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ABSTRACT

This document presents the final report on the Evaluation of the Pennsylvania Teleteaching Project, which was designed to accomplish six objectives: (1) to provide students with the opportunity to take courses that would otherwise be unavailable; (2) to provide students with a higher level of learning; (3) to be usable across a wide variety of learning environments; (4) to provide an administratively manageable and politically viable alternative means for instruction; (5) to provide teachers with a professionally non-threatening and professionally satisfying alternative teaching method; and (6) to provide a cost-effective alternative means of instruction. An audiographic system was used, that is, microcomputer linking via regular telephone lines coupled with an audio bridge; this technology allows a computer terminal to function as an electronic chalkboard and provides audio interaction. The study design and procedures included the collection of data using four methods: a mail questionnaire for teachers, a student data collection form also sent to teachers, a mail questionnaire for administrators, and a student questionnaire. The results and conclusions reported are drawn from the analyses of the questionnaire data from the three groups as well as results from the limited available student performance data. These results are discussed separately for each of the target groups, and the conclusions are organized into six areas relating to the evaluation questions: course opportunities, level of learning, versatility of application, viable alternatives, professional satisfaction, and cost effectiveness. Discussions of some of the issues uncovered during the evaluation of the project and some recommendations for addressing them conclude the report. The survey instruments are appended. (JLB)

# An Evaluation Study of Teleteaching in Pennsylvania

1987-1988



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September, 1988

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1987-1988

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TABLE OF CONTENTS

# INTRODUCTION

This document represents the final report on the Evaluation of the Pennsylvania Teleteaching Project, 1987-1988. The Pennsylvania Teleteaching Project was designed to accomplish the following six objectives:

- To provide students with the opportunity to take courses that would otherwise be unavailable.
- To provide students with a high level of learning.
- To be usable across a wide variety of learning environments.
- To provide an administratively manageable and politically viable alternative means for instruction.
- To provide teachers with a professionally non-threatening and professionally satisfying alternative teaching method.
- To provide a cost-effective alternative means of instruction.

The above objectives served as the focus for the evaluation study RBS conducted.

The Pennsylvania Teleteaching Project, administered by Riverview Intermediate Unit, is "a form of distance education which provides otherwise inaccessible courses to students throughout the state. Standard dial up telephone line service is a cost effective vehicle for transferring audio lectures on speaker-phones along with interactive electronic chalkboards by using a computer equipped with a modem." The teleteaching project has the potential for interconnecting all 29 of Pennsylvania's intermediate units, school districts, private schools, prisons, and special schools using one of two computer networks: an Apple IIe network, and an IBM/compatible network. In 1987-88, the two networks combined interconnected various combinations of 31 participating schooling sites (intermediate units, school districts, private schools, prisons and special schools) in Pennsylvania alone. In

addition, cooperating sites in Utah and Mexico were also linked to the Pennsylvania Teleteaching Project, thus providing courses delivered over distances covering 2 to 2,000 miles.

Overall, 21 separate courses were offered via the teleteaching network in the past school year. The courses ranged from 3 to 36 weeks in length, with the great majority being either 18 or 36 weeks in length. Thirty-nine teachers were involved as either teleteachers (sending site) or associate teleteachers (receiving site). A few of the above teachers were involved in more than one course during the year and in some cases teachers co-taught a course and thus served, at different times, as both a teleteacher and an associate teleteacher. In addition, a few courses were sent to more than one site. Approximately 139 students were involved as sending-site students and 146 were present at the receiving sites. The great majority of the courses were offered at the secondary level (9-12). Several courses, however, involved special populations (i.e., the math course for fifth grade gifted students, the health course for LD and EMR students, the remedial reading course for low achieving fifth graders, the social skills and check writing courses for incarcerated juveniles, and the social psychology course for "at risk" students).

## Evaluation Questions

The program objectives for the Pennsylvania Teleteaching Project were translated into the following evaluation questions in order to structure the evaluation of the project:

1. To what extent does teleteching provide students with the opportunity to take courses that would otherwise be unavailable to them?

2. To what extent does teleteaching provide students with a high level of learning?

3. To what extent is teleteaching practical for use in a wide variety of learning environments?

4. To what extent is teleteaching an administratively manageable and politically viable alternative approach to traditional teaching?

5. To what extent is teleteaching non-threatening and professionally satisfying to teachers?

6. To what extent is teleteching cost-effective?

The study conclusions presented in a later section of this report are organized in a manner which responds in order to the questions posed above.

## STUDY DESIGN AND PROCEDURES

### Design

The study design was operationally defined by the four data collection devices constructed: a mail questionnaire for teachers, a student achievement data collection form also sent to teachers, a mail questionnaire for administrators, and a student questionnaire (see Appendix A). The questionnaires solicited: (1) a description of participants' experience with the project; (2) their perceptions of the effectiveness of its organization, implementation and instructional impact; and (3) their perceptions of program strengths and needs -- from the perspective of their respective roles (i.e., teacher, administrator or student). Student achievement data and the availability of comparison or control groups was reported by teachers on the "student achievement data collection form." A follow-up phone survey was also conducted with select program staff (N=8) to obtain additional information about student achievement and program operations.

### Procedures

A preliminary phone survey of a dozen teleteachers was conducted in February 1988 to determine the extent to which student achievement data would be available for the purposes of the study. It was determined that there would be some data available at most sites, however, given the small Ns involved and the unavailability of comparison groups, it was deemed likely that most of the data would not lend itself to rigorous conclusions about program effectiveness in the area of student outcomes. It was decided nonetheless to solicit all available data for descriptive purposes.

The instruments and cover letters to be used in the study were constructed by RBS staff in April-May 1988, reviewed by the program sponsors (Riverview IU staff and Pennsylvania Department of Education staff), and mailed out to project participants by Riverview IU staff. Completed teacher questionnaires were returned by 38 of the 39 teachers involved in the project. Completed student questionnaires were also returned, where appropriate (there were no students at six of the sending sites), by all but four of the teachers. Some form of student achievement data (i.e., quizzes, lab grades, pass-fail scores, and/or final grades) was also received for 13 of the 21 courses offered. Finally, a total of 21 administrator questionnaires were returned from the following sources: 6 superintendents, 8 principals and 7 school staff representing other roles (e.g., special projects coordinator).

Following a preliminary inspection of these returns follow-up calls were made to eight of the teacher respondents in order to gain a more complete understanding of their responses to open-ended questions contained on the questionnaires.

The data returned were then coded and analyzed. All data were coded and keyed into the RBS computer system. The mainframe version of SPSS-X (Statistical Package for the Social Sciences) was utilized for comprehensive analysis of the data. Descriptive statistical analyses were performed to provide frequencies, means and standard deviations for all objectively scored items on the questionnaires. Items with open-ended responses were analyzed qualitatively and the results were included in this report as well. The results of the data analyses are presented in the following section.

## RESULTS AND CONCLUSIONS

This section presents results from the analyses of questionnaire data from administrators, teachers and students participating in the teleteaching project as well as results from the limited student performance data available. It then presents conclusions drawn from those results.

### Results

The results are discussed separately below for administrators, teachers and students. Those results most pertinent in addressing the six evaluation questions posed earlier in this document are then discussed further in the conclusions subsection that follows.

#### Administrators

A total of 21 administrators responded to the Administrator questionnaire. Included among these respondents were: six superintendents; eight principals; six directors, coordinators, or supervisors; and one business manager. All in some way served in an administrative or supervisory capacity for the teleteaching project in their school or district. Descriptive statistics for all items contained on the administrator questionnaire are presented in the Appendix to this report. Major findings are also summarized here.

In general, findings indicated that most administrators have had two years of experience with the teleteaching project, having been associated with an average of two teleteaching courses in previous years and one to two courses during the current year. Sixty-eight percent of the administrators indicated that their school or district was utilizing the MSDOS teleteaching

network vs. 32% indicating use of the Apple teleteaching network. Administrators indicated a wide variation in the amount of training and orientation received on the teleteaching equipment and instructional process. This ranged from no training at all to a total of two training sessions with on-site follow-up assistance. Administrators, on the average, rated their experience with the teleteaching equipment and materials during the course of the school year as good, with computer equipment operation rated as fair to good. Particularly problematic seemed to be the speaker-phone and the telephone lines transmission, both of which received specific mention in comments by administrators.

Administrators were also asked to rate a number of statements concerning the teleteaching program on a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). On the whole, the ratings were generally favorable, hovering around either side of the 4.0 level. The highest two rated statements were: "I would be willing to participate again in a teleteaching project" (4.45) and "I would recommend teleteaching to other school districts" (4.30). The lowest rated item was the statement "The orientation and training I've received have been adequate/effective" (3.68).

When asked what they liked most about the teleteaching project, administrators most frequently cited: the possibility of extended course offerings, the opportunity to share information with other agencies and cooperate with different schools, the relationship between sending and receiving school students, student enjoyment of the program, and the use of state-of-the-art technology. In terms of problems encountered in the implementation of the project, administrators most frequently mentioned:

"phone line problems", "the cost of the phone line", "meshing time schedules with cooperating schools", "insufficient/improper training of personnel", and "no problems." A follow-up question was asked as to what changes or improvements administrators would like to see made in either the project design or management. Most frequent responses to this question were: "greater emphasis on training of personnel"," worked well as is - no changes", "the addition of FAX machines for assignments and tests", and "the opportunity for teleteachers and associates across Pennsylvania to meet and discuss techniques."

In terms of future use and potential applications for the project and teleteaching in general (as well as additional comments administrators were asked to make), the most frequent responses were as follows: "expanded number of courses in the future", "great potential for use with gifted students", and expansion considerations of other types. Some suggestions in the latter area included the use of two-way video and audio via cable and microwave, the use of teleteaching applied to staff development purposes, structured opportunities for teleteachers and associates across Pennsylvania to attract and exchange information and techniques, state level awards and recognition for teleteaching teachers and students, the development of standard teleteaching equipment training lessons and their distribution, and production and dissemination of a project newsletter.

Teachers

A total of 38 teleteachers and associate teleteachers responded to the teacher questionnaire. Individual item statistics are provided in the Appendix. Highlights are discussed here. The responding teachers taught a

wide variety of courses. Approximately half of the teachers responding were teleteachers who taught at the sending sites and half were associate teleteachers who monitored the classes at the receiving sites. They ranged in overall teaching experience from one to 34 years, with a mean of 16. The years of experience specifically with teleteaching for the teleteachers ranged from one to three years, with 50% of the teleteachers having one year of experience and 33% having two years. The range of experience for associate teleteachers was similar, with 56% having one year of experience and 28% with two years of experience. In terms of the type of teleteaching network that the teachers were utilizing, 71% indicated they were using the MSDOS network, while 26% reported using the Apple network, with 3% using other computer systems on one or the other of these two networks.

The teachers were also asked about their experience with teleteaching equipment and materials. Good to excellent ratings were reported for computer equipment operation and computer software, while telephone line functioning and availability of materials ranged from fair to good. Two respondents rated these latter two areas as poor. In terms of how teachers were selected for participation in the project, almost 90% indicated that they were approached by their school administration to participate. The amount of training the teachers received on the equipment and the instructional process varied considerably. While the mean number of hours indicated for each was reported to be four, the range in training hours was rather large. For training on equipment, teachers reported having received from 0 to 15 hours (13% of the teachers reported receiving 0 hours training and 13% reported receiving 15 hours training). For training on the instructional process, teachers reported receiving from 0 to 20 hours (27%

indicated receiving 0 hours of training, while 13% reported receiving 15 or more hours). In terms of their access time on the equipment prior to the start of the course, teachers reported spending from 0 to 70 hours of time. While the average was approximately 12 hours, it should be noted that 21% of all the teachers had 0 time on the equipment prior to the start of the course. For these teachers, there was a mean of about 17 hours of previous experience on a personal computer. But once again it should be noted that the range of such experience was from 0 to 98 hours, with 50% of the teachers at the 0 level.

Teleteachers were asked to report the number of hours of preparation time necessary to prepare computer display files for each lesson. This was indicated to be approximately 2 hours. For associate teleteachers a similar question was asked regarding how much time it took them to prepare for each class, and the response was approximately 1 hour on the average.

Both teleteachers and associate teleteachers were asked a number of questions relating to their experiences in operating their respective classes during the past year. In responding to these questions teleteachers and associate teleteachers were very similar in their outlook, based upon their most frequent response to these questions. Both groups of teachers felt that students learned in a teleteaching situation about as well as in a regular classroom. They felt that students in a teleteaching class take more responsibility than those in a regular classroom. They rated student enthusiasm for the teleteaching class to be more than that in a regular classroom. They rated the progress of their class in the teleteaching situation as being just about what they expected. With respect to how attentive students were in a teleteaching classroom as compared to a regular

classroom, teachers in the remote classroom felt that they were about as attentive as in a regular classroom, while teachers in a home classroom felt that they were more attentive than in a regular classroom.

Following these comparisons of teleteaching home (sending site) and remote (receiving site) classes to regular classes, a series of questions were asked about teachers' teleteaching experience in general during the current year. These questions covered a wide range of factors and issues. In responding to these questions teachers were asked to rate each of the statements on the questionnaire in accordance with a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). The highest two ratings received were on the following statements: "I enjoy taking part in this method of teaching" (4.05), and "As a teleteacher, I now find myself better prepared for class" (4.00). The lowest two ratings were received for the statements: "The teleteaching orientation and training I've received has been adequate/effective" (3.23), "Students at the remote site take more responsibility for learning than students in a regular classroom setting" (3.31), and "I have had adequate preparation time for the teleteaching class I teach" (3.39).

Teleteachers were also asked about the kinds of contact that they and their students have had with other students at the remote site. It is interesting to note that nearly half of the sending sites had some form of contact with the remote site teachers and students other than during the teleteaching class. Sometimes photographs of students were exchanged between the two classes. At other times, the sending site teacher visited the remote classes either to teach a class or to administer a test or to deliver

materials. Some classes videotaped lessons and exchanged videotapes between the two classes. In another case, both classes met for a joint field trip.

To aid their participation in the teleteaching project, all teleteachers and associate teleteachers were provided with release time from other responsibilities, substitute days, and preparation time during the regular school day. In addition, some reported being compensated for time spent after school hours. A total of 54% of the participating teachers indicated that their participation affected their future goals as an educator. Typically, they indicated pursuing some computer oriented activities or course of study at the graduate level. In terms of the effect their participation had on other teachers that they worked with, most teleteachers indicated interest, positive reactions, and support from their colleagues.

When asked what they liked most about their teleteaching experience, the teachers most frequently cited the following: it gave them and their students exposure to modern and hi-tech equipment, it gave their students a chance to take a course not otherwise offered in the district, it gave them the opportunity to work cooperatively with another teacher, it helped students and generated high student interest, it was personally stimulating, and it helped in organizing class presentations. When asked what the teachers liked least about the teleteaching experience, they indicated the following: scheduling differences between sending and receiving sites, computer technical problems, problems in getting equipment set up initially, getting trained, and getting materials. Things that teachers would like to see changed in the project design and management include the following: more and better training, a better means of sending materials to the sites, fewer technical problems with equipment, more careful planning and better

scheduling, a video as well as audio connection between sites, and combining the Apple "working" and "transmitting" versions of the software.

Additional closing comments about the project by the teachers participating in it included the following: "the program has great potential", "administration of the program is terribly disorganized", "teachers need more preparation time", "it is an excellent project", "the cost of the project is relatively inexpensive", and "hope the program expands."

Students

A total of 242 students responded to a student questionnaire. Fifty percent of those students were from the sending sites, while the other fifty percent were from the receiving sites. Results from descriptive statistical analyses and individual items on the student questionnaire are presented in the Appendix. Highlights of those results are addressed in the paragraphs which follow.

A number of items on the student questionnaire contained a variety of statements covering different aspects of the teleteaching experience, with students required to rate them on a five-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). Some of the more highly ranked items included the following: "In my teleteaching class I didn't feel labeled or stereotyped as a good or poor learner" (3.69), "I would recommend this type of class to other students" (3.63), "It was important to me to have the opportunity to take this class" (3.63), and "In my teleteaching class the kids cooperated more often and/or helped each other to learn more often than in my regular classes" (3.60). On the other hand, some of the

lowest rated items were as follows (note that low scores signify disagreement with the statements): "At times, I felt irritated or upset at having to share the teacher with the students at the other site" (2.06), "I spent more time, outside of class, studying for my teleteaching class than I did for most of my regular classes" (2.26), "I tend to take notes more often in my teleteaching class than I do in my regular classes" (2.68,.

Students were asked some open-ended questions concerning their experience with the course. When asked how they benefited from participating in the teleteaching course, students most frequently cited the following: learned a lot of the course subject, learned about computer technology, had fun, have not benefited. When asked what they liked most about the teleteaching class, students most frequently responded as follows: "talking to the kids in the other class and sharing ideas", "learning, the computer", "could work at own pace", "everything." When asked what they liked least about the teleteaching class, students responded most frequently: "computer screen too small", "problems with computer hookups", "the other class was disruptive", "too many tests", "the whole program."

Students were also questioned about what changes or improvements they would recommend in the program. The following represent their most frequent responses: "a phone hookup to see the person on the other end", "a bigger computer screen", "make sure the other class is well matched to the sending site class", "more computers and fewer students."

Additionally, the limited amount of student performance data available was collected. This consisted of final grades for corresponding home and remote students for five courses. A total of 63 home students and 37 remote students were involved. Mean final grade scores were calculated for each of

the ten classes and are reported in Table 1 on the following page. The significance and limitations of this data are discussed in the following subsection on conclusions.

## Conclusions

The results presented above provide a broad spectrum of findings relevant to the experiences of administrators, teachers, and students in connection with the teleteaching program. Many of these results relate directly to one or more of the six evaluation questions posed earlier in this report. In this section, the results presented above are utilized to provide answers to each of the evaluation questions and to draw conclusions about the teleteaching project as it relates to each of the questions.

### Course Opportunities

1. To what extent does teleteaching provide students with the opportunity to take courses that would otherwise be unavailable to them?

Question 15 on the administrator questionnaire and question 10 on the student questionnaire bear directly on this question. In addition, question 45 on the teacher questionnaire relates indirectly. Administrators were asked to respond to the statement "The course being delivered by the project most likely would not have been possible to deliver at the receiving site if it were not for the project." The mean response of administrators to this question was in the "agree" to "strongly agree" category (4.20). Students were asked to respond to the following item on their questionnaire: "If it were not for the teleteaching project I would not have been able to take this class." Since this would be true only for receiving site students, a

Table 1

TELETEACHING FINAL COURSE GRADES

| Course | Home Students | N | Remote | N |
|---|---|---|---|---|
| 1. Death & Dying | 78.63 | (11) | 78.33 | (6) |
| 2. Analytic Geometry/ Calculus | 85.30 | (23) | 90.33 | (6) |
| 3. CAD | 80.51 | (6) | 83.51 | (6) |
| 4. Gifted Math (Gr. 5) | 82.70 | (10) | 75.53 | (13) |
| 5. SAT Prep. | 91.15 | (13) | 95.00 | (6) |

special analysis of receiving site student questionnaires was undertaken for this item. Results show a mean rating between "agree" and "strongly agree" (4.05). Additionally, for teachers responding to the question of what they liked most about the teleteaching experience, one of the responses with the highest frequency was that it "gave students a chance to take a course not offered in their own district."

There is little doubt from these results that the teleteaching approach to a great extent provides students with the opportunity to take courses that they would otherwise not be able to take. With increasing local and state requirements for graduation, and projected shortages in available teachers, it is anticipated that it will become even more difficult for rural districts to attract and retain teachers for the kinds of courses currently being taught via teleteaching. Therefore, this mechanism for delivery of courses will become even more valuable in the future.

Level of Learning

2. To what extent does teleteaching provide students with a high level of learning?

This evaluation question is addressed directly through two items on the administrator questionnaire (16, 17), three items on the teacher questionnaire (18, 21, 32), and one item on the student questionnaire. It is also addressed indirectly through several other items on each of the questionnaires.

Administrators indicated that they agreed with the following statements: "The course being delivered is as effective as class instruction" (3.90), and "I am satisfied with the instructional outcomes of the project" (3.95). For teachers, the majority at both the sending and receiving sites

indicated that students in the telelearning situation learn "as well as in the regular classroom" and that students' enthusiasm for the class "was more than in their regular classroom." In addition, more of both types of teachers indicated that the progress of their classes corresponded to their expectations.

For students, the majority agreed with the statement "In my teleteaching class I learn about the same, or even better than, I learn in a regular classroom." Students also agreed with the statement "Overall, I enjoy participating in the teleteaching project." Moreover, open-ended items on the student questionnaire elicited responses supporting a high level of learning through the teleteaching approach. When asked how they have benefited from participating in the teleteaching project, students most frequently responded that they "learned a lot about the course subject."

It should be noted here that an attempt was also made, in this study, to collect student achievement data for students participating at both the home and remote sites. Since the evaluation study was authorized so late in the school year (mid-Spring), appropriate testing with comparison groups could not be incorporated into the evaluation design beforehand, and thus the performance data collected is of limited value. This will be discussed further in the subsection on issues and recommendations below. Nevertheless, an aggregation of final course grades has been assembled from the student performance data collected in this study, and has been presented earlier in Table 1. Here, the mean final course grades for corresponding home and remote classes, taught via teleteaching, are represented for five different courses. As can be seen, the remote classes were able to attain higher final course grades in three of the five courses. Such results

should be viewed with extreme caution, however, since appropriate controlled experimental conditions could not be employed to assess student performance in this study. Thus, student groupings were not randomly assigned and have unknown comparability in terms of intelligence, prior course experience, strictness or laxity of teacher grading, and difficulty of tests and other assignments.

While carefully controlled comparisons (in an experimental vein) of the teleteaching approach compared with the traditional teaching approach have not as yet been possible, it is clear from the questionnaire findings that administrators, teachers, and students participating in teleteaching believe that there is a high level of learning taking place within the teleteaching setting. They also believe that this level of learning is at least as comparable as that provided in the regular classroom in most cases.

Versatility of Application

3. To what extent is teleteaching practical for use in a wide variety of learning environments.

It was not possible or appropriate to include items related to this question on the questionnaires because of the limited exposure of each individual respondent to only courses they were involved in at their site. Nevertheless, evidence related to the evaluation question is provided by the overall application of the teleteaching process across the many schools involved. A total of 21 courses covering 19 different subjects were offered via the teleteaching network during the current academic year. The subject areas covered in these courses are listed below:

- Pascal
- Pre-calculus
- Computer Science I
- Calculus
- Health
- Language Arts

- SAT Preparation
- Math
- French III
- Introduction to CAD
- Physics
- Advanced Physics
- Remedial Reading
- Social Skills
- Spanish III
- TELLS Math
- Check Writing
- Social Psychology
- Death and Dying

It is clear from the wide variety of different subject areas which have been adapted for use with the teleteaching process, and the wide range of levels of sophistication involved, that the teleteaching process is itself a very versatile one in its application. Moreover, its use in correctional institutional settings and with private and parochial schools further supports its versatility of application. It is an instructional approach that appears to be practical for use in many different learning environments.

Viable Alternatives

4. To what extent is teleteaching an administratively manageable and politically viable alternative approach to traditional teaching?

This question was directly addressed in four items on the administrative questionnaire (18, 21, 22, 23), five items on the teacher questionnaire (31, 34, 35, 26, 25), and two items on the student questionnaire (11, 25).

The majority of administrators, as evidenced by the mean rating for the item, indicated that they had been "satisfied with the management of the project and the implementation support provided." They also indicated agreement that "the teleteaching students are satisfied with their participation in the project," and "Overall, the teleteaching project met their expectations." Additionally, they indicated that they would "be willing to participate again in the teleteaching project." In open-ended responses, the administrators also indicated that one of the things they liked most

about the teleteaching project was its "flexibility and possibility of extended course offerings." Most saw the project in the future as being used for an expanded number of courses.

The teachers, in responding to items on their questionnaire, indicated agreement with the following statements: "My co-workers support my participation in the project," "My co-workers are interested in my participation," "I enjoy taking part in this method of teaching," "Overall, the telelearning project has met my expectations," "I would recommend this method of instruction to other teachers." In open-ended responses, teachers indicated that their colleagues expressed interest, had positive reactions, and were generally supportive of their involvement in the teleteaching project. They also indicated that they enjoyed working with teachers at another site, benefited from the use and familiarity with the computer equipment, and thought the project had great potential.

Students, in their responses to items on the student questionnaire, indicated general agreement with the following statements: "It was important to me to have the opportunity to take this class," and "I would recommend this type of class to other students."

As can be seen by the responses from administrators, teachers, and students, the teleteaching process has met with favorable reception. It has proved to be administratively manageable (though further improvements need to be made in this area as discussed later in this report) and a politically viable alternative approach to traditional teaching in instances where traditional teaching methods are not possible.

Professional Satisfaction

5. To what extent is teleteaching non-threatening and professionally satisfying to teachers?

Two items on the administrator questionnaire (19, 24) and eight items on the teacher questionnaire (24, 25, 26, 28, 31, 34, 35, and 37) relate directly to this question.

Administrators indicated agreement with the following statements: "To the best of my knowledge the teleteachers and associate teleteachers are quite satisfied with the project" and "Staff at the remote and home sites who have not been involved with the project have generally reacted favorably to the project."

Teachers have indicated agreement with the following statements: "My participation in the project is receiving adequate administrative support," "My co-workers support my participation in the project," "My co-workers are interested in my participation," and "Overall, I am enthusiastic about the teleteaching class." In addition, teachers indicated: "I enjoyed taking part in this method of teaching," "Overall, the telelearning project has met my expectations," "I would recommend this method of instruction to other teachers," and "I now find myself better prepared for class." In open-ended responses, many teachers said that they enjoyed working with the modern technology, they felt the program had great potential, and one teacher indicated that it was "the most rewarding year of my educational career."

The teleteaching process provides for the use of educational computer technology in a manner which blends the advantages of such technology with the advantages represented by having a teacher present in the classroom managing instruction. It does not threaten to replace the teacher, but

rather to magnify and enhance the impact of the teacher by making that teacher more available at a distance to remote sites and by focusing and facilitating the delivery of instruction from that teacher to the students. In this way, the teleteaching process represents a method of instruction that is non-threatening and professionally satisfying to teachers as reflected in the findings referenced above.

Cost Effectiveness

6. To what extent is teleteaching cost effective?

No new cost data were collected as part of the current evaluation study. This was due to the ready availability of recent cost data for programs operating within the Pennsylvania teleteaching project and also because of the current transition from two line to single line phone transmission systems across the project sites which would serve to substantially affect the cost structure. For these reasons, analysis and transformation of existing cost data, based on the study by Ellertson (1987), was utilized to address this evaluation question. The Ellertson study has been documented in a report entitled "Report on Distance Learning - A National Effectiveness Survey," which was funded by the Pennsylvania Department of Education. This study focused on the cost-effectiveness of distance learning systems as compared with traditional teaching methods. Costs were studied for the delivery of 34 courses conducted in a number of different states and involving several different transmission methods.

Using data from this survey, RBS was able to partial out 17 courses which were delivered through the Pennsylvania teleteaching project within Pennsylvania and involving a dial-up transmission procedure. One hundred

eighty-six students were involved across the 17 sites, with a mean of 11 students per site. Using the figures in the Ellertson report, and including only the 17 Pennsylvania sites, a mean cost for distance learning instruction per student per month was computed at $93.00. This figure assumed the then prevalent use of two separate phone lines for transmission of the course between the sending and receiving sites. Also using figures from the Ellertson report, the estimated cost for delivery of the same course at the same typical site by a regular certified teacher, if one were available, would have been $75 per student per month. Thus, for these 17 districts in Pennsylvania, the cost for teleteaching would, according to these figures, be slightly higher than the cost using a regular teacher.

However, since the time the Ellertson study was completed, the Pennsylvania teleteaching project has made some advances in methods of transmission and has succeeded in reducing the number of lines required from two to one. When fully implemented, this will result in a reduced transmission cost of half of what it originally was. Using the figures from the Ellertson report, and adjusting the transmission cost to accommodate single line transmission, a significant savings can be realized over the originally projected cost. When this is done, using the same methodology originally employed by Ellertson in his cost effectiveness study, a total cost per student per month of $71 for the teleteaching process is realized. When this is compared to the cost that otherwise would be involved should a regular teacher have been available to teach the same course, a savings of $4 per student per month can be realized for the teleteaching approach as opposed to the traditional approach (all other things being equal).

It should be clear that the cost comparisons discussed here are hypothetical in nature. For, if a regular teacher could have been found to teach the teleteaching course at the receiving site, most assuredly one would have been employed in that manner. However, in the absence of such a teacher, no reasonable alternative in most cases other than teleteaching could be found to deliver this course. Thus, the cost of a teleteaching course at a receiving site might prove to be very reasonable indeed if it meets course requirements needed by students even though it may come at a premium to the traditional method of class instruction. Whether one-line or two-line transmission is used in the teleteaching process, the cost analysis presented above shows the teleteaching approach to be very cost effective in its current applications.

## ISSUES AND RECOMMENDATIONS

This section presents some of the issues uncovered during the evaluation of the teleteaching project, discusses those issues, and provides some recommendations for addressing them.

### Integration of Computer Technology

The Pennsylvania Teleteaching project provides a process of instruction which blends computer technology with traditional teaching. It does not seek to replace teachers with machines. To the contrary, it utilizes the expertise and training of teachers, and their adaptability, to extend the impact of their teaching over a distance to one or more remote sites. At most of the sites in which it has been implemented, staff associated with the teleteaching approach have indicated an appreciable amount of interest, positive reaction, and support from their colleagues. This represents an approach to teaching which meets a defined need, generates little or no political opposition, and has few identifiable detractions. It is an approach that should be disseminated more widely within Pennsylvania. Thus, the following recommendations are offered:

- The Pennsylvania Department of Education should consider broader sponsorship of the program at a level of support that would promote good management, training, and implementation in new sites in which the project is adopted.

- Build on the current level of success with the teleteaching process and encourage the coordination of work done by teleteachers on the system and the sharing of information across teleteaching sites. Additionally, a process should be established for the continued infusion of the latest technology into the teleteaching process to further improve course delivery on an ongoing basis.

## Management, Training, and Support

A number of teachers participating in the project cited problems with the management, teacher training, and support in carrying out their responsibilities via the teleteaching process. Some held that the project may not have been as well managed as it had been in the past. A number of teachers believed that insufficient training was provided to them, so that they were not as prepared as they might have been in handling some of the equipment problems that came up during their teleteaching course. Others complained about the late delivery of computer equipment and the lack of assistance in setting it up. Still others indicated problems with support and with receiving materials in a timely manner. These kinds of concerns appeared to be more troublesome and more critical for first year teleteachers than for teachers who had used the teleteaching process before. Further problems surfaced in the coordination of class schedules between the sending and receiving sites and in the appropriate matching of students from both sites. For most sites the scheduling was workable and the students enjoyed working with students from the other class. However, for a notable minority of sites, the scheduling was to the detriment of the students and the match between classes created animosity and resentment. To address these issues, the following recommendations are offered:

- Consider, for sites that would be involved in the project the following year, leaving the equipment located at that site over the summer months and making the site responsible for its security.
- Prepare a comprehensive manual for equipment set-up, operation, and troubleshooting to be provided to all participating sites and to be used as a resource by teachers and administrators who have been trained but need such a reference as a follow-up to their training.

- Establish a means for networking technical assistance and troubleshooting services across all users of the system and all sites. This "schools helping schools" approach could serve to reduce the demands on Pennsylvania teleteaching staff time and, in some cases, provide for more efficient and effective distributed problem-solving.

- Construct a library of shared materials and "slides" that can be used by teleteachers to help prepare lessons.

- Provide firm guidelines to insure a proper match in scheduling and type of students between the sending and receiving sites.

## Need for Further Evaluation

The present evaluation study of the teleteaching project focused on six major evaluation questions. While the evidence is strong to support the conclusions drawn with respect to each of these questions, the issue of how much students learn via teleteaching (evaluation question #2) is one which demands a more rigorous evaluation than was possible given the timing and design of the current study. The most rigorous way to approach this question involves undertaking a controlled study with teleteaching and non-teleteaching classes being conducted for the same subjects in the same schools at the same time. In most applications of the teleteaching process, this approach is not only impractical but also impossible. However, there are some schools that have indicated an interest in participating in such a study, and if solicited, other schools may join in such an effort. This kind of a study (involving a true or quasi-experimental design) would not only provide an index for the level of learning to be expected by the teleteaching process as compared with more traditional methods, but would also provide an opportunity to test out various implementations of the teleteaching process itself for differential effectiveness. The following is our recommendation in this area:

- Seek out schools willing and capable of participating in a controlled evaluation of the teleteaching process and undertake such an evaluation as a follow-up to the present study.

## Closing Remarks

The Teleteaching project represents a promising infusion of technology into the educational process. Its rapidly expanding applications within local schools are demonstrating that it is a feasible, practical, and cost-effective approach to distance learning. It has received a generally favorable reception by administrators, teachers and students involved in its implementation, and has shown the potential to engender student performance at levels comparable to traditional modes of instruction.

# APPENDIX

Survey Questionnaires

ITEM RESULTS
(n=20)

# ADMINISTRATOR QUESTIONNAIRE

(For Superintendents, Principals and/or Project Coordinators/Directors)

1987-88 PENNSYLVANIA TELETEACHING PROJECT: Sponsored by the Pennsylvania Department of Education and Riverview Intermediate Unit. (Evaluation Contractor: Research for Better Schools, Inc.)

NOTE: All responses will be treated confidentially. Responses will be aggregated across categories of respondents. Individuals will not be identified.

1. Your Name _____ Phone # ( ) ____-_____

2. Your Regular Job Title and Role _____

3. Your School, IU, Agency/Institution _____

4. Your Role re the Teleteaching Project (explain) _____

_____

5. The number of teleteaching courses you are (or have been) involved with and/or responsible for in previous years (# 2.15 ) -- and, this year (# 1.65 ).

6. The number of years of experience you have had with the Teleteaching Project (i.e., 1st or 2nd, etc., yr.) 1.8

7. Which of the following teleteaching systems are you working with?

32% Apple 68% MS DOS 0% Other (please list)

_____

8. How did you become involved in the teleteaching project? (Explain briefly the stimulus and/or motivation which prompted your involvement.)

Through discussions with:

Intermediate Unit
Neighboring School District
Mansfield State University
PA Department of Education

9. What orientation/training have you received re the teleteaching equipment and/or instructional process? (Briefly describe the source, content and duration of orientation/training.)
   - o a few inservice sessions
   - o minimal (2)
   - o two training sessions with follow-up (2)
   - o state workshops (2)
   - o regional training meeting with follow-up (5)
   - o none (2)
   - o one-day inservice
   - o numerous

10. How much previous experience (pre-project) did you have with personal computers? (CHECK ONE)

10% None 38% A little 33% A Moderate Amt. 19% A lot

11. Circle the choice which best indicates your experience with the teleteaching equipment and materials this school year: %

| | 4 Excellent | 3 Good | 2 Fair | 1 Poor | $\bar{X}$ |
|---|---|---|---|---|---|
| a. Computer equipment operation | E 25 | G 65 | F 10 | P | 3.15 |
| b. Software operation | E 25 | G 55 | F 20 | P | 3.05 |
| c. Telephone line functioning | E 15 | G 40 | F 25 | P 20 | 2.50 |
| d. Material available (courier) | E 16 | G 24 | F 11 | P | 3.05 |

Comments:

- o fax machines would be a big plus for the program.
- o good program
- o the year went well
- o experienced delays due to delay in receiving updated software and due to line trouble
- o needed new speakerphone; telephone line was poor but that was our fault
- o speakerphone was a problem

Circle the appropriate response for each of the following statements:
(Statements 12-24)

| 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| Strongly Agree | Agree | Unsure or Undecided | Disagree | Strongly Disagree |
| SA | A | U | D | SD |

| | | % | | | | | $\bar{X}$ |
|---|---|---|---|---|---|---|---|
| 12. | Overall, the equipment has functioned adequately. | 5 SA 30 | 4 A 60 | 3 U | 2 D 10 | 1 SD | 4.10 |
| 13. | The orientation and training I've received have been adequate/effective. | SA 21 | A 47 | U 16 | D 11 | SD 5 | 3.68 |
| 14. | The project is effectively meeting the needs it was designed to address. | SA 30 | A 35 | U 25 | D 10 | SD | 3.85 |
| 15. | The course (or courses) being delivered via the project most likely would not have been possible to deliver at the receiving site(s) if it were not for the project. | SA 50 | A 35 | U | D 15 | SD | 4.20 |
| 16. | The course (or courses) being delivered are as effective as class instruction. | SA 30 | A 35 | U 30 | D 5 | SD | 3.90 |
| | (Comments) _____ | | | | | | |
| 17. | I am satisfied with the instructional outcomes of the project. | SA 30 | A 45 | U 15 | D 10 | SD | 3.95 |
| | (Comments) _____ | | | | | | |
| 18. | I have been satisfied with the management of the project and the implementation support provided (by the I.U., or by PDE). | SA 25 | A 65 | U 5 | D 5 | SD | 4.10 |
| | (Comments) _____ | | | | | | |

| | | % | | | | |
|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | $\bar{X}$ |
| 19. | To the best of my knowledge the teleteachers and associate teleteachers are quite satisfied with the project. | SA 15 | A 65 | U 5 | D 15 | SD | 3.80 |
| 20. | The teleteaching students are satisfied with their participation in the project. | SA 45 | A 35 | U 10 | D 10 | SD | 4.15 |
| 21. | I would recommend teleteaching to other school districts (or to other sites/agencies similar to mine). | SA 45 | A 45 | U 5 | D 5 | SD | 4.30 |
| 22. | Overall, the teleteaching project has met my expectations. | SA 25 | A 50 | U 15 | D 10 | SD | 3.90 |
| 23. | I would be willing to participate again in the teleteaching project. | SA 50 | A 45 | U 5 | D | SD | 4.45 |
| 24. | In my perception, school/agency staff at the "remote" and/or "home" sites who have not been involved with the project have generally reacted favorably to the project. | SA 10 | A 70 | U 15 | D 5 | SD | 3.85 |

(Comments) _____

25. Indicate the things you liked the most about the teleteaching project and your experience with it.

- o relationship between sending and receiving school students (2)
- o flexibility and possibility of extended course offerings are greatest assets (7)
- o the "new" and "revolutionary" aspects of project helped stimulate distance learning discussions
- o school motivator
- o support from PDE
- o opportunity to share information with other agencies and cooperate with different schools (3)

26. What problems, if any, did you encounter in the implementation of the project and in implementing your role?

- o no problems (2)
- o cost of dedicated phone line (3)
- o phone line problems (5)
- o meshing time schedules with cooperating schools (3)
- o IBM equipment problems, Apple seemed easier to use and more reliable
- o frustrating beginning but better when problems were worked through
- o lack of coordination, especially at the local level

25. (continued)

- o possibilities are endless
- o a creative alternative form of instruction where none otherwise could be provided
- o offers alternatives
- o greater responsibility on the student for learning
- o state of the art technology (2)
- o students enjoy it (2)

26. (continued)

- o improper/insufficient training of personnel (3)
- o only minor problems experienced and were corrected quickly
- o time needed by teacher to develop program
- o difficult blocking in time for students
- o initially poor student attitudes
- o shipping of equipment to a central location each summer for inventory could damage it

27. What changes or improvements, if any, would you like to see made in either the project design or management?

- o design - more rapid changeover to MSDOS
- o assign a local level person to coordinate the program
- o greater emphasis on training of personnel (3)
- o funds for development of programs
- o better planning in routing and study of most economical communications linking
- o assistance in handling transmission problems
- o better planning and scheduling
- o addition of fax machines for assignments and texts (2)
- o reduced phone costs

28. How do you see the project being used next year -- i.e., what future applications/potential do you see for the project and teleteaching?

- o great potential for use with gifted students (2)
- o good link with college and university resource people
- o expanded number of courses (9)
- o would like to see staff development using teleteaching
- o more opportunity for teleteachers and associates across PA to interact
- o state level awards and recognition for teachers and students
- o standard equipment training lessons made available
- o project newsletter
- o considering not participating due to problems in funding and training

29. Any additional or closing comments?

- o keep the program going; its potential is enormous
- o a new experience - good
- o should pursue two-way video and audio via cable or microwave (four schools can be linked for about $100,000)
- o problem seen with long distance phone calls
- o it works well
- o pleased with it
- o much better off as a result of this project
- o operated well
- o move our phone company to the 20th century!

27. (continued)

- o opportunity for teleteachers and associates across PA to meet and discuss techniques (2)
- o worked well as is - no changes (4)
- o software improvement

28. (continued)

- o improve quality of existing courses rather than adding new ones
- o excellent potential for use in other districts as enrichment program
- o expansion to a consortium of 20 schools

ITEM RESULTS
(n=38)

# TEACHER QUESTIONNAIRE

(For both Teleteachers and Associate Teleteachers)

1987-88 PENNSYLVANIA TELETEACHING PROJECT: Sponsored by the Pennsylvania Department of Education, and Riverview Intermediate Unit. (Evaluation Contractor: Research for Better Schools, Inc.)

Directions:

A. Please complete one copy of this questionnaire for each teleteaching course you have been involved with this year -- either as a sending or a receiving teacher. (Make copies of this questionnaire as needed.)

B. This questionnaire deals with any teleteaching courses you have been involved with during the current academic year -- whether completed or ongoing.

C. Your responses will be treated confidentially. (Responses will be aggregated across teachers -- individual respondents will not be identified.) Please complete this form and return it to Research for Better Schools, Inc. in the attached pre-addressed/posted envelope.

D. Teleteachers: Please respond to all questions #1-54.
Associate Teleteachers: Respond to all questions (1-54) with the exception of questions #36-41.

E. NOTE: Re Items 18-22:
Teleteachers: Remote refers to those students you teach at the remote site; "home" refers to those students present in the classroom with you when you teach. Leave the "home" columns blank if no students are present with you when you teach.
Associate Teleteachers: When answering please refer only to the students present with you at the "receiving" site.

1. Your Name _____

2. School _____ Phone # (  )____-_____
(The best time to contact me during the school day is between (_____& _____).

3. Name of course _____

4. CHECK ONE: I am: 53% a teleteacher; 45% an associate teleteacher.

5. How long has the course you are (were) involved with, been operating "on-line?" _____

6. Fill in: The course I am (was) involved with is a 21.70 week course, which is usually taught 4.50 times a week, for approximately 41.70 minutes each session.

7. There are (# 8.21 ) students at the sending site and (# 6.22 ) students at the remote site.

8. Indicate the grade level(s) and/or any special educational characteristics of the students. _____

_____

9. Respond to (a-c) or (d-e):

Teleteachers:

(a) Subject(s) you usually teach? _____
(b) Your years of teaching experience? 16.20
(c) Your experience with teleteaching? 1.66
(i.e., 1st, 2nd, 3rd or 4th course you've taught)

Associate Teleteachers:

(d) What is your regular educational role? _____
How many years of experience do you have in the above role? _____

(e) Your experience as a teleteaching Associate Teleteacher (i.e., 1st, 2nd, 3rd, etc. course you've been involved with)? 2.61

10. Which one of the following teleteaching systems are you working with?
26% Apple 71% MS DOS 3% Other (please list)
_____

11. Circle the choice which best indicates your experience with the teleteaching equipment and materials this year:

| | 4 Excellent | 3 Good | 2 Fair | 1 Poor | $\bar{X}$ |
|---|---|---|---|---|---|
| a. Computer equipment operation | E | G | F | P | 3.10 |
| b. Software operation | E | G | F | P | 3.07 |
| c. Telephone line functioning | E | G | F | P | 2.84 |
| d. Material available (courier) | E | G | F | P | 2.94 |

12. How were you selected for participation in this project?

0% I heard about the project and I volunteered
89% I was approached by the administration of my school, district, or I.U.
11% Other (please explain) _____

_____

13. How much training time did you receive:

(a) on the equipment 3.93 (hrs.) and
(b) the instructional process involved 4.10 (hrs.)?

14. Who trained you? _____

15. Prior to commencing the course, how much time did you have to work on the equipment on your own, outside of teaching? 11.57 (hrs.)

16. How much previous experience did you have with a personal computer?
16.70 (hrs.)

17. Respond to (a) or (b):

Teleteacher:

(a) On the average, how much time does it take you to prepare a computer display file for each lesson (i.e., the instructional visuals or slides that constitute the core of the lessons)?
1.90 (hrs.)

Associate Teleteacher:

(b) How much time on the average, does it take you to prepare for class? 1.08 (hrs.)

For the following questions (#18-22) --

Teleteachers: Indicate your response for both the "remote" and the "home" students (unless, of course, you have no home students).

Associate Teleteachers: Indicate your response for your students only in the "remote" column.

18. How well do students learn in the telelearning situation?

| % remote | | % home |
|---|---|---|
| 12 | Better than in a regular classroom | 24 |
| 79 | As well as in a regular classroom | 65 |
| 9 | Less well than in a regular classroom | 12 |

19. How much responsibility do you feel students take in a telelearning class?

| remote | | home |
|---|---|---|
| 50 | More than in a regular classroom | 59 |
| 32 | As much as in a regular classroom | 29 |
| 15 | Less than in a regular classroom | 12 |

20. How would you rate the students' enthusiasm for the class?

| remote | | home |
|---|---|---|
| 50 | More than in a regular classroom | 53 |
| 29 | As much as in a regular classroom | 35 |
| 21 | Less than in a regular classroom | 12 |

21. How well did the progress of your class correspond to your expectations?

| remote | | home |
|---|---|---|
| 18 | It surpassed my expectations | 24 |
| 42 | It was just about what I expected | 41 |
| 39 | It fell short of my expectations | 35 |

22. How attentive are students when they are being taught over the teleboard?

| remote | | home |
|---|---|---|
| 31 | More than in a regular classroom | 44 |
| 46 | As much as in a regular classroom | 28 |
| 23 | Less than in a regular classroom | 28 |

For questions 23-40 use the following scale:

Circle the appropriate response to each statement. (23-40)

| Strongly Agree SA | Agree A | Unsure or Undecided U | Disagree D | Strongly Disagree SD |
|---|---|---|---|---|

| | | % | | | | | $\bar{X}$ |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | |
| 23. | The teleteaching orientation and training I've received have been adequate/effective. | SA 13 | A 37 | U 16 | D 29 | SD 5 | 3.23 |
| 24. | My participation in the project is receiving adequate administrative support. | SA 26 | A 53 | U 5 | D 16 | SD | 3.89 |
| 25. | My co-workers support my participation in the project. | SA 16 | A 50 | U 29 | D 5 | SD | 3.76 |
| 26. | My co-workers are interested in my participation. | SA 11 | A 50 | U 26 | D 11 | SD 3 | 3.55 |
| 27. | I currently have a good understanding of the software. | SA 24 | A 61 | U 8 | D 3 | SD 5 | 3.94 |
| 28. | Overall, I am enthusiastic about the telelearning class. | SA 24 | A 55 | U 11 | D 8 | SD 3 | 3.89 |
| 29. | Overall, the students are enthusiastic about the telelearning class. | SA 21 | A 53 | U 11 | D 8 | SD 8 | 3.71 |
| 30. | The students enjoyed belonging to the telelearning class. | SA 16 | A 66 | U 5 | D 8 | SD 5 | 3.78 |
| 31. | I enjoyed taking part in this method of teaching. | SA 24 | A 66 | U 5 | D 3 | SD 3 | 4.05 |
| 32. | I have been satisfied with the progress of the class at the remote site. | SA 18 | A 47 | U 11 | D 21 | SD 3 | 3.57 |
| 33. | Students at the remote site take more responsibility for learning than students in a regular classroom setting. | SA 16 | A 34 | U 24 | D 18 | SD 8 | 3.31 |

| | % | | | | | $\bar{X}$ |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | |
| 34. Overall, the telelearning project has met my expectations. | SA | A | U | D | SD | |
| | 11 | 55 | 13 | 16 | 5 | 3.50 |
| 35. I would recommend this method of instruction to other teachers. | SA | A | U | D | SD | |
| | 18 | 42 | 29 | 5 | 5 | 3.63 |

(Questions 36-41 are for Teleteachers only:)

| | | | | | | |
|---|---|---|---|---|---|---|
| 36. I have had adequate preparation time for the teleteaching class I teach. | SA | A | U | D | SD | |
| | 13 | 39 | 22 | 26 | | 3.39 |
| 37. As a teleteacher, I now find myself better prepared for class. (Teleteaching constrains me to prepare more thoroughly.) | SA | A | U | D | SD | |
| | 33 | 43 | 14 | 10 | | 4.00 |
| 38. The students in my "home" class benefit from my teaching to students at the other site. | SA | A | U | D | SD | |
| | 22 | 56 | 11 | 11 | | 3.88 |
| 39. I have been satisfied with the progress of the class at the home site. | SA | A | U | D | SD | |
| | 18 | 53 | 6 | 18 | 6 | 3.58 |
| 40. The students at my home site take more responsibility for learning than students in a regular classroom setting. | SA | A | U | D | SD | |
| | 19 | 31 | 38 | 13 | | 3.56 |

41. Teleteacher: Describe what contact (visits) you've had with the students at the remote site and any contact that's occurred between students at the remote site and your home school.

- o two visits to remote site; letter profiles of each student sent to me from remote site
- o exchanged photographs
- o students wanted to get together - but couldn't arrange
- o visited remote day to administer posttest - no meetings between students
- o students sent letters and pictures to each other
- o we videotaped lessons and exchanged videotapes
- o no visits (5)
- o visited remote classes and taught a lesson; also delivered software each week
- o I made 3 visits to remote site; remote site students visited sending site once
- o I have one class per week at the remote site to use supplemental additional remedial strategies not conducive to teaching via teleteaching
- o met student at remote site last year
- o went to remote site twice to give a class
- o I have met teleteaching partner and we have exchanged videotapes for benefit of students
- o visited the remote students once
- o remote and home students met during a field trip

42. Please indicate which of the following opportunities have been provided you to facilitate your involvement in this project (CHECK ALL THAT APPLY).

100% Release from other responsibilities
100% Substitute days
100% Preparation time during the regular school day (how much?)

Explain your answers:

o also compensated for my time after school hours

43. Has your participation in this project affected your future goals as an educator in any way? 54% Yes 46% No (Please explain)

o more computer-oriented in terms of applications for instruction
o confirmed my decision to pursue masters degree in field of computers
o want to do graduate study in computer teaching techniques

44. Describe what effect your participation in the teleteaching project has had on other teachers you work with (i.e., their opinions about or reactions to the project).

o jealousy (2)
o interest (18)
o no effect (5)
o during teleteaching, other instructor in same room had to remain quiet with his students, limiting his teaching
o other teachers interested in the results obtained
o positive reactions (8)
o generally supportive (9)
o skeptical

45. Indicate the things you liked the most about your teleteaching experience.

- o learning to use modem and light pen
- o gave students a chance to take a course not offered in own district (4)
- o exposure to technological equipment (10)
- o helped students (5)
- o high student interest (4)
- o great software
- o organized presentations (3)

46. Indicate the things, if any, that you liked the least about your teleteaching experience.

- o when phone malfunctions hardware doesn't recognize remote students
- o problems in getting materials between schools
- o no instruction booklet
- o the equipment was delivered to my room the day before school was to begin without even a picture of how it was to be assembled
- o not being able to tell what students doint at remote site (no associate teacher)

47. What changes or improvements, if any, would you like to see made in either project design or management?

- o larger screen
- o make sure systems in both schools are ready by first day of class
- o more/better training (6)
- o more training on constructing slides and handling problems
- o receive slide files by mail rather than over telephone line daily
- o tasks kept to high interest
- o directions on how to set up equipment

48. Any additional or closing comments about the project and its impact.

- o a useful tool
- o continue generating software
- o put into our district prematurely
- o terribly disorganized (3)
- o connections were poor regarding timely arrival of materials
- o need more prep time (5)
- o need associate teacher at receiving school
- o need hardware to be left for summer
- o make sure remote class is well-matched in ability to sending class
- c make sure remote class is well-matched schedule-wise
- o project started too far into the year - out of phase with remote site
- o great potential in program (10)
- o the most rewarding year of my educational career
- o use as supplement to certain courses also
- o uncooperative students make course difficult
- o good to learn new instructional style
- o conditions must be right for it to work properly
- o hope the program expands
- o excellent project (2)
- o relatively cheap cost of program
- o the school district does not want to support such programs - only have them on paper

45. (continued)

- o exposure to students in remote site (2)
- o exposure to students from another country
- o working with another teacher (7)
- o personally stimulating
- o teaching teleteaching (2)
- o communicating with students in another school

46. (continued)

- o scheduling differences between sending and receiving sites (5)
- o time taken to do it
- o student lack of interest
- o somewhat inhibited by usual teaching style
- o lack of support from principal
- o children with severe reading problems not do as well
- o difficult to use the shape mode
- o poor training
- o the need to pull students out of other classes to take this one
- o size of classroom monitor
- o computer technical problems (3)

47. (continued)

- o need associate or aide at receiving school
- o receiving district should pay sending district for services
- o more planning and better scheduling (3)
- o better means of sending materials (3)
- o smaller classes
- o better software
- o combine the Apple "working" and "transmitting" versions (2)
- o reduce technical problems (3)
- o need more prep time (5)
- o provide video as well as audio connections (2)

ITEM RESULTS
(n=242)

## STUDENT QUESTIONNAIRE

1987-88 PENNSYLVANIA TELETEACHING PROJECT: Sponsored by the Pennsylvania Department of Education and Riverview Intermediate Unit. (Evaluation Contractor: Research for Better Schools, Inc.

1. School: _____

2. Name of course _____

3. Date _____ 4. Teacher's Name _____

5. The teacher who taught the course was

CHECK ONE:
(a) 50% present in my class, or
(b) 37% at another "sending" site with another class of students, or
(c) 13% at another "sending" site with no other students present.

Directions:

Circle the appropriate response for each of the following statements: (Statements 6-28)

| Strongly Agree | Agree | Unsure or Undecided | Disagree | Strongly Disagree |
|---|---|---|---|---|
| SA | A | U | D | SD |

Practice Items:

I like to watch TV game shows. SA A U D SD
I like the color pink. SA A U D SD

| | 5 | 4 | % 3 | 2 | 1 | $\bar{X}$ |
|---|---|---|---|---|---|---|
| 6. In my teleteaching class I learn about the same as, or even better than, I learn in a regular classroom. | SA 19 | A 44 | U 15 | D 15 | SD 8 | 3.49 |

(Explain briefly) _____

| | | | | | | |
|---|---|---|---|---|---|---|
| 7. In my teleteaching class I tend to pay more attention to the lesson than in my regular classes. | SA 14 | A 36 | U 21 | D 23 | SD 5 | 3.30 |

| | % | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | $\bar{X}$ |
| 8. I feel I take more responsibility for my own learning in my teleteaching class than I do in my regular classes. | SA 11 | A 36 | U 28 | D 20 | SD 5 | 3.29 |
| 9. I am more enthusiastic about my teleteaching class than I am about most of my other classes. | SA 12 | A 27 | U 27 | D 24 | SD 9 | 3.09 |
| 10. If it were not for the teleteaching project I would not have been able to take this class. | SA 22 | A 17 | U 17 | D 15 | SD 29 | 2.87 |
| 11. It was important to me to have the opportunity to take this class. | SA 18 | A 45 | U 24 | D 10 | SD 3 | 3.63 |
| 12. I enjoyed getting to know the students at the other site. | SA 15 | A 39 | U 33 | D 6 | SD 6 | 3.48 |
| 13. Overall, I was more attentive in my teleteaching class than I am in my regular classes. | SA 13 | A 31 | U 22 | D 28 | SD 6 | 3.17 |
| 14. I was required to respond more and/or participate more in my teleteaching class than in my regular classes. | SA 14 | A 30 | U 17 | D 32 | SD 7 | 3.12 |
| 15. In my teleteaching class the kids cooperated more often and/or helped each other to learn more often than in my regular classes. | SA 20 | A 43 | U 19 | D 15 | SD 4 | 3.60 |
| 16. At times, I felt a clear sense of academic competition with the students at other site. | SA 9 | A 33 | U 22 | D 22 | SD 14 | 3.00 |
| 17. Being in a teleteaching class forces you to listen more carefully to the lesson. | SA 17 | A 46 | U 15 | D 18 | SD 4 | 3.54 |
| 18. At times, I felt irritated or upset at having to share the teacher with the students at the other site. | SA 5 | A 8 | U 13 | D 36 | SD 38 | 2.06 |

| | | % | | | | | |
|---|---|---|---|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 | $\bar{X}$ |
| 19. | I tend to be <u>happier with myself and my class performance</u> in my teleteaching class than in my regular classes. | SA 7 | A 22 | U 37 | D 22 | SD 12 | 2.88 |
| 20. | My experience in my teleteaching class <u>either met or exceeded</u> my initial expectations. | SA 7 | A 35 | U 36 | D 12 | SD 11 | 3.14 |
| 21. | I tend to <u>take notes more often</u> in my teleteaching class than I do in my regular classes. | SA 11 | A 22 | U 12 | D 34 | SD 21 | 2.68 |
| 22. | I spent <u>more time, outside of class, studying</u> for my teleteaching class than I did for most of my regular classes. | SA 5 | A 12 | U 17 | D 38 | SD 29 | 2.26 |
| 23. | Participating in the teleteaching project may be one of the <u>most interesting</u> things I've done in high school. | SA 14 | A 33 | U 21 | D 18 | SD 14 | 3.16 |
| 24. | Overall, I <u>enjoyed participating</u> in the teleteaching project. | SA 24 | A 48 | U 14 | D 6 | SD 7 | 3.75 |
| 25. | I would <u>recommend</u> this type of class to other students. | SA 29 | A 37 | U 14 | D 10 | SD 10 | 3.63 |
| 26. | I <u>would participate</u> in a teleteaching class again. | SA 24 | A 35 | U 25 | D 7 | SD 10 | 3.57 |
| 27. | My teacher in my teleteaching class <u>had as much time</u> to deal with me as the teachers in my regular classes (i.e., I didn't feel slighted). | SA 17 | A 43 | U 17 | D 14 | SD 11 | 3.40 |
| 28. | In my teleteaching class I <u>didn't feel "labeled or stereotyped"</u> as a good or poor learner. | SA 18 | A 48 | U 21 | D 8 | SD 4 | 3.69 |

29. How have you benefited from participating in the teleteaching project?

- o learned a lot about the course subject
- o fun
- o learned to use modem
- o learned about computer technology
- o able to get more help from teacher and other students
- o had to have a lot of self-discipline and study hard
- o no benefits
- o benefited somewhat
- o able to take a class otherwise not available

30. What did you like most about the teleteaching class?

- o talking to the kids in other class and sharing ideas
- o learning
- o the teachers
- o the computer
- o challenged to do our best
- o the students
- o could take a course that otherwise wouldn't be available
- o could work at own pace
- o communicating with other students in my class
- o everything
- o friendlier atmosphere

35. What did you like least about the teleteaching class?

- o the timing
- o screen too small
- o couldn't see kids in other class
- o questions or problems too hard
- o the whole program
- o the slow pace
- o too much time typing and messing with computer
- o didn't get help needed
- o couldn't talk directly to teacher
- o scheduling conflict
- o problems with computer hook-ups

36. What changes or improvements would you recommend?

- o a phone hook-up to see person on other end
- o bigger screen
- o better voice quality over phone line
- o do away with the computer
- o expand curriculum taught over the computer
- o don't hold in same room as another class
- o more computers or less students
- o do more work on computer rather than with workbook
- o make a little more interesting
- o smoother running slide presentations

35. (continued)

- o too fast paced
- o too many tests
- o taking notes
- o long assignments
- o not enough teaching
- o class too large
- o nothing
- o the other class was disruptive

36. (continued)

- o eliminate the wasted time with trying to get computers to work properly
- o more discussion
- o none
- o more class work, fewer tests
- o make sure other class is well matched to sending site class