Time to Split, Virtually: 'Discourse Architecture' and 'Community Building' Create Vibrant Virtual Publics

QUENTIN JONES AND SHEIZAF RAFAELI

Abstract

This paper examines the importance of 'discourse architecture' and 'community' to the maintenance and growth of virtual publics. 'Virtual publics' are computer mediated discourse spaces created by using various technologies including email, the USENET, web based bulletin boards, IRC, MUDS, etc. It is argued that the over-emphasis to date on 'community' has discouraged *systemic analysis* of collaborative media systems. Further, it has distracted researchers' attention away from how 'discourse architecture' created by the interplay of technology and content can both enable and constrain the growth of a collaborative system's user population and participation. The paper suggests that systems-theory can be used to inform our understanding of virtual public growth. Further, we examine the genesis of virtual metropolises, where tens of thousands of individuals are engaged in public computer-mediated discourse. We suggest that an effective virtual public segmentation strategy is an essential element for those wishing to build a vibrant virtual metropolis. Segmentation strategy refers here to any systematic method used to split discourse spaces with the aim of creating a system of related virtual publics.

Keywords: virtual communities, online communities, e-communities, virtual publics, computer mediated communication

INTRODUCTION

The exponential growth in recent years of Internet technologies has resulted in a new era of both electronic commerce (Riggins and Rhee 1998) and interpersonal communication (Jones 1995). Of particular significance is the growth of collaborative media systems where the audience is a major source of media content as well as its primary receiver (Rafaeli and Larose 1993). The users of such systems and/or aspects of the systems themselves are now commonly referred to as virtual communities, or less often as online communities, electronic communities, or e-communities.

Increased interest in business processes over the Internet has resulted in an avalanche of terms to describe the phenomena. These include: Internet commerce, electronic commerce, icommerce, i-commerce, ecommerce, e-commerce, web commerce, net commerce, e-business and e-tailing (Ojala 1999). The abbreviation most commonly found in ACM and IEEE publications appears to be e-commerce and is therefore used here.

Strong claims have been made about the significance of virtual communities to e-commerce (Hagel and Armstrong 1997, Hof *et al.* 1997). The claims primarily relate to the ability of virtual communities to increase a portal's value by increasing

Authors

Quentin Jones is a PhD student in Information Systems at the University of Haifa, Israel. This paper is based upon the theoretical component of his doctoral research. He is currently exploring empirically many of the theoretical propositions outlined in this paper via analysis of the discourse structure of over one thousand virtual publics.

Sheizaf Rafaeli (MA, PhD, Stanford University) is at the University of Haifa, Israel. His interests are in computers as media, electronic commerce, online higher education and virtual organizations. His latest book is *Network and NetPlay: Virtual Groups on the Internet*, MIT Press, 1998. He co-founded *The Journal of Computer-Mediated Communication*.

Volume 10 (4): 214–223. www.electronicmarkets.org

website click throughs[1] and reducing user churn rates.[2] This, in turn, relates to the ability to profile users and to generate customized advertising. The marketing value of computer-mediated communication (CMC) between customers, potential customers and vendors has also been recognized (Hof *et al.* 1997). Recently, the case has also been made for the use of virtual communities in the building of stronger brands (McWilliams 2000). Further, the large number of group-CMC interactions occurring via the Internet allows for extraction of potentially strategic information (e.g. recommender systems, Resnick and Varian 1997) and marketing information (Kannan 1998). Virtual communities have also been proposed as intermediaries (Chang *et al.* 1999). Finally, the large-scale use of group-CMC tools have resulted in fundamental changes in the information environment, resulting in power-shifts that must be taken into account by those engaged in e-commerce (Kollock 1999).

This paper examines in theoretical terms the large-scale expansion of open collaborative media systems. It shows how e-commerce strategy, with a public group-CMC component, will need to take into account the relationship between discourse goals, the segmentation of discourse space and technology. In so doing, it aims to encourage systematic scientific research into the architecture and the geographies of these cyber-spaces.

DEFINING 'VIRTUAL COMMUNITY'

Users of collaborative media systems, or the systems themselves, are commonly referred to as 'virtual communities'. Such systems were used initially for socializing and collaboration. As a result, early advocates of CMC focused on the freedom of 'virtual association' and the sense of 'community' often gained by user-participation. Rheingold, the primary early popularizer of the application of the term to CMC (see Jones 1997 for a history of the term), argued, that 'whenever computer mediated communications technology becomes available to people anywhere, they inevitably build communities with it' (Rheingold 1993, p. 5). However, the position that *all* group-CMC systems have associated virtual communities should be rejected. This is because: First, *community* only results from a special set of circumstances. The most commonly cited definition of virtual community is that of Rheingold (Jones 1997). He defines virtual community as 'social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace' (Rheingold 1993, p. 5). Clearly, such webs of personal relationships do not occur in many of the cyber-places that allow for group interaction (e.g. Amazon.com's book reviews). Second, the term virtual community is redundant if we label every instance of group-CMC a virtual community. Finally, simple technological determinism, that would allow one to argue that group-CMC automatically leads to community, has been refuted on both empirical and theoretical grounds (Jones and Rafaeli 2000). Rheingold himself now rejects the notion that virtual community creation automatically results from the use of CMC-technologies (Rheingold 1999), he suggests that this incorrect notion has in part led to the term being usurped by e-commerce advocates.

Significant debate exists about what exactly constitutes a virtual community (Jones 1997). Perhaps this is because it is not entirely clear what a real community is. The *Penguin's Dictionary of Sociology* (Abercrombie *et al.* 1988) highlights this problem when it states, 'the term community is one of the most elusive and vague in sociology and is by now largely without specific meaning'. Researchers into non-virtual communities have had trouble-distinguishing community from: (1) place, (2) population, and (3) human interactions (Poplin 1972). Many researchers have used the term virtual community interchangeably with one or more of the following virtual community components:

(a) the computer-mediated space that supports group-CMC;
(b) the people communicating via a computer-mediated space that supports group-CMC; and
(c) the interaction of users via group-CMC.

It is reasonable to conclude that the concept of virtual community is not equivalent to its cyber-place or its member's interactions, nor its user-population. It is therefore important to distinguish a virtual community from its medium or platform, in which its users or agents interact (Lechner and Schmid 2000). Fernback and Thompson (1995) define virtual community as 'social relationships forged in cyberspace through repeated contact within a specified boundary or place (e.g., a chat channel) that is symbolically delineated by topic of interest'. This definition allows for a distinction between a virtual community and its computer-mediated space or virtual-settlement and its population. It also recognizes the emergent properties of a virtual community's components, which they refer to as 'social relationships'. Their definition is adopted here.

It is widely accepted that *virtual communities*, with an emphasis on notions of '*community*' are important to e-commerce. There can clearly be great financial returns in the production of information systems that attract and maintain users by effectively enabling user interactions, and managing user generated content. However, it will be argued that such systems do not all have associated 'communities', nor are the social networks required for 'community' simply scalable. Consequently it will also be argued that the managers of such discourse systems should not automatically focus on notions of 'community' when planning expansion.

SCALABLE COMMUNITIES?

To date, Hagel and Armstrong (1997, Armstrong and Hagel 1995) have produced the only widely recognized model of virtual community 'growth' or 'scalability'. Their 'net gain' model makes various links between virtual communities and e-commerce and is repeatedly cited in academic papers (Chang *et al.* 1999, Gallaugher and Wang 1999, Riggins and Rhee 1998). This section examines the net gain model as a means to understanding how small discourse spaces can be expanded into a large-scale discourse system.

According to Hagel and Armstrong, virtual communities are computer-mediated ***spaces*** where there is a potential for integration of content and communication, with an emphasis on member-generated content. They therefore distinguish between online information services from virtual communities. For example they do not consider Lexis-Nexis a virtual community because its rich content provision is not integrated with member-generated communication. Simultaneously, according to Hagel and Armstrong, it is possible to have a virtual 'community with no members' (1997, p. 134). They provide the example of Apple's struggling e-World, which lacked users to generate content, despite superb graphics and well-organized environments. Additional examples of virtual communities provided by Hagel and Armstrong are The Well and Amazon.com.

For virtual communities to grow, Hagel and Armstrong believe that a virtual community's organization has to be 'scalable'. They defined scalability as the ability of a virtual 'community to grow without losing its sense of community' (1997, p. 152). The use of the word 'scalable', also implies virtual communities can expand linearly by the addition of users and content. According to Hagel and Armstrong, a large scalable virtual-community, which can potentially have millions of members, will consist of a large number of sub-communities. To preserve a sense of community, organizers must preserve intimacy and a sense of membership continuity. To maintain a sense of intimacy, sub-communities must remain small. To achieve this organizers must give sub-communities the resources they need to develop. Organizers must also provide protection to *stalwarts* from hoards of *newbies* by moderation where appropriate. Membership continuity is helped not only by interesting member generated content but also by hooks such as calendar events and membership directories, which encourage increased community interaction. Finally, organizers of virtual communities must ensure that the advantages of scale related to purchasing power are captured. This will allow the broader virtual community to enjoy the benefits of growth.

Like most researchers into virtual communities (Jones and Rafaeli 2000), Hagel and Armstrong focus on factors that operate at the level of social interpretation. That is, they focus on how people feel about each other, 'a sense of community', 'satisfaction of needs', etc. This they believe is the best way to think about growth of small discourse spaces into multi-million member virtual communities. However, the connection between computer-mediated space and 'community' is not automatic and can lead to conceptual difficulties. For example, why would a typical user of an Amazon.com book review have a *sense of community*? And why would Amazon require it for growth? This in turn raises the question, in what sense is Amazon.com a 'community'? By the definitions of some scholars (e.g. Hill *et al.* 1995) *users* of Amazon constitute a 'virtual community'. They do so by sharing the characteristic of book buying, reviewing and browsing, and interacting in essence or effect only. However, Amazon.com is certainly not a 'virtual community' in the sense used by many of the original popularizers of the term. These early advocates of CMC linked virtual communities to Computer Supported Social Networks (Jones 1997, Wellman and Gulia 1999). In fact, if a virtual community with almost no members can exist, as described by Hagel and Armstrong, how can it have a sense of community at all? Further, Hagel and Armstrong's concept of virtual community 'size' or 'scale' are not entirely clear. Are they talking about the mediated space, the generation of user content, or user population? In addition, how does one measure a sense of community? The 'virtual community' as space definition does not distinguish between the various components of a virtual community, and its emergent property – social relationships. Further, by focusing on 'community' it is difficult to come to a direct understanding of how the interplay of technology and content can both enable and constrain growth so that architectural improvements can be made. Conversely, as will be shown later, useful theorizing about discourse architecture does not necessarily require a focus on factors that operate at the level of social interpretation, such as 'sense of community', or on social networks.

COMING TO TERMS WITH VIRTUAL PUBLICS

Virtual Publics

The term virtual public is proposed to avoid potential confusion surrounding the term virtual community. Virtual publics are symbolically delineated computer mediated spaces, whose existence is relatively transparent and open, that allow groups of individuals to attend and contribute to a similar set of computer-mediated interpersonal interactions. They are spaces, which may or may not have associated computer supported social networks with weak or strong ties (i.e. virtual communities). Virtual publics can be created by the use of a variety of technologies. Examples include IRC, email listserves, web-based bulletin boards and video conferencing systems. Virtual publics may be civil, social, both, or neither.

Virtual publics are not a subset of the class 'virtual

community'. The term represents a different approach to categorizing cyberspace. Virtual publics can be owned, because they are not an emergent, or ephemeral social property, but rather interactive discourse spaces.

Virtual publics are not private computer-mediated spaces such as password protected, corporate, employee-only, discussion boards. This is because private systems are generally not transparent, nor open to the public. This distinction is made to emphasize the difference between the constraints acting upon users of public as opposed to private cyber-places. For example, the use of a private cyber-place may be compulsory, or the content production may not be considered a 'public-good' (see below). Further, the rules for engagement may also be formalized or restricted, collectively resulting in different usage patterns to those of virtual publics based on equivalent technologies.

The need for this term 'virtual public' exists for a number of reasons. First, the types of social relationships forged in virtual publics vary widely. Secondly, it is important that a term exists that distinguishes between cybersociety (Jones 1995) and its public spaces. Thirdly, despite the differences in the technological and social aspects of virtual publics, their similarities make a collective label viable. Fourthly, virtual publics are of considerable importance to e-commerce.

The term 'virtual public user-population' refers to the individuals that engage in a virtual public's symbolically delineated space. The user-population of virtual publics based on a web-bulletin-board would be those individuals who over a period of time surfed to examine the discussion. It would not include those who only examined the discourse in a non-interactive setting. For an individual user to be considered part of an email based virtual public's user population would require list subscription. While not all cases of membership are clear-cut, the vast majority of cases can be categorized.

The messages that produce the interpersonal communication via virtual publics can take four forms. They can be broadcast, two-way, reactive, or interactive. Fully interactive communication requires that later messages in any sequence take into account not just messages that preceded them, but also the manner in which previous messages were reactive (Rafaeli and Sudweeks 1997). True conversations require interactive-communication (Herring 1999, Rafaeli 1988, Zack 1993). For a computer-mediated space to be considered a virtual public, it must enable interactive communication, although such interaction may not be realized.

The messages posted to a virtual public or thousands of virtual publics are often collected to create a searchable database of virtual public discourse (Resnick and Varian 1997). Such databases are not, in most cases, symbolically delineated interactive group-discourse spaces and are therefore not virtual publics. Therefore, virtual publics can be distinguished from related 'search spaces'.

Categorizing Virtual Publics

Virtual publics come in many forms, ranging from short-lived event chats to long-lasting product discussion spaces. In many instances, a virtual public's technological base, its architecture, will relate to its ability to effectively support various tasks (Lechner and Schmid 2000, Stanoevska-Slabeva and Schmid 2000). For example, product related special event synchronous-chats might drive a new product's sales better than other ongoing asynchronous based virtual publics. Further, virtual publics with an architecture that tightly links discourse to a relevant knowledge base, may best support various forms of communities of practice (Wenger 1998). The way in which a virtual public's technology structures discourse we refer to here as 'discourse architecture'. Despite the relevance of 'discourse architecture' to e-commerce we have only a limited understanding of how various technologies relate to discourse structures. To dramatically improve this situation we need both a virtual public taxonomy and a research framework. This sub-section addresses the issue of taxonomy, while the remaining sections of the paper examines the link between discourse architecture and e-commerce.

Hagel and Armstrong (1997) categorize virtual communities by the way they help people meet one of four basic needs: interest, relationships, fantasy or transactions. They sub-divide transactions based virtual communities into consumer-focused or business-to-business focused communities. Consumer-focused virtual publics can be sub-categorized as geographic, demographic or topical. Business-to-business virtual publics can be sub-categorized as vertical industry publics (e.g. software developer users-group), functional publics (e.g. marketers), geographic publics (e.g. local business association), or business type virtual publics (e.g. small businesses). While Hagel and Armstrong's approach is useful, their taxonomy is not exclusive with some virtual publics fitting into a number of categories simultaneously.

A useful taxonomy of social formations that are associated with various virtual publics does not exist. The creation of such a taxonomy requires an analysis of the types and strengths of the social networks typically formed by users (Wellman and Gulia 1999). Some of the labels given to virtual publics categorized by the social structures include: (1) 'virtual-settlements' the cyber-places with clearly associated social networks or virtual communities (Jones 1997, Liu 1999); (2) 'virtual airport bars', virtual publics where the social interactions that occur are 'fleeting' (Doheny-Farina 1996, p. 72); (3) 'cyber-Inns' (Coate 1992) virtual publics where the building of community is possible. All of these labels hint at how a taxonomy may be built and highlight the role that sociologists can play in understanding these cyber-spaces.

Categorizing virtual publics according to their technological base is more straightforward. For example: email based virtual publics, Usenet based virtual publics, web based bulletin board systems, avatar meeting places, Inter-

net relay chat (IRC). However, unless technology base can be tied to how a virtual public is used, or its social structure or user profile, such a taxonomy is not informative. This in turn suggests that what may be of critical importance is how different features of these technologies (e.g. synchronous or asynchronous communication) may structure discourse development, or architect discourse.

We concluded that a taxonomy of virtual publics should address at least four aspects:

(1) *Discourse Focus*: what users are writing/talking about e.g. topical, fantasy, product, brand.
(2) *User Profiles*: Demographic and geographical information.
(3) *Social Structures*: e.g. strong or weak ties.
(4) *Technology base and features that help structures discourses (Discourse Architecture)*: e.g.
    - media richness (sound, text, moving images etc.);
    - message timing (synchronous - asynchronous);
    - message storage duration;
    - discourse tied to a related knowledge base.

Maintainers/managers of virtual publics generally have goals in regards to their use of virtual publics. Some examples are:

- Match a particular demographic or geographic profile.
- Focus discussions on a particular product.
- Get users to develop strong interpersonal ties resulting in 'community'.
- Provide effective product support.
- Maximize the number of active or passive users.

To achieve any of these goals the managers of virtual publics need to ensure that the virtual public's discourse architecture enables/encourages the discourse form desired. For example, if a primary goal is the development of strong interpersonal ties, then interactive discourse must be encouraged. It follows then, that an understanding of the links between virtual public discourse structure and the taxonomy outlined above is of great importance. At present the details of such links are unclear. To improve upon this situation we must first gain an understanding of the link between technology and discourse structure (Jones and Rafaeli 2000). This is because it is technology that provides the architecture for virtual public discourse, whatever its use or associated social structure (Jones and Rafaeli 2000).

VIRTUAL PUBLIC EXPANDABILITY

The value of a virtual public to an e-commerce enterprise will relate to its purpose, and the size and quality, of its user population and user contributions. As a result many maintainers of virtual publics will wish to increase their value by expanding their user population and user contributions. Therefore, a model of virtual public expandability that can be used by those constructing e-commerce strategies is of considerable importance.

Virtual publics discourse is the output of a complex open system. Users are an essential component that can be exchanged with the surrounding environment. This is because users can subscribe/associate or unsubscribe/disassociate with a virtual public almost at will. Therefore virtual public discourse is the output of an open-system. Systems theory can therefore be used to model virtual public discourse. To understand the impact of the expansion of any part of a complex open-system on the system as a whole, an examination of its internal constraints is required. This is because the constraints will invariably produce interlocking non-linear feedback loops (Forrester 1969). A 'feedback loop' is the environment around any decision point in a system. Decisions lead to a course of action that changes the state of the surrounding system and gives rise to new information on which future decisions are based.

Modelling Virtual Public Discourse

Two basic sets of constraints delimit discourse in all virtual publics. The first are human factor constraints on initiating sustainable interactive discourse (critical mass). The second are human factor constraints that limit the expansion of discourse (information overload).

1. *Critical Mass:* Hiltz and Turoff (1978) proposed a 'critical mass hypothesis' for sustainable interactive-CMC. Their theory resulted from the observations of early computer conferencing systems. They noted that conferences with less than eight to 12 active users would after a short while fail to produce enough new material to justify users continued use of the system. They also observed that some of the users of these small conferences simply migrated to larger and more active conferences. The importance of a critical mass to sustained discourse in virtual publics is also suggested by research into the diffusion of innovations. Markus (1987) proposed that the widespread use of interactive media can result in a 'public good' if critical mass is reached. Rafaeli and LaRose (1992) showed the applicability of critical mass to BBS's (bulletin boards), one of the earliest forms of virtual publics. Likewise, economists have noted that for a positive 'network effect/externality' to occur an associated critical mass must be reached. 'Positive network externalities' occurs when a product or service becomes more valuable as more users adopt the product (Gallaugher and Wang 1999).

2. *Information Overload*: Many users of the Internet have experienced what is commonly referred to as 'information overload', that acute sensation of being swamped by unwanted information. This occurs because the degree to which information technologies can effectively control or aid CMC is limited by the finite capacity of human cognition. It logically follows that beyond a particular communication processing-load, the behavioural stress

zones encountered will make group communication unsustainable. Communication load being the processing effort required to deal-with a set of communications. Users of virtual publics have two options when group-communication leads to information overload. The first option is simply to end participation; the second option is to change communicative behaviour so that it becomes manageable. Empirical evidence exists for both these responses (Jones and Rafaeli 1999, Butler 1999). This occurs in various ways including lowering response rates, or paying less attention to messages. Individuals can also use agents and or filters to manage personal communication space. However, the result of such techniques is sub-group rather than group communication and the removal of the individual from the groups shared symbolically delineated space. This in turn will alter virtual public group communication patterns.

3. *Social Loafing – Free Riding – Leadership*: Between the constraints imposed by critical mass and information overload researchers have consistently found that a small minority of participants post a large proportion of messages (see Jones and Rafaeli 1999 for a review). Further, increases in user-population do not result in linear increase in user contributions (Jones and Rafaeli 1999). These asymmetries can be the result of some form of leadership phenomena or what has been labelled elsewhere as 'social loafing' or 'free riding' can be observed as group size increases (Latane *et al.* 1979). Free rider effects are common in situations where a public good is available to everyone, regardless of whether an individual contributes to its provision; and an individual's consumption of it does not reduce what is available to anyone else (Thorn and Connolly 1987). Several authors have noted that contributions to virtual publics can be considered public goods (Rafaeli and LaRose 1992, Kollock 1999).

There are two important implications to viewing contributions as public goods. First, it implies that exchanges in such spaces are more akin to gift transactions than commodity transactions (Kollock 1999). A gift transaction involves a diffuse and usually unstated obligation to repay the gift at some future time. In gift economies, an individual generally benefits by increasing the range and diversity of her/his social network. In its purest form, social relations rather than price drive gift economies (Bell 1991). This in turn suggests that the use of tools, such as agents and filters, that breakdown shared social cyberspace, will impact adversely on virtual public contributions. Second, most public goods will suffer from 'crowding' (Chamberlain 1974) (e.g. too many people using a park). In fact, the information overload section above describes a form of 'crowding' in virtual publics. Just as understanding of an ecosystem's stress points is essential for park management, an understanding of the group communication boundaries is essential for effective long-term management of virtual publics.

4. *User Population/Discourse Contribution*: By combining the two basic sets of constraints affecting discourse in all virtual publics, critical mass and information overload, with the 'social loafing' phenomena, Jones and Rafaeli (1999) produced the user population, discourse contribution function presented in Figure 1.

Figure 1 shows the typical relationship between interactive communication and user population if contextual factors are held constant. The notion 'contextual factors' involves matters such as individual differences, events that alter communication patterns (e.g. an election or a flame war, etc). The claim here is not that user behaviour in virtual publics has to follow the curve presented here. Rather, that:

(i) Critical mass will have to be reached for interactive group-communication to be sustained, for more than a short period. How this point is obtained will probably vary widely (hence, the faded line until the critical mass point). Further, even when critical mass is reached, discourse often occurs in waves with significant silent periods (Nonnecke and Preece 2000).
(ii) An increase in user population, which already has a sustainable group-communication, will not typically result in an equal increase in interactive communication.
(iii) Individual's cognitive-processing limits produce a constraint to discourse expansion even if the user population continues to grow.

5. *Technological Base and Discourse Structure*: The technology used to support a virtual public cannot remove the constraints on group-CMC noted above. However, different technologies can alter the zones at which these constraints operate (Turoff *et al.* 1999). Consequently, a link exists between CMC-technology and the point at which group CMC results in information overload. This is because technology-type correlates with message systems characteristics, which in turn relates to communication-processing load.

Communication-processing load relates to a number of

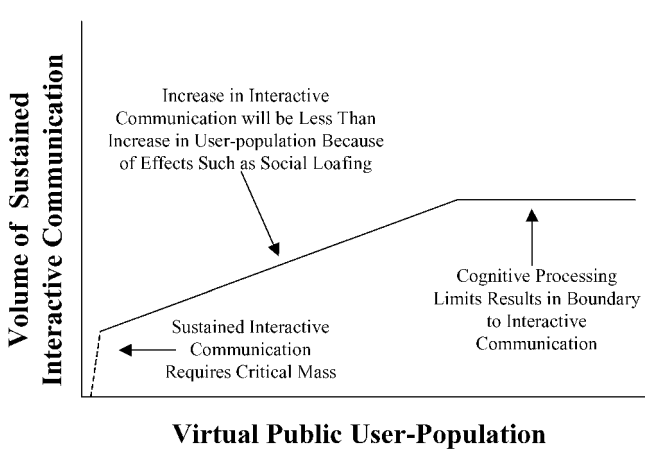

Figure 1. User population/contribution function

message system characteristics. Users generally have to make more of an effort to reply coherently to a thread than to a single message (Lewis and Knowles 1997). Therefore, higher interactivity correlates with higher communication-processing load. Similarly, a high frequency of postings will require quicker and more sustained processing by group members. Therefore, message density will also covary with communication-processing load. It is also likely that a decrease in 'interactional coherence', not compensated for by a useable persistent record, will also increase communication-processing load (Herring 1999).

A relatively synchronous CMC-technology such as IRC may sustain a higher density of interactive messages than an email list. This is because of the speed at which users in an IRC channel window can reply to the comments of other users. However, IRC channels may not be able to reach the same user population as an email list because they cannot store messages and take time to structure their responses.

The stress zones caused by information overload on interactive group communication can be identified empirically by the large-scale mapping of active participation in different types of virtual publics (Jones and Rafaeli 2000, Jones 2000). The claim here is not that technology will determine online behaviour, rather, that technology is both an enabler and constrainer of actions. Each class of CMC-tools will have its own associated stress zones that can be measured. For each class of CMC-tools, it is also likely that the point at which information overload becomes an issue will relate to the nature of the virtual public's discourse. For example, virtual publics which aim to support empathetic communities (Preece and Ghozati 1998) may require a greater level of interactivity and thread depth to sustain appropriate discourse than a virtual public focused on software support. If this is the case, then the maximum sustainable active user population of virtual publics that support empathetic communities will be less then those of software support virtual publics using equivalent CMC-tools. Considering the differences in the way CMC-tools structure communication it is likely that the position of the information overload stress zone will primarily relate to technology type, emphasizing the importance of discourse architecture.

6. *A Systems Model of Virtual Public Discourse*: Figure 2 shows how the constraints acting on virtual public discourse result in non-linear feedback-loops. It works as follows: An increase in the membership of a virtual public will probably result in an increase in virtual public communication. However, it will not be possible to expand virtual public communication indefinitely, because of the limited mental-resources available to individuals to process group communication. Once virtual public communication becomes unmanageable or incoherent, it is likely that there will be an impact on virtual public population size or growth, resulting in non-linear feedback.

The model above describes dependencies between activities, and examines prerequisites and constraints to communication. Therefore, it is a type of co-ordination theory (Malone and Crowston 1994). It does not examine external factors, such as awareness by potential members of the existence of a virtual public, as this does not inform us about the structure of virtual publics. To get a complete picture, an examination of factors external to a virtual public's system, such as the potential size of user-population, is also required.

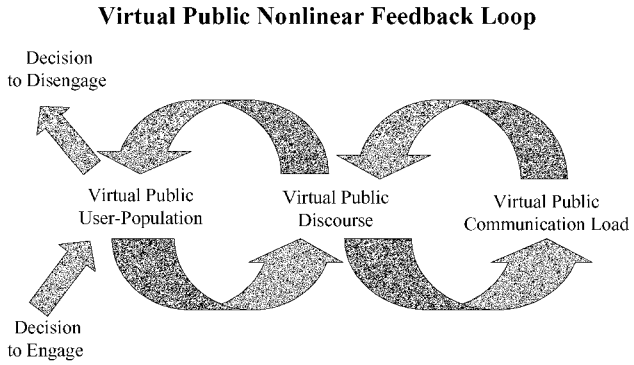

Figure 2. Virtual public non-linear feedback

A variety of factors can affect the flow of new users to a virtual public. Five of the most obvious are:

(i) Potential Population of individuals interested in the virtual public discourse in question.
(ii) Awareness by the potential population of a virtual public's existence.
(iii) Diffusion of the technology required (e.g. software and hardware) to use the virtual public.
(iv) Technical proficiency of the potential user population to use the software and hardware required to engage in a particular virtual public's discourse.
(v) Capacity of the virtual public in question. This of course will relate to the point on the user population/contribution function at which a virtual public is operating. Too much discourse will result in overload. It should be noted that this is the only internal virtual public system factor listed.

Existing marketing and diffusion of innovation theories to some extent address the first four of the factors described above. However, because of the explanatory level at which they operate, they do not address the issue of capacity (Jones and Rafaeli 2000).

STRATEGY AND THE VIRTUAL PUBLIC SYSTEMS MODEL

The provision of discourse space can:

(a) help tie users to a particular system through the creation of social networks (e.g. Kollock 1999);
(b) encourage the creation of valuable content (public goods) (Hagel and Armstrong 1997); and

(c) allow for enhanced customer profiling and customer feedback (e.g. Kannan 1998).

The value of a virtual public or series of virtual publics will relate to the size and quality of its user population, and their contributions. The virtual public component of an e-commerce strategy will need to address three issues:

(i) how best to attract individuals to a particular virtual public;
(ii) how to get people to stay; and
(iii) how to effectively manage growth.

This section shows how the model outlined above can be used to inform the virtual public component of an e-commerce strategy by examining the connection between discourse goals, segmentation strategy, and discourse architecture.

Discourse Goals

As discussed earlier, the maintainers of virtual publics need to determine the type of discourse they typically wish their virtual public to contain. If sustained interactive communication is considered essential, then a critical mass of communicators will be required. Amazon.com provides a virtual public for each of the books it sells. However, sustained interactive communication between book reviewers is not a goal, so critical mass is not an issue. For Excite's 'Virtual Places^{TM}' virtual publics, critical mass is an ongoing issue. For a number of years, Excite.com has run a public server for the avatar software Virtual Places^{TM}. Avatars are software generated visual characters that individuals use for inter-personal communication and for navigating cyber-space. With the help of 'Virtual Places', any web page is potentially a virtual public, as any web page can be used as a cyber meeting-place for group discourse (http://www.excite.com/communities/chat/ events accessed July 2000). Virtual Places discourse is synchronous and limited to 25 users. Therefore, the virtual publics they create are often highly transitory. To maintain and sustain a virtual public using such software ongoing interactive discourse is essential. Each newly created 'Virtual Places' virtual public will initially be confronted with the issue of critical mass. For this reason Excite created a web system sub-divided into six categories: peers, interests, regions, general chat, special events and adults only; where users are encouraged to gather and chat.

Where sustained interactive discourse is a goal, various techniques can be used to gain critical mass. Administrators can seed discussions by systematically encouraging a group of key individuals to contribute. Economic incentives can be given and where a number of related virtual publics already exist, group segmentation can be used to gain instant critical mass for new virtual publics.

Segmentation Strategy

The term virtual metropolis refers to collaborative systems where tens or even hundreds of thousands of individuals are engaged in public computer-mediated discourse. Those that engage in discourse via a virtual metropolis may or may not feel that they are part of a 'community' of users. 'Segmentation strategy' refers here to any systematic method used to split discourse spaces with the aim of creating a system of interrelated virtual publics. Segmentation strategy is realized through a system's discourse architecture. Virtual metropolises do not result from the large-scale growth of discourse within a single virtual public. As studies of usage show (e.g. Butler 1999), virtual publics are not 'scalable'. Therefore, a 'mega virtual public' cannot be sustained. Rather, virtual metropolises emerge from the creation of a series of related virtual publics, via the appropriate segmentation of discourse in different related cyberspaces. In turn, the resulting system of interconnected virtual publics encourages the expansion of user populations, while reducing the likelihood of overloaded virtual public discourse.

Amazon.com's segmentation strategy is straightforward; each book has its own virtual public. As the number of books Amazon sells grows, the number of virtual publics it maintains expands. Excite's segmentation strategy for 'Virtual Places^{TM}' virtual publics is to suggest chat spaces as users logon. If more than 25 users are on a particular page, users are encouraged to move to less crowded but related space. Administrators of email-lists based virtual publics have generally not had segmentation strategies. Hence, the small number of email based virtual metropolises. However, this has changed recently with the advent of free email-list management companies such as Onelist.com and Egroups.com. These companies gather many email list virtual publics into a single virtual metropolis by encouraging users to form new lists using their free services.

The need for critical mass and the appropriateness of segmentation strategy will relate to the purpose of a system of virtual publics and their technological base. We know from research into email-list discourse that boundary conditions can be identified empirically where high levels of discourse lead to a higher level of user membership turn-over (Butler 1999, Nonnecke and Preece 2000) and from research in progress (Jones 2000) that such zones lead to a reduction in message thread length. However, measures of virtual public 'crowding' are only now slowly being extracted from large-scale field studies into virtual publics discourse. These measures will provide the metrics for need to advise segmentation strategy (Jones 2000) and allow us to understand the relationship between discourse architecture and the potential to expand a virtual public.

CONCLUSION

Much of the current analysis of online discourse and their virtual spaces has 'ignored' more than a 'century's worth

of research' into community (Bruckman *et al.* 1999). Unfortunately, this situation is unlikely to change because of the popularity of applying the term 'virtual community' to nearly all forms of online discourse and discourse spaces. Further, exploring the impact and significance of the essence of 'virtual communities', computer supported social networks, is both difficult and context dependent. The focus on 'community' has distracted researchers' attention away from how 'discourse architecture' created by the interplay of technology and content, can both enable and constrain the growth of a collaborative system's user-population and participation.

It is argued that the community perspective is not generally required to make decisions about splitting online groups. The splitting of discourse spaces will not necessarily impact upon a sense of community. Many virtual publics do not have such a sense about them. As such, splitting groups should be tied to a segmentation strategy and virtual public crowding metrics as they emerge. This paper demonstrates how systems-theory can be used to inform our understanding. The model produced refocuses our attention on the factors that constrain user behaviour and discourse architecture. In regards to e-commerce strategy, the model suggests that virtual metropolises will result from the creation of many inter-related virtual publics. The rate at which this can occur will in part relate to the appropriateness of the segmentation strategy used.

Notes

1. Click through: a web advertising term. A click through is counted as a result of users clicking on an ad.
2. Churn rates relate to user retention. How many subscribers return to a website or chat space?

References

Abercrombie, N., *et al.* (1988) *Penguin Dictionary of Sociology*, Middlesex: Penguin Books.

Armstrong, A. and Hagel, J. (1995) 'The real value of online communities', *Harvard Bus. Review* 74(3): 134–140.

Bell, D. (1991) 'Modes of exchange: Gift and commodity', *Journal of Socio-Economics* 20(2): 155–167.

Bruckman, A. (1999) 'Research issues in the design of Online Communities: Report on the CHI 99 Workshop', Bruckman, A., Donath, J., Erickson, T., Kellogg, W. and Wellman, B. (eds) *SIGCHI Bulletin* (October) 31(4): 23–25.

Butler, B. (1999) 'The dynamics of electronic communities', Unpublished PhD dissertation, Graduate School of Industrial Administration, Carnegie Mellon University. Working papers available at: http://bbutler.business.pitt.edu

Chang, A. *et al.* (1999) 'Electronic communities as intermediaries: The issues and economics', *Proceedings of the 32nd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.

Chamberlain, J. (1974) 'Provision of collective goods as a function of group size', *Political Science Review* 68: 707–713.

Coate, J. (1992) 'Inn keeping in Cyberspace. Directions and implications of advanced computing', *Proceedings of DIAC* (Berkeley, CA 1992), Computer Professionals for Social Responsibility, Palo Alto, CA.

Doheny-Farina, S. (1996) *The Wired Neighborhood*, London: Yale University Press.

Fernback, J. and Thompson, B. (1995) 'Virtual communities: Abort, retry, failure?' [http://www.well.com/user/hlr/texts/VCcivil.html].

Forrester, J. (1969) *Urban Dynamics*, Cambridge, Mass: The MIT Press.

Gallaugher, J. and Wang, Y. (1999) 'Network effects and the impact of free goods: An analysis of the Web server market', *Int'l Journal of Electronic Commerce* 3(4): 67–88.

Hagel, J. and Armstrong, A. (1997) *Net gain: Expanding Markets Through Virtual Communities*, Boston, Mass: Harvard Business School Press.

Herring, S.C. (1999) 'Interactional coherence in CMC', *Proceedings of the 32nd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.

Hill, W., Stead, L., Rosenstein, M. and Furnas, G. (1995) 'Recommending and evaluating choices in a virtual community of use', *Proceedings of CHI1995*, ACM Press, 194–201.

Hiltz, S.R. and Turoff, M. (1978) *The Network Nation*, London: Addison-Wesley Publishing Company Inc.

Hof, R.D. *et al.* (1997) 'Internet communities', *Business Week European Edition*, 5 May: 38–47.

Jones, Q. (1997) 'Virtual-communities, virtual-settlements and cyber-archaeology: A theoretical outline', *Journal of Computer Mediated Communication* 3(3), [http://www.ascusc.org/jcmc/vol3/issue3/jones.html].

Jones, Q. and Rafaeli, S. (1999) 'User population and user contributions to virtual publics: A systems model', *Proceedings of Group99*, Phoenix, AZ: ACM Press.

Jones, Q. and Rafaeli, S. (2000) 'What do virtual ''Tells'' tell? Placing cybersociety research into a hierarchy of social explanation', *Proceedings of the 33rd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.

Jones, Q. (2000) 'An empirical investigation of boundaries to virtual public discourse', *Proceedings of the CHI2000*, The Hague, The Netherlands: ACM Press.

Jones, S.G. (1995) 'Cybersociety: computer-mediated communication and community', *Understanding Community in the Information Age*, Thousand Oaks, CA: Sage, pp. 10–35.

Kannan, P. *et al.* (1998) 'Marketing information on the I-Way: data junkyard or information gold mine?', *Commun. ACM 41* 3: 35–43.

Kollock, P. (1999) 'The economies of online cooperation', in M. Smith and P. Kollock (eds), London: Routledge, pp. 220–239.

Latane, B. *et al.* (1979) 'Many hands make light work: The

causes and consequences of social loafing', *Journal of Personality and Social Psychology* 37(6): 822–832.
Lechner, U. and Schmid, B.F. (2000) 'Communities and Media – Towards a reconstruction of communities on media', *Proceedings of the 33rd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.
Lewis, D. and Knowles, K.A. (1997) 'Threading electronic mail: A preliminary study', *Information Processing and Management* 33(2): 209–217.
Liu, G. (1999) 'Virtual community presence in Internet relay chatting', *Journal of Computer-mediated Communication* 5(1) [http://www.ascusc.org/jcmc/vol5/issue1/liu.html].
Malone, T.W. and Crowston, K. (1994) 'The interdisciplinary study of coordination', *ACM Comp. Surveys* 26: 87–119.
Markus, M.L. (1987) 'Toward a critical mass theory of interactive media', *Communication Research* 14: 491–511.
Markus, M.L. (1994) 'Electronic mail as the medium of managerial choice', *Organization Science* 5(4): 502–527.
McWilliams, G. (2000) 'Building Stronger Brands through Online Communities', *Sloan Management Review Spring* 41(3): 43–54.
Nonnecke, B. and Preece, J. (2000) 'Lurker demographics: Counting the silent', *Proceedings of the CHI 2000*, The Hague, The Netherlands: ACM Press.
Ojala, M. (1999) 'Information professionals meet Ecommerce', *Online* 23(5): 82–85.
Preece, J. and Ghozati, K. (1998) 'In search of empathy online', *Proceedings of A.I.S. Americas Conference*: 92–94.
Poplin, D. (1972) *Communities: A survey of theories and methods of research*, New York: Macmillan.
Rafaeli, S. and LaRose, R.J. (1993) 'Electronic bulletin boards and "public goods" explanations of collaborative mass media', *Communication Research* 20(2): 277–297.
Rafaeli, S. and Sudweeks, F. (1997) 'Networked interactivity', *Journal of Computer Mediated Communication* 2(4).
Rafaeli, S. (1988) 'Interactivity', *Sage Annual Review of Communication Research: Advancing Communication Science*, Beverly Hills: Sage, 16, 110–134.
Resnick, P. and Varian, H.R. (1997) 'Recommender systems', *Commun. ACM* 40(3): 56–58.
Rheingold, H. (1993) *The Virtual Community: Homesteading on the Electronic Frontier*, Reading, MA: Addison-Wesley.
Rheingold, H. (1999) *Presentation at the BBC online Community day*, [http://www.socio.demon.co.uk/bbc/rheingold.html], accessed June 1999.
Riggins, F.J. and Rhee, H.S. (1998) 'Toward a unified view of electronic commerce', *Commun. ACM* 41(10): 88–95.
Stanoevska-Slabeva, K. and Schmid, B.F. (2000) 'A Generic Architecture of Community Supporting Platforms based on the Concept of Media', *Proceedings of the 33rd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.
Thorn, B.K. and Connolly, T. (1987) 'Discretionary databases: A theory and some experimental findings', *Communication Research* 14: 512–528.
Turoff, M. *et al.* (1999) 'Collaborative discourse structures in computer mediated group communication', *Proceedings of the 32nd Hawaii International Conference on System Sciences*, Hawaii: IEEE Press.
Wellman, B. and Gulia, M. (1999) 'Virtual communities as virtual communities', in *Communities in Cyberspace*, P. Kollock. and M. Smith. (eds), Berkeley, CA: University of California Press.
Wenger, E. (1998) *Communities of Practice: Learning, Meaning, and Identity*, Cambridge: Cambridge University Press.
Zack, M.H. (1993) 'Interactivity and communication mode choice in ongoing management groups', *Information Systems Research* 4(3): 207–239.