

## Virtual Community Informatics: What We Know and What We Need to Know

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### Abstract

*The virtual community has just recently emerged with divergent opinions on the basic understanding of it. This study aims at collecting different definitions and classifications in the virtual community, and offers a working definition. It also addresses research conducted in the field by referring to Information Systems journals. The research categorizes the different stages in virtual community growth to show the transition of research in this area. A survey is also conducted on the extent of the adoption of informatics in virtual community web sites.*

information or feelings virtually. However, it is doubtful whether the tools that support virtual community web sites assist in relationship building and knowledge sharing.

This paper aims at comparing the different definitions and classifications of the virtual community to achieve a more compromising agreement on these basic concepts of the virtual community. Existing research on the virtual community is identified and future research topics are proposed. A survey is conducted on internet tools used in virtual community web sites, and suggestions are provided for how these tools can provide support. It is intended that these guidelines will support the virtual community research.

### 1. Introduction

With the exponential growth of the virtual community, more and more studies have been conducted on how virtual communities affect living standards by providing functions for relationship building and knowledge sharing [1, 3, 4, 6, 45]. Nevertheless, among these studies, little consensus has been reached on basic concepts such as definitions and classifications of the virtual community. Without such underlying concepts, researchers show various meanings for the same terms used. There is also a lack of research available on the topic.

The virtual community provides access for engaging in common activities, sharing feelings, or discussing ideas with others. The current practice is to build web sites and allow people to register as members who can then share

### 2. Definition of a Virtual Community

A generally agreed upon definition of a virtual community would be a good starting point. What we need is a working definition of the virtual community, a consensus found in the major stream of literature, a definition that understood by most of people. To achieve this goal, definitions of the virtual community proposed by various authors are compared in Table 1. Similar items found in definitions are then extracted in order to build up a working definition.

**Table 1: Definitions of virtual communities proposed by various authors**

Author	Definition
Howard (1993)	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.
Hagel and Armstrong (1997)	Virtual communities are computer-mediated spaces where there is a potential for an integration of content and communication with an emphasis on member-generated content.
Jones and Rafaeli (2000)	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.
Romm and Clarke (1995)	Groups of people who communicate with each other via electronic media, rather than face to face.
Craig and Zimring (2000)	A sense of community, that is, it is not guaranteed by opportunities for interaction but, rather, must grow out of interaction itself.
Hesse (1995)	A community that spins time and geography, a community that supplements buildings and streets with personal computers and information superhighways.
Erickson (1997)	Long term, computer-mediated conversations amongst large groups.
Carver (1999)	Virtual Communities are about aggregating people. People are drawn to virtual communities because they provide an engaging environment in which to connect with other people – sometimes only once, but more often in an ongoing series of interactions that create an atmosphere of trust and real insight.
Ho, Schraefel, and Chignell (2000)	Technologically mediated, persistent, environment which supports: multiple interaction styles, capability for real-time interaction, and multi-user engagement

In his definition of a virtual community, Howard [26], the primary early advocator of virtual communities and often quoted in the literature [30], includes factors that describe what a virtual community is: 1) *the Net / cyberspace* refers to activities carried out in cyberspace, to differentiate them from real community activities; 2) *public discussion* suggests that participants have discussions with one another, whether to share opinions, knowledge, feelings, or common topics of interest. There is the implication that topics are generated by participants rather than web site coordinators; 3) *personal relationship* indicates that with sufficient time, participants develop a self-sustaining relationship amongst themselves.

Hagel and Armstrong [18] focus on the content and communication aspects with special emphasis on member-generated content. Key points from their definition are: 1) *computer-mediated spaces* has a similar meaning to cyberspace and internet space when being accessed by technology; 2) *member-generated content* obviously refers to the data, information, discussion, expression, and feelings generated in discussions led by members. This helps to distinguish the virtual community from online information services.

The third definition from Jones and Rafaeli [29] uses the term ‘virtual public’ instead of virtual community. To repeat their definition: ‘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.’ Based on

this definition, virtual publics are: 1) in the *computer mediated spaces*, that is, the cyberspace arbitrated by technology; 2) *groups of individuals attending and contributing to a similar set of computer-mediated interpersonal interactions*, stressing the participants’ contributions to the interactions in cyberspace.

Romm and Clarke’s [41] definition points out only the aspect of communication, that is via electronic media. This broader definition may not sufficiently distinguish the virtual community from other web sites. However, there is still some similarity with the definition of the others. This similarity includes 1) *groups of people who communicate* indicating that participants interact with each other to share or discuss; 2) *electronic media* referring to the support of communication by technology.

In his definition of a virtual community, Hesse [22] defines it ‘as a community that spins time and geography, a community that supplements buildings and streets with personal computers and information superhighways.’ His definition focuses on the virtual community enabled by technologies designed to move *information* rather than goods and people. He appears to view the virtual community from a technical rather than human point of view. This is in contrast to the other authors who focus on the technology-based communication among groups [8, 12, 14, 25].

Based on the similar points proposed by the aforementioned authors, a working definition can be derived. The first similar point is **cyberspace**. All of the definitions state that the virtual community should be on the net, use computer-mediated spaces, or cyberspace. This point differentiates the virtual community from a real community. The second aspect in common is the usage of **technology** to support the activities in the virtual community. The different definitions directly or indirectly emphasize that access to the virtual community is through the computer or electronic media, i.e., technology. The third similar aspect is that the **content or topics of the virtual community are driven by the participants**. As mentioned, the participant driven community, not the web site coordinators, clearly distinguishes the virtual community from online information services. The final shared aspect is the successful virtual community **relationship** culminating after a certain period of communicating together.

To sum up, a working definition of a virtual community could be: a technology-supported cyberspace, centered upon communication and interaction of participants, resulting in a relationship being built up.

### 3. Classification of Virtual Communities

Authors classify virtual communities into different categories according to their underlying principals or focus. The different classifications are listed in Table 2:

**Table 2: Classifications of types of virtual community**

Author	Classified by	Types of virtual community
Hagel and Armstrong (1997)	Basic needs of human	- Interest, Relationship, Fantasy, and Transaction
Jones and Rafaeli (2000)	Use	- Transaction, business type, geographic, vertical industry, functional communities, demographic, interest, relationships, and fantasy
	Social Structure	- Virtual settlements, cyber-inns, virtual airport bar, virtual voluntary associations, other forms of social structures
	Technology Base	- Web-BBS, Web, Avatar meeting place, Usenet group, Email list, 3-D world, Text generated space, Internet relay chat, and other CMC-Technologies
Bressler (2000)	Motivation	- Communities of purpose, Communities of practice, Communities of circumstances, and Communities of interest
Carver (1999)	Not mentioned	- Interest, Relationship, Entertainment, and Commerce

Hagel and Armstrong’s [18] classification of types of virtual communities is commonly referred to in the literature [30]. In their opinion, interactions in the virtual community are based on people’s desire to meet four basic needs: interest, relationship, fantasy, and transaction. Under this classification, the *interest* need is targeted in the virtual community by aggregating a dispersed group of people who share an interest and expertise in a specific topic. The *relationship* need gives people with similar experiences the opportunity to come together and form meaningful personal relationships. The *fantasy* need provides an opportunity for people to come together and explore new worlds of fantasy and entertainment, while the *transaction* need is met online through the trading of information between participants. Hagel and Armstrong’s classification is similar to Carver’s [8], albeit with different wording for similar meaning.

Jones and Rafaeli [29] have further developed Hagel and Armstrong’s classification providing further classifications according to different focuses. These different classifications focus on use, social structure, and technology.

Bressler [5] classifies the types by motivation. The first motivation is of *purpose* where people are going through the same process or are trying to achieve a similar objective. The second motivation is of *practice* where people share the same profession, situation, or vocation. The third motivation is of *circumstances* that are similar to communities of practice, except that they are driven by position, circumstance, or life experiences rather than by professional motivation. The final motivation is of *interest* for people who share a common interest or passion. This classification comes from a more business perspective. The starting point differs from the perspective of Hagel and Armstrong who prospect a more sociological viewpoint.

Each of these classifications represents a specific understanding under different situations. We can therefore conclude that different classifications are appropriate in specific studies based on the perspective taken.

#### 4. Current Research Conducted on Virtual Communities

With the increasing importance of the virtual community, researchers are aware of the need for more research to be undertaken in the field. There is a lack of integration of the findings and a paucity of summaries of research that have been carried out. This section incorporates a list of studies that have been conducted in classification of the research topics into different types. To classify the researches of virtual community, meta-analysis conducted by authors in IS aspects have been studied [10, 32]. Finally a previous study on the meta-analysis of information technology implementation research [31] has been modified for supporting the classification of studies according to phases of virtual community growth. The growth of virtual community would be divided into five stages. The first stage is to get a **fundamental understanding** about the virtual community. It includes the derivation of underlying concepts, principals, definitions and models, etc. After having an idea of what the virtual community is, it is important to know how to build it up. Thus, in the second stage, the emphasis is on **technology development** for supporting its growth, including studies on the tools used in the virtual community and technological potential for it. After building up the virtual community, it is also necessary to understand the **functions derived and proposed adoptions** of it. This is the main focus in the third stage. The studies encompassed in this stage are the potential applications of virtual community, relationship building and knowledge sharing in the virtual community, points to be aware of when developing a virtual community, etc. The fourth stage combines the conceptual ideas and technology available into reality. This means that **implementations and outcome assessments** need to be worked out to gain experience of virtual community building and to evaluate the results. In the final stage, with sufficient understanding of the virtual community, research can link up the knowledge of the virtual community with other disciplines to enlarge its potential benefits. This is a step of **institutionalization**, including studies on the impact of the virtual community on e-commerce. The work in these five stages may not happen in sequence, and on a practical level, it is very likely that they are conducted in parallel.

In addition to the above summary, five top IS journals suggested by previous findings [10, 19, 36] have been reviewed with the details shown in Table 3. It is noted that there were very few studies that could be extracted from these top journals.

**Table 3: Top IS Journals Studied**

Journal	No. of articles coded
MIS Quarterly	2
Information Systems Research	0
Management Science	0
Communications of ACM	10
Journal of Management Information Systems	0

In view of the lack of studies, other sources have also been included in the list shown in Table 4.

**Table 4: Research conducted on the virtual Community**

Research Type	Source	Author	Research Topic
Basic Research	ACIS	Romm and Clarke (1995)	Virtual Community Research Themes: A Preliminary Draft for A Comprehensive Model
	ACM	Igbaria (1999)	The Driving Forces in the Virtual Society
	IEEE	Ho, Schraefel, and Chignell (2000)	Towards an Evaluation Methodology for the Development of Research-Oriented Virtual Communities
	Information Research	Burnett (2000)	Information exchange in virtual communities: a typology
	International Journal of Electronic Commerce & Business Media	Jones and Rafaeli (2000)	Time to Split, Virtually: 'Discourse Architecture' and 'Community Building' as means to Creating Vibrant Virtual Metropolises
	International Journal of Information Management	Romm, Pliskin, and Clarke (1997)	Virtual Communities and Society: Toward an Integrative Three Phase Model
	Journal of Computer Mediated Communication	Jones (1997)	Virtual-Communities, Virtual Settlements & Cyber-Archaeology: A Theoretical Outline
Technology development	ACM	Hattori, Ohguro, and Yokoo (1999)	Socialware: Multiagent Systems for Supporting Network Communities
	HICSS	Bieber, Engelbart, Furuta, Hiltz, Noll, Preece, Stohr, Turoff, and Van De Walle (2001)	Virtual Community Knowledge Evolution
	MIS Quarterly	Goodman and Darr (1998)	Computer-Aided Systems and Communities: Mechanisms for Organizational Learning in Distributed Environments
Functions derived and adoption	ACM	Berghel (2001)	A Cyber publishing Manifesto
	ACM	Cowan, Mayfield, Tompa, and Gasparini (1998)	New Role for Community Networks
	ACM	Faucheux (1997)	How Virtual Organizing is Transforming Management Science
	HICSS	Swan (2001)	Knowledge Management in Action: Integrating Knowledge Across Communities
	HICSS	Stanoevska-Slabeva and Schmid (2001)	A Typology of Online Communities and Community Supporting Platforms
	IEEE	Zhang, Chang, and Read (2000)	Virtual Communities and Multimedia Virtual Conference – An Ambassador-based Approach
	IEEE	Erickson (1997)	Social Interaction on the Net: Virtual Community as Participatory Genre
	Information & Management	Pliskin and Romm (1997)	The impact of e-mail on the evolution of a virtual community during a strike
Implementation and outcome assessment	International Journal of Information Management	Wachter, Gupta, and Quaddus (2000)	IT takes a village: Virtual communities in supporting of education
	ACM	Marlino, Sumner, Fulker, Manduca, and Mogk (2001)	The Digital Library for Earth System Education: Building Community, Building The Library
	ACM	Hiltz and Wellman (1997)	Asynchronous Learning Networks as a Virtual Classroom
	ACM	Chellappa, Barus, and Whinston (1997)	An Electronic Infrastructure for A Virtual University
	ACM	Hardwick and Bolton (1997)	The Industrial Virtual Enterprise
	Computer Communications	Rao (1998)	India Network – the first case study of a virtual community
	Computers & Education	Pearson (1999)	Electronic networking in initial teacher education: is a virtual faculty of education possible?
	HICSS	Hesse (1995)	Curb Cuts in the Virtual Community: Telework and Persons with Disabilities
	IEEE	Emmen (1999)	Establishing a Virtual Medical Worlds Community
Institutionalization	MIS Quarterly	Majchrzak, Rice, Malhotra, King, and Ba (2000)	Technology Adaptation: The Case of a Computer-Supported Inter-organizational Virtual Team
	ACM	Singh, Yu, and Venkatraman (2001)	Community-based Service Location
	European Management Journal	Kozinets (1999)	E-Tribalized Marketing?: The Strategic Implications of Virtual Communities of Consumption
	Sloan Management Review	McWilliam (2000)	Building Stronger Brands through Online Communities

A look at the above list of articles indicates that studies on the virtual community are not the main focus of the IS

field although it is receiving increasing attention. Most of the existing studies focus on defining the basic concepts of

the virtual community and the attempts to adopt or implement the virtual community. Another point raised from the list is that there is a lack of studies on technology development for supporting the virtual community and also a deficiency in investigating the relationship between the virtual community and other IS disciplines. It is surprising that although the virtual community can be referred to as a computer-mediated community, technology plays an important role to support its growth. Few studies have been conducted to propose how technology can enhance its development. Based on these points, it can be concluded that the development of the virtual community is still at an early stage and little research has been conducted, especially in the technology development aspects.

### 5. Direction for future research on virtual community

There are prospective topics of studies that could be valuable contributions to the area of virtual communities. The following topics are some of the proposed research questions that could be studied further.

The first proposed research topic is: Meta-analysis of research in virtual community. The suggested methodology is to build a hypothesis and test on the trend of researches in the virtual community and the methodologies adopted. The second proposed research topics is: Impact of Informatics to support communication in virtual community. The way to work it out can be to find out which tools are used in the virtual community web sites. Based on the existing tools and proposed Informatics, experimental web sites are developed and questionnaires are collected on the perspectives on the web sites that are supported by different tools. Socio-Technical Theory can be applied in this study. The third proposed topic is: Knowledge Transfer in virtual community. A case study can be conducted on some of the virtual community web sites and evaluations are carried out on the process of how knowledge is transferred via these communities. The fourth topic is: A review on technology-supported relationship. A case study on the virtual community web sites can be performed to see how a relationship is built up. Technology Acceptance Model can be referred to justify how technology influences a relationship in the virtual community. The fifth proposed topic is: User Interface Design of virtual community to differentiate from online information services. Surveys can be conducted on various virtual communities and online information services web sites. Then different characteristics on user interface design for the two types of web sites can be defined and compared. Game Theory may be applied in this study. The final one proposed in this study is: Longitudinal Study on technology adoption in virtual community. To work it out, surveys can be performed on virtual community web sites during two time periods to find out the tools adopted and to compare the difference of them. Technology Adoption theory can be used to explain the phenomenon.

### 6. Survey on Adopting Informatics in Virtual Community Web Sites

One of the aspects of concern in the virtual community is how technology can help to support its growth. Since the virtual community is located in cyberspace that uses technology to operate its functions, there is the need to take into consideration the requirements of participants. In other words, it is an issue that combines both technology and social aspects. This study suggests using community informatics (CI) to support the development of the virtual community because community informatics is concerned with the question of how communities, community affairs, and “civil society” in general are interpenetrated, enhanced, and enabled through the use of Information and Communication Technologies (ICT) [17]. It can also be viewed as a promising strategy for taking advantage of ICT to further the goals of community development [38]. Informatics can refer to a large variety of tools. They range from e-mail and forums to decentralized computing linked together and networks of Telecentres that support the communications.

In order to propose how informatics can help the virtual community to grow, we must first understand how it supports the virtual community in the current situation. In this section, the results of a survey conducted on existing virtual community web sites indicate which tools are used to support these web sites. The results will contribute to our understanding of the current situation, which in turn will assist researchers in proposing what can be done to improve the situation.

The virtual community web sites selected in this survey include those searched from the dominant search engines – Yahoo.com and Google.com. A search was conducted under the key words “virtual community”. It was surprising that the number of web sites searched in Yahoo.com and Google.com was 490 and 1,320,000 respectively. Although both are very popular search engines, the number of virtual community web sites linked to them show a great difference. The reason may be due to the segmentation of a search engine visitor. Since Google.com is a more referential search engine in the academic field, most academics prefer to link their web sites to Google.com. This is supported by Figure 1 that shows the number of fantasy types has the largest proportion (44%) in Google.com. Another possible reason for the difference in number is the different web site classification systems which warrants investigation.

Search Engine	Types of virtual community				Inaccessible
	Interest	Relationship	Fantasy	Transaction	
Yahoo.com	43 (48%)	21 (23%)	16 (18%)	10 (11%)	10
Google.com	21 (26%)	14 (18%)	35 (44%)	10 (12%)	8
<b>Total</b>	<b>64 (38%)</b>	<b>35 (20%)</b>	<b>51 (30%)</b>	<b>20 (12%)</b>	<b>18</b>

Figure 1: Types of virtual communities in virtual community web sites

Web sites grouped under the four types classified by Hagel and Armstrong (see Table 2) come from a more sociological perspective than what can be correlated to this study which looks at the issue from a technological and sociological view point. Figure 1 shows the distribution of Hagel and Armstrong's four community types for the web sites searched. The samples include the first 100 web sites from both Yahoo.com and Google.com that sum up to 200 web sites. However, 12 web sites in the first 100 ones in Google.com duplicate with those in Yahoo.com and there are 18 inaccessible web sites among the samples, resulting in 170 useful web sites for the study. Among these 170 web sites, 38% belong to the interest type, 20% belong to the relationship type, and the balance 30% and 12% belong to fantasy and transaction types respectively. It should also be noted that the classification in this survey is based on the focus of the web sites studied, not whether the web site could really provide that function.

The results of the study shows that in Yahoo.com, there are 10 out of the first 20 web sites which provide tools for participants' communication, 5 out of the second 20 web sites, 6 out of the third 20 web sites, 6 out of the fourth 20 web sites, and 4 out of the fifth 20 web sites. For Google.com, including the duplicated sites, there are 4 out of the first 20 web sites having tools for participants' communication, 4 out of the second 20 web sites, 7 out of the third 20 web sites, 12 out of the fourth 20 web sites, and 10 out of the fifth 20 web sites. The counting includes only the accessible web sites. This result shows that although there are many web sites that call themselves "virtual communities", not all of them provide tools or functions to support communication. Many of these web sites are just online information services web sites, such as Danville Virtual Community (<http://danvillevirtual.com/>) that just provides services for internet web site building. Most of the named virtual library web sites, such as Virtual Reference Library (<http://vrl.tpl.toronto.on.ca/>), Cleveland Digital Library (<http://web.ulib.csuohio.edu/SpecColl/cdl/>), Michigan Virtual Learning Collaborative (<http://www.siweb.com/mvu-courses/virtualcampus/>) just provide linkages to search information for the participants, but they do not facilitate communication between the participants. These kinds of web sites usually provide contact means to the web site builder only, but do very little for the participants of the site.

To understand which tools are used in the virtual community, Figure 2 shows the frequency of tools used in the sample web sites. The tools listed in the figure include the most popular types of tools: e-mail, forums, message boards / bulletin boards, and chatrooms. These are some primitive tools that support sharing and message delivering among participants to some extent. Among these tools, forums gain the most percentage on adoption, followed by chatrooms, e-mail, and message boards.

Search Engine	Tools				
	E-mail	Forums / Discussion Board	Message Board / Bulletin Board	Chatroom	Other
Yahoo.com	16	15	9	11	Intranet
Google.com	7	21	10	13	Newsletter whiteboard
<b>Total</b>	<b>23</b>	<b>36</b>	<b>19</b>	<b>24</b>	

**Figure 2: Tools used in the sample virtual community web sites**

Taking a closer look at these most commonly adopted tools, Nancy White suggests that e-mail can be individualized or sent to a larger list of recipients. This is always the first and easiest tool to consider. However, it is also very easy to abuse, creating useless junk email or "spam" which can alienate the audience [49]. Forums are designed to support a debate that goes on for an extended period of time, not to give a quick hint of popular opinion [17]. In a forum, people come together online for discussion of a common interest topic or topics [43]. Bulletin boards are comprised of dial-in electronic space, which can store transmitted electronic messages. Individuals can dial into the board to retrieve the range of messages placed there, including those that might have been specifically left for them [17]. Chatrooms have interactions usually with small groups for a very low cost. However, a time needs to be chosen that works for the target audience, which becomes increasingly difficult as we expand to global audiences and groups [49]. Apart from these popular tools, internet broadcast that allows a one-to-many presentation via the web and the traditional methods that include telephone conferencing and video conferencing are some less frequently used examples to support communication in virtual communities.

Although the use of these simple tools to support communication in the virtual community is frequently used today, there is a question of their ability to support knowledge transfer among the participants. It is also doubtful whether these tools can help the participants to share in depth and whether the interaction will result in building up relationships.

## 7. Conclusion

The results of this study help to build up a consensus on the virtual community definition: a technology-supported cyberspace centered upon communication and interaction of participants, resulting in a relationship being built up. The different types of classifications suggest that researchers can adopt a particular classification according to their research focus. The findings of studies conducted on the virtual community can help researchers gain a clearer vision of the deficiency of existing research and the potential of future studies. The proposed research on the virtual community suggests some examples on what can be worked on for virtual communities and how to conduct these studies. Finally, this study discusses the tools for

supporting virtual community web sites. Although it does not cover all the virtual community web sites, the results reflect a lack of informatics adopted in the field. This may lead to researchers proposing richer informatics to support the development of the virtual community.

In conclusion, this study points out that research in the virtual community is still in an initial stage with many areas left for researchers to investigate. To support the growth of the virtual community, informatics is definitely a powerful tool to facilitate the functions of relationship building and knowledge sharing.

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**Appendix 1: Tools used in virtual community web sites**

Interest Type:

Virtual Community Web Site	URL of virtual community web site	Description	Tools used
Virtual Valley Electronic Community	<a href="http://www.virtual-valley.com/">www.virtual-valley.com/</a>	Life in Virtual Valley Electronic Community	- e-mail - chatroom
BeeTown Virtual Community	<a href="http://www.beetown.com/">www.beetown.com/</a>	Web site provides information on various interest, e.g. travel, employment, etc.	- e-mail - forum - chatroom
Community Virtual Mall	<a href="http://virtmall.com/">virtmall.com/</a>	Introduction on MetroWest	- e-mail
Virtual Community Of Mission	<a href="http://www.mission-city.com/">www.mission-city.com/</a>	Providing information on web hosting	- e-mail - chatroom
Lycos Communities	<a href="http://clubs.lycos.com">clubs.lycos.com</a>	Web site provides various interests	- message board - chatroom
Kennewick	<a href="http://www.kennewick">www.kennewick</a>	Sharing on information	- forum

Man Virtual Interpretive Center	<a href="http://-man.com/">-man.com/</a>	about Kennewick Man	
MSN Web Communities	<a href="http://communities.msn.com/home">communities.msn.com/home</a>	Web site provides information on various interest, e.g. sports, lifestyle, computer, etc.	- e-mail - chatroom
British Columbia Community System	<a href="http://dhbit.ca/">dhbit.ca/</a>	Providing a chance for members to share about topics in technology	- forum - chatroom
Virtual Brighton and Hove	<a href="http://www.brighton.co.uk/">www.brighton.co.uk/</a>	Web site provides information on leisure and entertainment	- e-mail - discussion forum
Theatre Virtual	<a href="http://www.teatrevirtual-mercatflors.net/">www.teatrevirtual-mercatflors.net/</a>	Web site to explore real connections between Theatre and the Internet.	- forum
Kmt	<a href="http://www.thinkofit.com/webconf/weblooks.htm">www.thinkofit.com/webconf/weblooks.htm</a>	A virtual community dedicated to ancient Egypt	-bulletin board -chatroom
VTOS.net	<a href="http://www.tvos.net/">www.tvos.net/</a>		-chatroom
EFF Net Culture	<a href="http://www.eff.org/pub/Net_culture/Virtual_community/">www.eff.org/pub/Net_culture/Virtual_community/</a>	Information of Electronic Frontier Foundation	-bulletin board
Ourwest.com	<a href="http://www.cbvcp.com/">www.cbvcp.com/</a>	Web site for various interest, e.g. game, arts, card, etc.	-forum
Butler County Virtual Community	<a href="http://freepages.history.rootsweb.com/~butlercounty/">freepages.history.rootsweb.com/~butlercounty/</a>	Life in Butler County Historical Society's Virtual Community	-forum -chat
The Fifth Goddess	<a href="http://www.fifthgoddess.com/">www.fifthgoddess.com/</a>	Web site for building spiritual foundation	-forum -chat -newsletter
DreamGate virtual community development	<a href="http://www.dreamgate.com/dgvc_01.htm">www.dreamgate.com/dgvc_01.htm</a>	Information about dream research	-e-mail -discussion forum
East Kilbride Online - Home Page	<a href="http://www.eastkilbrideonline.com/">www.eastkilbrideonline.com/</a>	Information on various interest: horoscopes, games, etc.	-discussion forum -chatroom
Old English Sheepdog Chat Room	<a href="http://thor.prohosting.com/~sheepdog">thor.prohosting.com/~sheepdog</a>	Discussion on old English Sheepdog for Sheepie lovers	-e-mail -bulletin board -chatroom
The Hunting Trail	<a href="http://www.hunting-trail.com/">www.hunting-trail.com/</a>	Games on hunting	-message board -chatroom -newsletter
Starting a virtual community	<a href="http://www.nwfusion.com/newsletters/web/0511web1.html">www.nwfusion.com/newsletters/web/0511web1.html</a>	Experience shared on building virtual community	-forum -newsletter
The Virtual Community	<a href="http://www.ezboard.com">www.ezboard.com</a>	Sharing on movies	-forum

Relationship Type:

Virtual Community Web Site	URL of virtual community web site	Description	Tools used
Virtual Center Of The Sephardic Community	www.bsz.org/	Linking up members in Sephardic Community	- e-mail
Worldwide Virtual Community of the Disabled	www.linkable.org/	Linking home pages of disables people	- e-mail
Montrose Virtual Community	www.Montrose.org/	Web site provides free web page hosting and links for the people	- e-mail - intranet
Virtual Community	www.virtual-community.com/	Linking up people and providing information for members of virtual communities in UK	- forum
Dallas Virtual Jewish Community	www.dvjc.org/	Assisting the members of Dallas Virtual Jewish Community on organizing text seminar, culture, etc.	- forum
Mount Pleasant Virtual Community	www.lcsystems.com/mtp/	Providing services and information to Mount Pleasant residents	- e-mail - forum
Youthnet	www.youthnet.org.sg/	Linking up youth through joke, contest, etc.	- chatroom - "dare dare" (message sent to specific person)
Asianworld.com	www.asianworld.com/	An online community for people of Asian background and beyond	- e-mail - message board - chatroom
Virtual Jerusalem	www.virtualjerusalem.com/	Providing information and helping build up relationship among Jewish	- e-mail - forum - message board - chatroom
Virtual Chicago	www.vchicago.org/	A program geared toward education through cultural and intellectual exchange	- e-mail - chatroom
Virtual Mayor	www.virtualmayor.com/	Facilitating easy access to Representative in Parliament	- message board
Well, The	www.well.com/	A Story of Love, Death and Real Life in the Seminal Online Community	- e-mail - discussion board
bianca	www.bianca.com/	Helping to bring members together and share on different topics	- forum - chatroom
Mishpacha: A Virtual Community for Real Jewish Parents	www.mishpacha.org/	Providing guideposts to Jewish belief, practice and community, as well as a group of fellow travelers to join together	- discussion board
One Vision Virtual Community	www.onevision.org.uk/	Web site encourages people to seek the common ground in all belief systems	- forum
Beaufort County's Original Virtual Community	www.beaufort-county.com/	Services to members of Beaufort County	- bulletin board
Virtual SLA	www.sla.org/con	Providing members with a	- discussion

	tent/interactive/index.cfm	channel for internet connection	- board - chatroom
IAmFromKorea.Net: community	www.iamfromkorea.net/	Linking up Korean from all over the world	- chatroom
Spruce Harbor.com	www.spruceharbor.com/	Life in Spruce Harbor	- chatroom
Visitation Virtual Community	www.ee.cua.edu/~georgvis/virtual/virtual.htm	Life in Georgetown Visitation	- bulletin board
Dallas Virtual Jewish Community	www.dvjc.org/	Web site promotes Jewish culture, education & scholarship	- discussion forum
GoKaty.com	www.gokaty.com/	Life & information in Katy, Texas	- forum - message board

Fantasy Type:

Virtual Community Web Site	URL of virtual community web site	Description	Tools used
Online Community Report	www.onlinecommunityreport.com/	Web site provides report on current events and trends in online communities, including book review.	-discussion board
Haptics Community, The	haptic.mech.nwu.edu/	Providing online resource for researchers in the haptic display community	-bulletin board
EdGateway Communities	edgateway.net/	Providing resources and discussion for educators	-e-mail -message board
Virtual College of Texas	www.vct.org/	Providing Texans access to quality instruction and support regardless of distance or time constraints	-discussion forum
Virtual Reference Desk	www.vrd.org/	Information about Virtual Reference Desk (VRD) that is a project dedicated to the advancement of digital reference and the successful creation and operation of human-mediated, Internet-based information services.	-discussion board
Electric Minds	www.minds.com	Holding various conference for members to discuss	-chatroom
The Virtual Community Bookstore	www.thinkofit.com/webconf/wcbooks.htm	Helping users to choose software and build an online space for virtual community or virtual teams	-forum -whiteboard
Ecclesfield School Virtual Community	www.esvc.free-serve.co.uk/	Discussion place for members of Ecclesfield School, Sheffield, UK	-forum
IndustryCommunity.com - Industrial Virtual Community	www.industrycommunity.com/	Provide assistance on searching solution of a specific technical problem	-forum
Integrity Home School Virtual Community for Idaho and Beyond	integrityhs.hypermart.net/	Information for parents and children for distance learning	-e-mail
VCC - English Home	edu.coop.org/	Information on development of co-operative movement	-forum
MSVCC Home	www.msvcc.org/	Information for Mississippi Virtual Community College	-discussion forum
Developing a Virtual Community for Student Groupwork	cssec.co.umist.ac.uk/	A project funded under the Joint Information Systems Committee Technology Applications Programme	-e-mail
ASTD	www.astd.org/	Information on workplace learning & performance issues	-discussion forum
Virtual Community Presence in Internet Relay Chatting	www.ascusc.org/jcmc/vol5/issue1/liu.html	Article on virtual community presence	-message board
TechSoup.org	www.techsoup.org/articlepage.cfm?articleid=177&topicid=5	Technical support for non-profit making organization	-message board

Transaction Type:

Virtual Community Web Site	URL of virtual community web site	Description	Tools used
Virtual Community of Associations	www.vcanet.org/	Supporting association for association executives in Greater Washington	- forum
Virtual Virginia Agricultural Community	www.vvac.org/	Web site to bring together Virginia's diverse agricultural industry into an electronic "virtual community" describing and supporting the state's agriculture.	- e-mail - bulletin board
BestWeb Internet	www.bestweb.net/	Shopping guide for gifts, mp3, beauty, etc.	- message board
cenla.com - welcome	www.cenla.com/	Shopping on beauty, real estate, etc.	- chatroom
Drug Discovery Online	www.drugdiscoveryonline.com/	Online marketplace and information for drug industry	- e-mail - discussion forum - newsletter
Bioresearch Online	www.bioresearchonline.com/	Online marketplace and information on bioresearch	- e-mail - discussion forum - newsletter
Water Online	www.wateronline.com/	Online marketplace and information on water treatment	- e-mail - discussion forum - newsletter
JPT	www.jpt.com	Life in LockOn Communities	- message board - chatroom