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Key Issues in Desktop Video Conferencing: An Exploratory Examination of an Electronic Community

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Abstract

Desktop Video Conferencing (DVC) allows individuals to share video, audio and text communications from their personal computers. Electronic communities link users that share a common interest. By studying one such community dedicated to DVC technology using a content analysis methodology, we hope to discover insights into this much-touted technology.

Introduction

Desktop Video Conferencing (DVC) continues to excite the imagination but seems stagnated in an endless loop of incremental improvements.   Academic and practitioner articles expound the eventual adoption of DVC as part of routine business transactions and customer service applications but adoption lags behind intent. Some have proposed that DVC could have the potential to alter interorganizational (e.g. electronic commerce) and intraorganizational (e.g. DSS, group dynamics) and ultimately basic societal relationships. The expansion of business and interpersonal applications through increased bandwidth will allow participants to visualize unrealized product and service representations that seek to leverage opportunities and understanding. This research looks at early adopters of DVC through an exploratory empirical examination of their technological concerns as expressed through an electronic community.

Background

The Internet reduces barriers to communication by allowing individuals to communicate with a minimal level of difficulty or expense. Low communication barriers foster the development of almost an endless variety of special interest groups. These groups allow the formation of electronic communities centered on the common interests of the participants despite their location or status (Armstrong and Hagel, 1996). The Internet supports a variety of communication strategies including chat rooms for synchronous (one to many) communication or e-mail for direct (one to one) asynchronous communications. One of the oldest and most widespread forms of group communication is the "List-serve." Voluntary adoption and one-to-many asynchronous communication characterize list-serves. An interested party joins the community by sending their email address to a mechanized server that then allows that person to send and receive communications from all the members of the electronic community.

The study of information systems is driven by technological change. To understand the impact of an evolving technology such as DVC it is critical that we observe those users who have adopted this technology to access their insight. The MIS literature has a rich history of polling practitioners to identify their concerns (Brancheau, Janz and Wetherbe, 1996). Traditionally this research has been carried out through the active participation of users (e.g. Delphi, survey, and case). Because participates know they are being observed this may alter their responses as noted in the "Hawthorne effect" (Babbie, 1989). A respondent may also not express a true concern because it could be perceived as foolish or politically sensitive. Potential temporal limitations may exist because the subject is required to recall and synthesis concerns after the fact. This could result in their responses being colored further by hindsight. The participants' response might also be altered by the general deterioration of memory. The research can also be limited by self-selection that may cause appropriate participants to decide not to respond. List-serve communications offer an opportunity to use unobtrusive techniques that access a wider pool of candidates, which would include subjects that would normally not participate in a study.

Content analysis is a research methodology that allows researchers to unobtrusively study their subjects as their concerns are recorded. Content analysis has traditionally been a qualitative research technique that extracts data from communications via a set of predefined classification or categorization procedures. Historically it has been used to examined all forms of both and oral written communication, however the advent of electronic communities which are supported by digitized text afford the opportunity to use this analysis method to examine electronic communication. This would allow the researcher to overcome the temporal related weaknesses associated with other methodologies. These issues are captured at the time of their occurrence via e-mail and stored as archives of the list-serve. Since the observation of the subjects actions or concerns are recorded

unobtrusively, list-serve participant responses will be unaffected by the researchers interest or indirect participation. Also, because the subjects' concerns are motivated by the desire to address immediate concerns, their inclusion in daily dialogue is not altered by their willingness to respond to a questionnaire or interview.

The primary weakness of content analysis centers on the establishment and application of appropriate classification techniques. The researcher could unconsciously bias classifications to support study objectives or vary in the application of grouping criteria. Computerized content analysis as a methodology offers the potential for reducing the opportunity for researcher bias, the consistent use of coding schemes, the easy manipulation of text and the ability to process large amounts of data (Morris, 1994).

Methodology

The CU-SEE-ME list-serve was selected as an electronic community to study DVC. CU-SEE-ME is a low cost commonly available DVC freeware software program (commercial version available) that is widely available and downloadable so that it provides minimal barriers to entry for both business and individual users of DVC technology. Internet based technology increases the likelihood that users of CU-SEE-ME would also be familiar with and have access to other list-serves. This list-serve is one the oldest and most active electronic communities focused for this technology.

All e-mail messages, including date, author, subject line title and message content (note all-inclusive nature of material) were downloaded from the CU-SEE-ME database for 1997. The subject lines and authors were stripped from the messages and analyzed. Additionally, raw measures of message and author frequency were determined. Content analysis was carried out through the use of "Catpac". Catpac is a self-organizing artificial network program that is optimized for reading text. Catpac is able to identify the most important words in a text and determine patterns of similarity based on the way words are used in the text. It does this by assigning a neuron to each major word and then by forming a pattern of weights representing complete information about the similarities among all words in the text. Neural networks have been successfully used in medicine, marketing, accounting, and finance (Swales and Yoon, 1992).

Results

The success of this research is based on the implicate assumption that the CU-SEE-ME list serve is a valid electronic community dedicated to the understanding of DVC. The validity of this contention can be initially evaluated by examining the stability and relative commitment of the community. As shown in Figure 1, the frequency of messages and the numbers of list-serve participants in 1997 is relatively constant. This suggests that the list-serve is representative of a stable and ongoing electronic community of interested and dedicated DVC users. List-serves represent an environment where individuals could gain and share knowledge as well as concerns with other interested parties. The result is a network of interpersonal channels of communication that support the use of technology (Brancheau and Wetherbe, 1990).
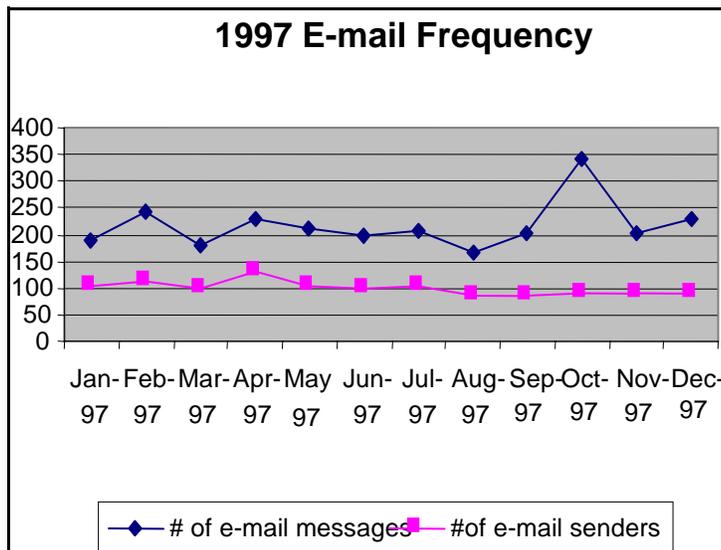
The frequency analysis also suggests that DVC experts or channel leaders may have a substantial impact on the electronic community. 35.8% of the messages were sent by 2 people (427 of 1193). 34.3% of the messages (409 of 1193) were people who sent only one message the entire year. These people were interesting in getting their concerns addressed and did not participate in addressing the concerns of other members. Preliminary analysis suggests that a few key members of this list-serve represent a repository of expertise for the DVC community. Our evaluation of the DVC community social interactions will require more time and analysis. In the future, our evaluation may include in-depth interviews with these channel leaders.

An iterative analytic process of refinement consisting of the elimination of redundant and ambiguous terms was used to identify technology issues. Figure 2 illustrates the rank ordering of the five most cited concerns of the DVC users based both on the raw frequency in which the topic was mentioned and also it relationship to the database and localized frame. This process relates both overall

1997 E-mail Frequency

Legend: # of e-mail messages, #of e-mail senders

Figure 1

interest in terms of frequency and the relative intensity of issues as reflected in the temporal proximity (discussion topic threads) of the concerns. The most often cited concern dealt with the basic ability to effect the quality of the audio transmission. The second issue dealt with the application of DVC to Chat groups. The third ranked topic of discussion dealt with the ability of the users to control transmission security. The final concerns address hardware issues associated with modems and quickcam/camera use, respectively.

These issues were then related to each other through a neural networked-based cluster analysis. This process clustered the concerns based on the proximity of the concepts to each other. The locations of the issues were determined by the focus of the discussions during the related frame. In other words, topics that were discussed together would have an increased likelihood of loading into the same group. The clustering was carryout independently using both the Centroid and Ward cluster grouping techniques with identical results. The five concerns loaded into two groups. Audio, Modem and Cam concerns formed one group, while Chat and Security issues formed another. This appears to represent a clear delineation between issues concerned with basic operation of the system (e.g. those dealing with audio quality and hardware operations) and those associated with more complex application and social concerns.

Ranking	Description	Group
1 Audio	Quality of Audio	1
2 Chat	Chat Groups	2
3 Security	Security of Transmissions	2
4 Modem	Hardware Issues	1
5 Cam	Camera Use	1
Top Five Issues of Desktop Video Conferencing		

Figure 2

Future Directions and Limitations

Future research will expand the data set to include messages from the community's inception beginning in 1994. This richer database in combination with a more detailed analysis of the e-mail messages shared by the members should allow for a more complete understanding of both the concerns and interactions of the community. There is also the potential for multi-methodological research, which could include both structured interviews and a general survey of the members based on the insights gained from content analysis. In addition, this methodology can be expanded to examine almost any electronic community.

This exploratory study focused on a single list serve and technology and thus any expansion of these finding to other environments and technologies should only be carried out with due care. In the future, as our traditional social structures are replaced and augmented by the wider availability of computer and telecommunications technology, the impact and pervasiveness of electronic communities will only grow. This study represents another step and an alternative path in understanding DVC technology. It also provides MIS researchers another window to observe computer mediated interaction as well as providing an improved technique for understanding these phenomena.

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