Sense of Community in Web Environments

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1. INTRODUCTION

For decades the fields of social psychology and anthropology have studied communities, and the characteristics of communities are rather well known (e.g. Napier & Gershenfeld, 1993; Carrol & Rosson, 1997). Researchers interested in psychology of the Internet have recently begun to explore whether communities could appear in the Web environment as well (e.g. Valtersson, 1996).

Most of the studies regarding online-communities are either case studies, concentrating on single online-communities like WELL (e.g. Smith, 1994), or on single online-community-related characteristic like awareness (e.g. Dourish & Bly, 1992). Furthermore, these studies have focused on the community, not directly on *sense* of community of individual members. **Sense of community** means the part of one's self-concept that has to do with perceiving oneself belonging and feeling affinity to a certain social grouping. The study of social phenomena in the Web environments is rather fragmentary and there is no coherent theory in this field. The purpose of the present study is to give more understanding to the issue and look for evidence of individuals' sense of community in the Web environment and find out what are the most critical psychological factors that affect the sense of community in the Web environment.

It is not known how much the Internet really connects people, or if it just produces isolation and false sense of connectedness, thus decreasing psychological well being. There is evidence supporting both views. For example, greater use of the Internet is associated with a decline in social involvement and an increase in loneliness and depression (Kraut *et al.*, 1998) whereas a study by Hampton and Wellman (2000) suggests that the Internet strengthens social relations and community involvement.

This study does not directly deal with the effect of the Internet on a person's *real life* social involvement, but it looks for evidence that could confirm that individuals can feel sense of community in a Web environment. If a person feels sense of community, he is socially (although virtually) involved, which is connected to psychological well being (e.g. Cohen & Wills, 1985).

1.1 Defining Community

Most definitions of a community stress out the same aspects. For example, Schichter (1998) defines a community as a social grouping, which has the following properties: shared spatial relations, social conventions, a sense of membership and boundaries, and an ongoing rhythm of social interaction. According to Preece (2000), groups that share important resources, provide social support and show reciprocity can be considered communities.

In terms of social dynamics, there are many similarities in traditional and Web-communities: both involve developing a web of relationships among people who have something meaningful in common e.g. hobby, profession or political cause (Kim, 2000). Although many characteristics of a traditional community also apply to Web-communities, they

probably manifest themselves differently due to the computer-mediated nature of online interactions.

In a Web environment there is a distinction between network communities and community networks. Network communities are born and exist only in the Web, whereas community networks are real life communities that have happened to make themselves Web sites (Carroll & Rosson, 1997). In order to find out, whether individuals can feel a sense of community purely based on online interactions, this study concentrates on network communities.

1.2 Defining Sense of Community

Defining *sense* of community brings out the individual's perspective: how do individual people feel about their social environment, and do they consider it as a community that they are a part of.

Sarason (1976) defines **the psychological sense of community** as a sense of mutual responsibility and purpose – a feeling of being a part of a group one can depend on and contribute to. Sense of community has to do with the affinity of community members; they feel they belong together, are similar with each other and like one another.

Tajfel (1981) defines **social identity** as that part of the individual's self-concept, which derives from his knowledge of his membership in a social group, together with the value and the emotional significance of that membership. Therefore, the concept of social identity is closely related to sense of community. In their social identity theory Tajfel & Turner (1986) suggest that in seeking self-enhancement or positive self-identity, individuals characteristically categorize people so that they favor members of the group to which they themselves feel they belong. Social identity is based on the human capability to perceive something that relates to us in symbols and language (Kaunismaa, 1997). This capability is the same, whether the individual is in a real social environment or in a Web environment.

In this study, the sense of community is understood in line with Sarason, Tajfel and Kaunismaa: sense of community is a part of one's self-concept, that has to do with perceiving oneself as belonging and feeling affinity to a certain social grouping.

It is known that in real life people who share a social identity perceive themselves to be more similar to each other. They are also more likely to co-operate, feel a stronger need to agree with group opinion, perceive in-group messages to be of higher quality and conform more in both behavior and attitude (Nass, Fogg & Moon, 1995).

Social identity can be manipulated with minimal cues (e.g. group members wear similar badges) - at least in real life and in small groups. It is also possible to induce a psychological group formation between a human and a computer (Nass *et al.*, 1995), a fact that emphasizes the ease and flexibility of group identity formation. Even though communities are larger formations than groups, it is still very likely that sense of social identity can be identified in a community of people who interact via the Web.

1.3 Psychological Structure of Sense of Community

Several factors can contribute to sense of community in the Web environments, and they can be extracted from the definitions of sense of community. Some of them can be extracted from the known characteristics of real life communities and the studies of Web-communities. In the lack of any coherent framework of sense of community in the Web environment, it is suggested here that based on the known characteristics of these factors they could be grouped as prerequisites, facilitators and consequences of sense of community as shown in Figure 1. Justifications why each factor has been included to its group are presented in the following chapters.

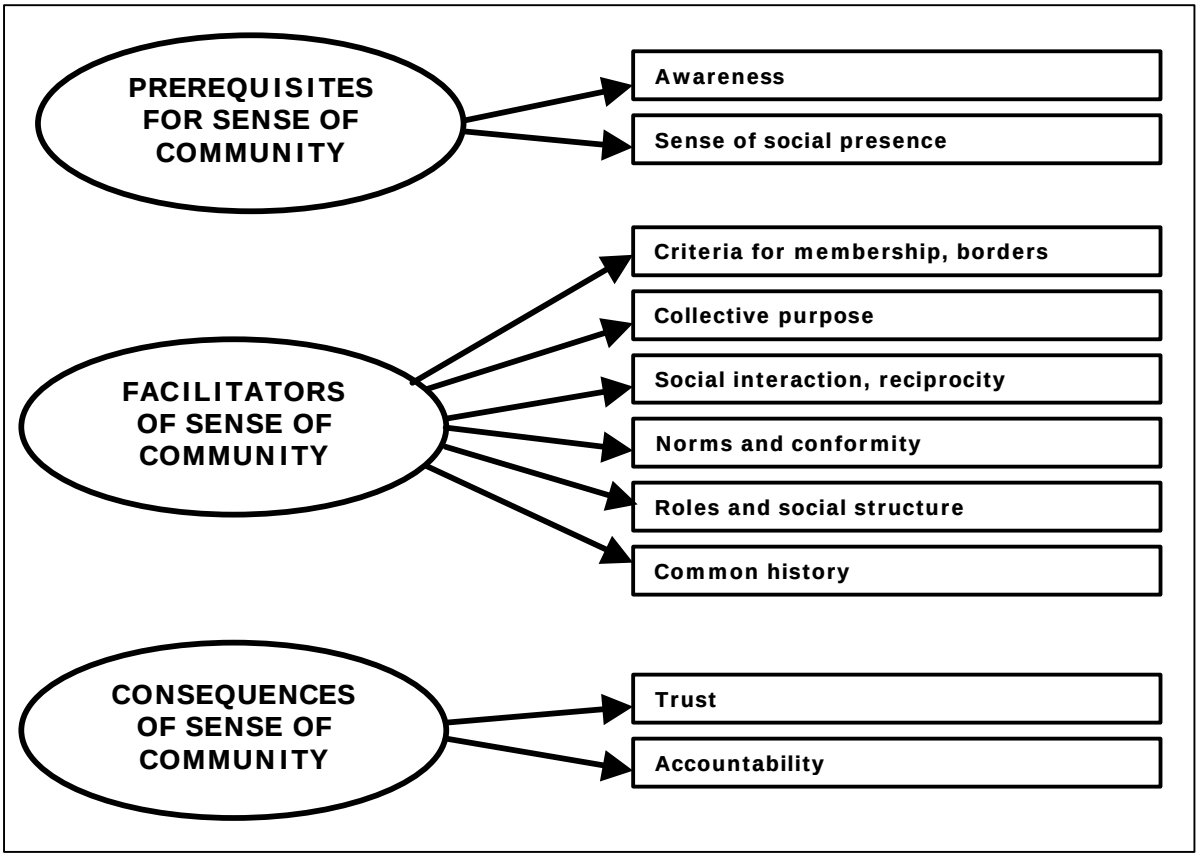

Figure 1. The possible contributing factors of sense of community grouped as prerequisites, facilitators and consequences.

1.3.1 Prerequisites

Due to lack of usual social cues and the transitory nature of the online interactions, there are presumably certain prerequisites for the development of the sense of community in a Web environment. These prerequisites are awareness of others and sense of presence (both self and others) in a Web environment.

1.3.1.1 Awareness

There are many dimensions in awareness, but this study focuses on awareness as an ability to maintain and constantly update a sense of one's social and physical context (Schlichter, 1998). A simple example of awareness is that when on a certain Web site, a person knows that there are also others there at that moment. Greenberg, Gutwin & Cockburn (1996) have specified the concept of **group awareness** that consists of four different kinds of knowledge of what is going on. *Informal awareness* is basic knowledge of who is around in general and where people are located relative to you. *Group-structural awareness* involves knowledge about e.g. roles and responsibilities. *Social awareness* is the information that a person maintains about others in social or conversational context (e.g. are others paying attention). *Workplace awareness* involves knowledge about how the others in the group interact.

Awareness can be thought as a prerequisite for sense of community to develop for at least two reasons. Firstly, perceiving, recognizing, and understanding the activities of others is a basic requirement for adequate human interaction and communication in general (Sohlenkamp, 1998). Secondly, when an individual knows others are there, it brings norms into play to guide behavior (Erickson & Kellogg, 2000).

1.3.1.2 Sense of Social Presence

Closely related to awareness is the **sense of social presence**. Short, Williams and Christie (1976, 65) have defined social presence as "a perceptual or attitudinal dimension of the user, a mental set towards the medium." It is a feeling of being socially present with another person at a remote location. The difference to awareness is that sense of presence also includes the notion of *self* being present at a given location. Media perceived as having a high degree of social presence are judged as being warm, personal, sensitive, sociable and active (Short *et al.*, 1976). Even though *sense* of social presence is important, it has been noted that in order to develop social identity on the Web, actual spatial *co-presence* is not required (Lea & Spears, as cited in Preece 2000).

1.3.2 Facilitators

Awareness of others and sense of social presence are not enough for sense of community to develop. There should also be certain identifiable characteristics of communities, which are likely to facilitate the sense of community. These facilitators include criteria for membership and borders, collective purpose, social interaction and reciprocity, norms and conformity, roles and social structure and common history.

1.3.2.1 Criteria for Membership and Borders

In most groups and communities there are criteria for membership (Carrol & Rosson, 1997). When an individual has met the criteria and has been accepted as a member of the community, he will probably value the membership more and his perception of belonging can develop.

In consequence of the criteria, there are "borders" of community, determined by the knowledge of who belong to the in-group and who to the out-group (Napier & Gershenfeld, 1993). This affects social behavior, emphasizing the affinity to in-group and possible prejudices against out-group (Helkama, Myllyniemi & Liebkind, 1998). From an individual member's point of view, one indicator of the existence of borders is that he communicates differently with other members than non-members (Napier & Gershenfeld, 1993).

1.3.2.2 Collective Purpose

An important facilitator to feelings of affinity is collective purpose (Carrol & Rosson, 1997). The purpose can be for example a common interest, need, value, concern or activity that gives a reason to the community. When members can give common reasons for being in the group, there is a sense of purpose among the members (Napier & Gershenfeld, 1993). The collective purpose also defines the goals of the community. Recognizing the shared purpose helps the individual also feel a sense of identification and unity, and get a better idea of who he is and what he is a part of (Bressler & Grantham, 2000). Naturally individuals have their personal goals as well. The more these goals are in line with those of the community, the stronger sense of collective purpose the individual can feel.

1.3.2.3 Social Interaction and Reciprocity

Social interaction is one of the obvious prerequisites for community to exist in any environment. If there is a collective purpose and shared goals, community members usually work together and interact to reach those goals. Social interaction is also likely to increase after there is sense of community among the members.

In the Web environment most interactions are text-mediated, and hence, face-to-face and online interaction are clearly different. In online interactions there is often a lack of co-presence (being in the same place at the same time), which reduces the non-verbal communication and makes interactions asynchronous. However, online interactions have the advantage of being reviewable and revisable, because the written messages persist (Preece, 2000).

From individual perspective reciprocity of information, support and services is one of the most meaningful characteristics of social interaction. A person who develops a strong social regard and identity with his social system is likely to make return offers for help, although anonymity may tempt to only take and not repay (Preece, 2000). Relatedness, reciprocity and mutual understanding are among important facilitators on achieving sense of community (Bressler & Grantham, 2000).

It is not certain whether or not one's *own* participation is obligatory for the sense of community in Web environments. According to a study by Valtersson (1996) the sense of community is difficult to achieve without one's own participation, whereas a study by Nonnecke & Preece (as cited in Preece, 2000) concluded that it is, in fact, possible to feel a strong sense of community without ever participating. Nonnecke and Preece focused on lurkers in Web-communities (Lurker is a person who does no participate, only observes).

Their interviews of lurkers showed that lurkers can become so immersed in the community's discussions, that they feel they know other participants and that they belong to the community. In line with the view of one's own participation as optional, Bressler & Grantham (2000) emphasize any kind of involvement over active participation. So presumably the more involved the individual feels with the community –whether he participates or not – the more likely he is to feel the sense of community.

1.3.2.4 Norms and Conformity

Communities have norms, implicit or explicit rules and standards, which guide the group and define the range of acceptable behaviors of individual members. Norms regulate the performance of a group as an organized unit, keeping it on course towards its objectives. In real life norms are mostly invisible; they develop by subtle, beyond-awareness processes of inference (Napier & Gershenfeld, 1993). In a Web environment they may have to be more explicitly stated.

If the norms of the group are compatible with an individual's values and goals, the person will conform to the norms of the group (Napier & Gershenfeld, 1993). Conformity can appear in computer-mediated co-operation, although somewhat reduced (Smilowitz *et al.*, as cited in Wallace, 1999). In general, the conforming influence of the group also reduces when the majority is not consistent and unanimous. If, however, group influences such as conformity, can be observed in the Web environments, it indicates that the individual strongly identifies himself as a member of the community (Helkama *et al.*, 1998).

1.3.2.5 Roles and Social Structure

Communities are held together by a network of social roles. A role defines behavior and responsibilities that others expect from the role-holder (Helkama *et al.*, 1998). The social structure of communities becomes evident with the existence of core and periphery, subgroups and leadership (Carrol & Rosson, 1997). On individual level, recognizing one's own place in a community's social structure may facilitate the forming of sense of community, assuming that the place is agreeable.

Real life statuses can often be equalized in online environment, and communication skills and quality of ideas may determine one's influence on others (Suler, 1998). A participant in a Web community can credit and bolster his standing by contributing to the group.

Closely related to roles is the concept of membership lifecycle, which consists of five roles. Before joining the community, a person is a *visitor*. He does not have a persistent identity in the community, and he probably seeks more information about the community in order to decide whether to join or not. Once the person has joined, he becomes a *novice*, a new member who needs to be introduced to the community life. After a while the member becomes a *regular member*, an established member that is accustomed to participating in the community life. When the member becomes experienced, he may be promoted to a *leader*, who helps keeping the community running. Finally, the member becomes an *elder* who shares his knowledge, passes along the community traditions and values, and acts as an

advisor (Kim, 2000). It can be assumed that the further the individual is on the membership lifecycle, the stronger sense of community he feels.

On the Web, the time it takes to advance in a membership lifecycle is condensed. Although interaction is often asynchronous and stretches over time, the temporal life in the Web proceeds fast. Internet environments change rapidly, and so do memberships of online groups. A person's subjective sense of time is intimately linked with the rate of change in the world one lives in. In the online environment, the experience of time seems to accelerate, and people can proceed from novice to elder in a relatively short time (Suler, 1998).

1.3.2.6 Common History

A community usually has a shared history, which gives the members a feeling of belonging together. The historical ties that bind the members consist of defining episodes, which are occasions when something memorable or important has happened in the life of the community (Carrol & Rosson, 1997). The more aware an individual member is of his community's history, the more likely is a shared identity amongst the members, and the more likely it is for a member to feel that he belongs to the community.

1.3.3 Consequences

Trust and accountability are among the possible consequences of feeling the sense of community in a Web environment.

1.3.3.1 Trust

In the community context trust is the expectation of the members that arises within a regular, honest, and cooperative behavior, based on commonly shared norms (Fukuyama, as cited in Preece, 2000). In online environment trust indicates a positive belief about the perceived reliability, dependability, and confidence in a person, object or process (Fogg & Tseng, 1999). Community structure and norms contribute to members' feelings of security, stability, and trust. Thus, if an individual member expresses trust in other members, it may be a consequence of a sense of community in a Web environment.

1.3.3.2 Accountability

Accountability means a person's willingness to accept responsibility for his actions, and as a consequence, being trustworthy. In a Web environment where a person is aware of others being present and knows there are certain social rules to follow, he is likely to be more accountable than without these influences (Erickson & Kellogg, 2000). Therefore, also accountability can be considered as a possible consequence of sense of community in a Web environment.

1.4 The Aims of the Study

The main purpose of the present study was to look for evidence of individuals' sense of community in a Web environment. Previous studies of real-life communities and occasional studies of Web-communities have indicated that there are factors that are likely to be important in sense of community in Web environment (e.g. Carrol & Rosson, 1997). The specific questions that the present study aimed to answer were:

1. What are the most critical psychological factors that affect the sense of community in a Web environment?
2. Can the factors be grouped as prerequisites, facilitators and consequences of sense of community, as suggested in the introduction?
3. Are there some background variables that affect the sense of community in a Web environment?

2. METHODS

2.1 Materials

An online questionnaire consisting of three parts was used (Appendix 1). First there were questions on respondents' background information, second there were propositions regarding possible factors of sense of community, and third there was one open question. The questionnaire was in Finnish.

The eight questions about the respondents' background information included gender and age, Internet usage experience and the duration of community membership. Also there were the member's estimate of his own activity in the community indicated by the frequency of reading and writing messages, and the member's estimate of his own place in the membership lifecycle: visitor, novice, regular, expert and leader. (These were otherwise the same as Kim's (2000) roles, except the original leader and elder were replaced with expert and leader.)

There were 50 propositions, to which the user was asked to express his degree of agreement on a seven-point scale. The propositions were composed so that they reflected different aspects that precede, facilitate or follow the sense of community. Translated examples of each kind of proposition can be seen below:

- I usually know when there are others present in the site (prerequisite / awareness)
- People here usually follow the rules of the site (facilitator / norms and conformity)
- My words won't be misused here (consequence / trust)

Finally there was an open question: "Tell in your own words why you use the given site and its discussion groups, and what you feel you get from it."

The questionnaires were otherwise similar for each community, except that each community was referred to with its own name. For example the questionnaire for Njet's members referred to that community by the name Njet. In this way the propositions were clearer, and it was easy to classify the answers by community.

The questionnaire was composed specifically for this study, based on possible factors of sense of community, which were presented in the introduction. This was because this kind of study has not been conducted before, so there were no ready-made questionnaires to use.

2.2 Participants

2.2.1 Studied Web-communities

Three Web-communities took part in the study. They all had characteristics that made them suitable for this study, and were selected on the following basis:

1. They all had to be network communities, i.e. the community existed only in the Web, or at least was initially developed online.
2. The Web sites had to have similar tools for members to interact, preferentially the kind tightly located within the site, so that it would also offer a sense of place. All selected sites had asynchronous discussion forums. (See Appendix 2 to see screenshots of each site's discussion page)
3. They all had to have about the same amount of members and activity.
4. The purposes or at least the types of communities had to be similar. The selected communities were all communities of interest.

The background information for each site is listed in Table 1.

Table 1. The background information for each site.

Web-community	**Kärkiverkosto http://karkiverkosto.sitra.fi**	**Verkkoklinikka www.verkkoklinikka.fi**	**Njet www.njet.net**
Description	Service that collects and mediates information about the Finnish information society and its development.	Medical portal that provides information and guidance on physical and mental health.	A portal dedicated to culture. Based on voluntary content creation.
Type	Community of interest	Community of interest	Community of interest
Members (approx.)	4000 registered users, about 200 of them participate in discussions	11 000 registered users, exact number of active participants of discussions unknown. (Possibly less than 100)	600 registered users, exact number of active participants unknown (Possibly 100-200)
Age	2.5 years	5-6 years	2 years
Critical tools	Discussion groups	Discussion groups, Who's online-service	Discussion groups, Who's online -service
Examples of discussion topics	Modern times, locality, navigation, content creation, distant work.	Adoption, dieting, childcare, depression, studying, relationships, exercising, smoking.	Philosophy & science, graphical heaven, books and theatre, music, feelings, free time.

2.2.2 Respondents

A total number of 162 persons filled the questionnaire. 49 of them were Kärkiverkosto members, 65 were Verkkoklinikka members and the rest 48 from Njet. 67.3% of

respondents were women. The majority of the respondents (64.2%) were between ages 20 and 39. Most respondents (65.4%) had over four years of experience in using the Internet, and almost everyone's usage was versatile. Most respondents (64.6%) had been members of their Web-community from six months to two years.

The respondents represented all the phases in membership lifecycle as seen in Figure 2. The largest group considered themselves experts.

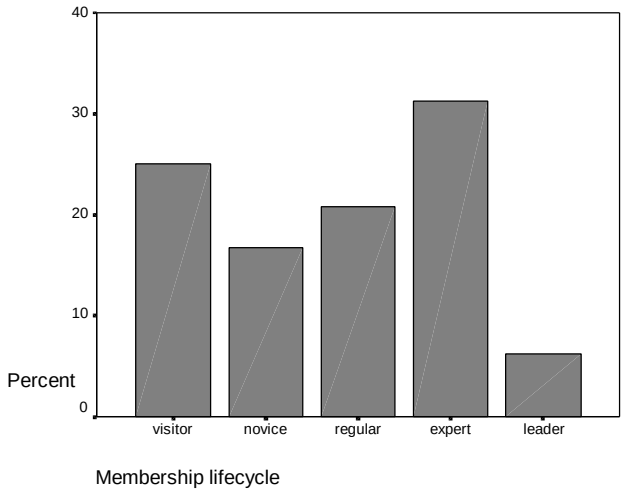

Figure 2. Distribution of respondents self-evaluated phase in membership lifecycle.

The respondents included both active participants of discussions that read and wrote messages daily and more passive participants who never wrote messages and read them seldom. The more active the participants were, the further they thought themselves as being in the membership lifecycle. Figure 3 shows the distribution of activity of reading and writing messages in different phases of the membership lifecycle.

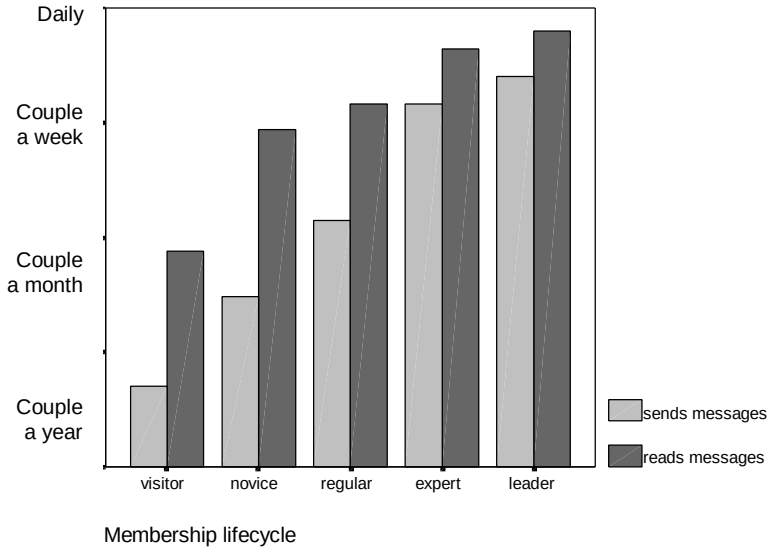

Figure 3. The distribution of activity of reading and writing messages in different phases of membership lifecycle.

2.3 Procedure

2.3.1 The Pilot

After the questionnaire was constructed, it was tested in order to validate it and identify the most suitable propositions to be included in the final questionnaire. The test respondents (n=18) were instructed to think themselves as users of some Web site and its discussion forum. The test respondents were mainly psychology and cognition science students from University of Helsinki.

The pilot responses were analyzed with a simple correlation. Those items that did not correlate at all even though they were assumed to measure the same construct and therefore correlate, were taken into further evaluation. The answers to uncorrelated pairs were counted, and if one of the propositions had received significantly more "I don't know" – answers, it was removed. Also, a one-way analysis of variance was calculated to see whether answers differed in different phases of the membership lifecycle. If one of the variables in an uncorrelated pair was further away from being significant, it was removed. As a result the original 60 propositions were reduced to 50.

2.3.2 The Study

The gathering of data was conducted entirely online. The validated questionnaires were placed on the Web, and links to them were added to the communities' home pages, together with a prompt text encouraging members to participate. This way all members from each community had access to the questionnaire from their own community homepage. Members had approximately three weeks to fill in the questionnaire, and they were able to fill in it when ever and where ever it was suitable for them.

This procedure was chosen even though it does not necessarily result in a random or representative group of the general population, nor is the situation truly controllable. However, the Web-questionnaire was the most suitable method for studying people in Web-communities, especially because the members of the communities had access to the questionnaire directly from their own Web page. Measuring via Internet also has the advantage of resulting in high response rate, and yielding quantitative data within a short period of time.

2.4 Measures

The data gained from the propositions were analyzed with factor analysis in order to find out how the variables would load on factors, and to see if there were factors that could be identified as characteristics of sense of community. Factor analysis was chosen for the statistical method because it is suitable for analyzing the correlation of factors that cannot be identified directly and to detect the structure in the relationships between variables. The data were statistically analysed with SPSS 8.0. A correlation matrix was composed out of

the variables, the factor pattern matrix was calculated, the scales were formed and reliabilities were calculated for both of them.

In order to see how the open answers supported the data gained from propositions, the answers were counted and grouped in two ways. To see what kind of answers there were, similar answers were grouped together and the groups were titled. To see how the answers might support the factors found in the factor analysis, the answers were grouped according to which factor they supported, if any.

To find out, whether some of the variables could be considered as prerequisites, some as facilitators and some as consequences of sense of community, the respondents' scores in the different propositions were taken into further evaluation. The scores in awareness- and social presence –propositions were summed and then grouped to four groups according to the amount of scores so that group 1 had the lowest scores and group 4 the highest. The distribution of groups in different phases of the membership lifecycle was then examined with analyses of variance and error bars. The same was done for scores in trust and accountability –proposals and for scores in facilitator-proposals.

In order to find out how different background variables might be connected to respondents' scores in the four factors, the scores in these factors were calculated for each respondent. The scores were then grouped to four groups according the amount of scores so that group 1 had the lowest scores and group 4 the highest. A one-way analysis of variance was then calculated to see whether the respondents who scored low would differ from those who scored high, and in *which* background variables. In order to see *how* the groups differed their mean scores and standard deviations were graphically examined.

4. RESULTS

3.1 The Critical Factors

The factor analysis used to explore the critical factors in sense of community was Maximum likelihood –analysis and the initial factor solution was rotated with Varimax-rotation. The rotated factor pattern matrix revealed four factors, which can be seen in Table 2.

Table 2. Factor pattern matrix that shows the four critical factors indicating the sense of community in Web environment. The P-numbers are the unique identifiers of the propositions. In parentheses are the assumed variables the propositions reflect.

Characteristics	F1: Reciprocal involvement	F2: Basic trust for others	F3: Similarity, common purpose	F4: Shared history
P45: Others seeking guidance (Trust)	**,77**	-.03	.16	-.10
P55: People willing to participate (Social interaction, reciprocity)	**,73**	.28	.07	-.07
P14: Others correcting inappropriateness (Norms, conformity)	**.65**	.14	.18	.10
P18: Self revealing personal issues (Trust)	**.62**	.02	.15	.17
P34: Sociable environment (Awareness, social presence)	**.62**	.37	.28	.18
P1: Others as reason for visiting the site (Social interaction, reciprocity)	**.61**	.31	.00	.05
P26: Active environment (Awareness, social presence)	**.60**	.27	.30	.02
P33: Self seeking guidance (Trust)	**.57**	.09	**.42**	-.03
P9: Knowledge of others being present (Awareness, social presence)	**.52**	.09	-.07	.31
P59: Existence of long-time participants (Social interaction, reciprocity)	**.51**	.28	.27	.18
P25: Existence of subgroups (Social structure, roles)	**.44**	-.08	.16	.17
P46: Others lie (Trust)	**.43**	-.39	.02	-.14
P49: Self said something not sayable in real life (Accountability)	**.41**	.03	.22	-.01
P35: Being oneself (Trust)	**.40**	.35	.15	.10
P8: Experienced guide newcomers (Membership lifecycle)	**.40**	-.17	.20	.14
P28: Existence of core and periphery (Social structure, roles)	.33	.12	.19	.27
P29: Expect others to be fair (Trust)	-.02	**.76**	-.03	-.02
P51: People follow the rules (Norms, conformity)	.19	**.63**	.06	.01
P42: Warm environment (Awareness, social presence)	.45	**.56**	.31	.09
P3: Existence of rules (Norms, conformity)	.17	**.55**	.06	.04
P2: Others wont misuse one's own words (Trust)	-.06	**.53**	.01	-.23
P56: One's own privacy is protected (Trust)	-.06	**.53**	.09	-.01
P53: Self not committed participant (Social interaction, reciprocity)	-.25	**-.47**	-.30	-.30
P23: Others not seem real (Awareness, social presence)	-.10	**-.42**	-.10	-.19
P21: Difficult to get accepted (Borders, criteria for membership)	-.10	**-.42**	.00	-.15
P31: Respect for others (Social interaction, reciprocity)	.10	**.42**	.15	-.10
P10: Membership is important (Social interaction, reciprocity)	.30	**.41**	.39	.37
P6: Accountable for own words (Accountability)	.04	**.39**	-.01	.24
P20: Self trying not to annoy others (Norms, conformity)	.06	.26	.24	-.02
P27: Not caring what others think (Norms, conformity)	-.01	-.25	-.13	-.03
P40: Not being able to get know anyone (Awareness, social presence)	-.16	-.17	-.10	-.15
P60: Shared goals (Common purpose)	.05	-.01	**.69**	-.03
P41: Existence of the purpose (Common purpose)	.13	.14	**.62**	.02
P52: Knowledge of the purpose (Common purpose)	.22	.07	**.56**	.05
P30: Shared language (Norms, conformity)	.28	.09	**.55**	.13
P38: Agree with others (Norms, conformity)	.12	.44	**.52**	.13
P13: Similar values (Common purpose)	.14	.39	**.51**	.18
P48: Membership as advantage (Social interaction, reciprocity)	.36	.42	**.48**	.22
P4: Similar interests (Common purpose)	.24	.38	**.47**	.01
P17: Not having much in common with others (Common purpose)	-.23	-.29	**-.39**	-.13
P32: Shared language (Borders, criteria for membership)	.17	-.14	.31	.03
P24: Self committed to reciprocity (Social interaction, reciprocity)	.07	.27	.27	.05
P57: Knowledge of founders (Common history)	-.16	-.01	-.15	**.83**
P19: Knowledge of founding (Common history)	-.12	-.02	.04	**.79**
P5: Knowledge of background (Common history)	.15	.03	.09	**.68**
P36: Impression of number of participants (Awareness, social presence)	.27	.14	.03	**.51**
P15: Getting to know others (Social interaction, reciprocity)	.42	.10	.06	**.47**
P47: Recognizing own role (Social structure, roles)	.06	-.11	.05	**.39**
P58: Others affecting one's opinion (Norms, conformity)	.07	.19	.19	.37
P43: Existence of leaders (Social structure, roles)	.06	.07	.04	.27

The variables that loaded strongly on the first factor emphasized the existence and the respondent's awareness of other members' activity and willingness to participate specifically in reciprocal manner, but also the respondent's own willingness to be involved. Hence, the first factor was named as **reciprocal involvement**. The variables that loaded strongly on the second factor accentuated the existence of norms and the impression that members follow them. They also emphasized the respondent's trust for others and that his words and privacy would be protected. Hence, the second factor was named as **basic trust for others**. The variables that loaded strongly on the third factor stressed out the existence and knowledge of shared purpose, and that the members had shared goals, language, values

and interests. Also conformity was apparent in the variables. Based on these, the third factor was named as **similarity and common purpose**. The variables that loaded strongly on the fourth factor highlighted the knowledge of shared background, the founding and founders of the community. The factor was named as **shared history**.

The reliabilities of factor scales and the standard errors of measurement are presented in Table 3. The reliabilities that indicate the precision of the measurement were counted with the assumption that the errors do not correlate. The standard error of measurement indicates the average error of measurement made when using the scale. Reciprocal involvement -scale had the best reliability, but all reliabilities were noticeably high.

Table 3. The reliabilities of factor scales and the standard errors of measurement (SEM).

	F1 Reciprocal involvement	**F2 Trust for others**	**F3 Similarity, common purpose**	**F4 Shared history**
Reliability	.886	.873	.812	.819
SEM	.290	.263	.360	.383

The respondents' most frequently occurring answers to the open question are summarized in Table 4. The question asked respondents to tell in their own words why they use the given site and its discussion groups, and what they feel they are getting from it. The results of grouping the same answers according to which factor they supported are shown in Table 5. Only part of the answers could be seen as reflecting the factors, so the sum of answers in the two tables is not the same. The answers supported especially the importance of reciprocal involvement and similarity of members. Two respondents even mentioned directly sense of community as their reason for participating.

Table 4. Respondents' reasons for using the site. N means the number of references.

Reason for using / participating the Web-community	**N**
"Peer support", reciprocity	51
Gaining information and tips	38
Having company, acquaintances and friends	29
Keeping up to date	18
Consuming time, just having fun	17
Testing own ideas, a way to affect others	16
Some subjects are easier to discuss via Web	11
Listening to others' opinions and gaining new point of views	10
Good atmosphere	9
Curiosity towards others' lives	8
Feeling of affinity	7
Expatriate Finns' contact to Finland	3

Table 5. The number of answers that reflected different factors

Factor	**N**
F1: Reciprocal involvement	71
F2: Basic trust for others	10
F3: Similarity, common purpose	30
F4: Shared history	6

3.2 The Prerequisites, Facilitators and Consequences

It can be assumed that if awareness and social presence are prerequisites of sense of community, then the Web-community members who are in the beginning of the membership lifecycle should stress out these variables as much as the members in the other end of the lifecycle. This, however, was not the case. The respondents' scores to awareness- and social presence –propositions in different phases of membership life cycle differed ($F(4, 156)=16.23$, $p<0.001$) so that the awareness- and social presence -scores grew as the member proceeded in the membership lifecycle (see Figure 4).

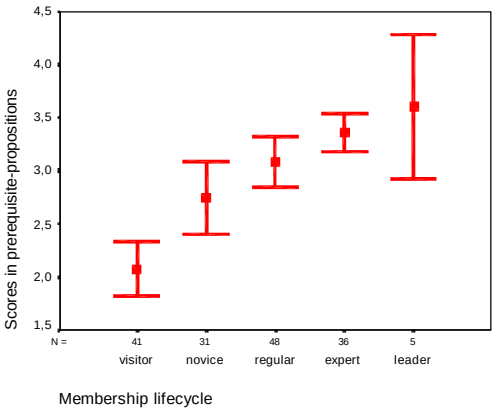

Figure 4. The mean scores and their standard deviations in awareness and social presence –propositions in different phases of the membership lifecycle. The numbers in y-scale indicate the score-classes, where 1 means "lowest scores" and 4 "highest scores". The numbers in x-scale indicate the number of members in a given phase in the membership lifecycle. The confidence interval for mean is 95%.

It can also be assumed, that if trust and accountability are consequences of sense of community, then the members who are further in the membership lifecycle might stress them out more than visitors and novices. This was the case with trust and accountability -scores, which differed in different phases of the membership lifecycle ($F(4,157)=6.41$, $p<0.001$). As shown in Figure 5, the further the member was in the membership lifecycle, the higher he scored. Then again, that would be the case in any facilitator if the sense of community strengthens as the membership lifecycle proceeds.

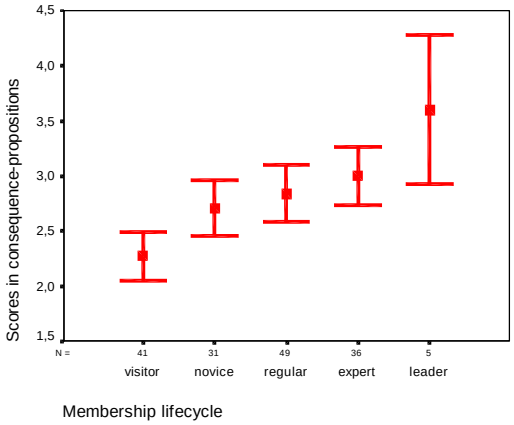

Figure 5. The mean scores and their standard deviations in trust and accountability –propositions in different phases of the membership lifecycle. The confidence interval for mean is 95%.

For comparison, the scores in facilitator-propositions were examined, and they too differed in different phases in the membership lifecycle, as expected ($F(4, 155)=17.13$, $p<0.001$) (Figure 6).

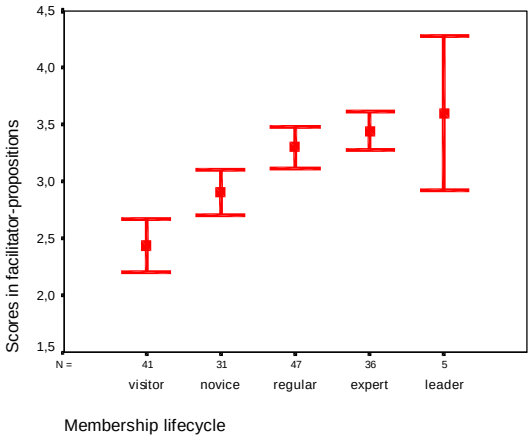

Figure 6. The mean scores and their standard deviations in facilitator –propositions in different phases of the membership lifecycle. The confidence interval for mean is 95%.

The major finding was that the variables could not be strictly grouped as temporal prerequisites, facilitators and consequences of sense of community. All the variables do facilitate the sense of community, but based on this data it cannot be argued that some of the variables precede the sense of community and some follow it.

3.3 The Effects of the Background Variables

Four one-way analyses of variance revealed that some of the background variables also influenced the responses. Table 6 shows the results.

Table 6. Four one-way analyses of variance of scores in different factors and the respondents' background variables.

Background variables	**Scores in F1 (reciprocal involvement)**			**Scores in F2 (basic trust for others)**			**Scores in F3 (similarity, common purpose)**			**Scores in F4 (shared history)**		
	df	F	p	df	F	p	df	F	p	df	F	p
Web-community	3, 155	18.17	.000	3, 155	3.20	.025	3, 155	3.95	.010	3, 155	5.45	.001
Gender	3, 155	5.10	.002	3, 155	2.12	ns	3, 155	6.02	.001	3, 155	1.79	ns.
Age	3, 155	8.06	.000	3, 155	6.66	.000	3, 155	9.54	.000	3, 155	3.28	.023
Web experience (in years)	3, 155	1.18	ns.	3, 155	0.64	ns.	3, 155	1.84	ns.	3, 155	1.54	ns.
Membership duration	3, 154	3.49	.017	3, 154	0.75	ns.	3, 154	2.02	ns.	3, 154	10.21	.000
Sending messages	3, 155	48.89	.000	3, 155	19.23	.000	3, 155	18.30	.000	3, 155	22.53	.000
Reading messages	3, 154	49.83	.000	3, 154	24.79	.000	3, 154	26.28	.000	3, 154	26.09	.000
Phase in membership lifecycle	3, 155	20.42	.000	3, 155	16.67	.000	3, 155	14.24	.000	3, 155	33.67	.000

$p<0.01$, $p<0.001$

Below the results are described in more detail based on examination of graphical presentations (error bars, see Appendix 3) of statistically significant differences.

F1: Reciprocal involvement. The members in Verkkoklinikka and Njet stressed out reciprocal involvement more than members in Kärkiverkosto ($F(3,155)=18.17$, $p<0.001$). Women emphasized reciprocal involvement more than men ($F\ 3,155)=5.10$, $p<0.01$). The younger respondents recognized reciprocal involvement more around them and in themselves than the older respondents ($F(3,155)=8.06$, $p<0.001$). The more respondents themselves sent messages, the more they considered the members and themselves to be reciprocally involved $F(3, 155)=48.89$, $p<0.001$). The same applied to reading messages $F(3, 154)=49.83$, $p<0.001$). Reciprocal involvement also grow as the member proceeded in the membership lifecycle ($F(3, 155)=20.42$, $p<0.001$).

F2: Basic trust for others. The younger respondents emphasized trust more that the older respondents ($F(3, 155)=6.66$, $p<0.001$). The more respondents sent messages, the more they emphasized trust for others' fairness ($F(3, 155)=19.23$, $p<0.001$). The same applied to reading messages ($F(3, 154)=24.79$, $p<0.001$). Trust also grow as the member proceeded in the membership lifecycle ($F(3, 155)=16.67$, $p<0.001$).

F3: Similarity, common purpose. Women emphasized similarity more than men did ($F(3, 155)=6.02$, $p<0.01$). The more respondents sent messages ($F(3, 155)=18.30$, $p<0.001$) and read messages ($F(3, 154)=26.82$, $p<0.001$), the more the similarity was emphasized. Visitors emphasized similarity less than all the others ($F(3, 155)=14.24$, $p<0.01$), who emphasized it about the same amount.

F4: Shared history. The members in Njet stressed out reciprocal involvement more than members in Kärkiverkosto and Verkkoklinikka ($F(3,155)=5.45$, $p<0.01$). The longer the respondents had been members, the more the shared history was emphasized ($F(3, 154)=10.21$, $p<0.001$). The more respondents sent messages ($F(3, 155)=22.53$, $p<0.001$) and read messages ($F(3, 154)=26.09$, $p<0.001$), the more the shared history was emphasized. The further the members were on the membership lifecycle, the more the shared history was emphasized ($F(3, 155)=33.67$, $p<0.001$).

4. DISCUSSION

There are many assumptions and descriptions of sense of community in a Web environment. The present study was one of the first ones proving documented results based on reasonably large body of data. The results showed that psychological structure of sense of community in a Web environment could not be presented with critical variables grouped as prerequisites, facilitators and consequences as suggested in the introduction. However, the data revealed another interesting pattern: the four critical factors in sense of community in a Web environment based on this data were identified to be 1) reciprocal involvement, 2) basic trust for others, 3) common purpose and similarity of members, and 4) shared history. Many of the respondents' background variables supported this structure, and gave further ideas of the dynamics of the development of sense of community. The composition of the four factors is shown in Figure 7, and discussed in more details in the following chapters.

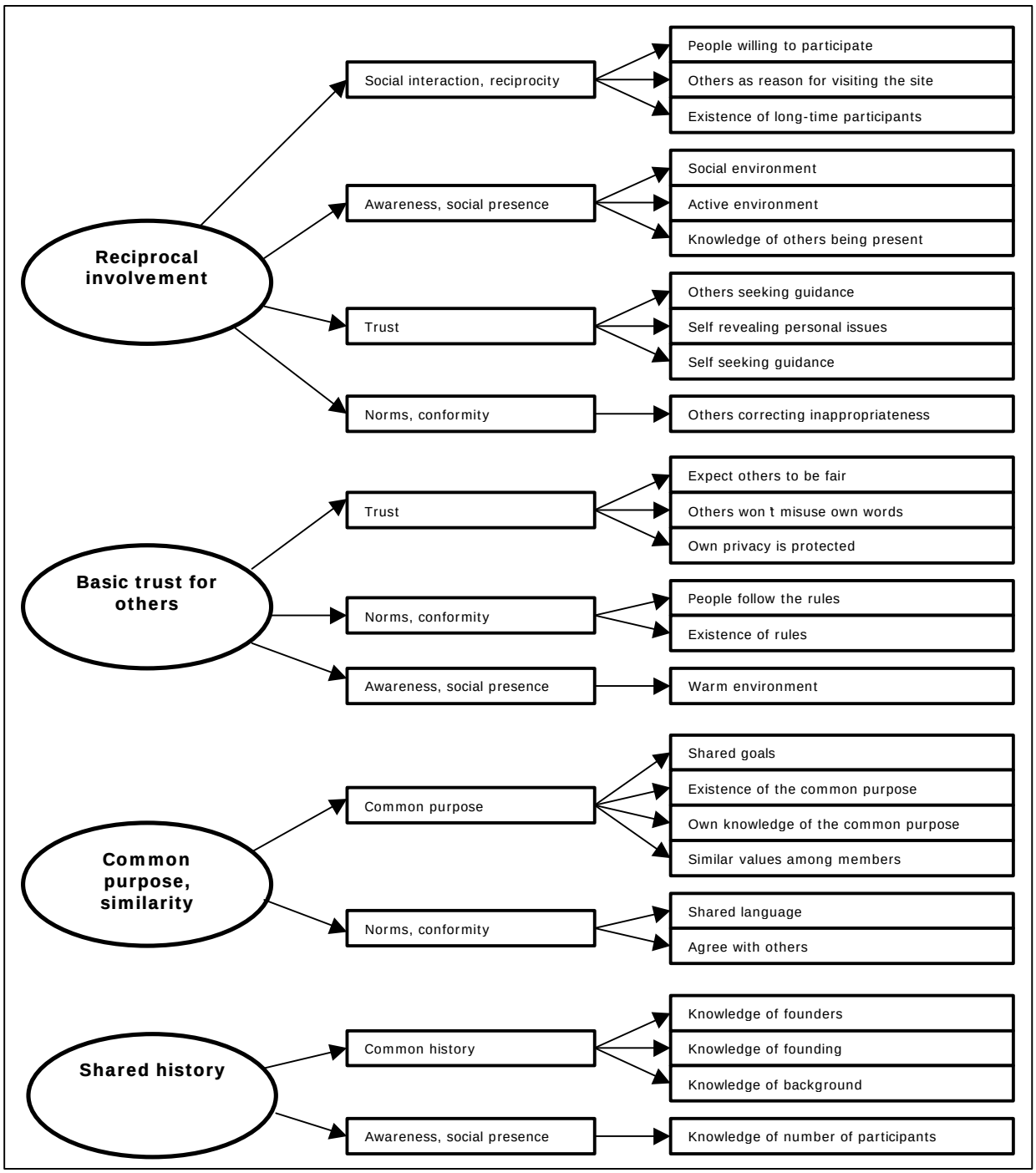

Figure 7. The four critical factors of sense of community, and the variables that compose them.

4.1 Reciprocal Involvement

The variables that loaded strongly on the reciprocal involvement -factor emphasized both respondents' perception of other members' participation and the respondents' own involvement. Three variables indicated social interaction: the existence of long time members, the members' willingness to participate, and the respondent's notion of others as his reason for visiting the site. Three variables indicated awareness and social presence. The environment was perceived as sociable and active, which are known signs of social presence

(Short *et al.*, 1976). The third indicator of awareness was knowledge of others being present, but considering the importance of reciprocal involvement, it may be that it is not just about awareness of others *being* there, as it is about others *doing* something there. Three variables in this factor indicated trust: the respondent was trustful enough to reveal personal issues and seek guidance from others, who did the same. One variable indicated the existence of norms in a sense that there were clear boundaries for appropriate behavior.

The frequency of sending and reading messages was connected to how high participants reached in factor scores in reciprocal involvement. Probably it is a two-way influence: on the one hand, seeing others being involved encourages the individual to get involved himself, and on the other hand, one's own involvement makes one perceive the environment more active.

Another noticeable background variable influence was that members of one of the Web-communities (Kärkiverkosto) found the reciprocal involvement less important than the other two. One reason for this can be the fact that in the other two sites the discussion forums were a more central part of the sites' purpose than in the third one. Also, the Kärkiverkosto was the only one missing the "Who's online" –feature that shows the names of the users currently logged in to the site. The younger respondents seemed to emphasize reciprocal involvement more than the older ones. This may be because younger have greater need to be in social interaction than the older. Also, the older respondents were less trustful, which partly explains why they were not that keen to be reciprocally involved.

Concepts related to reciprocal involvement have been mentioned in the descriptions of real life sense of community, e.g. Sarason (1976) mentioned mutual responsibility as a part of sense of community, and Nass *et al.* (1995) mentioned the co-operative nature of people who have shared social identity. One explanation why *reciprocal* involvement is an important part of sense of community in a potentially low-trust online environment can be that when a person provides information and support for others on the Web, he expresses his identity, especially his expertise or supportive nature. While he is helping others, he is also increasing his self-esteem and respect from others, thus sustaining his online status (Constant, Sproull and Kiesler, 1996). This explanation is also in line with the idea of sense of community being part of one's self-concept (Tajfel, 1981). Reciprocal involvement is a strong sign of sense of community, because a person who develops a strong social regard and identity with his social system is likely to make return offers for help (Preece, 2000).

4.2 Basic trust for others

The variables that loaded strongly on basic trust -factor emphasized especially trust and norms. The variables indicating trust referred to basic trust that a person can be safe where he is and that others will not harm him. Others are expected to be fair and a person feels that his own privacy is protected. The variables indicating norms and conformity stressed out that the existence and following the rules increase trust. This factor had also one social presence – indicator, the fact that respondents found the environment to be warm.

Young people were more trusting than older people. This may be because those with more life experience have more realistic views of life, and are a bit more cautious than younger people. High frequency of both sending and reading messages were connected to trust, but the

influence was not as strong as with reciprocal involvement. However, it seems that the more a person has witnessed trustworthiness around him, the more encouraged he is to participate. And the more he participates, the more experiences of trustworthiness he gets. The fact that trust did not rise with membership duration or membership lifecycle supports that trust cannot be taken as a pure consequence of sense of community.

Trust is often mentioned when characteristics of communities are discussed, but it is especially important in Web-communities because of the low levels of social presence, possible anonymity and the easiness of leaving the community (Preece, 2000). One reason that makes trust part of *sense* of community may be that people who feel social identity perceive in-group messages to be of higher quality (Nass *et al.*, 1995). Higher quality can mean e.g. wiser or funnier messages, but one indication of higher quality can also be that the messages –and the messengers- can be trusted. Even though Web-community members may be heterogeneous in their social characteristics, their homogenous interests may foster high levels of empathetic understanding between members (Wellman & Gulia, 1996). The same reason may explain high levels of trust between members. Without the basic trust that others will not harm you, the reciprocal nature of involvement could also be more difficult.

4.3 Similarity and Common Purpose

The variables that loaded strongly on the third factor stressed out that the respondents perceived the members as having much in common. The variables that indicated common purpose pointed out that a common purpose existed and that the respondent knew what it was. There were also many other aspects that members had in common, e.g. goals, language, values and interests. Two variables indicated norms and conformity, accentuating shared language and that the respondents often agreed with other members. Since all the Web-communities included in the present study were communities of interest, it was expected that the members would find themselves as having many shared characteristics.

Women members found themselves more similar to their fellow community members than men did. In the present data the explanation to this may be that the majority of female respondents were from Verkkoklinikka, where *all* members had many things in common, and the shared purpose was very obvious to them. Also in this factor the high frequency of sending and reading messages was connected with higher emphasis of similarity. Here too it is a two-way connection: finding others to be similar lowers the threshold to participate, and the more one participates, the more experiences of others' similarity he gets. Visitors did not notice similarity that much, but for everyone else from novice to leader it was equally clear.

The similarity and common purpose of members is most often mentioned in both descriptions of community and sense of community. For example, Sarason (1976) mentioned sense of mutual purpose as a part of sense of community, and Nass *et al.* (1995) noted that people, who have shared social identity, perceive themselves to be similar with each other. Similarity and common purpose are also strong signs of sense of community, because a member, who recognises them, probably feels a sense of identification and unity, and gets a better idea of who he is and what he is a part of (Bressler & Grantham, 2000). The fact that an individual is willing to adapt and conform to the community norms emphasizes the effect of sense of community in an individual member. The more strongly he

identifies himself as a member of the community the more he conforms (Helkama *et al.*, 1996).

4.4 Shared History

The variables that loaded strongly on the shared history -factor highlighted the respondents' knowledge of shared background, the founding and founders of the community. Also one awareness indicator, the knowledge of the number of participants, was included in this factor.

The longer the respondents had been members and the further they were on the membership lifecycle, the more knowledge of the shared history they had, which is very understandable. High frequencies of sending and reading messages were also connected to knowledge about shared history, possibly because the more a person participates, the more he shares information with other members, e.g. the information about the common background. Also, those who have been members for a long time, are also the ones who have participated contributing the development of the Web-community, so shared history is emphasized more.

Shared history with others is yet another aspect that members have in common, that makes them more similar with each other, and facilitates the feeling that they belong together. History also creates a sense of continuity and stability, which in turn can increase trust. Although shared history as one of the factors of sense of community is understandable, it seems it has not really been mentioned in other researchers' descriptions of *sense* of community. However, as a characteristic of community itself shared history is often mentioned (e.g. Carrol & Rosson, 1997).

4.5 Improvements and Future Research Issues

This study has offered data about sense of community in a Web environment, but it has some problematic aspects that must be considered as well. As in any study using a questionnaire, it reveals only the aspects it asks and the way respondents have wanted to answer them. Furthermore the current questionnaire was constructed for this study and validated only with a small number of respondents, so there is the danger of respondents interpreting the questions divergently. Then again the noticeably high reliabilities of all the factors indicate that the questionnaire was valid enough.

Online environment for the questionnaire can be problematic, too. People who participate are self-selected and by no means random or representative of the general population. However, the "general population" in this study was the members of Web-communities, so the respondents did represent the members of *involved* Web-communities fairly well, in a sense that there were respondents from each phase of the membership lifecycle. The online environment is also uncontrolled: the researcher cannot see if the respondent lies or answers many times or otherwise afflicts the study. However, in the present study, the fact that the questionnaire included an up-front disclosure of all the aspects of the questionnaire, and the fact that the respondents seemed to be motivated, made the situation in the present study trustworthy for both the participants and the researcher. Furthermore, the number of participants was so extensive, that the probability of false answers was rather small.

In studying the sense of community a few aspects can be improved. First of all, the questionnaire should be developed further. For example, some new propositions could be added to test if the four factors found in the present study were consistent. Alternatively, the same questionnaire could be tested with more Web-communities that represent different types of communities to see if the same factors would still be emphasized, and thus generalizable to all Web-communities. It could also be interesting to broaden the research scope to find out how the sense of community in the Web environment affects the person's real life social participation and psychological well being (cf. Kraut *et al.*, 1998; Hampton & Wellman, 2000).

The study could also be methodologically more comprehensive. In addition to the questionnaire, one could analyze the Web site content, e.g. by reviewing discussion archives. That way one could gain more objective information to support respondents' subjective interpretations and answers to the questionnaire. For example, instead of relying on respondents' own estimate of their frequency of sending and reading messages, one could count them. Another extension to methods could be evaluating the included Web sites themselves, to solve if some of the sites' features affect to the level of sense of community the members of the site feel.

4.6 Conclutions

The data provided clear evidence of the existence of sense of community in Web environment and its possible psychological structure. Sense of community in a Web environment consists of a notion that through text-mediated interaction one can influence and help others, and also get help when needed. It also includes a basic trust that one can be safe where one is, and a notion that one is amongst people like oneself. Furthermore it includes knowledge of how the community came to be what it currently is. Together all these indicate a sense of belonging to a certain spatial and social context and amongst certain people: a sense of community.

The present study started from the assumption that the facilitators of sense of community *in a Web environment* can be partly extracted from those of *real life* communities and sense of community. The data supported this; most of the variables that are central in real life communities and sense of community, are essential in the Web environment as well. Although the variables could not be strictly grouped as prerequisites, facilitators and consequences of sense of community, most of them were somehow facilitating the sense of community. In fact, many of the variables can be seen as being prerequisite, facilitator *and* consequence for sense of community in the Web environment. For example, there cannot be a sense of community without awareness of others, but being aware facilitates the growth of sense of community, and as result of it, one pays attention to or perceives others' presence even more. The same can be said for e.g. social interaction and trust, among others.

A couple of variables turned out to be less important in the factor solution. Variables indicating criteria for membership and borders were among the less important variables. This was probably because there were only two propositions related to criteria and borders, and the Web-communities included in the present study did not even have any specific criteria for membership. Also the variables indicating roles and social structure were not very important in the factor solution, but the phase in the membership lifecycle was otherwise influential. The data strongly supported the assumption that the further the individual is on the membership

lifecycle, the stronger sense of community he feels. Furthermore, variables indicating accountability were not very important, but then again, there were only two propositions that indicated accountability.

Interestingly, the frequency of sending and reading messages influenced how high participants reached in factor scores in all four factors and thus felt sense of community. Generally, the more participants sent and read messages the more they felt the sense of community. What makes this interesting is that scores in all four factors indicate that the frequency of reading messages influences *more* than the frequency of sending messages. If reading messages could be seen as indicating involvement, and sending messages as active participation, this result would support the notion that it is possible to feel strong sense of community without ever participating (Nonnecke & Preece, as cited in Preece, 2000). However, that cannot be argued on the basis of the present data, since sending and reading messages correlated strongly with each other, i.e. the same people both read and send messages. In any case one's own participation does intensify sense of community enormously.

It is not yet certain how much the Internet really connects people, or if it just produces isolation and false sense of connectedness. The present study provided evidence for the existence of sense of community in the Web environment, and that it is not that far from the sense of community in real social environments. Hence, it does not seem like *false* sense of connectedness, quite the contrary. The possibility of feeling sense of community in the Web environment shows us that the Web can be more than just another communication medium. Memberships in Web-communities can enrich peoples' lives, and make them feel like they are a part of something.

However, the studies reporting connections between Internet use and declines in psychological well being cannot be overlooked. Positive outcomes of Web usage require that Web-communities are built with dedication and expertise. Based on the results of the present study, it can be recommended for community-builders to support the four factors of sense of community. For example, providing usable tools for interaction, which would lower the threshold to participate, could support reciprocal involvement. Also, making others' activity visible would support individual's awareness that there are others present and that they are participating. Having explicitly stated policies and a moderator to govern the Web-community could support trust between members. Having visible member-profiles or -searches could help members find and become aware of people who are similar with them. The common purpose could be brought to attention with an explicitly stated purpose in the site, and the shared history with a written back-story.

These guidelines are similar with the ones that have been appearing recently to help building Web-communities (e.g. Kim, 2000; Preece, 2000). That makes sense because community and sense of community are actually two sides of the same coin: one cannot exist without the other. But the sense of community is not merely a feature of a Web site. Instead it is a mental construct, which develops from human interaction, and from the fact that the individual identifies himself as a part of a community.

The use of Internet will probably increase, even though it has its limitations. Because one of the most influencing changes that the Internet has brought is a social one, more professionals in the field of psychology should notice that their expertise is needed.

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