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ABSTRACT

Two programs for providing distance tutoring for at-risk elementary school children were implemented and evaluated in successive years. Each program employed 10 graduate education students as tutors for approximately 25 sixth-grade children, i.e., 2-3 tutees per student. Tutoring exercises were oriented around writing and language skills development. Program 1 was restricted to electronic mail exchanges via a local bulletin board system, whereas Program 2 permitted both electronic mail and teleconferencing via a national network. Results showed moderate to extensive use of both systems by two-thirds of the students. Students' reactions were somewhat negative about Program 1, but positive about Program 2, seemingly because of the greater flexibility of the latter system and stronger relationships established with their tutors. Additional findings and discussion concern the type of communications made, tutor experiences and reactions, advantages and disadvantages of each system, and recommendations for future program design. (14 references) (Author/BBM)

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An Evaluation of Alternative Distance Tutoring Models for At-Risk Elementary School Children

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Abstract

Two programs for providing distance tutoring for at-risk elementary school children were implemented and evaluated in successive years. Each program employed 10 college education students as tutors for approximately 25 sixth-grade children. Tutoring exercises were oriented around writing and language skills development. Program 1 was restricted to electronic mail exchanges via a local bulletin board system, whereas Program 2 permitted both electronic mail and teleconferencing via a national network. Results showed moderate to extensive use of both systems by two-thirds of the students. Students' reactions were somewhat negative about Program 1, but positive about Program 2, seemingly because of the greater flexibility of the latter system and stronger relationships established with their tutors. Additional findings and discussion concern the types of communications made, tutor experiences and reactions, advantages and disadvantages of each system, and recommendations for future program design.

An Evaluation of Alternative Distance Tutoring Models for At-Risk Elementary School Children

In an Utopian world, the problem of dealing with differences in learner abilities could be easily resolved by providing each individual with a personal tutor. Aside from the natural appeal of a one-to-one teaching ratio, research on the effects of individualized tutoring has provided fairly strong evidence that it can result in substantial achievement gains by both tutors and tutees (e.g., Bierman & Furman, 1981; Gardner, 1978; Levin, Glass, & Meister, 1987; Slavin, 1988). Unfortunately, in typical educational settings, the realities of limited budgets and large class sizes make such tutoring highly impractical. Even where qualified adults, such as college students, may be willing to tutor children on a voluntary basis (Hirschorn, 1988), significant constraints are the considerable time, expense, and logistical difficulties involved in arranging face-to-face interactions.

These considerations create a rationale for using telecommunications technology to place tutors and tutees in contact with one another from remote locations. Although such "distance" interactions cannot be expected to convey the full impact of face-to-face tutoring, they can seemingly offer many of the advantages with fewer practical constraints (McConnell, 1986). The purpose of the present research was to examine how two distance tutoring models, designed for at-risk elementary school children, operated with regard to degree of use, component activities, and impact on participants.

Although distance learning is associated today with state-of-the-art computer technology, it is hardly a new concept. Correspondence learning, in which tutors and tutees interact through the mail or telephone contacts, have been in existence for many years. Today's computer applications use two basic forms of telecommunications, text teleconferencing and electronic mail (Quinn, Mehan, Levin, & Black, 1983). In teleconferencing, tutors and tutees communicate in "real time" by typing messages on a computer terminal that are transferred by modem to the receiver's computer. The result is a conversation based on immediate exchanges of information, much like that on a telephone. In contrast, electronic mail systems operate in the same way as the exchange of written letters or memos. Once the electronic messages are transmitted to another person, they are stored in a Bulletin Board System (BBS) file (or "mailbox") under his/her name, to be read and responded to at a later time.

For teaching purposes, the advantage of teleconferencing over electronic mail is the ability to conduct an interactive tutoring session that structurally resembles that of face-to-face tutoring. The Cyclops teleconferencing system, used in the Open University in Britain as an instructional supplement in college courses, is one example (McConnell, 1986). Students could "attend" as many Cyclops classes, which were regularly scheduled in place of normal face-to-face sessions, as desired. Evaluations showed attendance and learning under Cyclops to be as high or higher as with conventional tutoring. Electronic mail, on the other hand, has the advantage of creating a relatively permanent written communication that students can access at their convenience

(Quinn et al., 1983). It also provides a means of promoting socialization activities by the sending of written messages to "pen pals" and peers (Sayers & Brown, 1987). The main disadvantages are the delay of communications between teacher and student, and the absence of direct person-to-person contacts (Jones & O'Shea, 1982; Newman, 1987).

The above analysis suggests that teleconferencing and electronic mail both offer unique advantages for distance education. The present research
describes and evaluates how each was used with at-risk elementary students participating in the Apple Classroom of Tomorrow (ACOT) program. Alternative distance learning programs employed in successive years are examined. The first (Study 1) involved a locally controlled BBS that restricted communications to electronic mail only, and the other program (Study 2) a nationally-based network system (AppleLink) that permitted both electronic mail and teleconferencing applications.

Study 1

The focus of Study 1, was a distance tutoring model oriented around the exchange of electronic mail messages between tutors and tutees. Activities and attitudes of participants were evaluated through analyses of tutor journals, tutor and tutee survey responses, and the frequency and content of the messages transmitted.

Method

Participants

Tutees consisted of 24 sixth-grade minority students enrolled in the Apple Classroom of Tomorrow (ACOT) class at an inner-city elementary school. There were 15 males and 9 females ranging in age from 10 to 13. The class was one of 13 national sites selected by Apple Computer to establish a computer-intensive environment in which computers would be highly accessible to the children both at school and at home (Baker & Herman, 1988). The present ACOT school was the only site involving distance tutoring and an at-risk student population. Students had been selected to participate in ACOT the previous year on the basis of interest and having access to a home telephone. Because selection did not appear to be systematically biased toward higher ability or higher motivation, the ACOT sample was regarded as reasonably representative of the overall population of sixth-graders at the site school.

Tutors were 10 graduate students (four males and six females) working toward a Master of Arts in Teaching degree at a local university. The tutors' participation was voluntary while offering the incentives of learning about computers and being loaned a home computer system to use during the year. Each tutor was assigned 2-3 tutees during the school year

Tutoring Methods and Assignments

The host system for the BBS was a 512K Macintosh with a 20-MB hard disk drive and an Apple Personal Modem. One dedicated phone line was used for all incoming calls. Students and tutors accessed the BBS using an Apple IIc computer, an Apple Personal Modem, and Apple Access II software. Once they were on-line, any messages that had been sent to them since their last access were listed by sender's name and message number. They could then select between menu options allowing them to read, send, edit, or delete messages. In sending a message, the user entered the recipient's name and a brief message title. After the message was typed, it could be sent as it appeared, edited or deleted. File transfer was not easily accomplished and therefore was not used.

Considering that electronic mail would be the primary tutoring mode, assignments were oriented around writing skill activities that depended on the exchange of information over time rather than through real-time interactions. The initial assignment asked students to construct a "contrast paragraph" comparing their own background and interests to those of their tutors. Completed paragraphs were posted on the BBS for the tutors to examine and react to through comments and feedback. Later, a printed copy of the assignment was handed in and evaluated by the classroom teacher. Additional BBS assignments during the first semester were patterned on this basic orientation of students submitting early work, receiving feedback, and preparing revised versions to submit in class.

Assignments during the second semester were used to help students expand their reading and writing vocabulary. Tutors were given copies of vocabulary journals that their tutees had created using a data base. Exercises created by tutors listed different groups of words and asked the student to use each correctly in a sentence, identify synonyms, and indicate correct or incorrect uses in completed sentences. Tutors evaluated this work and submitted the grades to the classroom teacher. In addition to these and related formal assignments, tutors and tutees were strongly encouraged to use the BBS informally to share experiences and maintain regular contact.

Instrumentation

Student attitude survey. A 13-item attitude survey was developed to assess student reactions toward three aspects of the BBS: (a) value and utility, (b) helpfulness of tutors and assignments, and (c) technical/operational features. Students reacted to each item using a 5-point Likert-type scale ranging from "strongly disagree" (1) to "strongly agree" (5).

Tutor journals. The tutor journals were forms used by tutors to record any communications received from their tutees. At the top of the form were spaces to indicate the tutee's name, the date the message was sent, and the type of message (social, request for help, etc.). Space

below was used to write a description of the message and any impressions about its content.

Tutor survey. At the completion of the program, tutors were administered an attitude survey containing 14 Likert-type items and 10 open-ended questions. The items and questions concerned feelings about their preparedness for the program, the appropriateness of their training and the tutoring activities, strengths and weaknesses of the program, and perceived value of the experience for them and their tutees.

Message data base. A data base was developed for recording and analyzing messages transmitted on the BBS. Categories included number of words, sender, receiver, subject, synopsis of content, and category. For the latter measure, categories were derived on the basis of examining common themes or purposes conveyed in the messages. Eight were identified as inclusive of all messages: Social, BBS Assignment, Tutor Business, Tutee Problems, Miscellaneous, Reminder, Excuse-Explanations, and Grade Report.

Procedure

The tutoring program was initiated in September with orientation meetings for students, teachers, parents, and tutors. These sessions includedbasic demonstrations of how to operate the equipment and use the BBS. Tutors and students met one another at the meeting and also at two social gatherings that were subsequently held at school and the university. The program formally began in early October with the assignment of the first exercise (the contrast paragraph). Tutors gave feedback on the drafts transmitted, and students made revisions until an "acceptable" version was produced. Comparable procedural orientations were used for additional assignments during the year (e.g., word clarification, sentence construction, vocabulary journals).

A hard copy of every electronic mail message recorded on the BBS was obtained for research purposes. Three one-week samples were chosen at random from different periods of the year for analysis. Word counts were made and other critical data were recorded from the messages sampled. The only subjective evaluation concerned categorizing the content of the message. Although some of the messages contained elements of more than one category, it was fairly easy to identify a primary category based on the general intent conveyed (for further details, see Ulrich, 1988).

The student and tutor surveys were administered independently in April. Items were read aloud to students as they read them silently.

Results

How the BBS was Used

Table 1 shows the frequency of messages posted by the different user groups during the three analysis periods. Staff consisted of the

ACOT coordinator and the present authors, all of whom participated in supervising the tutoring project. The results reveal a fairly high level of total responses, ranging from 131 to 231 messages per week. With the exception of boys whose activity rate was very low, the three remaining groups (tutors, staff, and girls) each accounted for close to one-third of the total messages sent. Dividing the frequencies by the number of users yielded mean individual rates of 5.2 weekly messages per tutor (n=10), 14.7 per staff member (n=4), 3.7 per girl student (n=15), and .9 per boy student (n=11). Parallel analyses conducted on the number of messages received showed similar results, with the weekly averages being 4.9 for tutors, 13.1 for staff, 3.3 for girls, and 1.6 for boys. Mean numbers of words per message were 50.7 for tutors, 41.9 for staff, 76.2 for girls and 19.5 for boys.

Insert Table 1 about here

In any given observation week, from half to two-thirds of the girls and boys posted at least one message. Ten of the 26 students, however, failed to post a single message during any of the observation periods. Across the three sample periods, girls (f=167) were almost seven times more active in sending messages than boys (f=24). Girls sent 33 (17%) messages to other girls, but only 2 (1%) to boys; 69 (36%) of their messages were sent to tutors and 87 (45%) to staff. Boys, however, sent half their messages to tutors and half to the ACOT staff, thus sending none to other students. Correlations between standardized achievement test scores and message sending or receiving rates were not significant.

Type of Message

The most frequently used message category was Social (n=274). Topics for these messages included general encouragement for using the BBS, puzzles, chatting about sports, and general friendly letters of correspondence. Messages between students accounted for 12% of the total; the remaining 88% involved tutors and staff communications with the students and with one another.

The second most frequently used category, BBS Assignments (n=104), most often consisted of exercises or feedback posted by the tutors, and responses or questions by the children. The third category, Tutor Business (n=81), entailed messages concerning meetings and other matters such as technical aspects of using the BBS. Tutee Problems (n=40) were messages by tutors concerning students who were failing to complete assignments correctly or on time, and the corresponding replies by staff. As the year progressed, this type of message was used increasingly often, as certain students became identified as chronic offenders who were unlikely to respond to reminders or encouragements. Messages that could not be labeled because of their brevity or content (n=27) were classified Miscellaneous (e.g., "Yes, I will do that"). Other categories consisted of (a) Reminders to students (n=20; e.g., "Remember, your work is due next Tuesday"), (b)

Explanations by students for not responding (n=15), and (c) Grade Reports (n=15) of students' performances.

Student Attitudes.

In response to the attitude survey, students expressed mixed to negative reactions regarding the helpfulness of the tutoring assignments. Specifically, from one-half to two-thirds felt that they were: (a) not understanding corrections made by their tutors (67%), (b) not learning much from their tutors (62%), (c) receiving little help with their writing skills (65%), (d) receiving insufficient time from their tutors (56%), (e) finding the BBS assignments difficult (57%). Only a little over half felt that they had enough on-line time (the 30 min. allotted per access) to complete messages, and about one-third found that the line was usually busy when they tried to call.

Correlations were computed between the number of messages received/sent and survey responses. As might be expected, those who were more active in sending messages were more likely to prefer writing social messages than tutoring assignments (r=40, p < .04), and were more bothered by (a) the public display of the messages written (r=.39, p < .05) and (b) the difficulty of accessing the BBS (r= .42, p = < .04). More active users were less inclined to feel that their tutors were helping them with their writing skills (r = -.45; p < .03). The relationships seem largely due to the very active users being more involved in social than in academic communications Girls had a higher preference than boys for social messages and were less satisfied with the BBS access and the helpfulness of their tutors (p's < .05).

Tutor Attitudes

Tutors' responses (n=9) to the Likert-type survey items indicated that most felt sufficiently trained in computer skills (78% agreement) and in the subject matter (78%) to do the work expected. There was less agreement, however, regarding the sufficiency of the orientation training in acquainting them with teachers' objectives (22% agreement), teachers' expectations (44%), and students' expectations (11%). Nearly all tutors (89%) felt that a more intensive training program was needed, two-thirds (67%) would have liked additional opportunities for personal contacts with students.

The majority of tutors (56%) felt that they related well to their tutees, whereas close to half (44%) felt that their tutees related well to them. Two-thirds (67%) agreed that they were given sufficient materials to plan the assignments. Less than one-fourth agreed that teachers communicated with them adequately (22%) or provided sufficient feedback on their roles as tutors (22%).

When asked what types of BBS assignments were appropriate for the type of delivery method, nearly all the tutors indicated a preference for the first assignment type (friendly letter writing). One tutor responded that the writing skill development exercises "took advantage of the computer's capabilities while the fill-in-the-blank or multiple-

choice vocabulary exercises should have been on paper and given to the students." However, another volunteered that writing skills were too difficult to communicate during the 30 minutes of allotted BBS access time. The general consensus was that with a more flexible BBS system most of the assignments would have worked well.

The greatest strengths of the program were perceived as providing participants with exposure to new technology and software; creating an awareness of the special learning and communication needs of the children; providing support to students; and, in some cases, allowing the development of a friendship via the BBS. One of the most important strengths was perceived to be writing skills development, as reflected in the following tutor comment: "The strength of BBS had to do with the fact that the children had to rely on written communication to get their work done. They were forced to read and comprehend as well as write in a way that others could understand." Weaknesses were identified as (a) lack of effective communications with teacher and tutee; (b) delayed feedback; (c) insufficient phone lines; (d) inability to talk on-line; (e) inability to print out assignments; (f) tutees not completing the assignment on time; (g) inappropriate assignments that could have been better handled by printed material; and (h)a lack of planning time.

When asked what was expected of them, the tutors listed motivating students, helping with assignments, correcting assignments, and interacting socially. Several tutors, however, indicated some confusion about what their primary roles should be. All but one tutor was highly positive about recommending the ACOT tutoring experience to future prospective tutors. The one negative response was that the responsibilities demanded too much time. All tutors felt that they could have tutored better in person at times because the BBS was very impersonal and assignment corrections often became to wordy. Other comments expressed concern over the apparent lack of parental support. One tutor wrote, for example, "No wonder Jill does not respond to my messages or worry about F's on BBS assignments, her parents obviously don't feel that the BBS is of enough importance to let her hook it up to the phone line." Whether due to parental behaviors or other factors, the failure of some students to complete the assignments or communicate regularly was the biggest source of frustration for the tutors as a group.

Based on the results, positive aspects of the program were viewed as the high level of BBS usage by most of the students, and the perceived potential to channel that activity into academically-focused exercises. A significant impediment to program activities was the operational limitation of the single-line BBS system which made access highly difficult, restricted the time and space available for messages, and did not allow file transfer or real-time communications. Many students also found the assignments difficult and not helpful for learning. In view of these outcomes, goals for the second year were to increase the effectiveness of the program through the use of a more versatile BBS and more carefully planned assignments.

Study 2

The second-year project and evaluation were comparable to those of Study 1 with the following major differences: (a) AppleLink, a national network system that permited both electronic mail and teleconferencing, was used as the BBS; and (b) due to a delays in establishing BBS accounts and allocating computer equipment, the project was not initiated until January of the school year.

Method

Participants

Students were 27 sixth-grade minority students (9 boys and 18 girls) from the same school as in Study 1. Tutors were again 10 education students from a local university (8 females and 2 males). Based on the Study 1 results, an attempt was made to establish closer student-tutor relationships by having each tutor spend three days at the school, in October, to become acquainted with his/her tutees and the school environment.

Procedure

Due to the late start-up time, fewer exercises could be assigned relative to Study 1. One assignment was a "friendly letter" that the students composed and sent to their tutors who gave suggestions for improvement. The second exercise was the construction of a personal time-line of each student's life. A third was the writing of an autobiography using the time-line as a reference. A fourth was a contest in which students earned team points for completing assignments and for having on-line conversations with special people (teachers or staff) who accessed the system intermittently. As in Study 1, students were also encouraged to use the system frequently and regularly to communicate with others. Such conversations took the form of both on-line conversations and electronic mail exchanges.

Data regarding program activities and reactions were obtained from instruments adapted from Study 1 and several additional measures. These included: (a) student and tutor attitude ratings and open-ended questions, (b) student interviews, (c) tutor journals, and (d) AppleLink billing records indicating individuals' frequency of access and accumulated on-line time.

Results

How the BBS was Used

Due to the inability to obtain copies of actual messages under the AppleLink system, data regarding uses of the BBS were obtained from two secondary sources, tutor journals and billing records. The journals provided a record of the messages sent by students to their tutors during March 1 to April 15, a six-week period when all participants had active

BBS accounts. Tabulation of the messages recorded showed that students sent tutors a total of 97 messages. This represented a 41% increase over the 69 student-tutor messages sent during the six-week period monitored during Study 1, but comparability of the data is weakened by differences in school and tutoring activities occurring at those times. The messages were categorized as being one of five types: Personal/Friendly (n=39), Tutoring Assignments (n=26), Mail Responses (n=18), School Activities (n=11), BBS Operations (n=3). The length of the messages ranged from 10 to 90 words, with an average of about 25 words.

The billing records indicated the total amount of time each user was on line each month from January through April. A summary is provided in Table 2. As revealed, virtually all tutors and most (approximately two-thirds) of the tutees accessed the system each month. Tutor on-line times greatly fluctuated across time periods, a direct result of the planning and communication requirements for different tutoring exercises. Student on-line times were more consistent averaging close to one hour per week overall. The distribution of student on-line time, however, was highly skewed, with some individuals spending considerable time (e.g., as high as 71 hours in one month) and others only a few minutes.

Student Attitudes

Survey results. The attitude survey was completed by the 23 students who attended class on the day of its administration. In direct contrast to Study 1, responses were the most positive on items concerning relationships with tutors: (a) liking one's tutor (100% agreement), (b) wanting to spend more time with tutors (87% agreement), and (c) feeling that tutors liked them (70% agreement). Nearly three-fourths (74%), however, felt that they did not have enough contact with their tutors. Students also compared the tutor interactions favorably with those involving peers, with the majority feeling that they: (a) preferred tutors messages to friends messages (56%); (b) preferred talking to tutors than to friends (63%); (c) would rather have their present tutor than one from their school (61%), or (d) preferred leaving messages for tutors than for friends (65%). With regard to assignments, 69% agreed (with the remainder undecided) that they liked assignments on the BBS, and 65% agreed that they were learning from their tutors. Their main frustration was not having the opportunity to use the BBS for as much time as they wanted (82% agreement).

On open-ended items, tutees were asked to identify what they liked most and least about the tutoring experience. Sixty-five percent felt that it gave them a chance to meet new people and learn new things. One tutee wrote, "Getting to know someone from a college and that my tutor is helping me to improve my work." Another responded, "I liked it because it gave me a chance to learn something new." Students also liked being able to talk to friends and "getting to know people all over the world." The consensus regarding the least favored aspect was the limited on-line communication with tutors.

Interview responses. Interviews were conducted over a three-day period the first week of May. All 24 students who attended school during that period agreed to the interview. On the average, students reported spending 5.4 hours a day on the computers at school compared with an average home usage of 1.2 hours. When asked what they liked best about their ACOT experiences, they cited meeting new friends (n=8), learning new activities (n=3), having new and much more software (n=2), etc. Six (25%) students identified the use of AppleLink as their favorite experience. When asked what was liked least about ACOT, the only four students who responded each mentioned "more work" in their replies.

Approximately one-third had not used AppleLink from their home but did so from school. Reasons were equipment problems, no access to a phone, or not knowing how to operate the system. Each student was also asked to describe his or her use of AppleLink with regard to specific applications of the Post Office (send/receive mail), ACOT Chat Room (ACOT-only teleconferencing), or the Apple Lobby (general public teleconferencing). The Apple Lobby was used by more than 92% of the students. The main reason for its use was the adventure of meeting new people from across the country. Less than 25% of the students, however, used the ACOT Chat Room more than once or twice; those who did not use it responded that "there was never anybody there." Fifteen of the 24 students indicated they used the Post Office for sending/receiving messages. When asked how the tutoring experience could be improved, 96% felt that more personal contact was needed. Specific suggestions were to have occasional meetings of the participants at school or to arrange set times to "meet" in the ACOT Chat Room.

Tutor Attitudes

All 10 tutors either agreed strongly or agreed that they were competent to tutor based on their academic skills and computer expertise. Seven indicated that the assignments were appropriate for the BBS, and all agreed that AppleLink was easy to use. Six felt that they related well to their tutees.

At least half of the tutors disagreed, however, that they received adequate communication from classroom teachers (80%) or that they were able to communicate their expectations to their tutees (50%). The majority were undecided on whether they had enjoyed the tutoring-mentoring process (60%) and on whether the tutoring assignments were consonant with the classroom teacher's assignments (80%). None indicated that they were disappointed with their tutees' responses.

When asked to list positive aspects of the program, many tutors identified the initial face-to-face meeting, students' introduction to new technology, the motivational benefits of using a computer for learning, and the computer skills they personally gained. The most often mentioned negative aspect was the lack of coordination between the tutors, tutees, and school teachers. One tutor responded, "I felt isolated. There seemed to be no strong central advocate for the AppleLink

activities in the classroom who had enough time to see that things got done." Other negative aspects included the lack of personal contact with students, or fail re to communicate or complete assignments by some students, and equipment failures.

Five of the tutors (50%) felt the tutoring would have been more effective in person; mainly, because the students were so "elusive." Four of the tutors stated that a combination of distance tutoring and face-to-face personal tutoring would be best. Eight tutors indicated that their tutees were frequently unresponsive. One wrote, for example, "I tried to be funny and supportive and show my interest in their lives, but the replies I got were very short and didn't develop into any kind of dialog." Generally, the tone of the open-ended comments seemed largely dependent on the responsiveness of their tutees, which in at least one-third of the cases was extremely low. Thus, some tutors described their tutees' activities and productivity in positive terms while others were negative. Interview responses reinforced these impressions, while also providing suggestions for improving the program. These included having workshops for using the BBS; holding students more accountable for their work; and having more teacher support; more structure, greater integration between classwork and BBS assignments, and more personal interaction. Reactions to the prospect of participating in similar programs were positive, but qualified on the basis of the above types of changes being made.

Discussion

Evaluation of the two distance tutoring programs revealed common outcomes as well as some contrasts. In both instances the potential benefits of the tutoring activities for improving learning and motivation were clearly recognized and acknowledged by staff and tutors. Involving students in reading and writing activities as a natural means of communicating on the BBS was seen as an especially valuable feature. Another consistent finding was the general enjoyment and extensive use of the BBS by most students. Such was particularly the case with the AppleLink system (Study 2) which permitted students to converse in real time in addition to exchanging electronic mail messages. In both programs, about one-third of the students were highly active BBS users, accessing the system nearly every day, while another one-third were almost completely inactive. The main reasons for the latter (especially in Study 2) appeared to be equipment problems, and lack of motivation to complete assignments or to use the system in general.

Differences between program outcomes generally reflected the contrasting environments that were created by each. In the case of the local BBS (Study 1), users were greatly frustrated by the difficulty in accessing the system as well as time delays and the restrictiveness of electronic mail communication (c.f. Newman, 1987). In the case of the AppleLink system, access was almost always immediate, but students appeared to be diverted by many of the extraneous system features (e.g., public conversation rooms, and information sources), resulting in less commitment to the academic activities assigned. While the greater flexibility of the AppleLink system expanded ways of communicating, it also created increased training demands. For example, both students and

tutors experienced difficulty in learning how to upload and download files, as was required for several of the exercises.

Based on the findings, a number of guidelines are suggested to improve the effectiveness of future programs. First, greater front-end planning is required to more closely match program activities to curriculum objectives and media capabilities. Although most of the tutoring exercises assigned generally appeared appropriate, their designs were often dictated primarily by the immediate demands of maintaining a consistent program of activities as opposed to being derived from a systematic analysis of what instructional needs each would support during the school year. There were also some activities (e.g., vocabulary exercises) that would have been more appropriately conveyed through conventional delivery modes (printed exercises or classroom instruction) than by distance tutoring. Compared to the exercises based on electronic mail exchanges, those that took advantage of the on-line interactive capabilities of the AppleLink system were not as well developed or frequently used.

Second, tutoring exercises need to be documented for participants in advance of their assignment, with objectives, completion dates, activities, and products clearly specified. In the present programs, tutors often received only brief oral descriptions of exercises a few days in advance of the start-up time. This left them little time to prepare materials and uncertain about expectancies.

Third, in order to take full advantage of distance tutoring capabilities, students and tutors need to be fluent with the operational procedures for the system. In the case of the present AppleLink program, insufficient training on file operations (uploading/downloading, printing, etc.) resulted in lack of preparedness by students for completing several of the assignments independently.

Fourth, and perhaps most importantly, increased personal contacts between tutors and tutees appear crucial for establishing meaningful relationships and strengthening the social aspects of the learning experience (Jones & O'Shea, 1982; Paulet, 1987). Accordingly, the need for more frequent face-to-face meetings between students and tutors was one of the most consistent and strongest recommendations made by participants. Some support for this idea is provided by the Study 2 results which suggested the establishment of closer tutor-tutee relationships and more positive student attitudes relative to Study 1. A strong contributing factor appears to have been the three full-day classroom visitations that Study 2 tutors made at the beginning of the year.

Overall, the results of the two studies reinforce the notion that distance tutoring is attractive to students and can involve them in useful learning activities using a combination or separate applications of electronic mail and teleconferencing. However, as in the case of conventional tutoring, success does not directly follow from putting students who need help in contact with capable tutors (see review by Cohen, 1986). Tutoring activities must be carefully planned with regard to individual needs and educational objectives, while positive interpersonal relationships of mutual trust and caring need to be developed. Unlike

conventional tutoring, an additional requirement for distance tutoring is to establish these conditions within the constraints and unique environment imposed by the technological systems. This design integration process appears likely to offer instructional designers the greatest degree of challenge.

Table 1. Frequencies and Proportions of Messages Posted by Different User Groups in Study 1

Period	Tutors (n = 10)		Staff (n = 4)		Girls (n = 15)		Boys (n = 11)		Total (n = 40)	
	f	p	f	p	f	p	f	p	f	p
1	72	.31	93	.40	53	.23	13	.06	231	1.00
2	42	.32	44	.34	37	.28	8	.06	131	1.00
3	42	.20	83	.40	75	.36	5	.03	205	1.00

Table 2. Percent Participation and Mean One-Line Time for Tutors and Tutees in Study 2

Period	Tutors (n = 10)		Students (n = 27)	
	% Using	M Time (hrs.)	% Using	M Time (hrs.)
Jan.	80	17.8	59	4.4
Feb.	100	3.0	67	4.3
Mar.	100	10.1	62	2.8
Apr.	100	3.9	78	5.3

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