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ABSTRACT

A study investigated the introduction of an experimental school-centered and neighborhood-oriented communication system in a small midwestern town. It was anticipated that normal parent-teacher-school communication would be enhanced by the electronic messaging potential of the system. Researchers observed the entire adoption process from the introduction of the idea to the eventual dismemberment of the system. All 500 participating families (80% of those invited) had personal computers installed in their homes free of charge, and were linked into a neighborhood network through the local telephone company's lines. Some 350 families elected to cancel the service eventually, prompting the telephone company to cancel the program. Results from phone interviews with from 88 to 249 participating families indicated that the system failed to be adopted on a permanent basis by the target population because of: (1) technical inadequacies within the system; (2) the availability of faster, more efficient, and otherwise more desirable communication media; (3) the lack of institutional mandate to use the system; and (4) the lack of commitment to the system by local opinion leaders. (SG)

Response to a Community-based Information and Communication System

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Response to a Community-based Information and Communication System

Much has been written about the potential social, economic and educational benefits of widespread home adoption of personal computers (Danko & MacLachlan, 1983; Dickerson & Gentry, 1983; Dutton, Rogers & Jun, 1987). The acquisition of home computers allows for the possibility of becoming linked to a highly interactive communication system that provides a variety of types of information directly to the home. Since a number of such systems are already actualities and others are at the threshold of commercial availability, it is no longer visionary to speak of computerized home banking, shopping, voting, library access and, especially, teaching and learning.

One of the fundamental questions which has been raised concerning the introduction of these home-based information systems is, who adopts the systems for what purposes under what circumstances? Is it possible to predict patterns of adoption and diffusion on the basis of both system variables and personal and demographic characteristics of potential adopters?

In this paper we describe one such innovation and offer some answers to this question.

The introduction of an experimental school-centered and neighborhood-oriented communication system in a small midwestern town (Town) provided the investigators with the opportunity of observing the entire adoption process, from

the introduction of the idea to the community to the eventual dismemberment of the system. The expectation was that an understanding of the technical features of the system, the personal and socio-economic characteristics of potential adopters and the social milieu into which the innovation was introduced would help illuminate the total process of this specific type of innovation adoption.

In the spring of 1988, Local Telephone Company (LTC)[1] offered all families living in Town's Northwest School neighborhood the opportunity of participating in a novel and experimental community electronic communication project. Before the project was launched, the local school board and school administrators were asked to review and approve plans for the system, which they did in April, 1988. The project was known as the LTC Scout System. Families with children who attended the school were viewed as central to the experimental project, though those without children were also invited to participate. All teachers and administrators in the school were asked to participate whether or not they lived in the Northwest School neighborhood. All participants were to have a personal computer installed in their home free of charge.

The personal computer of every participating family was to be linked to the neighborhood network through the company's telephone lines. A main-frame computer had been installed in LTC's local office in April, 1988, and installation of computers in neighborhood homes began one

month later. Initially, about 75% of the families invited chose to have the personal computers installed. The percentage of those accepting the devices increased over the next five months until about 500 families, or some 80% of the possible adopters, were hooked into the system.

LTC's Scout computer service system was to start in late July or early August of 1988 and was to continue on a no-cost-to-user basis until March or April of 1989. At that time, patrons would be asked whether they wished to continue their participation on a paid basis. Users would keep the personal computers at no cost, but a service charge of between $10 and $20 per month would be added to their telephone bills. At the outset, a variety of electronic bulletin board and mail services would be available and it was contemplated that, during the experimental period, additional information services would be added as interest and need dictated.

While a great many non-school services were to become available, the heart of the Scout System was the local elementary school. It was anticipated that normal teacher-principal-counselor-child-parent communication would be enhanced by the electronic messaging potential of the system. Teachers could use it to assign homework, parents could have electronic conferences with teachers, children could query teachers about difficulties encountered in doing homework and the principal and counselors could communicate with parents about behavioral or disciplinary problems.

One of the reasons for LTC's choice of the Northwest School neighborhood for this experiment was the cosmopolitan and sophisticated nature of the community. It is a relatively affluent area, about half of whose residents are associated with a nearby major state university. The remainder are largely business and professional people who work in the Greater Town area. An estimated 50% of the residents already had home computers and another approximately 30% had some familiarity with computer use, chiefly through work. It was judged that this community would have far less trouble than most in overcoming computer shyness or anxiety, and that, therefore, it would be the measurable benefits of the communication system itself which would be responsible for its adoption or non-adoption rather than any underlying negative attitudes of residents towards computers.

Much of the installation of the home computers was completed by the end of August, and residents were prepared for the system to go online with the beginning of the school year. Unfortunately for LTC, some persistent problems in the basic program were not solved for another six to eight weeks, and so it was October before the system went into full operation.

Because of the delay in initiating service, the trial period was extended so that residents had free service until the end of May, 1989. At that time they had to decide whether to retain the system or return the computer to the

LTC office. Retaining the system was the more passive and inertial alternative, since it required that essentially nothing be done beyond notifying LTC of the decision. On the other hand, residents who chose not to retain the system were asked to dismantle and repack its components and return them to the company's office. Service personnel were generally not available to undo the system as they had been to install it. Furthermore, for a relatively affluent community, the modest ($15/month) addition to the monthly telephone bill upon adoption would not appear to be a significant deterrent to adoption.

By the end of June, 1989, approximately 165 families made the decision to adopt, while over 350 chose to return the personal computer and other components to the company. Within three months, by early fall, LTC declared the experiment over and discontinued main-frame service. At the same time, it offered residents of the community the opportunity to buy the personal computers at a bargain rate of $100. The normal retail value of the personal computer was about $1,100. About 100 residents responded by purchasing the computers.

Assumptions and Hypotheses

In general, our analysis of the process of adoption of the innovation (here defined as making the decision to keep the personal computer on a paying basis after expiration of the trial period) followed Rogers' widely accepted typology of adoption (Rogers, 1983) which was developed on the basis

of a variety of studies of adoption and diffusion of innovations (e.g. Brandner, Lowell & Straus, 1959; Singh, 1966). Although the mandatory trial period and the low cost of adoption of the Scout System distinguished it from many of the innovations studied in the adoption and diffusion literature, the steps, processes and categories offered by Rogers still provided a solid basis for analysis.

The steps in the adoption process as outlined by Rogers are knowledge, persuasion, decision, implementation and confirmation.

The knowledge stage encompasses knowledge both of the existence and the functional characteristics of the innovation and of the needs which it promises to satisfy. Either of these categories of knowledge may come first, but once both are known, the two tend to reinforce one another.

It is at the persuasion stage that the potential adopter forms a favorable or unfavorable attitude toward the innovation.

The next two stages in the Rogers typology appear to have been inverted in this case because of the special type of adoption system employed. Rogers suggests that decision involves a choice to adopt or not adopt, and that this is followed by implementation, the stage during which the innovation is put to use. The marketing strategy of LTC, however, permitted the community to go through the stage of implementation for about a six-month trial period before it was necessary to make a decision to adopt or reject the

innovation, a strategy which should have increased the probability of a positive decision for adoption. Also, in accordance with self-perception theory (e.g. Bem, 1967; Kiesler, Nisbett & Zanna, 1969; Salancik & Conway, 1975), this inversion of the decision and implementation stages should have had a further enhancing effect on the positive attitudes of members of the community toward the Scout System. This theory suggests that, while there is certainly validity to the common sense observation that affirmative or negative behavior toward some object is enacted subsequent to the establishment of prior positive or negative attitudes, the reverse is also true. That is, in Bem's words, "an individual's attitude statements may be viewed as inferences from observations of his own behavior..." (Bem, 1967, p. 186). Giving the community the trial opportunity before it had a chance to form opinions about the system should have had the effect of moving community members' attitudes in a positive direction by making them active stakeholders in the project.

Rogers' final stage, confirmation, occurs when an innovation decision is reinforced or, in some cases, reversed by the appearance of conflicting or negative information about the innovation. In the case under study, decision and confirmation appear to have merged in the single action of keeping or returning the personal computer to LTC.

Within the framework of these stages in the decision process, Rogers suggests five attributes of innovations, the

presence or absence of which will be predictive of the rate of adoption. The five are relative advantage, compatibility, complexity, trialability, and observability.

Among the components of relative advantage are a) the capacity of the innovation to do things which could not be done before, or to do things better, faster or more efficiently, b) affordable price, and c) the tendency of the adopted innovation to confer higher status on the adopter.

Compatibility encompasses the degree to which the innovation fits prior value and belief systems of potential adopters, their past experiences and their perceived needs.

Complexity refers to the perception of adopters of how difficult the innovation will be to understand and to use.

Trialability is "the degree to which an innovation may be experimented with on a limited basis." (Rogers, 1983)

Finally, observability is the degree to which others may see the results of the adoption. Clearly, this attribute is related to the enhanced status component of the relative advantage attribute of the innovation.

Many of the characteristics of the LTC Scout System clearly fitted a model which would predict widespread adoption. The price was advantageous, the technology appeared to be compatible with the value and belief systems of the community and with their previous experience, the hardware and software did not appear to be particularly complex to a community already strongly oriented to the use of computers, the adoption process established by LTC

mandated a trial period at no cost to the adopter -- a very favorable feature -- and use of the system was certainly modestly observable to others, at least when it was used for interactive communication purposes rather than simply for information.

In spite of these predisposing positive factors, a large majority of those who tried the system rejected it. Our study suggests reasons for this outcome.

Method

Design

A panel study was conducted that included telephone interviews at three points during the project. An initial survey was conducted during September of 1988 in order to gather background information on participants and to document their expectations about the Scout system. A second survey, conducted in November of 1988, was designed to gather information about system use and attitudes toward various aspects of the project, and a third survey was conducted in April of 1989 just prior to the conclusion of the "no-cost-to-user" period. This survey was designed to gain additional insight about attitudes toward the system and to document the system users' final evaluations of the project. Data on adoption of the system on a pay basis was provided by LTC after the third wave of data collection.

Respondents

During the fall of 1989, 249 families from the Town community were randomly selected for the panel study from a

master list of phone numbers provided by LTC. The master list (N = 418) included the phone numbers of each family that received computer installation by LTC for the Scout program. This list did not include teachers and administrators who lived within the city limits, but who also received the computer installation. Of these 249 families who participated on the first-wave survey, 175 (70.3%) agreed to participate again on the second-wave survey and 88 (35%) continued their participation on the third-wave survey. The high attrition rate across the three waves was due primarily to two factors: a) participants in the project lost interest in the system and disassociated themselves with anything related to it--including the survey, and b) LTC was also surveying participants through the mail and many people refused participation because they felt "over studied." On the first-wave survey the interviewer asked to speak to the adult female of the household. On the subsequent waves, the interviewers asked to speak with the same person who responded to the earlier survey. Adult females were chosen primarily because they were more likely to be available for an interview.

Interviewers

Thirteen graduate students (4 males, 9 females) who were enrolled in a research methods course served as telephone interviewers for the first two waves of interviews as part of their course curriculum. In order to standardize interviewer behavior throughout the questionnaires, the interviewers

participated in a 90-minute training session prior to beginning each wave of the survey. The 249 families were randomly divided among the 13 interviewers. Each interviewer conducted both a wave-1 and wave-2 survey on each of the families assigned to them (approximately 19 families per interviewer). For wave-3 of the survey, 10 undergraduate students from a class in communication technology conducted the telephone interviews for extra credit. As in the first two waves, these students participated in a 90-minute training session prior to conducting the telephone interviews.

Interview Content

The initial survey gathered several pieces of background information including the sex and age of each person in the household, employment status of the adults in the household, type of residence, prior experience with computers, and general attitudes toward computers. In addition, several questions were designed to assess the respondents' attitudes toward the quality of communication between the school system and the household. Finally, a number of questions were designed to assess the general expectations that respondents had about their future use of the Scout system.

The second survey included a number of questions about the Scout system itself, including questions about whether problems had occurred logging onto it, the physical location of the computer in the home, and whether or not the "hot" screen on the system was generally left on at all times. The

"hot" screen was the term given to the first screen that appeared when the system was turned on. It contained a calendar, the current time, and information on electronic mail that may have been sent to a family member's mailbox. In addition, several questions designed to parallel questions on the first survey about attitudes toward computers and toward the quality of communication between the school system and the household. Finally, a number of questions were designed to assess the general expectations that respondents had about their future use of the Scout system.

Results

As was pointed our earlier, while we use as a basic model Rogers' typology of adoption (Rogers, 1983), the unique circumstances under which this innovation was offered to consumers forced us to use a modified and foreshortened version of the steps of knowledge, persuasion, decision, implementation and confirmation. The broadly based information and orientation campaign initiated by LTC, encompassing newspaper, radio and television coverage as well as distribution of a handsome informational folder to every household in the community, assured a high level of knowledge. In this case, knowledge of the characteristics of the system preceded any demonstrable awareness of the community of their information and communication needs which adoption of the system promised to satisfy.

1. Knowledge

If knowledge implies familiarity with the innovation on the part of potential adopters, this knowledge appeared to exist before the program was even proposed. As mentioned earlier, one reason LTC selected Town was because of the high probability that most residents were computer literate. Our assumption, (and LTC's as well) was that most of the community already had substantial knowledge about computer systems.

To assess this factor, we asked respondents on the first wave whether or not they had a computer in the home. Over half of the respondents indicated that they did have a computer in the home (54.8%). In addition, the large majority of respondents (82.6%) indicated either agreement (55.1%) or strong agreement (27.5%) with the statement that "computers are ver_ important to have in our home" [$X^2_{(2)}$ = 270.14: $p < .001$] (unless otherwise noted, all responses dealing with agreement or disagreement were measured on the traditional 5-point scales: "strongly agree," "agree," "undecided," "disagree" and "strongly disagree"). These data indicate that the sample was computer literate and highly motivated to attend to any information about a new computer system that might enter the home.

Knowledge, however, also includes comprehension of the need for the innovation. The evidence for this type of knowledge is not compelling. In this sample, indeed, there

is little evidence that the community believed such a need actually did exist.

Specifically, one of the major justifications by LTC for implementing the Scout system was to enhance communication between the community and the school system. Consequently, on the first-wave survey, we asked respondents to indicate the extent to which they agreed or disagreed with the following statement: "Overall, we feel well-informed about school-related issues." A large majority of respondents who had children in the school system (75.4%) indicated either agreement (63.6%) or strong agreement (11.8%) with this statement [$X^2_{(2)} = 153.08$; $p < .001$]. This result suggests that there may not have been a need on the part of the community to use the Scout system for enhancing school communication. The responses to the second and third surveys indicate that the community was satisfied with the quality and quantity of communication with the school, and that there was no need to open up a new channel.

Specifically on the second and third waves, we asked respondents to indicate the extent to which they agreed or disagreed with the following statement. "Overall, we feel that the Scout contributes significantly to how well informed we are about school related issues." Of those who responded on wave-two (N = 127), only 2.4% indicated strong agreement with the statement. Another 29.1% indicated agreement, while 24.5% indicated that they were undecided. The remainder of respondents (44.1%) indicated either disagreement (37%) or

strong disagreement (7.1%) with the statement [$X^2_{(2)} = 7.57$; $p < .05$]. On the third-wave of the survey, of those who responded (N = 83), only 10.8% indicated either agreement (8.4%) or strong agreement (2.4%) with the statement. In contrast, 59% of the respondents indicated disagreement (47%) or strong disagreement (12%) with the statement [$X^2_{(2)} = 29.30$, $p < .01$]. Thus, a considerable portion of the respondents did not believe that the Scout system contributed to school-related knowledge. Moreover, based on the percentages and the increasing value of X^2 on the third-wave results, there may have been a trend during the implementation period for more respondents to indicate their disagreement with the statement asserting that the Scout did contribute significantly in this area.

2. Persuasion

The knowledge of and willing acceptance by potential adopters of the role of the home computer really made a persuasive campaign superfluous. The careful choice by LTC of the experimental community - a relatively affluent, highly educated, upscale area whose residents are familiar with the language and the tools of the information society - appeared to assure a generally positive response. Certainly the 80% acceptance rate for the trial period suggests little hesitancy on the part of the community to buy into the concept of a community centered electronic information and messaging system.

To the degree, however, that the process of persuasion existed during the free trial period, we seem to detect a negative effect.

One of the primary factors related to a respondent's attitude toward adopting the Scout technology may have been the extent to which prior expectations were fulfilled. On the third-wave survey, we asked respondents to indicate their expectations and then to respond to the question, "Were these expectations fulfilled?" Of the 76 respondents who answered this question, 22.9% indicated that their expectations had been fulfilled. In contrast, 68.7% stated that their expectations had not been fulfilled [$X^2_{(1)} = 19.0$; $p < .01$].

3. Implementation-Decision

The inversion of the normal decision-implementation order, explained earlier, eased the process for potential adopters of the system. In theory, this inversion should have enhanced the rate and level of adoption, since cost played no role in the choice to participate in the experimental phase of the program. The ultimate criterion of adoption, however, was acceptance of the innovation after the trial period of implementation. Of the initial 249 respondents on the first-wave survey, only 83 (33.3%) eventually adopted the system on a pay basis, while 166 (66.7%) decided against adoption [$X^2_{(1)} = 27.67$; $p < .01$].

In summary, because of LTC's choice of the community and its population of potential adopters for its experimental effort, and because of the inversion of the decision and

implementation stages, the final decision and the confirmation of the decision to adopt or not adopt turned almost entirely on the attributes of the innovation rather than the knowledge or persuadability of the experimental population.

These attributes are now considered in the framework of Rogers' five-attribute model. Rogers posits that four of the five attributes considered -- relative advantage, compatibility, trialability and observability -- are positively related to rate of adoption, while one -- complexity (as perceived by members of a social system) -- is negatively related to rate of adoption.

While a degree of reliable agreement may be reached about complexity, relative advantage and compatibility, a large share of their significance as criteria of adoption level and rate lies in the subjective perception of them by members of the social system. A technology perceived as complex by one person will appear to be simple to another. The saving of time may be viewed as a great relative advantage by a busy individual but may be seen as having essentially no value to a person with many empty hours to fill. While it may be fairly simple to generalize about compatibility with values and belief systems across major cultural boundaries (all observers may agree that the introduction of innovative fast foods containing pork products will be rejected wholesale in Islamic cultures), within a given culture, and assuming that the innovation does

not violate any universal norms or collide with any universally accepted prohibitions, compatibility depends to considerable degree upon subjective factors and upon individual, family or community perceptions of needs, attitudes and beliefs.

On the other hand, fairly straightforward objective measures may be applied to evaluate the trialability and observability of innovations. All observers can agree on the extent of the opportunities provided possible adopters to test and experiment with an innovation on a trial basis. Similarly, reasonable consensus can be arrived at concerning the degree to which the use or results of an innovation may be observed by others.

The Scout quite obviously offered high trialability and observability to potential adopters of the system. It is, in fact, difficult to conceive of an innovation offering a better opportunity for a test period than that which LTC provided for the 500 families in the Northwest School community. The entire system was installed at no charge in each home, and the original three-month free trial period ended up as a six months' use of the system at no charge before the adoption decision had to be made.

Just living in the Northwest neighborhood when the widely discussed system was made available made the acceptance of the system widely known to all observers. Further, the very fact that the innovation was a highly interactive communication system made any individual's use of

it known to all others with whom communication took place. It was possible, of course, for families to use the informational capabilities of the system without engaging in interactive electronic mail or bulletin board activities, but the restricted size of the experimental community made virtually everybody's use of the Scout readily known.

We refrained, therefore, from trying to gather any empirical evidence concerning the Scout's trialability and observability, since the existence of both is so evident upon simple inspection. Both were very high in this experimental situation and both should have contributed materially to a high and relatively rapid rate of adoption of the system.

We proceeded, then, by exploring the impact on the process of adoption of the other three attributes of the new technology: relative advantage, complexity and compatibility. We did this through analysis of the answers to the open-ended questions on the wave-2 survey, administered after the system was up and working but before the termination of the experiment.

In our study, relative advantage refers to individuals' perceptions of the capacity of the Scout to do things which could not be done before, or its ability to do them better, faster or more efficiently. Comments which are directly related to the degree to which the Scout provided services, opportunities, and facilitation of communication that are otherwise unavailable or difficult to accomplish are included

in this section. This category includes only those comments that assume the system is working properly.

Issues related to the technical adequacy, capacity and performance of the Scout are subsumed under the attribute complexity. Specifically complexity refers to those characteristics of the Scout that individuals perceive as either inhibiting or facilitating use. The more difficult the system is felt to be in terms of learning, manipulation and performance, the greater its complexity. Perceived and actual technical problems with the Scout are also considered related to issues of complexity, as these problems most often lead to the perception that the system is unreliable and difficult to use.

Compatibility refers to the degree to which the Scout system is congruent with the values, beliefs and expectations of the community which it serves. Comments related to the expectations of individuals based on their familiarity with computers in general, their values about what the Scout should provide, and their beliefs about the school system as well as the role expectations for administrators and teachers are included.

Overall, there were 187 responses to open-ended questions on the wave-2 survey. Of these, 183 were coded (4 did not deal with the Scout). Twenty-three of the comments were positive, suggesting that attributes of the Scout facilitated its use and subsequent adoption. One-hundred-sixty comments were negative, providing strong evidence that

individual users did not perceive that the system had the requisite levels of the three attributes to facilitate adoption.

Almost half the comments (43%) dealt with issues of relative advantage (directly related to rate and level of adoption). Of these comments 20 were positive and 59 were negative. Typical of the 20 positive were the following:

"We used the Scout for getting baby-sitters and exchanging recipes and gossip."

"Our Bible study group used it."

"Used it for scouting and Young Astronauts."

"Sales at grocery stores; information from bank."

It is interesting to note that none of the positive comments illustrating relative advantage referred to school-home communication, ostensibly the chief reason for inaugurating the system.

The 59 negative comments indicate that the Scout was perceived to be redundant, providing no new capabilities, inefficient or unnecessary. Examples of these comments are:

"Telephone is easier to use to talk to people."

"The Scout didn't do what we needed."

"Communication with schools is already good."

The relative degree of complexity (inversely related to rate and level of adoption) was also an important consideration for respondents. Sixty-three comments (34% of the total) expressed frustration with the Scout's technical

performance, while only one respondent wrote positively about the Scout's technical system. Typical comments were:

"We'd like the equipment to work. Equipment is crappy; parts go out all the time."

"Frustrating because it is frequently down."

"Poor software."

Although the community's past experience and familiarity with computers in general suggest that the Scout should be compatible with their prior beliefs and values, the qualitative data indicate that the Scout did not meet their technical expectations regarding the appropriateness of use (school-related values). Of the 40 comments related to compatibility issues, only two were positive:

"The Scout has made teachers more accessible and students more informed."

"Enjoyed using it for school contacts."

The remaining 38 responses were negative. Some emphasized the unsophisticated character of the technology:

"Very slow."

"Not enough memory."

"It ties up our phone line."

Eight of the 38 reported that the services were not those they felt were appropriate for the system:

"The school doesn't use it well; we just get school lunch menus."

"It's used mostly for social stuff; I have to tell the kids to get off."

Furthermore, parental values related to school affairs were not reinforced by the Scout. Specifically, the absence of an institutional mandate, which parents expected to have been established through the use of the Scout by teachers and administrators, was particularly problematic. Despite the absence of a prior felt need for enhanced school-parent interaction, the public rationale for the system had raised parental expectations for increased and improved school-home communication. Indeed, 16 comments (40%) dealt directly with the respondents' frustration based on the lack of teacher support. Respondents indicated that they wanted more information from the teachers and wished that the teachers would have initiated use of the Scout and generally just used the Scout more.

"I wish the teachers would use it more."

"My son's teacher doesn't use it."

"I'd like more communication with the teachers."

The perceived lack of teacher support and its subsequent negative effect on attitudes toward the Scout are not surprising when we examine the results of a survey of the Northwest School teachers. Responses on questionnaires from all 21 teachers involved in the program indicate they were not enamored with the system, although it does seem that many of them gave the Scout a chance. Rather than being hostile to the idea of the Scout system prior to installation (only two teachers said they did not use the system at all; one chose not to have it installed in her home), their

experiences with the system created the very negative set of attitudes identified in the quantitative data.

Of the 21 responses, nine explicitly mentioned technical problems, issues related to the complexity of the Scout: Comments such as "The technology made communication difficult at times; phone answering machines were sometimes more efficient," "The system was a pain to use," "Too many mechanical limitations," and "Its lack of reliability led to frustration and created a lack of interest in the system," are consistent with remarks made by the parents.

Teachers also did not perceive any relative advantage to using the Scout. After their experiences with the system, only one of the teachers felt there was a need for such a system. Comments suggest that the teachers did not feel the Scout gave them any unique capabilities. Over and over again the teachers noted that "the system never served any useful function:" there "was no need for it." Traditional communication media were believed to be sufficient for teacher tasks. For example, one teacher responded that she was "more comfortable communicating with students, parents, teachers and administrators in more 'traditional' fashions," and another said, "I found I could not use the Scout for anything I couldn't use the phone for. The phone was faster and more convenient. The whole thing was a waste of time!"

Perhaps more interesting, in terms of the teachers' hostility/indifference to the system, is that their negativity may ultimately have relatively little to do with

the technical problems (complexity) of the system or its capabilities (relative advantage). Rather, the fact that the machines were not universally adopted by all families seems to have been ideologically antithetical to teachers' philosophies of equality of opportunity (non-compatibility with values). As one teacher responded, she would use the system only "if all students had them -- half my class did not." Teachers did not use the machine because they could only communicate with some of their students; it was not universally available.

One teacher tried to use it as a bulletin board for a school group, but abandoned the idea after it was apparent that not everyone had the machine, Another teacher explained that she first wrote letters to her students on the machine each night but quit "because not all had the Scout and some who did didn't use it." Thus, even when teachers did try to use the system, their very efforts created an "elite" -- something that conflicted with their own definition of their role in a democratic society.

In reading the teachers' responses, we get a sense of a cycle of non-response, rooted in reliability/technology problems and in the differential availability of the medium, that reinforced a widespread belief among the teachers that traditional forms of communication are equivalent, and perhaps even superior, to the type of mediated system. Furthermore, the complete lack of responses linking their own actions to those of the administrators, suggests that there

was no institutional mandate to use the system, making the teachers feel that the Scout was not a part of their job.

An institutional mandate to the teachers would presumably also have included a period of instruction and training in the use of the system. Although the Scout system was a fairly elementary one, persons unfamiliar with computer messaging might very well have been put off by it and shrunk from using the system. While using the computer as a means of communication and as a tool to develop problem-solving skills are not strictly comparable, it has been suggested by Thompson (1989) that the lack of "thoughtful, in-depth programs to educate teachers and administrators in the uses of computers as (problem-solving) tools..." may contribute to the failure of some school systems to make appropriate use of new technologies. In similar fashion, the reluctance of the Northwest School teachers to use the Scout system may have been contributed to by the failure of the LTC and school authorities to provide any training concerning its possibilities and use.

Conclusion

On the basis of our investigation, we conclude that the LTC Scout system failed to be adopted by the targeted population for four fundamental reasons:

1) Both the hardware and the software of the system were perceived to be flawed by frequent failures, slowness and other technical inadequacies.

2) The system was viewed as almost completely redundant; there was no unique communication niche which it filled, and other communication systems were seen as faster, more efficient or otherwise more desirable.

3) The environment in which the system was placed provided no institutional mandate to use it; no costs could be imposed for failure to use it, as is possible in a more hierarchical structure or organization.

4) No commitment to the system was made by opinion leaders, either in the school or in the community, and hence the community at large had no lead to follow. Indeed, if school personnel are viewed as opinion leaders in this situation, their behavior had, if anything, a negative effect on community use of the Scout system.

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Footnotes

[1]LTC and Northwest School are titles fabricated by the authors in order to protect the identity of the two participating organizations. The Scout computer system is the fictionalized title of the computer system utilized by the community. Electronic mail, games and appointment calenders comprise a sample of the multiple options the system provides.