
Coping with a MEDLIB-L service outage

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Objective: The study assessed the coping strategies of MEDLIB-L subscribers during an unexpected disruption in the list's service.

Methods: An online survey of MEDLIB-L subscribers was performed following a six-day service outage in August 1999.

Results: Respondents' information needs resulted in two distinct coping strategies. Subscribers without a recognized information need or an information need determined to be not pressing coped by waiting out the interruption. Subscribers with pressing information needs turned to alternative methods of resolving these needs.

Conclusions: While most respondents missed the list and the assistance that it provided, many did not feel that the outage required significant coping strategies. The outage was viewed as a "minor stressor" and did not require secondary-level assessment of the availability and suitability of alternative resources.

INTRODUCTION

On August 24, 1999, the Medical Libraries Discussion List (MEDLIB-L) unexpectedly went down. The service outage lasted six days and left the discussion list's participants, including medical librarians and other health information professionals, without their accustomed forum for exchanging questions, concerns, announcements, and ideas. MEDLIB-L has been in existence since 1991, when it was started at the Health Sciences Library at the State University of New York at Buffalo, and is currently managed by the Medical Library Association (MLA).

Technological glitches such as the MEDLIB-L service outage are emerging as familiar occurrences of an information technology-based society. For example, in 1999, the Melissa and Love Bug viruses shut down email servers and cost millions of dollars in lost commerce, in addition to the time, energy, and money lost by government agencies, researchers, and students. As professional work and communication become more and more dependent on stable electronic networks, questions arise as to how those who experience interruptions in their electronic communication cope. The

concepts of "cope" and "coping behavior" are defined in the psychological literature as "conscious strategies used by individuals encountering stressful or upsetting situations" [1]. This preliminary study has been conducted to explore how MEDLIB-L subscribers coped during the August 1999 service outage. Did health information professionals rely on alternative procedures and practices when faced with the sudden MEDLIB-L service interruption? Did they simply wait out the outage? What did their coping strategies indicate about the urgency or importance of MEDLIB-L to fulfilling their information needs?

REVIEW OF LITERATURE

Discussion lists such as MEDLIB-L have become forums for information seeking, monitoring, and sharing. Through their work, library and information science (LIS) professionals have been early adopters of the information technologies used to access and share information. As a keystone species [2] of the information society, examining this use is instructive to better understand the impact of new modes of communication on practice. Research into the use and uses of

electronic discussion groups has identified patterns of user behavior. For example, although many researchers and LIS professionals subscribe to discussion lists or read electronic discussion groups, few actively participate to the same degree that they use private email [3–7]. Membership in electronic discussion groups is also known to be transient due to mismatches between subscribers' expectations about the content, social norms, and management of these information exchanges and the actual reality of the lists [8, 9].

A previous study of MEDLIB-L usage conducted by Schoch and Shooshan [10] found that 72.1% of the respondents had continuously subscribed and that 64.8% had at some time sent a "nomail" command to the list. Active participation in MEDLIB-L, measured in terms of posting or responding to discussion list postings, was found to be infrequent (less than once per month) and pertained mostly to asking and answering questions and discussing products and procedures. Participants also tended to respond to postings rather than initiate postings. Most participants claimed to read 41% to 100% of the postings, while less than 20% claimed to read 91% to 100% of the postings, a finding that led the researchers to feel that most "participants did not find the entire enterprise useful and are probably filtering messages that they believe to be most relevant or useful" [11]. From this study, a conclusion could be drawn that for at least some subscribers, MEDLIB-L was a source they relied on for giving or gathering information. The MEDLIB-L outage thus presented an opportunity to study how users coped with an interruption in service. The authors also felt that the outage provided subscribers with enough "down-time" that they might have missed the services or connectivity they came to expect as MEDLIB-L subscribers.

Research and theoretical work in the area of coping strategies has been used to provide a foundation for examining this information behavior. Information behavior encompasses how people need, seek, give, and use information in a variety of contexts. By examining coping behavior, researchers have gained an understanding of the patterns in information seeking ranging from health-related contexts [12–14] to contexts such as war zones [15]. For example, theories such as Miller's [16] blunting and monitoring of information during stressful events have been used to explain the information behavior of women with multiple sclerosis [17]. Although the context under examination in the present study does not involve the kind of stress and coping behaviors that one will find when people are dealing with health problems or war zones, we are examining a situation in which employees may experience stress in their work activities. Examining information behavior via coping strategies may help provide insight into the ways that information profession-

als cope with interruptions in their technology-based communication network.

In the present study, Lazarus and Folkman's [18] framework for analyzing coping strategies has been used to interpret how MEDLIB-L users assessed the service outage. Lazarus and Folkman define coping as what people actually do or think to appraise and subsequently manage the demands of a particular stressful situation. Coping situations are often described by examining how one reacts to stress or stressors. The reactions are often affected by how one assesses the resources available to reduce the effects of stress or stressors. This act of appraisal is important to researchers concerned with coping strategies, because it places attention on the thoughts, feelings, and actions of the coping individual, not the source of stress itself [19]. Appraisal is conducted at two levels: the primary level, in which a situation is evaluated to determine if the demands of the situation are likely to be stressful, and the secondary level, in which judgments are made regarding the availability and suitability of resources and likely outcomes [20].

The decision to use Lazarus and Folkman's appraisal construct as a theoretical framework was undertaken to approach the study of communication technology from the perspective of the user [21]. Appraisal focused the researchers' attention toward the actions and judgments of people in coping situations rather than focusing on the stressors or stress themselves, which enabled us to study the use of MEDLIB-L rather than its design. MEDLIB-L subscribers' coping behavior during the service outage was explored to determine whether subscribers assessed the service outage as a significant interruption in their information behavior. Coping behavior that included changes in communication patterns would indicate that the outage caused subscribers to exhibit secondary appraisal.

METHODOLOGY

A survey instrument was designed to gather information about how subscribers to MEDLIB-L coped with the service interruption the previous month. At the time of the study, there were 2,050 subscribers to the list [22]. The survey was made available to subscribers via an email posted to the discussion list and in an online format accessible from the MLA Website. The introductory information accompanying the survey explained that members could respond using the online Web-based survey or via email, fax, or postal mail. A request for participation was posted August 31, 1999, the first day following resumption of MEDLIB-L service. The identity of respondents was kept confidential. September 17 was given as the final day to respond. Just prior to the deadline, a reminder was sent to the list to encourage further responses. Categorical responses were coded for statistical analysis,

Table 1
Library locations

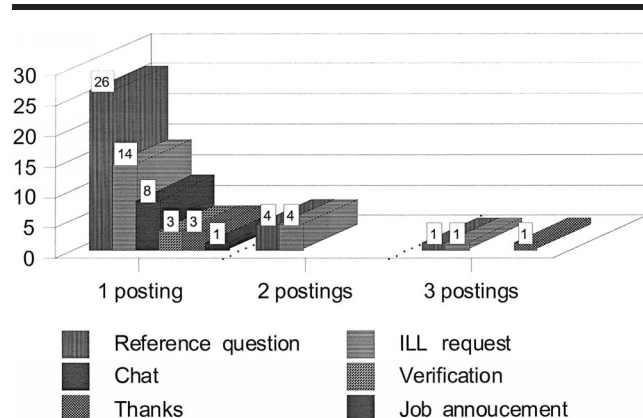
Region	Frequency	Percent (%)
Middle Atlantic	19	17.1
Southeastern Atlantic	18	16.2
Greater Midwest	21	18.9
Midcontinental	11	9.9
South Central	10	9.0
Pacific Northwest	12	10.8
Pacific Southwest	10	9.0
New England	9	8.1
Europe	1	0.9
Total	111	100.0
No response	12	
Total	123	

and qualitative answers were coded into categories using content-analysis techniques.

ANALYSIS OF NUMERICAL RESULTS

The primary purpose of the survey was to determine whether during the six days of the MEDLIB-L service outage respondents encountered situations for which, under normal circumstances, they would have posted requests to the discussion list. A total of 123 surveys were returned. Because the survey was sent both to the list as a whole (as a discussion list posting) and made available on the MLA Website, we could not determine whether an accurate response rate had been obtained. It should also be noted that the respondents were self-selected and did not necessarily substantially represent all MEDLIB-L subscribers. Thus, the following results are presented for the purpose of contributing to future studies that examine how health information professionals use information technology in the workplace.

The respondents worked in medical libraries that were widely distributed among the National Network of Libraries of Medicine (NN/LM) regions (Table 1), with no region being over represented. Of the 123 respondents, forty-two reported that they would have posted a request if discussion list service were available. These respondents were asked to indicate the type and number of requests they would have posted during the outage. Figure 1 shows that most respondents indicated they would have posted only one request. Reference questions, interlibrary loan (ILL) requests, and chat were the types of postings reported by most of these respondents. This result was not surprising, because Schoch and Shooshan [22] found that the most frequently reported mode of participation in MEDLIB-L was responding to and, to some degree, initiating reference questions, product information, and professional discussion. Two of the forty-two respondents said that they would have posted a request to MEDLIB-L but did not indicate the type.

Figure 1
Number of respondents with postings during outage

Reference requests

Additional analysis was performed on reference questions to determine which specific resources were consulted during the MEDLIB-L service outage. When respondents indicated that they would have posted a reference question, they were asked to describe whether they attempted to use an alternative mode of communication, such as telephone or email messages sent directly to colleagues, as opposed to email sent to the MEDLIB-L distribution list or whether they used alternative resources, such as print tools, to obtain the needed information. They were also asked to indicate whether use of these sources resulted in successfully obtaining the needed information. Of the thirty-one respondents who indicated they would have posted a reference question during the outage, twenty-one (66%) said that they tried an alternative source to obtain the needed information. A variety of sources were mentioned, and six of these respondents mentioned two or more alternative sources (Table 2).

Seven of these respondents said that they tried alternative sources but failed to describe these sources. Email, telephone calls, Web searches, and print resources were mentioned with almost equal frequency.

Table 2
Alternative sources used for reference questions

Source	Number of respondents
Telephone	6
Email	4
Web	4
Print tool	4
Email discussion list	3
Database	1
Colleague (face-to-face)	1
No response	7

Table 3
Alternative sources used for interlibrary loan requests

Source	Number of respondents
Telephone	4
DOCLINE (email discussion list)	3
Web	1
Email	1
No response	7

Only three respondents mentioned that they posted the question to another discussion list. One of these respondents said,

I posted both questions to another discussion list, the solo librarians list (SOLOLIB). I got one or two suggestions, but I think I would have gotten a better quality response from MEDLIB-L because the questions were specific to medical libraries.

Respondents who reported that they used alternative sources were requested to indicate whether they obtained an answer to their question or questions. However, a little more than half of the respondents did not indicate if they were successful or not. Of the nine respondents who did provide an answer, six said they obtained the needed information.

While some MEDLIB-L users actively sought alternative sources for their reference questions, others did not. A total of ten respondents said that they had reference questions to post during the outage but did not try to locate the needed information. Six of these respondents said that they did not try alternative sources, because the information need was not pressing. These respondents said they waited until MEDLIB-L was up and running to post their questions. Two of these respondents said that they had exhausted all other resources and MEDLIB-L was their "last resort." Four of the remaining respondents did not explain their reasons for their behavior.

Interlibrary loan requests

As with reference requests, respondents who would have posted an interlibrary loan request during the MEDLIB-L service outage were asked to describe whether they attempted to use an alternative mode of communication—such as telephone or email messages sent directly to colleagues, as opposed to email sent to the MEDLIB-L distribution list—to obtain the needed materials. Respondents who did use an alternative mode of communication were asked to indicate if they were successful in obtaining the needed materials. A total of fifteen respondents said that they had tried alternative channels, and five said they had not. Telephone calls and the DOCLINE discussion list were the most-used channels (Table 3). Some of these respon-

dents said that they had to use more than one channel to obtain the needed material.

Seven respondents said they used alternative channels but did not specify what they were. Missing responses made it difficult to determine if the use of alternative channels resulted in successfully obtaining the needed material, as only four of these twenty respondents answered this part of the survey. Only four respondents said that they were successful in obtaining the needed materials. The lack of responses to this question might be due to the fact that the transactions discussed had not been completed at the time the librarians completed the survey.

ANALYSIS OF OPEN-ENDED COMMENTS

At the end of the survey, respondents were asked whether they had any other comments about their coping strategies during the service outage. A total of seventy-nine respondents (64%) provided comments. Content analysis revealed that the comments related to the following:

- what they did or would do about their information needs during the outage
- what they felt about the outage and MEDLIB-L
- how they used MEDLIB-L

As suspected, most of these comments were positive in regard to how the respondents valued the information they gained from MEDLIB-L. Only one person said that he or she "rarely has seen anything of substance posted to the list."

The respondents who talked about what they did or would do about their information needs included both those who had messages to post during the outage (15 respondents) and those who did not (23 respondents). The comments of the respondents who did have messages to post echoed their earlier answers regarding their use or nonuse of alternative channels of communication. The comments of respondents who did not have messages to post during the outage were almost equally divided among those who said that if they did have something to post they would wait until the list was back in service (12 respondents) and those who said they would use an alternative communication channel (11 respondents). Telephone, email, Web, and other discussion lists were mentioned as alternative channels they would use, if necessary.

More than one-third (42%) of the respondents who provided general comments described how much they missed MEDLIB-L or that the outage made them realize how helpful the list is to their professional work. What follows are a few excerpts that reflect the general nature of these comments.

I missed the sharing of ideas, discoveries, and strategies for providing reference services. I looked at the chat room posted for medical libraries discussion, but it was not being used

[to] the same extent as the mailing list, and was no real substitute for MEDLIB-L's helpful communications.

I realized how much I depend on MEDLIB-L for contact with other medical librarians. It is especially important when you are the only librarian in your organization.

Having MEDLIB-L gives me a certain security plus provides new information. Not having it as a back-up made me anxious (more than usual!).

I really missed MEDLIB-L during the extended service outage, and there was no real substitute for the networking it provides for me. As an information consultant, my business is actually located in cyberspace, which means I have no contact with my colleagues. I rely on MEDLIB-L as an important way to keep current and stay in touch with other professional medical librarians. I keep my skills sharp by answering *their* requests for information, and I monitor MEDLIB-L to acquire new information resources.

Four of these thirty-three respondents said that while they missed the list, they were not really inconvenienced by the outage. As one of these respondents said, "it is not the end of the world as we know it." Nine respondents said that they felt a bit relieved when the list went down. Many of these respondents mentioned that they were relieved, because they often felt overwhelmed by the great number of messages from the discussion list each day.

For sixteen respondents, the fact that MEDLIB-L went down and the way it went down* created frustration. Many said they were frustrated by receiving so many duplicate messages, and some were frustrated by the fact that they did not know what was happening and that they did not know when the discussion list would be up and running again. The following comments are representative of these respondents and reflect some of the filtering described by Schoch and Shooshan [23].

It was almost a nice break from all of the ILL messages, which I just delete without reading. The biggest inconvenience was the multiple copies of the same messages over and over.

It is irritating to have the same messages pop up, but deleting is easy.

No [additional comments], except [I] didn't like getting the same message several times.

Too much time was wasted deleting the numerous duplicate messages.

I belong to several discussion lists, and it was frustrating to have so many additional messages. I reviewed the list of

* Immediately prior to the MEDLIB-L service interruption, multiple copies of each posting were delivered to subscriber inboxes, which caused additional frustration concerning the way in which the service broke down.

messages and deleted messages from previous dates before opening any messages.

It would have been helpful to have a more immediate reaction and announcement to the group. It appeared that repeat messages were sent because people didn't know what was going on and I think that made the situation worse.

From these comments, it was clear that the discussion list participants wanted to be kept up-to-date about the technical glitches or problems and the way the discussion list owners or moderators were resolving the problem. The general comments provided by respondents also included statements about how they used MEDLIB-L. The following comments are typical examples of what respondents reported.

For some types of questions, this list is indispensable, and there are no equivalent coping strategies other than using another mailing list. Unfortunately, there are none broad enough in scope to have answered the questions I wanted answered. My questions tend to be of a global nature.

When you are looking for an answer to an unusual management problem, MEDLIB-L is the best place to get that answer.

I tend to use MEDLIB-L more for keeping in touch with [the] profession and the issues about medical libraries, not as a reference resort except as a last resort.

It was not hard—I use MEDLIB-L mostly to keep track of articles or Websites people are recommending. It's not an everyday essential part of our reference or ILL activities. We use it mostly as a vehicle of last resort once our usual resources haven't worked. However, when we *do* need it, it's an invaluable resource.

It wasn't a big deal. For what I get out of MEDLIB-L, (a sense of trends and issues of concern to medical librarians), the outage was insignificant.

Just that, as annoying as the list has become, in my opinion, it does serve an invaluable function of linking us all. There is really no substitute for it.

After reading these and similar comments, we recognized that MEDLIB-L is an essential information source for some subscribers and an informal meeting or discussion forum for others. Many of these respondents described how they used the list as an informal information source. Following are examples of this type of comment.

I miss the dialog with my colleagues but fortunately, I didn't have an information need that I couldn't fill some other way. If I had (and I have had in the past), it would have been really frustrating. Once you get used to a responsive and helpful list like MEDLIB-L and would like to confer with other medical librarians, you really feel a hole in your day.

I always learn from reading the list. During its outage, I was reminded how useful it is for that purpose, in addition to the times I actually call for help.

Very much missed the MEDLIB-L group—have come to rely on their expertise; a wonderful safety net.

I generally just read the messages, rarely place requests or respond to other people's reference questions. Generally, I use MEDLIB-L to catch important announcements. Didn't really need to "cope," as I guess I don't really "need" MEDLIB-L the way that other librarians do.

Many of the participants clearly valued MEDLIB-L as a tool they could use to build professional relationships and contacts.

DISCUSSION

As early adopters of email discussion list technologies, information professionals were an ideal population for exploring issues pertaining to coping strategies. The MEDLIB-L service outage presented an opportunity to examine the way that respondents coped with an unexpected interruption in a normally stable electronic-communication network. We were interested in investigating whether respondents relied on alternative procedures and practices or whether they waited out the service outage. We were further interested in gauging the importance of MEDLIB-L through the comments given by respondents concerning the overall impact of MEDLIB-L on their daily professional activities.

The results of this preliminary study showed that study respondents' strategies for coping with the MEDLIB-L service outage in August 1999 fell into two groups: those who chose alternative methods and those who simply assessed the importance of an information need as not pressing, resulting in a deferral of resolving that need until MEDLIB-L service resumed. In particular, two specific types of MEDLIB-L messages were examined: reference (REF) questions and ILL requests. Assessment of the resources available to answer REF questions led some respondents to use alternative methods, such as telephone and email messages sent directly to colleagues, as opposed to email sent to the MEDLIB-L distribution list. Assessment of the resources available for ILL requests led some respondents to use DOCLINE.

Although respondents reported that they missed the list or reported that MEDLIB-L was helpful, many did not feel that the outage required significant coping strategies. Thus, for these respondents, the outage could be viewed as a minor stressor that for the most part would not require secondary-level assessment of the availability and suitability of alternative resources. The outage only seemed to draw these subscribers' attention to the particular services they valued from MEDLIB-L.

There were several comments from users concerning the impact that MEDLIB-L had on their day-to-day activities. Particularly notable were the comments that

MEDLIB-L served as a safety net for information needs and that MEDLIB-L provided an important virtual gathering place for information exchange for many health information professionals.

This study does not address the expectations that respondents have concerning the length of the possible outage, which may have affected their decisions whether or not to pursue alternative communication channels. Future studies should therefore attempt to account for "expected length of service outage" as a variable that would determine the circumstances under which it would be advisable for health information professionals to seek alternative channels during future service outages. A further question that needs addressing concerns how one-person libraries' use of MEDLIB-L compares to its use by librarians from larger libraries, especially in the face of future service outages.

Additional research in the area of health information professionals' use of electronic communication networks should continue to use theoretical insights to guide professional practice. By taking advantage of the opportunity presented by the MEDLIB-L service outage in August 1999, this study is a step in that direction.

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