

## Chapter 7

### General Summary, Conclusions, and Suggestions for Future Research

The analyses presented in this book try to give answers to the following three questions. *What kinds of benefits do academic Internet Discussion Groups provide in general? How can disciplinary differences in the prevalence of use of Internet Discussion Groups be explained? How can it be explained that some Internet Discussion Groups achieve a high and satisfying level of group discussion whereas other groups fail to achieve adequate contributions from the members to the discussion?* The answers to these questions are summarized below under the headings ‘the impact’, ‘the spread’, and ‘cooperation and social order’.

In order to answer the questions, the analyses makes use of two different data sets. The first, the so-called ‘offline data set’, consists of answers to a questionnaire sent to a random sample of English and Dutch university researchers. The respondents are active researchers in their discipline in the humanities, the social sciences, or the natural sciences. The offline data set is used for the analyses in Part IIA related to the first two questions. The analyses in Part IIB, related to the third question, are based on the second data set, the so-called ‘online data set’. This consists of information about the directly observed communication behavior of members of 49 academic mailing lists combined with information about these members obtained via an online questionnaire. The selection of the mailing lists was based on the answers of the respondents of the offline data set. The researchers of the offline data set were asked to mention at most five Internet Discussion Groups (IDGs) that they use for professional reasons. Of the mailing lists mentioned among the IDGs, a random selection of mailing lists that discuss academic topics was chosen. The selection procedure aims at ensuring that for the data analysis a diverse group of mailing lists of professional relevance for various groups of university researchers in England and the Netherlands could be used. The online data set is (at best) an approximation of a representative sample of professionally relevant mailing lists used by English or Dutch university researchers, although this is not strictly guaranteed by the selection procedure.

#### **The impact:**

Chapter 3 tests hypotheses about the beneficial effects of IDGs. I made a distinction between three kinds of *contact benefits* (weak contacts, reception contacts, and strong

contacts) and two kinds of *information benefits* (research information and practical-helpful information). For every hypothesis it was analyzed whether differences in the sizes of the benefits can be found between well-integrated and peripheral researchers. In this way different versions of the so-called '*equality hypothesis*' (Gresham 1994a; Walsh 1998f; Hiltz and Turoff 1978; Walsh and Bayma 1996a; Hesse et al. 1993a), implying a reduction of social inequality, were tested.

The data analyses in Chapter 3 reveal the following about the benefits or impact of IDGs. Evidence was found for the presence of contact and information benefits. In general, there was more evidence for contact benefits than for information benefits. For the provision of practical-helpful information benefits no evidence was found. The hypothesis about research information benefits was confirmed, but only for researchers in the natural sciences. While there was some evidence for all three kinds of contact benefits, much more evidence existed for the hypotheses about the weak contacts and the reception contact than for the hypothesis about strong contacts. There were no differences between researchers in the natural sciences on the one hand and researchers in the humanities and social sciences on the other hand with regard to the hypotheses about contact benefits.

With regard to the impact of IDGs on the macro level of the academic communication system, no evidence was found for any version of the so-called equality hypothesis. The various versions of the equality hypothesis imply that peripheral researchers profit more from the opportunities offered by IDGs for the making of new contacts than well-integrated researchers. Neither the peripherality hypothesis (Walsh and Bayma 1996a; Walsh 1998f) nor the strong equality hypothesis (Gresham 1994a) found any supporting evidence. No differences were found between well-integrated and peripheral researchers with regard to any of the contact or information benefits. For example, those who are well-integrated do not profit less from the opportunities of making new weak contacts than those who are peripheral in the informal academic communication networks.

Apart from the general impact, differences between IDGs were found with regard to the quantity of benefits they provide. Researchers in very active IDGs tend to obtain more benefits than researchers in very passive IDGs. Another finding was that only a very small minority of researchers used newsgroups. As a consequence, although the analysis included academic mailing lists *and* newsgroups, the results are based to a very large extent only on data about the benefits provided by mailing lists.

I conclude from the findings the following. The *most general benefits* offered by IDGs to the university researcher are not information benefits, but *contact benefits*. Researchers in different fields profit from active discussions in IDG in the respect that they make new contacts with other researchers. These contacts make the researcher more visible and more aware of other researchers. They also lead to the exchange of papers. The *strongest impact* that IDGs seem to have is on the *weak contacts* of the researcher. However, weaker evidence for an effect on strong contacts was also found. The new contacts made with the help of IDGs enlarge the informal communication network. At the same time, the enlargement does not imply that the 'additional' contacts are always stable in the sense that they provide a tie to the same person for a long time.

The size of the benefits does not differ between peripheral and well-integrated researchers. The hopes expressed in different versions of the so-called "equality hypothesis" are not supported by the findings. No evidence was found for the expectation that IDGs could reduce social inequalities in access opportunities to informal communication. There are beneficial effects important for peripheral researchers. However, the effects are only of moderate size, they exist for peripheral and also for well-integrated researchers, and they do not reduce the gap between those who have a lot of contacts and those who have very few.

As a consequence, it is justified to argue that IDGs provide social capital to university researchers. The kind of advantage that they provide more often consists of contact benefits than of information benefits. *Inequalities* with regard to the distribution of informal contacts in the research system are *not reduced*.

In addition, I conclude from the findings that *not all IDGs are of the same useful kind*. Some active IDGs tend to be better suited for providing opportunities for obtaining contact or information benefits than others. The findings indicate that it is useful to distinguish between different IDGs and to analyze under which conditions IDGs are more efficient for the transfer of information and for the making of new contacts. The results suggest that for further research it would not only be useful to analyze *whether* electronic groups provide access to social capital leading to different kinds of benefits, but also to conduct a more detailed analysis of the *interaction in electronic groups* to find out more about the *conditions fostering the provision of benefits*. Such an analysis was conducted in Part IIB of this book.

**The Spread:**

Research that tries to analyze disciplinary differences in the prevalence of information & communication technology (ICT) use takes into account a number of conditions that differentiate between academic disciplines. I made a distinction between two kinds of hypotheses. Some hypotheses focus on conditions that raise *problems of trust* between researchers and thereby are expected to inhibit the use of specific ICTs for informal communication (Kling and McKim 2000a). Other hypotheses focus on conditions that induce certain *communication needs* of a researcher and thereby stimulate the use of specific ICTs for informal communication (Walsh and Bayma 1996f). These ideas have been expanded to explain differences in the prevalence of use of Internet Discussion Groups (IDGs). In addition, I have argued that a low degree of 'visibility' of the research work in a field may stimulate researchers to make use of IDGs. They have an additional incentive to start using them because they are in need of information that helps them to obtain an overview of ongoing research and new developments in their field when it is not easy to do so. Based on these ideas, hypotheses about conditions expected to raise trust problems and hypotheses about conditions predicted to influence the communication needs of the researcher are tested in Chapter 4.

The data showed clear differences between the eight disciplines in the prevalence of IDG use. The analyses made clear that the two trust hypotheses were not supported by the data. Moreover, in multivariate analyses two of the three conditions that were expected to induce communication needs showed a significant association with the use of IDGs. Firstly, researchers who experienced a higher degree of interdependence with the work of other researchers made use of IDGs significantly less often. This finding, however, is contrary to the expectation of the corresponding 'communication need hypothesis', which predicts a positive association. Secondly, researchers who work in fields with a larger number of relevant journals, that is, fields with a lower degree of visibility, made use of IDGs significantly more often. This finding supports the corresponding communication need hypothesis.

Other analyses revealed the following. The degree of visibility can explain the initial use of IDGs, as the hypothesis implies. However, in a multivariate analysis it is not a good predictor for the continued use of IDGs. Furthermore, the analyses showed persistent and strong associations between the IDG use of the respondent and that among his colleagues in the university department or in his other informal communication networks.

I conclude that trust problems are only of limited use for explaining differences in the prevalence of IDG use among university researchers. The *decision* of whether *to start using IDGs* depends more on the *communication needs* of the researcher, which is influenced by the *degree of visibility* of research in the field. In general, existing hypotheses about the effects of social aspects of the research field organization can explain disciplinary differences in the prevalence of IDG use only to a limited extent. After controlling for the theoretically relevant factors, many of the disciplinary differences in IDG use were still significant.

In order to integrate the findings with the arguments of other researchers about the relevance of trust problems for the use of electronic publication tools (Kling and McKim 2000a), it is proposed that further research should make a distinction between different kinds of ICTs according to their potential for inducing problems of trust between their users. For example, pre-print servers may have a higher potential for trust problems since the research papers sent to the pre-print servers may have a value that depends on the novelty of the findings and ideas. On the other hand, the value of messages sent to a mailing list rarely depends on the novelty or secrecy of the information. As a consequence, IDGs may have a lower potential for inducing trust problems than pre-print servers, which in turn may have a lower trust problem potential than electronic journals. The higher the potential for trust problems, the larger are the effects of conditions that are expected to induce problems of trust. The distinction between different trust problem potentials may help to steer further research and may solve the apparent contradiction between the presented findings and other research.

### **Cooperation and social order:**

Chapter 5 analyzes the problem of cooperation in electronic groups. It focuses on the question of under which conditions group members participate actively in the group discussion by sending questions and, more interestingly, by publicly sending answers, that is, by providing help to those who sent questions. Existing theories about conditions fostering active participation in the group discussion focus on *information incentives*. According to the reciprocity model (Thorn and Connolly 1987c), a number of conditions are expected to stimulate the provision of help and answers by influencing the group members' hope for reciprocity. The reciprocity model presupposes that a member expects others to reciprocate his own provision of help and answers. Building on this assumption, it presents a number of conditions that are expected to diminish or increase the hope for reciprocity. When applied to academic

IDGs it can be used to derive some hypotheses predicting under which conditions members are willing to send answers to the IDG.

Other researchers argue that social incentives could also stimulate active participation (Kollock 1998d). Network analysts claim that social networks existing offline have an impact on relations and interaction online (Wellman and Gulia 1997; Wellman et al. 1996). However, it is left open what kind of social incentives could stimulate active participation and by which mechanisms offline social networks could have an impact. Two new theories have been developed that can fill these gaps. Both theories make use of Becker's (1976) theory of social interaction and social production function theory (Lindenberg 1986). The so-called contact model claims that the active participation of researchers in academic IDGs is motivated by the goal of making *new contacts* with other researchers. The so-called reputation model supposes that active participation is motivated mainly by the goal of gaining *reputation* within one's academic community. Both models can be used to derive a number of predictions of which conditions motivate researchers to send questions to the IDG and which conditions stimulate them to send public answers to questions. The reputation model highlights the relevance of the social embeddedness (Granovetter 1985b) of academic IDGs for stimulating active participation. Moreover, making use of the insights of Coleman (1990c), it can explain the emergence of a help-prescribing norm in IDGs. Furthermore, the logic of the reputation model predicts that the degree of embeddedness influences the members' degree of satisfaction with some aspects of the quality of the group discussion.

The analysis of the communication behavior of members of 49 academic mailing lists demonstrated the following. The public provision of help and *answers* can best be explained using the reputation model. The contact model is not supported by the data and the reciprocity model barely finds any supporting evidence. At the same time the reputation model receives much more support. The only effect correctly predicted by the reciprocity model and the contact model can also be explained by the reputation model. Moreover, the prediction of the Coleman model with regard to the effect of social embeddedness on the emergence of norms in IDGs is supported by the data.

Neither the reputation model nor the contact model are very good in explaining the sending of *questions* to the IDG. Only very limited evidence to support the predictions of the reputation model is found. The hypotheses of the contact model are not supported. Finally, three of four hypotheses concerning the effects of social embeddedness on the members' degree of satisfaction with different aspects of the *quality of the group discussion* are supported.

I conclude the following from the findings. The hope for a reciprocal exchange of information between members in general barely motivates the public provision of help and answers, if at all. The *public provision of help and answers*, as the most crucial form of contribution to the public good, is much more *stimulated by a social incentive, namely the incentive to gain reputation within the academic community*. IDGs with a *high degree of social embeddedness provide extra stimuli* for the members to provide help and answers to others in the IDG. Moreover, a high degree of *embeddedness fosters norm development* in electronic groups, which in turn stimulates cooperative behavior between members.

The public sending of questions in general does not seem to be influenced by considerations about a loss of reputation nor is it in general used to facilitate the making of new contacts. It seems that questions are sent most often when the members expect to receive answers with a high likelihood. In this sense, the sending of questions is influenced by information incentives. However, this form of active participation is not based on reciprocity considerations.

*Social embeddedness stimulates cooperative behavior by providing incentives for becoming active as a public help provider.* This not only has an effect on the 'quantity' of sent messages. It *also has effects on some qualitative aspects of the group discussion*. The attainment of reputation in the academic community is not only dependent on the amount of provided help and information, but also on the kind of information given. As a consequence, under a high degree of embeddedness the members are stimulated to think more carefully about what information they send to the IDG. They face an incentive to provide 'better' information, and information that is more relevant to the topic of the IDG discussion in order to avoid damaging their reputations by sending low-value information. Moreover, in embedded IDGs researchers tend to profit more from the discussion in the sense that they receive more professionally interesting messages.

At the same time, the stimulation of active participation by social embeddedness has its costs. Researchers in highly embedded IDGs tend more often to regard the quantity of sent messages as too high. Contrary to the initial expectation, this negative by-product of embeddedness is not mitigated by the 'higher' quality of the sent messages.

**Limitations of the Study:**

Before I give a broader outlook about what we have learned from the findings with respect to future research, I would first like to mention some of the limitations in the data, the analyses, and the theoretical approach.

First of all, in order to analyze problems of cooperation and inequality related to the Internet, it was decided to make use of two different data sets enabling distinct kinds of analyses. A restriction of this design, inevitable due to practical reasons, is that the analyses are based on cross-sectional data. The design was planned in such a way that the findings nevertheless allowed the drawing of conclusions that go beyond statements about associations. Even so, a longitudinal analysis of the dynamics in electronic groups and a longitudinal analysis of the potential impact on the networks of group members would offer additional insights. The first advantage would be that the findings of this analysis could be replicated, which is necessary for evaluating the claims of this book. For example, data on university researchers in other non-European countries would give a valuable opportunity for a comparison of the impact on the researchers' social networks to be made. An even more thorough test of the hypotheses would then be possible. We know now that it is not unreasonable to assume that IDGs have an impact on the contact networks of researchers. A longitudinal study could analyze whether the apprehension about a possible 'Balkanization' of the academic communication networks (Alstytne and Brynjolfsson 1996a) is justified and under which conditions it is likely.

A limitation of the theoretical approach used for the analysis of interaction in electronic groups is that it does not strongly take into account the dynamics of interaction. It offers insight into some of the mechanisms underlying electronic interaction and how they are induced by social conditions. Although this is useful for improving electronic communication in groups, it neglects the details of the dynamics. It is important to analyze, for example, how relationships in electronic groups develop over time. Is it possible to foster cohesion and embeddedness in groups that were founded as a more or less anonymous group based only on common interest? Research on the dynamics of electronic social networks could profit from research carried out on the development of other kinds of social networks, for example in organizations (see e.g. Van de Bunt 1999). In addition, such research could take a closer look at the opportunities for shaping the formation and dynamics of electronic interaction more actively. In the long term, such research may be able to give advice on how to increase the likelihood that desired macro outcomes, such as a cohesive electronic group, can be reached.

### **An Outlook: Studying Electronic Groups**

I hope that the analyses have contributed to the gaining of more insights into impact of IDGs on society. Moreover, I hope to have shown that it is crucial not only to ask *whether* some kind of impact of the Internet, for example the enlargement of certain informal contact networks, is likely. Research should go one step further by analyzing *under which conditions* such an impact is to be expected. For example, IDGs with a higher degree of embeddedness tend to have more active members. IDGs with more active discussion participants tend to provide more opportunities for the making of contacts and partly for a more beneficial transfer of information. These findings have important implications for knowledge management. For example, a list manager or an active group of researchers in a field can influence the embeddedness of electronic Internet groups (see section 6.4 for more details).

One interesting question is whether such an analysis of group interaction is possible for other kinds of electronic groups outside the academic world. So-called 'online communities' are expected to have an enormous impact with regard to social issues (Rheingold 1993), marketing success (Hagel III and Armstrong 1997), or organizational outcomes (Cothrel and Williams 1999). Other kinds of electronic groups face similar problems. Electronic self-help groups have to stimulate the active participation of their members to encourage the mutual provision of help. Some groups may wish to facilitate the making of new contacts. Commercial online communities may wish to stimulate active member participation as a means of enhancing marketing activities. Electronic groups in organizations would like to encourage member participation in order to foster organizational commitment and the sharing of knowledge among co-workers. The problem of how to foster active participation will become even more crucial if the tendency is for more organization members to work at home or in locally dispersed organizations.

The question of how to stimulate active member participation is not the only problem to be analyzed in electronic groups. Trust problems between group members are also relevant for electronic interaction. The development of solutions to such problems requires knowledge about which mechanisms underlie electronic interaction and which social conditions influence interaction. Electronic groups differ with regard to their social embeddedness. Another feature distinguishing different kinds of electronic groups is their degree of multifunctionality (Lindenberg 1997). Whereas some groups are used only for entertainment or for obtaining information, other kinds of groups insist on a high degree of social involvement. Moreover, the structure of

interdependency between members of different groups varies. Members of academic electronic groups may have a strong common group goal, namely to achieve a beneficial group discussion. Members of commercial electronic groups such as those that include online auctions or other kinds of economic transaction face a different situation. Their interaction is characterized by only a weak degree of common interest and a high degree of conflicting interest, which makes interaction more problematic. However, online communities can be steered and structured much more actively than most academic groups, since they are under control of a management. The management may be able to make use of tools that influence the communication situation for the members and their interdependencies by constructing an appropriate incentive structure (see Matzat and Vos 2000 for details). These groups require more detailed knowledge about the behavioral mechanisms that influence electronic interaction. The analysis of problems that these groups face may profit from classical small-group research (see e.g. Homans 1961; Homans 1951; Kelley and Thibaut 1978; Lindenberg 1997) that has analyzed similar questions. Future research must contribute to the gaining of such knowledge by advancing the theory of interaction in electronic groups, which may then be used for the formulation of advice on how to govern electronic interaction.

This study has shown that ‘even’ in academic electronic groups that are expected to focus on information, social incentives play a role in improving communication. A sociological analysis of the *governance structure of electronic groups* promises to have theoretical and practical relevance for finding out more about how to shape the Internet. Future research on electronic groups may help to overcome problematic aspects of the Internet and to help fulfill its potential to improve human communication, facilitate cooperative behavior, and stabilize social order.