be more easily woven into the socio-technical fabric of the organization with this kind of context analysis.

Of course, this chapter could only show some of the complexity of a full analysis. Furthermore, a single application of the model is not very useful. However, as an index to real-world communication process problems and solutions in their complicated context, the SCM can allow for the acquisition, classification, and navigation of best practices and benchmarks and reference models. More case analysis, resulting in more sophisticated reference models will eventually lead to more widely useful applications.

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