DOCUMENT RESUME

ED 048 669 24f EA 003 434

AUTHOR Kyzar, Barney L.
TITLE Comparison of Instructional Practices in Classrooms of Different Design. Final Report.
INSTITUTION Northwestern State Univ., Natchitoches, La.
SPONS AGENCY National Center for Educational Research and Development (DHEW/CE), Washington, D.C.
REPORT NO RR-1
BUREAU NO BR-0-G-039
PUB DATE 30 Jan 71
GRANT OEG-7-70-0152-(509)
NOTE 76p.

EDRS PRICE EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS *Acoustical Environment, Acoustics, *Classroom Environment, Individual Differences, *Open Plan Schools, *Research Projects, School Buildings, Student Teacher Relationship, *Teaching Methods
IDENTIFIERS Louisiana

ABSTRACT

This study compared various instructional practices and problems in open plan classrooms with practices and problems in conventional plan school buildings. One secondary and three elementary schools having open plan classrooms were each paired with a comparable school having conventional classrooms. Instruments were used to record: teaching techniques, psychological climate, social organization, order maintaining techniques, provisions for individual differences, and activities utilized in the instructional program. A sound survey was conducted in each of the schools to determine the amount of noise transmitted between instructional areas or rooms, and sound level readings were taken during instructional periods to ascertain actual classroom noise levels. The evidence gained in this investigation indicated that noise is not a problem in open space schools. (Author)

EDUCATIONAL SPECIFICATIONS

SCHOOL PLANNING LABORATORY
NORTHWESTERN STATE COLLEGE
NATCHITOCHES, LOUISIANA 71457

RESEARCH REPORT #1

"A Comparison of Instructional Practices
In Classrooms of Different Design"

Sponsored By

U.S.O.E. GRANT OEG-7-70-0152-(509)

PROJECT # OG 039

FINAL REPORT

PROJECT NO. OG 039

GRANT NO. OEG-7-70-0152-(509)

COMPARISON OF INSTRUCTIONAL PRACTICES IN CLASSROOMS OF DIFFERENT DESIGN

Barney L. Kyzar, Ed.D.
School Planning Laboratory
Northwestern State University

Natchitoches, Louisiana 71457

January 30, 1971

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF HEALTH
EDUCATION AND WELFARE

Office of Education
Bureau of Research

TABLE OF CONTENTS

PART Page

LIST OF TABLES

PART I

PROBLEM AND PROCEDURE

The purpose of this study was to compare various instructional practices and problems in classrooms of "open-plan" and "conventional-plan" school buildings. The open-plan represents one of the latest innovations in classroom design, while the conventional-plan is characterized by classrooms having the familiar four walls.

The conventional classroom consists of the traditional four-walled rectangle, about 22' by 30' in dimension, with a bank of windows along the outside wall and usually a single door connecting the classroom to an inside or outside corridor. Advantages of this design include the compactness it affords, the freedom from outside distractions, and the sense of pride and security that the enclosure affords teachers and students alike. Several of the disadvantages are the lack of adequate air circulation, the virtual shutting out of the outside environment and its educational opportunities, and both the creation of undue competition and a tendency toward a lack of cooperation among classes.

Recent years have witnessed the design of classrooms that would retain the majority of the advantages of the conventional classroom while eliminating or reducing to a minimum the disadvantages. Simultaneously, while the above efforts have been under way, many new ideas have entered the field of curriculum and methods as well as the field of architectural design and building materials. The combined impact of these influences has resulted in numerous innovations in classroom design and equipment. Foremost among these innovations, as far as the instructional program is concerned, has been the open-plan type of classroom. This design has found expression in the removal of permanent interior classroom partitions and the subsequent division of space by movable cabinets and/or light-weight roll-away panels, freeing the class from the restraints of an enclosed room.

Since its inception this design feature has caused a number of questions to be raised by laymen, educators, and teachers. Some of the more pertinent questions have dealt with the psychological effects on both teachers and students, the distraction caused by students as they move through the building, and the important problem of noise transmission. In one school system having a facility with open-plan classrooms, certain teachers refused to accept assignments in the new building while others requested transfers away from this new school before the end of the first year. There were other teachers, however, who requested that they be transferred to the new school and, after the first year, stated they would not return to their former schools under any conditions.

What are the implications of this design for the programs in these schools? Unfortunately, only subjective evidence has been reported to date (1, 2, 4, 6). The ambitions of educators, architects, and laymen alike to offer the best for the student of today, coupled with the increasing demand for full value received from the educational dollar, deem it imperative that research be conducted to present some objective evidence as to the impact of this innovation on the instructional program in schools of this design.

PURPOSE OF THE STUDY

The purpose of this study was to investigate and compare various aspects of instructional practices and problems in schools utilizing open-plan classrooms and those with conventional, four-walled classrooms. Specifically, these aspects were:

1. Teaching techniques utilized
2. Classroom social organization
3. Order-maintaining techniques
4. Classroom psychological climate
5. Provisions for individual differences
6. Educational activities utilized in the instructional program
7. Noise transmission

In addition, teachers were asked to comment on problems encountered in the utilization of open spaces for instruction.

PROCEDURE

On the basis of a survey of architects throughout the State of Louisiana regarding the locations of schools with the salient features under investigation, three school systems were chosen for the study. In each system, one elementary school having open-plan classrooms was paired with a comparable school having conventional, four-walled classrooms. One of the systems also included a secondary school of the open-plan design. This school was paired with a conventional secondary school. One other secondary school that was to have been a part of the study did not open as scheduled and thus was not available for investigation.

The elementary schools utilized for comparison are identified in the report as Schools A^O and A^C; B^O and B^C; and C^O and C^C (the superscript ^{O} is used to identify the open-plan schools and the superscript ^{C} to identify the conventional-plan schools.) The secondary schools are identified as S^O and S^C.

School A^O represents the ultimate in open space in that the division of instructional areas is accomplished by a single black-board unit measuring some five feet by five feet. The notable exception is a space representing approximately two classrooms in size, separated from the general instructional area by cabinets extending some seven feet in height. This forms, in effect, a permanent wall. There are four of

these areas, one in each corner of the large open space. The enrollment is approximately five hundred students in grades one through five.

School A^O is in its second full year of operation, with both an integrated faculty and student body. The crossover of faculty required by the courts was achieved prior to the opening of the school.

There are twenty-four teachers in School A^O, in addition to special personnel serving the Materials Resource Center. The average age of the staff is twenty-six years, with a mean of three years of experience. Eight of the teachers are serving in the school for the first time. Twelve are "charter" members of the faculty.

The planning for this school was a "textbook" operation. The architectural phase was supported by the development of complete educational specifications. Selected staff representatives along with school planning specialists and the architects participated in this planning.

Following completion of the design, and while the school was under construction, five teachers were selected and released from their regular duties to completely design the curriculum. This group was under the direction of a member of the central office staff. The five included two primary teachers, two intermediate teachers, and one person designated as coordinator of the Materials Resource Center. This compliment of personnel devoted one school year in preparation of the program. The principal and additional staff members were selected prior to the opening of the school and received a thorough indoctrination by the planning committee.

The building was not completed for a normal September opening. Students and teachers worked in a gymnasium for one semester, utilizing the basketball court.

School B^O is of the same basic design, with three hundred twelve students in grades one through six housed in one room. Instructional spaces are separated by storage cabinets and panel dividers, except in two areas where classes operate in contiguous spaces without benefit of barriers. This school also features two instructional areas isolated from the general space by seven foot cabinets. As in school A^O, this is essentially a permanent divider.

School B^O was planned by the architects, with consultative assistance of the central office staff. The building and its attendant program was conceived as the beginning of an instructional organization to permit cooperative teaching and independent study. The completion of the school was simultaneous with key central office personnel changes, and initiation of a series of court orders relative to integration.

Open-plan school B has a total of seventeen faculty members, four of which are new. Ages vary from twenty-one to sixty-five. Teaching experience ranges from one to thirty-two years, with a mean of eleven. Ten of the seventeen are teaching in the school for the first time. There have been three faculty crossovers in the past two years to accommodate court orders. The school is in its second year of integration.

School C^o differs in design in that Levels (grades) one, two, and three are housed in one open area, and Levels four, five, and six are housed in an identical, but separate, area. Each space accommodates ninety students. All of the open-plan schools are carpeted and air conditioned.

School C^o is in its first year of operation, with eight teachers, supported by specialists in music, library and physical education. The median age of the staff is forty-five years. All are experienced teachers and each possesses the Master's Degree. The student body is integrated, the staff is not. The school was designed to serve as a research laboratory for a College of Education and was carefully planned to permit maximum flexibility for the organization of instruction.

The construction of the building experienced several delays, resulting in a late August completion date. This, coupled with a failure to receive funds to initiate the planned program, necessitated major alterations in the opening of the school.

As a consequence, the on-campus laboratory school that was scheduled to serve as the control situation was split, with one-half of the teachers and their assigned students moved to the new facility. The teachers were randomly selected, and moved within a period of one week. No efforts were made to indoctrinate the staff or students in the utilization of the new facilities. This was deemed practical in view of the absence of time and that they would be returned to their former facilities as soon as arrangements for funds were completed.

The paired conventional schools feature the traditional four-walled classrooms, each with its corridor door, wall of windows, and twenty-five to thirty-five students.

The open space secondary school S^o contains some classrooms with cabinet dividers, some with operable walls, and some with permanent enclosures. There are few interior doors in the instructional areas. The school is carpeted and centrally air conditioned. School S^c is traditional in design and arrangement, is carpeted, and has window air conditioning units.

Secondary school S^o was occupied in January of 1968, as one of two high schools serving the community. It remained in this capacity until a court-ordered desegregation plan was effected in September of 1970. The school was then paired with school S^c, creating a north and south campus. The faculty and student body are now completely integrated.

The faculty was engaged in an intensive four-week workshop during the summer of 1970 to organize for the current year. Faculty and administrative personnel of both races were actively involved.

A "block of time" plan evolved, permitting a college type schedule. Classes were scheduled so that all students would be in both buildings on alternate days. Most of the teachers also move back and forth. This feature permitted the study to utilize the same teachers in each of the two schools. The planning program did not include orientation to the open facilities in school S^o.

Selection of Classrooms

In each of the elementary schools investigated, three classes were selected, giving a representation of all levels of instruction. One class each of Social Studies, English, Math, and Science was utilized in the secondary schools. Teachers were equated on the basis of agreement by principals, except in schools S^O and S^C where the same teachers alternately operated in each of the two schools. No attempt was made to control the student population.

Selection And Use of Instruments

The nature of the study indicated that observation of on-going school activities would produce the desired results relative to instructional practices and problems. Considering this, instruments were selected and adapted to record the observed behavior. Those aspects of the program being investigated included teaching techniques, psychological climate, social organization, order-maintaining techniques, provisions for individual differences, and activities utilized in the instructional program.

In addition to data gained from observation, a sound survey was conducted in each of the schools to determine the amount of noise transmitted between instructional areas or rooms. Also, sound level readings were taken during instructional periods to ascertain actual classroom noise levels.

The researcher and assistants elicited and recorded statements from teachers in the open-plan schools relative to the problems and potential of their particular arrangement for instruction.

Observation Instruments

For the purpose of investigating classroom practices, an observation instrument developed by Sanders (7) was selected and adapted for use. According to Sanders, the instrument permits one to describe aspects of the instructional program and to relate these descriptions to what is currently considered the best in educational thought and practice. The schedule consists of parallel descriptive statements placed in one of three columns. The statements in the first column are designed to describe the least desirable practices, while the statements in column five describe the most desirable ($1 < 3 < 5$). As the entire instrument developed by Sanders was not applicable to this study, only selected schedules were utilized (Appendix, Exhibits I-V).

To compensate for the length of the schedules, copious notes were made of the on-going activities within the classroom. At the end of the day, the day's observations were recorded on the Summary Sheet designed for these schedules (Appendix, Exhibit VI). Each item on the schedule was given a score of 1, 3, or 5. This score reflected the opinion of the observer as to which column best fit the classroom observed. The item ratings were then summed to give the observed classroom an overall score on each schedule.

In addition to data obtained from the Sanders Schedule, the types of activities utilized in the classroom instructional programs were observed and recorded.

Teachers in the open-plan schools were queried relative to their comments and opinions on the effectiveness of their own instructional spaces. Their views were edited, combined, and classified under the broad category of problems encountered in the use of classroom facilities.

Noise Transmission

This part of the investigation was completed in two phases. Phase I was a sound survey to determine noise reduction between classrooms of the buildings under study. Phase II was a measurement of actual classroom noise levels during the instructional program.

In considering acoustical isolation between rooms, it is necessary to distinguish two terms. These are noise reduction and transmission loss, defined as follows:

$$NR = SPL_1 - SPL_2$$

$$TL = SPL_1 - SPL_2 + \log S - 10 \log A_2$$

$$= NR + 10 \log S - 10 \log A_2,$$

where

NR = Noise Reduction in db

SPL_1 = sound pressure (average) level in the source room

SPL_2 = average sound pressure level in db in the receiving room

TL = Transmission loss in db

S = total area of the sound transmitting surface between rooms, in square feet

A = total absorption in the receiving room in sabines (3:19)

Noise reduction, then, is the difference which exists between the average sound pressure levels in the two rooms when a test noise is produced in the source room. This measurement includes the effect of noise transmission through the common room boundaries as well as the transmission through other channels such as walls, ventilating ducts, cracks or other openings, and the effect of the acoustical absorption and the location of furniture in the rooms.

On the other hand, transmission loss is a physical measure of the loss of acoustic energy through a wall or ceiling structure, independent of the acoustical environment in either room. This is based on the assumption that most of the noise transmitted between the two rooms travels through the partition walls. For the purpose of this study, the measurement of noise reduction was utilized.

According to Lane and Mikeska (3:20), the specific equipment necessary for field measurements depends upon what is available to the researcher; however, certain basic requirements can be listed. These instruments include:

1. Noise source for which a tape recorder with pre-recorded octave bands of filtered white noise can be used. The octave bands are recorded in approximately two minute intervals with

a pause between each band. This allows the tape recorder to be started and measurements made throughout the frequency range.

2. Power amplifier and loud speaker which are necessary to give sufficient amplification to the electrical signal and to convert it into sound pressure variations.
3. Signal receiving circuit which includes a microphone and a sound level meter.

The procedure used in Phase I was adapted from that reported by Land and Mikeska (3:22) and Nowak (5). A loud speaker was set up in the source room. The speaker was energized by a tape recorder playing octave bands of white noise. The researcher, utilizing a receiving circuit (sound level meter), recorded from three to five measurements at predetermined points. These readings were then averaged to obtain a mean reading for this room or space. After obtaining readings in all of the octave bands, the procedure was repeated in the receiving room or space. The average sound level, measured in the receiving room, was subtracted from the sound level recorded in the source room (Formula 1) to determine the noise reduction value. Attenuation readings in the open-plan elementary schools were taken with conditions (dividers, etc.) as they are normally used. The conventional schools were measured with doors and louvers closed and doors and louvers open. The noise reduction values in School S^{o} were measured in rooms with operable walls, in rooms with cabinets as dividers, and in rooms separated by permanent partitions. School S^{c} was tested with doors open and doors closed.

Phase II was a recording of actual classroom noise levels. Sound level readings were made from a sound level meter at five minute intervals for a period of one-half hour during the observation periods. These readings were then averaged to establish a composite reading for each observation period.

The specific instruments utilized in Phases I and II included:

1. Tape containing pre-recorded octave bands of white noise. The tape was prepared in the studios of Southmost Recording Co., Baton Rouge, Louisiana, by N. B. Traylor of N. B. Traylor and Associates, Consultants in Acoustics, Baton Rouge, Louisiana. The specific equipment components necessary were (1) White Noise Generator, (2) Sound Analyzer, and (3) Eight-Track Studio Recorder.
2. Roberts Taper Recorder, Model #1725, energizing a Quam's 12" speaker, Part #12A4PA.
3. Sound Level Meters (2), General Radio 1565A (S/N 1779) and General Radio 1551C (S/N 4882).
4. General Radio Sound Level Calibrator 1562A (S/N 218).

ESTABLISHING RELIABILITY OF DATA

The establishment of reliability of measurements on Sanders Schedules was completed by the research assistants (2) and two staff members of Northwestern State University. Utilizing two groups, independent obser-

vations were made during regularly scheduled classes at Northwestern Laboratory School, Natchitoches, Louisiana.

The average agreement of the observers revealed complete agreement on eighty per cent of the items in the schedule. The ratings were within one category of each other on the remaining twenty per cent.

The reliability of the sound measurements was checked with the cooperation of the same group. After a period of orientation in the use of the Sound Level Meter, separate measurements were made at five minute intervals for a period of one hour. The measurements were made in an elementary school classroom while the instructional program was in progress. The coefficient of reliability obtained by correlation was .95.

SCHEDULE OF OBSERVATIONS

A total of thirty-two days of observation was spent in conducting the study. This included a total of four one-half hour observation periods in each of the selected classrooms. The observations were spaced periodically, with each room visited at different times of the school day.

ORGANIZATION OF THE REMAINDER OF THE REPORT

Part I has been a presentation of the problem and procedures used in the investigation. Part II presents an analysis of the data obtained from the Sanders Schedules, activities utilized in the instructional program, and opinions of teachers in the open-plan schools. The data obtained from the study of noise transmission are found in Part III. Part IV is a summary of findings and conclusions.

REFERENCES FOR PART I

1. Baughman, M. D. and Eberle, R. F., "Open Classrooms: Guidelines for Creative Teacher," Clearing House, 39:387-92, March 1965.

2. Eberle, R. F., "Open Space Schools," Clearing House, 44:23-8, September, 1969.

3. Lane, R. N. and Mikeska, E. E., "Field Measurement of Sound Transmission Loss," Noise Control, 6:18-22, May-June, 1960.

4. Lewis, A. J., "Innovation And The Open School," Educational Leader, 24:673-5, May, 1967.

5. Nowak, Matthew A., "A Sound Survey of the Geometric School Plant," Research Report 64, Texas Engineering Experiment.

6. Reedy, J., "Noise Is For Learning," Clearning House, 43:154-7, November, 1968.

7. Sanders, David C., "An Evaluation of Innovations In Elementary School Classroom Seating," Unpublished Doctoral Dissertation, The University of Texas, Austin, Texas, 1958.

PART II

THE INSTRUCTIONAL PROGRAM

The purpose of this section of the report is to present data pertinent to the instructional programs in classrooms utilized in the study. An analysis was made of the results of observations in which the Sanders Schedules A - E were utilized. The schedules, which were designed to measure various aspects of the instructional program, are:

Schedule A--Teaching Techniques
Schedule B--Social Organization
Schedule C--Order-Maintaining Techniques
Schedule D--Psychological Climate
Schedule E--Provisions for Individual Differences

In addition to data from the above instruments, an analysis was made of the activities utilized in the instructional program. The opinions of teachers in the open-plan schools relative to problems encountered in the use of facilities are also presented.

TREATMENT OF DATA

The data gathered from four observations in each classroom were summed to yield a total score on each of the Sanders Schedules A - E. A percentage score was achieved utilizing the sum of scores on each Schedule as the numerator and the total points possible on each schedule as the denominator. These percentages were utilized as raw data for analyses, employing a Test of Significance of Difference Between Percentages. The sources of total variation of percentages between pairs of schools and building design were tested.

The frequencies of activities observed in the instructional program in each classroom were also summed. A statistical evaluation of these data was not attempted. The information is presented in tabular form and is accompanied by a narrative discussion. The same is true of the listing of teachers' reaction.

PRESENTATION OF DATA

Data necessary to examine the variance of Sanders' Schedules A - E and of the activities utilized in the instructional program are presented in tabular form.

A COMPARISON OF OPEN-PLAN SCHOOLS A, B, C, AND S WITH CONVENTIONAL-PLAN SCHOOLS A, B, C, AND S

Schedule A: Teaching Techniques

Schedule A was designed to describe "Teaching Techniques" utilized in classrooms. Table 1 contains data relative to the significance of differences between percentages.

An examination of Table 1 discloses a significant difference in the interaction of schools A^O and A^C, with A^O apparently more in harmony with tenets of modern education. No significant differences were noted between schools B^O and B^C and between C^O and C^C.

Schools S^O and S^C were not found to be significantly different in this aspect of the instructional program.

Schedule B: Social Organization

Schedule B was designed to describe classroom "Social Organization" in the same manner as Schedule A was utilized to depict "Teaching Techniques." Table 2 portrays the percentages and variance data for Schedule B. The tabular arrangement is the same as that of the preceding schedule.

A review of Table 2 shows a significant (.05 level) difference in the interaction of schools. The pattern is the same as established in the preceding schedule in that the trend favors school A^O, while other schools and the design interaction were not significantly different.

Schedule C: Order-Maintaining Techniques

Schedule C was designed to evaluate "Order-Maintaining Techniques" in the various schools. Table 3 contains the pertinent data.

A review of Table 3 reveals data indicating a significant difference favoring the open-plan secondary school S^O over School S^C. This would suggest that teachers were more democratic and diplomatic in their approach to the maintenance of order in the open-plan school than were teachers practicing in the traditional four walls. Significantly, these were the same teachers.

Schedule D: Psychological Climate

Schedule D was used to describe the "psychological Climate" found in classrooms. Data relative to this schedule are contained in Table 4.

An examination of Table 4 reveals no significant differences in either the school or building design interactions.

TABLE 1

STATISTICAL DATA, t-TESTS FOR SIGNIFICANCE
OF DIFFERENCES BETWEEN MEANS
FOR SCHEDULE A: TEACHING TECHNIQUES**

SCHOOL	PER CENT	t*	LEVEL OF SIGNIFICANCE
A^O	.706	3.65	.05
A^C	.476		
B^O	.675	.338	n.s.
B^C	.698		
C^O	.430	.314	n.s.
C^C	.447		
Total-Open Plan Schools A, B, and C	.598	1.74	n.s.
Total-Conventional Plan Schools A, B, and C	.544		
S^O	.600	1.22	n.s.
S^C	.694		
Total-Open Plan School S	.600	1.22	n.s.
Total-Conventional Plan School S	.694		

*t is based on significant differences between two percentages.

**Data obtained from four observations of one-half hour each.

TABLE 2

STATISTICAL DATA, t-TESTS FOR SIGNIFICANCE
OF DIFFERENCES BETWEEN MEANS
FOR SCHEDULE B: SOCIAL ORGANIZATION

SCHOOL	PER CENT	t	LEVEL OF SIGNIFICANCE
A^O	.550	2.44	.05
A^C	.396		
B^O	.601	.388	n.s.
B^C	.622		
C^O	.288	1.61	n.s.
C^C	.359		
Total-Open Plan Schools A, B, and C	.475	.387	n.s.
Total-Conventional Plan Schools A, B, and C	.463		
S^O	.558	.181	n.s.
S^C	.544		
Total-Open Plan School S	.558	.181	n.s.
Total-Conventional Plan School S	.544		

TABLE 3

STATISTICAL DATA, t-TESTS FOR SIGNIFICANCE
OF DIFFERENCES BETWEEN MEANS
FOR SCHEDULE C: ORDER-MAINTAINING TECHNIQUES

SCHOOL	PER CENT	t	LEVEL OF SIGNIFICANCE
A^O	.867	1.42	n.s.
A^C	.823		
B^O	.905	.583	n.s.
B^C	.889		
C^O	.735	.516	n.s.
C^C	.751		
Total-Open Plan Schools A, B, and C	.834	.722	n.s.
Total-Conventional Plan Schools A, B, and C	.821		
S^O	.682	5.48	.05
S^C	.923		
Total-Open Plan School S	.682	5.48	.05
Total-Conventional Plan School S	.923		

TABLE 4

STATISTICAL DATA, t-TESTS FOR SIGNIFICANCE
OF DIFFERENCES BETWEEN MEANS
SCHEDULE D: PSYCHOLOGICAL CLIMATE

SCHOOL	PER CENT	t	LEVEL OF SIGNIFICANCE
A^O	.720	1.05	n.s.
A^C	.662		
B^O	.716	.044	n.s.
B^C	.718		
C^O	.559	.962	n.s.
C^C	.611		
Total-Open Plan Schools A, B, and C	.662	.068	n.s.
Total-Conventional Plan Schools A, B, and C	.664		
S^O	.733	.269	n.s.
S^C	.716		
Total-Open Plan School S	.733	.269	n.s.
Total-Conventional Plan School S	.716		

Schedule E: Provisions for Individual Differences

Schedule E was designed to assist in assessing "Provisions for Individual Differences" evidenced in classrooms. Table 5 contains the data for this schedule.

A review of the data for "Provisions for Individual Differences" reveals a significant difference in the interaction of schools A^O and A^C. No other significant differences between schools or between building designs are evident. This would indicate that while teachers in one of the open-plan schools are more adequately meeting the desired objective, the trend does not encompass similarly designed schools.

ACTIVITIES UTILIZED IN THE INSTRUCTIONAL PROGRAM

The frequencies of observed activities in the instructional program are presented in Table 6. No attempt was made to subject these data to statistical analyses.

A review of the instructional activities and their observed frequencies reveals no discernible trends in comparing schools by design, except in the case of schools C^O and C^C. The disparity of occurrence of Reading, Discussion, and Independent, Free Choice activities suggests some interesting possibilities.

Reading, considered to be a quiet activity, was observed twenty-three times in open-plan school C^O and only eleven times in conventional-plan school C^C. Discussion activities, normally considered to be noise producing, were observed twice as many times in conventional-plan school C^C as compared to school C^O. Independent, Free Choice activities, with the possibility of these producing additional noise, were observed fifteen times in school C^C as opposed to seven times in open-plan school C^O. Whether consciously or unconsciously, teachers in open-plan school C^O selected what might be considered "quiet" activities as vehicles for the instructional program.

It is pertinent to note that schools A^O and B^O were in their respective second and third years of operation, while school C^O was opened in September of 1970. Also, teachers in school C^O were given no advance preparation for the move from their former conventional facilities. The failure to adequately prepare teachers for the abrupt change in environment, coupled with the absence of experience in adjusting to the new instructional spaces, might have been significant in affecting the choice of activities.

A comparison of open-plan school A^O and open-plan school C^O affords an interesting pattern. In open-plan school A^O, the observed frequencies for Writing, Reading, Discussion, and Independent, Free Choice activities were twelve, fourteen, seventeen, and three respectively. The figures for these same activities in school C^O were eighteen, twenty-three, ten, and seven. Thus, school A^O was observed to utilize fewer writing and reading activities and more discussion, a seeming trend to-

TABLE 5

STATISTICAL DATA, t-TESTS FOR SIGNIFICANCE
OF DIFFERENCES BETWEEN MEANS
FOR SCHEDULE E: PROVISIONS FOR INDIVIDUAL DIFFERENCES

SCHOOL	PER CENT	t	LEVEL OF SIGNIFICANCE
A^O	.706	14.15	.05
A^C	.522		
B^O	.712	.667	n.s.
B^C	.694		
C^O	.451	.258	n.s.
C^C	.543		
Total-Open Plan Schools A, B, and C	.618	1.64	n.s.
Total-Conventional Plan Schools A, B, and C	.590		
S^O	.625	.806	n.s.
S^C	.600		
Total-Open Plan School S	.625	.806	n.s.
Total-Conventional Plan School S	.600		

TABLE 6

FREQUENCIES OF ACTIVITIES OBSERVED IN THE INSTRUCTIONAL PROGRAMS IN OPEN-PLAN AND CONVENTIONAL-PLAN SCHOOLS A, B, C, AND S

ACTIVITY	A^O	A^C	B^O	B^C	C^O	C^C	S^O	S^C
ACADEMIC, INVOLVING WRITING	12	14	17	18	18	14	4	9
READING	14	12	12	17	23	11	4	1
DISCUSSION	17	13	10	12	10	20	7	6
LISTENING	16	15	9	12	11	17	5	4
ART	0	0	0	0	6	2	0	0
MUSIC	0	1	0	1	0	2	0	0
DRAMA	0	0	0	0	0	0	0	1
RHYTHMIC	0	1	1	1	0	2	0	0
INDEPENDENT STUDY AND FREE CHOICE	3	5	3	4	7	15	1	5
CHALKBOARD BY STUDENTS	7	1	3	6	3	3	1	0
ORAL SPELLING	5	6	5	6	3	2	0	0
REST PERIOD	0	2	2	1	0	2	0	0

ward noise-producing activities. The pattern, however, deteriorates in the frequency of the Independent, Free Choice activity.

As opposed to the teachers in school C^{o}, teachers in school A^{c} were given extensive preparation prior to moving to their present facilities. This preparation included a complete development of the curriculum and consideration of both the philosophy and practice of instruction. This experience might have contributed to the differences observed. The preparation of the staff of school B^{o} was not as intense as that of school A^{o}. Teachers in school C^{o} were given no preparation.

COMMENTS BY TEACHERS CONCERNING OPEN SPACES FOR TEACHING

. . . I want my solid walls back.

. . . Students have a hard time putting their trays away. (Students have no storage compartments in their desks; tote trays stored in cabinets are utilized.)

. . . Blackboards are too low for students to see. (Blackboard space is provided on back of storage cabinets on casters.)

. . . My students seem to feel suppressed; there is not spontaneity.

. . . There are too many interruptions from visitors and observers.

. . . There is not enough bulletin board space. (Bulletin board space is provided on back of movable cabinets.)

. . . We're overcrowded, and things are too noisy.

. . . We're turn teaching, not team teaching.

. . . I'm here by chance, certainly not by choice.

. . . Absolutely not enough storage space.

. . . We're a little too close for comfort; there needs to be some dividing line between these classes.

. . . I'm a new teacher, and you'd be surprised how many ideas I've picked up merely by noticing my fellow teachers.

. . . Our blackboard space is entirely inadequate. The overhead projector, while good, is really not a satisfactory substitute.

. . . The noise level is too high.

. . . It just gets confusing with students moving all the time.

. . . I like this open space, but it would be much better if each grade level could be in an open space, but separated from other grade levels.

. . . There is too much confusion when classes change.

. . . The noise is terrible.

. . . I don't like it, the kids don't like it. Do you?

. . . There is not enough storage.

. . . There is too much noise; what's wrong with solid walls?

SUMMARY

Statistical analyses of data pertinent to Schedules A - E indicated some significant differences in the interaction of open-plan and conventional-plan schools. No discernible trends were evident in the use of activities in the instructional program. Some indications were, however, of some importance. The comments of teachers were primarily centered on noise and the absence of walls. The statements following are offered as a summary of these findings:

1. The instructional programs observed in classrooms of the open-plan schools were not significantly different from those observed in the conventional schools, except in a few cases.
2. Where significant school variations were noted, school S^O appeared to be more in harmony with modern educational practices. These differences were observable in the following areas:
    a. Teaching Techniques
    b. Social Organization
    c. Provisions for Individual Differences
3. The open-plan secondary school S^O was favored over conventional school S^C in only one area. This was in Schedule C: Order-Maintaining Techniques. Significantly, these were the same teachers.
4. Activities utilized in the instructional program showed no major differentiation except for differences noted between schools C^O and C^C. Differences in four of the observed activities appeared to be significant. These were:
    a. Academic, involving writing
    b. Reading
    c. Discussion
    d. Independent, Free Choice
5. Teachers considered noise as one of the prime problems in teaching in open spaces.
6. The absence of walls which afford visual and auditory privacy and which serve to hold bulletin boards and blackboards appeared to be a negative psychological factor for teachers.

PART III

NOISE TRANSMISSION

The purpose of Part III is to report data related to noise transmission in classrooms utilized in the study. The results of the survey to determine noise reduction values between classrooms or instructional spaces are presented. In addition, data concerning the overall sound levels in classrooms during the instructional program are reported. The reader is referred to Part I for a review of procedures utilized in the collection of these data.

TREATMENT AND PRESENTATION OF DATA

The survey data concerning noise reduction between instructional spaces in each of the classrooms under investigation are shown in tabular form. Each table contains noise reduction values in decibels for each of the octave pass bands (90-5600) in hertz, in addition to the mean attenuation for each of the conditions tested. A description of the physical characteristics of the instructional areas can be found in the Appendix, Exhibit XXVII.

The sound data collected from measurements made during the observation periods were summed and the mean obtained for the overall sound levels. These mean readings were used as raw data for analyses. The t-test for Independent Groups was utilized in analyzing these data. The data are presented in tabular form.

NOISE REDUCTION BETWEEN CLASSROOMS

Noise reduction may be defined as the difference between the sound pressure levels in the source area and in an adjoining area when a noise is produced in the source area.

Open-Plan Schools A, B, C, and S

Tables 7-10 contain the noise reduction values for schools A^{o}, B^{o}, C^{o}, and S^{o}. As was observed, the attenuation data were surprisingly low regardless of the use of barriers. In fact, the use of cabinets or panels as dividers did not appreciably affect the transmission of noise. In spite of the relatively low attenuation, teachers and students reported that noise, as a factor, did not constitute an uncontrollable problem.

TABLE 7

DIFFERENCE IN NOISE REDUCTION
IN DECIBELS BETWEEN INSTRUCTIONAL
SPACES OF SCHOOL A°

OCTAVE PASS BANDS IN HERTZ	CONDITION* C
90-180	4
180-355	3
355-710	5
710-1400	7
1400-2800	8
2800-5600	6
Mean	6

*Condition C - Normal division of classroom area (one 5' x 5' blackboard unit on casters).

TABLE 8

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOL B[O]

OCTAVE PASS BANDS IN HERTZ	CONDITION* C	D
90-180	7	3
180-355	8	8
355-710	11	12
710-1400	8	9
1400-2800	6	10
2800-5600	6	9
Mean	8	9

*Condition C - Normal division of instructional space (one movable blackboard unit)

D - Instructional space separated by movable cabinets and panel dividers

TABLE 9

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES IN SCHOOL C°

OCTAVE PASS BANDS IN HERTZ	CONDITION* D
90-180	6
180-355	5
355-710	8
710-1400	9
1400-2800	7
2800-5600	6
Mean	7

*Condition D - Instructional space separated by movable cabinets and panel dividers

TABLE 10

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOL S°

OCTAVE PASS BANDS IN HERTZ	CONDITION* D	E	F
90-180	7	7	18
180-355	6	12	20
355-710	9	18	21
710-1400	10	19	23
1400-2800	10	19	25
2800-5600	7	13	22
Mean	8	14	21

*Condition D - Instructional space divided by movable cabinets

E - Instructional space divided by operable plastic wall

F - Instructional space divided by permanent wall. Source room tiled. Receiving room carpeted.

Conventional-Plan Schools A, B, C, and S

Tables 11-14 contain the noise reduction values for the conventional-plan schools utilized in the study. A look at the attenuation data reveals a low of 20 decibels (Table 11) to a high of 34 decibels (Table 12). The reports of teachers indicated that transmitted noise was of no consequence.

SOUND LEVELS IN CLASSROOMS DURING THE INSTRUCTIONAL PROGRAM

A Comparison of Open-Plan and Conventional Schools A, B, C, and S

Table 15 contains data relative to sound levels in classrooms during the instructional program. An evaluation of these data reveals a significant difference in schools B^O and B^C. The interactions of other schools and the design variances were not significant. As can be noted, the mean readings for each of the schools were relatively close. This would suggest that the actual sound level reading will be similar, regardless of the physical arrangement for instruction.

SUMMARY

An examination of the data related to noise reduction between classrooms and to the overall sound levels in classrooms utilized in the study reveals the following:

1. The noise reduction quality of the open-plan schools ranges from 6 to 9 decibels; this is relatively low. Transmitted noise, although a consideration, is not conceived as an impossible problem.
2. Transmitted noise is not a factor in conventional schools, regardless of the open or closed position of doors.
3. The overall sound levels in open-plan and conventional-plan schools are no different. This raises some rather pertinent questions relative to the attitudes of teachers in the two types of schools and about the effect of the carpeting on noise control.

TABLE 11

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOL A[C]

OCTAVE PASS BANDS IN HERTZ	CONDITION* A	B
90-180	26	19
180-355	33	22
355-710	30	20
710-1400	33	21
1400-2800	33	19
2800-5600	30	17
Mean	31	20

*Condition A - Doors closed, windows closed, louvers closed

B - Doors open, windows closed, louvers open

TABLE 12

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOL B[c]

OCTAVE PASS BANDS IN HERTZ	CONDITION* A	B
90-180	31	24
180-355	35	24
355-710	33	24
710-1400	35	26
1400-2800	33	26
2800-5600	33	26
Mean	34	25

*Condition A - Doors closed, windows closed, louvers closed

B - Doors open, windows closed, louvers open

TABLE 13

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOLS C[c]

OCTAVE PASS BANDS IN HERTZ	CONDITION* A'	B'
90-180	30	22
180-355	32	24
355-710	29	23
710-1400	32	27
1400-2800	38	27
2800-5600	30	27
Mean	32	25

*Condition A' - Doors closed, windows closed

B' - Doors open, windows closed

TABLE 14

DIFFERENCE IN NOISE REDUCTION IN DECIBELS BETWEEN INSTRUCTIONAL SPACES OF SCHOOL S[C]

OCTAVE PASS BANDS IN HERTZ	CONDITION* A'	B'
90-180	29	23
180-355	31	26
355-710	29	27
710-1400	36	27
1400-2800	41	28
2800-5600	32	25
Mean	33	26

*Condition A' - Doors closed, windows closed

B' - Doors open, windows closed

TABLE 15

VARIANCE DATA AND DIFFERENCES IN MEANS OF SOUND LEVEL READINGS RECORDED DURING THE INSTRUCTIONAL PROGRAMS IN OPEN-PLAN AND CONVENTIONAL-PLAN SCHOOLS A, B, C, AND S

SCHOOLS	$\bar{X}$	SS	t*	P
A^O	66.06 db.	11.93	1.20	n.s.
A^C	64.19 db.	19.27		
B^O	70.10 db.	25.19	2.67	.05
B^C	63.08 db.	53.72		
C^O	66.25 db.	3.24	.890	n.s.
C^C	68.20 db.	110.33		
S^O	62.33 db.	107.33	.395	n.s.
S^C	62.66 db.	284.00		
DESIGN				
O	66.47 db.	10.395	.644	n.s.
C	65.16 db.	14.509		

*t is for independent groups.

PART IV

SUMMARY AND CONCLUSIONS

The succession of changes and proposed changes in the educational experiences planned for students has witnessed a move from programs grounded in formal discipline and rote memory to curricula that attempt to compensate for the varying needs of future citizens in a complex, changing society. More recent efforts have concentrated on a transfer of the major responsibility for learning from the teacher to the learner. The methods and materials of instruction have, of necessity, undergone radical changes to meet this latest challenge.

While changes have occurred in philosophies, programs, methods, and materials, the physical space for instruction has not kept pace. The new emphases on learning have placed unique demands on school building design.

A significant breakthrough in the concept of school design has been accomplished with the emergence of open spaces for instruction. This has found expression in the elimination of interior partitions, freeing the classroom from the restraints of the familiar four walls. What has been the impact of this innovation on the programs in these schools? Have the promises of improved curricula been achieved, or have new sets of problems been produced? The purpose of this study was to investigate various instructional practices and problems in buildings of this design.

SUMMARY OF MAJOR FINDINGS

Data From Descriptive Schedules A - E

Statistical analyses of data pertinent to Schedules A - E indicated some significant differences. The statements following are offered as a summary of these findings.

1. The instructional programs observed in classrooms of the open-plan schools were more in harmony with the principles of modern education than were programs in conventional-plan classrooms. Differences were noted in four of the five specific areas observed. They were:
    a. Teaching techniques
    b. Social organization
    c. Order-maintaining techniques
    d. Provisions for individual differences
2. While school variations were noted, no significant differences in the design variation were recorded. This would suggest that while individual open-plan schools were adjudged to have programs more in

harmony with modern educational theory than did their paired conventional schools, the differences were not sufficient to produce significance as a group.

Activities Utilized In the Instructional Program

No definitive patterns were established for activities utilized in the instructional program, but the following were observed:

1. Teachers in one of the open-plan schools appeared to select activities that would be "quiet producing" as opposed to discussion and other more active types of activities.
2. Teachers in open-plan schools that had been in operation for more than one year appeared to utilize more "noise producing" activities than did teachers who lacked experience with open spaces.

Comments By Teachers Concerning Open Spaces For Teaching

Teachers comments relative to open spaces for instruction centered on the absence of walls and their conceived advantages. The absence of permanent partitions which afford visual and auditory privacy and which serve to hold bulletin boards and blackboards appeared to be a negative psychological factor for teachers.

Noise Transmission

1. The noise reduction quality of the open-plan schools was surprisingly low. A range of only 6 to 9 decibels was recorded, except where operable, folding walls were utilized. By contrast, the conventional-plan schools produced differences ranging from 20-34 decibels. In spite of this, teachers in the open space schools did not indicate that transmitted noise was an uncontrollable problem.
2. The operable walls in school S^{O} succeed in producing a mean difference in sound levels between instructional areas of 14 decibels. This fell at a point between the extremes of no space dividers and the conventional non-movable dividers. Utilization of folding walls affords the opportunity to either create open space or to achieve isolation secluded arrangement if desired. This flexibility would appear to warrant careful consideration.
3. The overall noise levels in classrooms of open-plan and conventional-plan schools ranged from a low mean of 63 decibels in one of the conventional classrooms to a high mean of 70 decibels in an open-plan school. This produced a statistically significant difference. In actual practice, however, this difference would not appear to affect performance.
4. In one of the paired situations, the mean overall sound level in the conventional school was higher by 2 decibels than was the mean for the open-plan school.

5. It is relatively safe to assume that the overall sound levels in open-plan and conventional-plan schools utilized in this study are alike. This fact represents the significance of these findings.

CONCLUSIONS

Successful research is the careful identification of a considered problem, the classification and control of discernible variables, and the application of scientific methods of problem solving. These components yield valid findings. Valid findings form the basis for defensible conclusions. The process, when it can be performed to perfection, results not only in progress, but also in the production of a feeling of satisfaction for the researcher. These two circumstances might well constitute the motivating force that moves men and civilizations.

The crucial factor in the research process is the control of operable variables. This was a particular problem in a study of this nature and served to limit results, thus preventing unbiased conclusions. Also, it must be remembered that the establishment of cause-and-effect relationships is always difficult, and in this case perhaps impossible. It is thus the hope of the writer that the statements that follow will of themselves make some contribution to the consideration of this important area of concern. The conclusions represent a compilation of research findings and personal observations stimulated by interaction with the problem and its ramifications.

One of the conceived problems in the analysis of open spaces for teaching is that of noise. This is a logical reaction when a mental comparison is made of the traditional classroom and its confining, protective walls. The evidence gained in this investigation, however, indicated that noise <u>is not</u> a problem in open space schools. If the schools utilized are representative, teachers' concepts of noise can be relegated to the area of attitudes. This does not mean, however, that the problem can go unattended.

Those teachers who complain of or are aware of noise are more than likely compensating for the absence of visual security. This would suggest the importance of preparing teachers to move to these radically different teaching stations. It cannot be assumed that all teachers will satisfactorily adjust if given sufficient time. Teachers must be afforded the encouragement and assistance to examine, analyze, and contemplate the teaching environment and must be supported by careful curriculum planning, considered methods of instruction, and adequate leadership if the full potential of open space is to be achieved. To do less is to deny students, teachers, taxpayers, and ultimately society the quality of education that is both possible and practicable.

The idea of teacher preparation for open-plan schools is underscored by the results of observed instructional practices. One of the open-plan schools consistently scored above other schools, including the remaining open-plan schools, in this aspect of the investigation.

What were the reasons behind the observed differences? Why were not all of the open-plan schools identical in the character of their instruction? Each was staffed by competent teachers, each employed both a variety and quantity of instructional materials, and each was carpeted, well furnished, bright and modern.

One factor looms paramount. The teaching staff of this particular school was subjected to a carefully planned program prior to the opening of the school. Also, new personnel added to the staff have been conditioned to the demands of this unique spatial arrangement.

The reader is correct to speculate that this kind of attention to detail would probably produce favorable results if the move were to conventional facilities. The conjecture has merit and demands consideration.

When conceived to improve instruction and when executed with skill and determination, in-service education programs will likely enhance the quality of instruction regardless of the surroundings. But is this enough? Is not the word good a relative term that precedes better, and is this not a prelude to best? Open spaces for teaching and learning provide the potential to permit and encourage continuing improvements in instruction to a degree not possible in conventional schools. The only barriers remaining are those of an absence of creativity and desire. This credence for the future might be the prime reason undergirding the concept of open-space schools.

SUGGESTIONS FOR FURTHER RESEARCH

The results of this study have neither permitted a definitive assessment of the success of open spaces in improved instruction nor suggested an unequivocal negative attitude. The truth undoubtedly lies in a problem area as yet unearthed by research.

An examination of the problem indicated that clearly defined trends were not discernible; however, the necessary information to evaluate the effect of teaching space on instruction was available. The discovery of pertinent information awaits the proper research techniques.

Three major areas of concern brought into sharper focus by the study were in the realm of noise and its effects, the characteristics of teachers who seem to perform best in open spaces, and the determination of whether instruction is actually better or potentially better in open-plan schools than in conventional-plan schools.

One of the open-plan schools utilized in the study appeared to have a program approaching the quality considered adequate for the 1970s. It is recommended that this school, and others that can be identified, be evaluated to determine common characteristics. A model might then be developed to serve as a guide in establishing or restructuring future schools. This, however, might be premature. At present, there are no instruments specifically designed to evaluate instruction in open-plan

schools. Development of an instrument would be a desirable and necessary first step.

One intriguing and baffling revelation was the fact that carpeting in the open-plan schools did not measurably affect the noise level. Either the carpet is ineffectual in this respect, or the characteristics of the noises in the two types of schools are different. The noise level or loudness is the same. Additional study needs to be made of the characteristics of the noise produced, and on the effect of the carpeting on noise. This would be particularly significant, especially when one of the major advantages of carpeting is purported to be that of the control of sound.

A final suggestion relates to the area of personality and anxiety research. Are some teachers, due to personality characteristics, better equipped to adjust and to perform at a high level in the open-plan schools? A corollary is the extent to which the openness creates a higher level of anxiety in some teachers than in others, resulting in improved or decreased performance. Research evidence would be invaluable in selecting teachers for open-plan schools and in planning adequate teacher-preparation programs at the college level.

EXHIBIT I

SCHEDULE A: TEACHING TECHNIQUES

Level 1.

A. Teacher plans and imposes program. Little or no teacher-pupil planning.
B. Teacher assigns, pupils study, teacher tests, pupils review, teacher retests.
C. Uses textbook as the major source of content but may supplement with a workbook.
D. Methods in general are highly authoritative using textbooks, lectures, and recitations.
E. Drill is used indiscriminately and widely, without any concern for the degree to which it is needed or meaningful.
F. Evaluation consists of teacher made and standardized tests in subject matter achievement.

Level 3.

A. Teacher plans broad outline of program, and does much to the initiatory action. Uses teacher-pupil planning on some details of the curriculum such as housekeeping chores, conduct, control, and occasionally in the area of subject matter.
B. Uses a unit or project in the core in addition to the assign, study, review, retest technique. Unit is strictly a subject matter to life activities of pupils.
C. Textbook is the main source of content, but will also use workbook, dictionary, encyclopedia, and a few library source books.
D. Use is made of authoritative procedures when necessary, but there is evidence of attempts to use developmental methods of deductive procedures.
E. Drill is widely used, but obvious cases where it is not needed are eliminated on both a group basis and individual basis. Attempts to motivate drill by showing necessity for it.
F. In addition to teacher and standardized tests, the teacher evaluates notebooks, written work, and does some observation of pupils work habits and behavior.

Level 5.

A. Within a broad framework, the entire program is cooperatively planned. The curriculum is one of cooperative study under the direction and

guidance of the teacher. Activities may follow pupil initiated action.

B. Program revolves around a unit or project, usually of the subject-matter variety, except more attempts are made to use action projects which revolve around the common activities that children engage in and are interested in.

C. A variety of textbooks are used in connection with a wide variety of other sources, found in library, community and school, are used as sources of content and investigation.

D. Methods in general are of the developmental type involving problem solving situations using deductive and inductive procedures.

E. Drill follows diagnosis and consequently is put to a considerable degree on an individual basis. Attention is given to meaningfulness, motivation, degree of maturity, etc.

F. Evaluation is an all-inclusive activity that is carried on continuously. Uses teacher-made and standardized tests, problem solving, observation, anecdotal recores, sociometry, scorecards, ratings, etc.

EXHIBIT II

SCHEDULE B: SOCIAL ORGANIZATION

Level 1.

A. Social organization autocratic and non-permissive. Evidenced by:
   1. Group heavily teacher dominated. Teacher is "boss" and she rules with an iron hand. Teacher asserts her authority; makes all rules, decisions, judgments, etc.
      a. Teacher appoints workers when she needs them. This occurs seldom.
      b. Teacher tells, directs everything herself.
      c. Teacher is present and leads everything, but may rarely appoint a committee.
      d. Teams, groups (if any) teacher appointed. No pupil choice.
   2. Pattern of communication strictly from teacher to the pupil and pupil to the teacher. Teacher edict allows no pupil-to-pupil communication.
   3. Aim of authoritativeness is unquestioned compliance with authority.

Level 3.

A. Social organization generally democratic and semi-permissive. Moderate teacher domination. Evidenced by:
   1. Group organized democratically. Teacher will assert her authority at will by arbitrarily setting aside democratic procedures without giving children much of a chance to work out own solutions to problems.
      a. Class officers regularly elected. Have duties and responsi-

bilities which are largely teacher imposed. Many leaders are elected, but teacher may arbitrarily appoint many.

b. Uses committees for routine housekeeping, party planning, and occasionally to work out standards. Allows children to participate in some difficult tasks as well as the easy ones.

c. Uses pupil leaders in P. E. as captains for games, or may entrust a leader to run a group in reading as teacher works with another group.

d. Personnel on teams, groups, etc. are largely appointed by teacher but generally observes pupil choice.

2. Patterns of communication are from teacher to pupil, pupil to teacher, and pupil-to-pupil. However, the pupil-to-pupil relationships are within limits of rules, some of which are teacher determined, some are cooperatively determined.

3. Aim of teacher assertion of authority is basically compliance with authority. However, semi-permissiveness is an attempt to give children opportunity to work out more positive basis for recognizing the authority and compliance with it.

Level 5

A. Social organization thoroughly democratic, and permissive. Teacher evidences authority as guidance function in directing activities.

1. Group organized democratically. Teacher functions as guidance person. Teacher does not surrender authority, but as the teacher she exercises direct control over the pupils without constraint and conflict in order to help pupils work together cooperatively.

a. Class officers elected regularly. Regular duties and responsibilities have been cooperatively planned. Most leaders are elected; teacher rarely appoints one unless situation demands it.

b. Uses committees for all classroom functions in social living. Teacher guides and directs if pupil maturity is insufficient.

c. Pupil leaders are used and elected in all areas of the program and all are given an opportunity to participate as leaders.

d. Personnel on teams, groups, committees are usually pupil chosen. If teacher appoints, pupil choice will usually be observed.

2. Thoroughly permissive organization for communication. Teacher is one of group, and the group functions under democratic action within the limits of cooperatively arrived at standards. Teacher's role is one of democratic leadership.

3. Teacher exercises "democratic authority" in order to help pupils grow in their ability to react wholesomely to authority, be it individual, group, or society.

EXHIBIT III

SCHEDULE C: ORDER-MAINTAINING TECHNIQUES

Level 1.

Very poor order maintaining techniques

A. Sample techniques
   1. Directs shame, blame, or sarcasm at offenders so that all may hear.
   2. Seizes or otherwise makes physical contact with offender. May paddle.
   3. May remove privileges of group for offense of individual.
   4. May assign additional work to entire group for offense of individual.
   5. Shouts, glares at offenders. Warns, threatens.
   6. Relocates offender by having him stand or sit in a conspicuous place.
   7. Sends serious offenders to principal's offices.
   8. Standards for group behavior are determined and imposed by teacher.

Level 3.

Acceptable order-maintaining techniques

A. Sample techniques
   1. Reprimands are mild, redirective, and in private. Teacher uses mild voice. No sarcasm is used.
   2. No overt physical contact with offender except occasionally placing hand on him to get his attention.
   3. Removes privileges of individual only after private conference with him.
   4. Additional work is not assigned as punishment.
   5. Does not raise voice. Frequently controls group with "Shh-hh!"
   6. Locates individual in group where he will work most cooperatively.
   7. Gains attention of class by calm voice and at times a mechanical device.
   8. Pupils arrive at standards of behavior democratically under the guidance of the teacher. Pupils have some decision in handling offenses.

Level 5.

Very sound order-maintaining techniques

A. Sample techniques.
   1. Teacher leads offender to evaluate behavior in terms of standards arrived at by group. This is done privately.
   2. No physical contact with offender.
   3. Offenders privileges are not removed. Teacher views such action as negative.
   4. Additional work is not assigned as punishment.
   5. Normal, mild voice is used in talking with offender, if possible, done in private.
   6. Locates individual in group where he works most cooperatively.
   7. Gains attention of class with calm voice. Pupil often gets the attention of class through use of a commonly agreed upon signal, such as small bell.
   8. Pupils arrive at standards of behavior for the group. Pupils generally handle infractions, with the teacher guiding to avoid extreme punishment and with the teacher handling extreme offenses.

EXHIBIT IV

SCHEDULE D: PSYCHOLOGICAL CLIMATE

Level 1.

A. Restrained and somewhat antagonistic classroom psychological climate. Evidenced by:
   1. Teacher adjustment to class:
      a. Self-control below average, somewhat nervous.
      b. Generally aloof and austere. Finds little to be cheerful about, but may smile or even laugh on occasions.
      c. Has set rather high goals for all to achieve, and is insistent that all reach them, although teacher will admit that all cannot.
      d. Teaching is generally a "chore," but exhibits an occasional flash of pleasure in her work.
      e. Treats all individuals alike. Seems unable to accept each pupil for what he is.
      f. Obviously has a few "pets," and shows obvious dislike for a few incorrigibles.
      g. Has much difficulty in finding anything good in the class as a whole or in individuals, except for few favorites.
      h. Rapport with class as a whole is below average. She may on a few occasions appear to be in "contact with them." Rules the class more through mental coercion than by fear of physical reprisal.

2. Pupil adjustment to class:
   a. Some, but not many, exhibit obvious dislike for the teacher, school, and/or other pupils.
   b. Pupil behavior below average. Many conduct infractions occur, however antagonisms are not extreme.
   c. Some emotional maladjustment is observed. Some children appear tense, nervous, and anti-social.
   d. Pupils exhibit very poor work habits and appear uninterested in work.
   e. Pupils require constant supervision not only academically but socially.

Level 3.

A. Moderately friendly and cheerful classroom psychological climate. Evidenced by:
   1. Teacher adjustment to class:
      a. Self-control is average. Given to infrequent temper outburst. Does not appear nervous.
      b. Generally friendly and cheerful, but a certain "distance" between herself and pupils is observable.
      c. Is a "driver" only to extent that she thinks pupils are capable of achieving. Tolerant with slow learners.
      d. Generally seems to enjoy her work. Instances of displeasure are observable however.
      e. Treats most pupils alike, generally, but will deal individually with extremes of behavior.
      f. Shows favoritism for a few but is not obvious about it. Appears to like most children, but may exhibit dislike for a few certain individuals.
      g. Tries to find excellence in most children, and believes she has an average class. Encourages good work, and does not "ride" poor workers very hard.
      h. Rapport with class as a whole is good, but morale is weak due to teacher over-control.
   2. Pupil adjustment to class.
      a. Only a few pupils exhibit an obvious dislike for the teacher, school, and/or each other.
      b. Pupil behavior is acceptable. Only a few conduct infractions occur and most of them are easily settled by the teacher.
      c. Very few cases of emotional maladjustment observed. Most pupils are alert and eager.
      d. Pupils exhibit acceptable work habits, and generally appear interested in work, with only some unable to do sustained, profitable work.
      e. Most pupils work well with only a basic amount of supervision. Teacher is somewhat free to work with individual cases, both academically and socially.

Level 5.

A. Happy, wholesome and tension-free classroom psychological climate. Evidenced by:
   1. Teacher adjustment to class.

a. Self-control very high. Seldom loses temper, is extremely patient, calm and does not appear nervous.
b. Very friendly, cheerful, and courteous. Enters into pupil activity easily, enjoys humor, etc., yet maintains an identity as the status member of the group.
c. Encourages all pupils to perform at the best of their ability. Stimulates all individuals to do their best, whether playing, working, or resting.
d. Much evidence that teaching is considered her "calling" and derives an optimum of satisfaction from work done.
e. May occasionally treat all pupils alike if thinks situation warrants it. Usually tries to understand the individual and deal with him accordingly.
f. Displays open like and appreciation of all children.
g. Uses psychological laws of behavior in all areas of learning and believes her teaching is effective and that class is doing well.
h. Rapport with class is excellent and class morale is high due to the degree of freedom allowed by the teacher's democratic methods.

2. Pupil adjustment to class.
a. Pupil attitudes toward teacher, school, and/or other pupils generally wholesome. Infrequent dislikes are observed.
b. Pupil behavior is relaxed, friendly, happy, and tension free. Few conduct infractions are observed.
c. Most children are alert, eager, interested, cooperative, and exhibit a high degree of self-control suitable to maturity level.
d. Pupils exhibit good work habits and all appear interested in work. Most pupils show a high degree of self-initiative and self-confidence.
e. Teacher supervision consists of guiding the activity in progress. Works much of the time with individuals and helps direct small group activity.

EXHIBIT V

SCHEDULE E: PROVISIONS FOR INDIVIDUAL DIFFERENCES

Level 1.

Complete absence of sensitivity to and the provision for individual differences

A. Teacher sensitivity, evidenced by:
   1. No children allowed in room until appointed time. Then all march in according to a pre-determined routine.
   2. Teacher performs all housekeeping duties.
   3. Learning activities are teacher selected.
   4. Daily schedule rigidly followed.
   5. No provision for free choice activities.
   6. Many children located in chairs or desks unsuited to their statures.
   7. Seating arbitrarily assigned.
   8. Some children with less obvious vision and hearing defects are observed to be located at rear of room.
   9. Uniform tests for all.

B. Teacher provisions for, evidenced by:
   1. Academic areas:
      a. A course of study is followed systematically.
      b. No individual or small-group instruction.
      c. Uniform minimum essentials for all. All pupils are held to identical pre-determined achievement standards.
      d. Uniform texts in all curriculum areas. Few or no supplementary books.
      e. Uses audio-visual aids in very limited way.
      f. No provision for free choice activity, but may use free leftover time.
      g. Evaluation on all-class basis. Some individual diagnosis and remedial work for very slowest.
   2. Physical adjustment areas:
      a. Provides for extremes of stature, hearing and vision: obvious cases only.
      b. All participate in games unless ill or obviously physically handicapped.
      c. Use of toilet and drinking fountain restricted to scheduled periods (recess or P.E.) but extreme needs are provided for. No rest periods after lunch.
      d. In addition to c above, some provision for relief from fatigue is made through insertion of one brief relaxation period in A.M. and P.M. No attempt to provide a change of pace by alternating periods of intense mental activity.

3. Social adjustment and mental hygiene areas.
   a. Limited evidence that children's personal problems are considered in appraising their classroom conduct or performance.
   b. Much evidence that teacher treats all children exactly alike as they react to teacher authority. Behavior is strictly supervised, and infractions are swiftly punished by teacher pre-determined rules and methods, respectively.
   c. Aim of teacher discipline is blind obedience to authority. Little or no attempt to create a social situation in which pupils utilize freedom for genuine choice; freedom which eventually leads to self-control or self-discipline.

Level 3.

Appreciable sensitivity to and provisions for individual differences

A. Teacher sensitivity evidenced by:
   1. Children are allowed in room early, but must work or play quietly at seats, in group or individually. Others informally come in at appointed time according to pre-determined routine.
   2. Teacher assigns individuals or committees to perform housekeeping duties, except few considered too difficult. Some respect shown for choice and interest.
   3. Groups for reading, arithmetic, and spelling. All other activity on all-class basis. Teacher works with very slow learners.
   4. Daily schedule usually followed rigidly. Deviations are allowed and do occur. Less rigid adherence to pre-set times on schedule.
   5. One free choice period. Individual may also use time left from another activity.
   6. Most large and small children are located in desks or chairs suited to their statures. A few misfits are observed.
   7. Seating teacher assigned, with obvious adjustments to facilitate inter-pupil relationships.
   8. All children with obvious vision and hearing defects are located where they can work most efficiently.
   9. Differentiated texts at two levels, supplemented by moderate supply of source books and instructional aids.
   10. Children dismissed by teacher pre-determined loosely informal routine. Some are asked to remain for "disciplinary" or academic reasons.

B. Teacher provision for, evidenced by:
   1. Academic areas:
      a. Course of study is followed systematically.
      b. Sub-groups for instruction in reading, arithmetic, and spelling. Individual help for slow learners only.
      c. Uniform minimum essentials, but less able learners are given less difficult assignments and not expected to do as well as the most able learners.
      d. Differentiated texts in language arts only. Workbooks in language arts and arithmetic. Source books: dictionary, encyclopedias, and moderate supply of library books.
      e. Moderate use of audio-visual aids.

f. One free choice period, and may use free left over time.
g. Evaluation on all-class basis. Uses diagnosis and remediation group. Some encouragement for bright students.

2. Physical adjustment areas:
   a. Adjustment of large and small children to seating available. Provides for obvious vision and hearing defects.
   b. All participate in group games, but suitable tasks are found for all.
   c. Use of toilet and drinking fountain restricted to scheduled periods (recess, P.E. or after lunch). All needs are provided for, however, although penalties may be imposed.
   d. Some provision is made for elimination of fatigue by attempts to intersperse a period of physical activity to relieve long periods of mental activity.
3. Social adjustment and mental hygiene areas:
   a. Moderate evidence that children's personal problems are considered in appraising their classroom conduct or performance.
   b. Moderate evidence that teacher treats all children alike as they react to teacher authority. Some evidence that teacher deviates from pre-determined rules and punishments in some individual cases. Moderate permissiveness based upon pupil maturity. Punishments infrequent and not sever.
   c. Aim of teacher discipline is obedience to authority, tempered with some attempt to develop self-control in some of the more obvious behavior areas, such as use of rest period facilities, fruitful use of free time, etc

Level 5.

Through sensitivity to and provision for individual differences

A. Teacher sensitivity evidenced by:
   1. Children feel free and welcome to come to room before school time. Very permissive atmosphere for individual expression.
   2. Individuals and committees perform all housekeeping duties under teacher guidance. Selection and rotation of assignments are democratic.
   3. Learning activities on all-class, group, or individual basis as needed. Much individual attention to all students.
   4. Daily schedule very flexible and serves as guide only.
   5. One or more free choice activity periods and may use left over time.
   6. All children appear located in desks and chairs suited to their statures.
   7. Each pupil has self-chosen station as "home-base." Much uncontested interchange of desk usage depending upon individual's role in large or small group activities.
   8. All children are observed and tested for vision and hearing defects, and are located in the room accordingly.
   9. Room seems filled with texts, materials, source readings, arts and crafts materials, and other instructional aids.
   10. Dismissal is informal. Teacher creates very permissive atmosphere. Engages in guidance and individual instructional activities after dismissal.

B. Teacher provision for, evidenced by:

1. Academic areas:
   a. Course of study serves only as a general guide; frequent deviations result from cooperative teacher-pupil planning.
   b. Wholesome intermixture of large-group, small-group, and individual activities revealing comprehensive planning for academic and social development of pupils according to teacher knowledge of individual abilities and problems.
   c. Careful planning for differentiated pupil roles based upon pupil abilities and backgrounds with attainment expectations adjusted accordingly.
   d. Differentiated texts and supplementary materials on all levels needed. Abundant amount of source materials.
   e. Uses all types of audio-visual aids to maximum advantage.
   f. One or more free choice activity periods plus free left over time.
   g. Evaluation on individual basis. Uses diagnosis and remediation for all but concentrates on low and high groups, but is concerned for all as need arises. Will use any and all sources of help.
2. Physical adjustment areas:
   a. All seating accommodated to stature. After observation and tests, all with hearing and vision defects are stationed where they can work efficiently.
   b. P. E. activities are chosen according to need, interest, and ability. If all should play same game, suitable tasks are found for all.
   c. Although periods are scheduled for use of toilet and drinking fountain, individuals are free to use them as need arises.
   d. The schedule provides for alternating activities involving bodily movement to be alternated with activities calling for high degree of mental concentration to relieve fatigue. Much use of short relaxation games, singing periods, arts, etc. as devices to relieve fatigue. The whole program is geared at a high interest level, and everything is done to cut fatigue factors to a minimum.
3. Social adjustment and mental hygiene areas:
   a. Much evidence that children's personal problems are considered in appraising their classroom conduct or performance.
   b. Teacher treatment of reaction to teacher authority by pupils placed upon individual basis. Much evidence that teacher has placed upon individual basis. Much evidence that teacher has studied each individual's background and attempts to set up or select environmental factors that will be effective in producing desirable changes in behavior.
   c. Aim of teacher discipline is self-control or self-discipline. Teacher, through use of democrati leadership, creates a social situation that will enable pupils to use free choice which eventually leads to self-control. Group standards are democratically determined.

EXHIBIT VI

SUMMARY SHEET

OBSERVATIONS--SANDERS SCHEDULES A - E

School_____ Class_____

Observation No._____ Date_____

A

A. _____
B. _____
C. _____
D. _____
E. _____
F. _____

B

A.
1.
a. _____
b. _____
c. _____
d. _____
2. _____
3. _____

C

A.
1.
a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
g. _____
h. _____

D

A.
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

B.
2.
a. _____
b. _____
c. _____
d. _____
e. _____

E

I.
A. _____
B. _____
C. _____
D. _____
E. _____
F. _____
G _____
H. _____
I. _____
J. _____

II.
A.
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

B.
1 _____
2. _____
3. _____
4 _____

C.
1. _____
2. _____
3. _____

EXHIBIT VII

TOTAL RECORDED SCORE AND PERCENTAGES FOR

SCHEDULE A: TEACHING TECHNIQUES

N	SCHOOL	TOTAL RECORDED SCORE	TOTAL POSSIBLE SCORE	PERCENTAGE
120	A^O	424	600	.706
144	B^O	310	720	.430
144	C^O	486	720	.675
72	S^O	216	360	.600
120	A^C	286	600	.476
144	B^C	322	720	.447
144	C^C	503	720	.698
72	S^C	250	360	.694

EXHIBIT VIII

TOTAL RECORDED SCORE AND PERCENTAGES FOR

SCHEDULE B: SOCIAL ORGANIZATION

N	SCHOOL	TOTAL RECORDED SCORE	TOTAL POSSIBLE SCORE	PERCENTAGE
120	A^O	330	600	.550
144	B^O	208	720	.288
144	C^O	433	720	.601
72	S^O	212	370	.558
120	A^C	238	600	.396
144	B^C	259	720	.359
144	C^C	448	720	.622
72	S^C	196	360	.544

EXHIBIT IX

TOTAL RECORDED SCORE AND PERCENTAGES FOR

SCHEDULE C: ORDER-MAINTAINING TECHNIQUES

N	SCHOOL	TOTAL RECORDED SCORE	TOTAL POSSIBLE SCORE	PERCENTAGE
260	A^O	1128	1300	.867
312	B^O	1148	1560	.735
312	C^O	1413	1560	.905
156	S^O	532	780	.682
260	A^C	1070	1300	.823
312	B^C	1172	1560	.751
312	C^C	1388	1560	.889
156	S^C	720	780	.923

EXHIBIT X

TOTAL RECORDED SCORE AND PERCENTAGES FOR

SCHEDULE D: PSYCHOLOGICAL CLIMATE

N	SCHOOL	TOTAL RECORDED SCORE	TOTAL POSSIBLE SCORE	PERCENTAGE
160	A^O	576	800	.720
192	B^O	537	960	.559
192	C^O	688	960	.716
96	S^O	352	480	.733
160	A^C	530	800	.662
192	B^C	587	960	.611
192	C^C	690	960	.718
96	S^C	344	480	.716

EXHIBIT XI

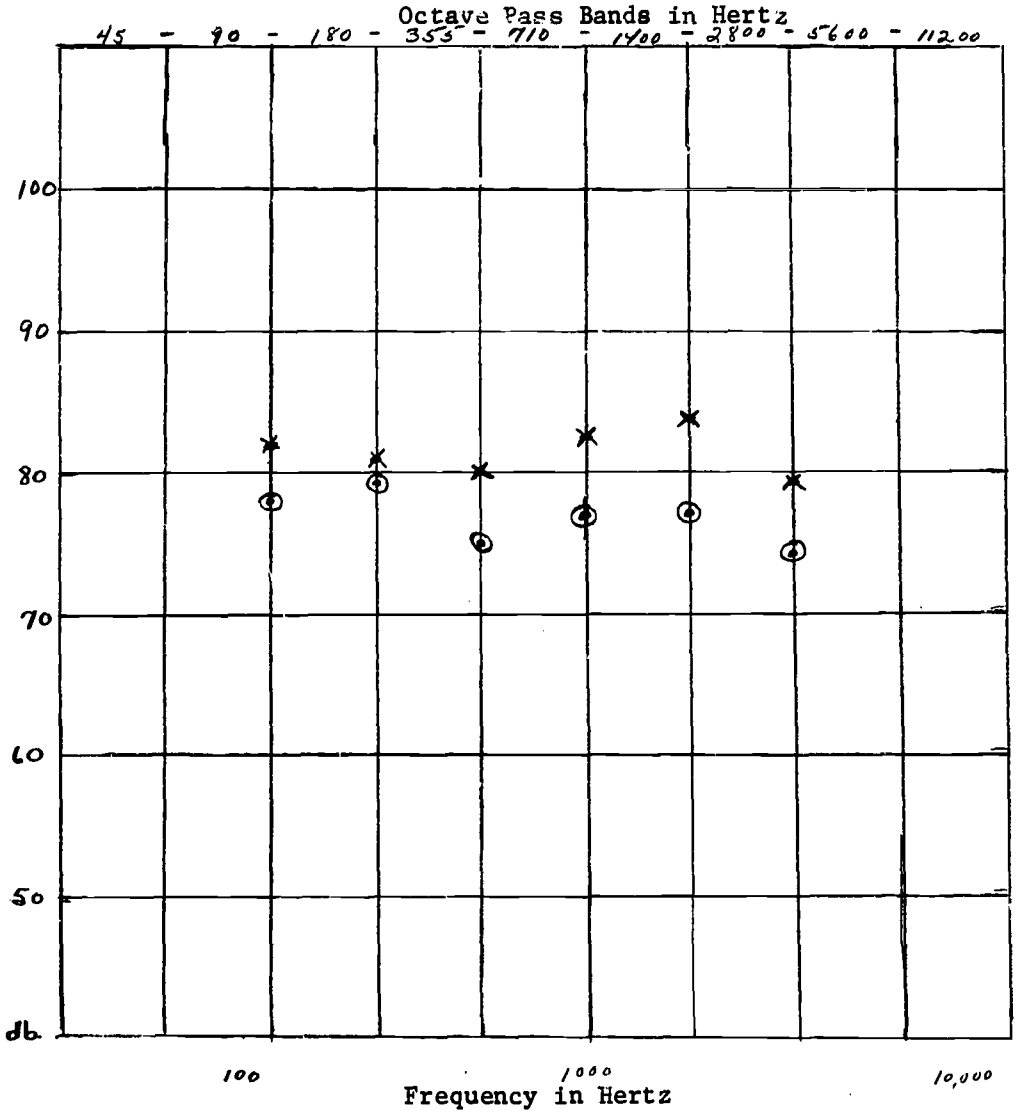
TOTAL RECORDED SCORE AND PERCENTAGES FOR

SCHEDULE E: PROVISIONS FOR INDIVIDUAL DIFFERENCES

N	SCHOOL	TOTAL RECORDED SCORE	TOTAL POSSIBLE SCORE	PERCENTAGE
480	A^O	1696	2400	.706
576	B^O	1300	2880	.451
576	C^O	2051	2880	.712
288	S^O	900	1440	.625
480	A^C	1254	2400	.522
576	B^C	1566	2880	.543
576	C^C	2000	2880	.694
288	S^C	864	1440	.600

EXHIBIT XII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL A°

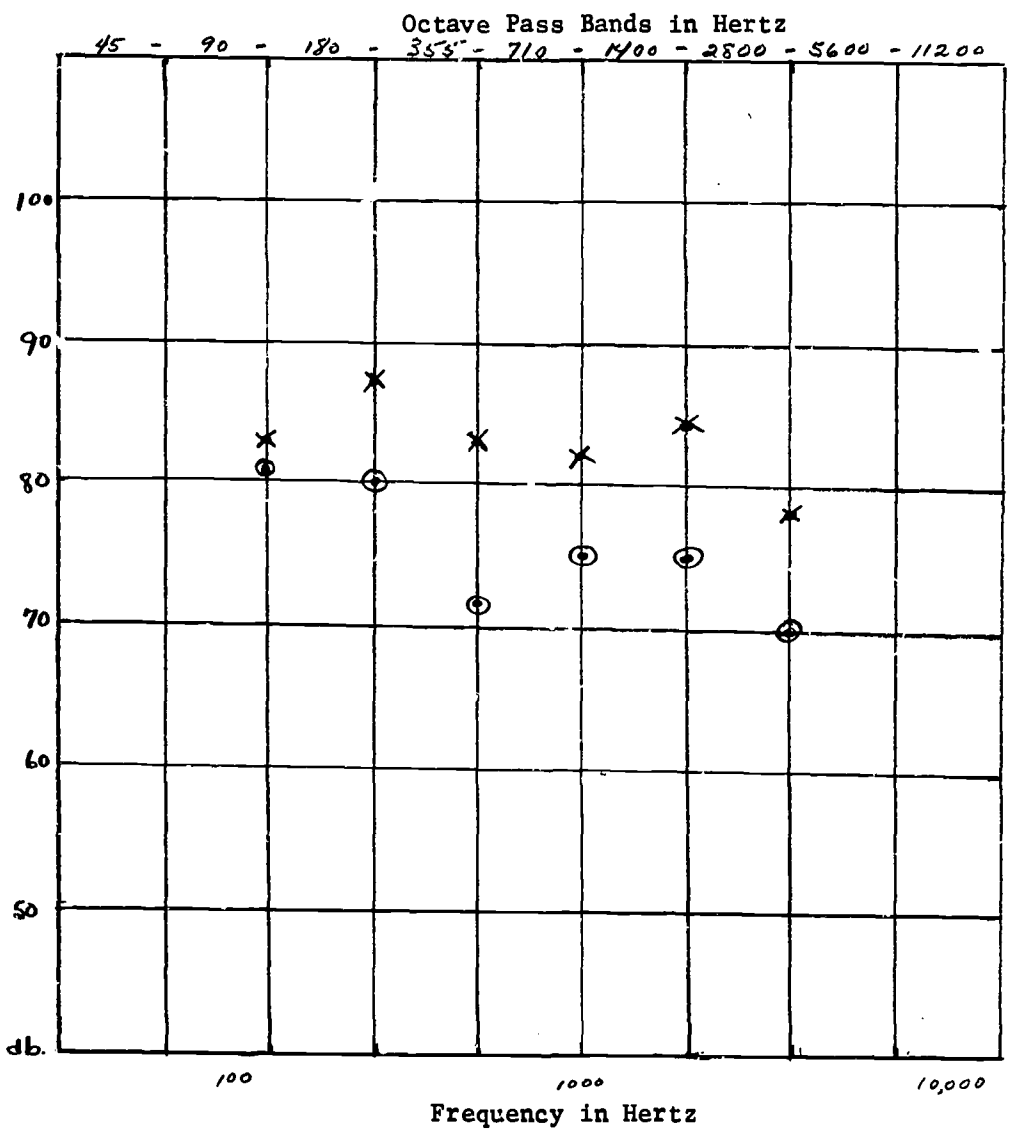


✱ Source Room--Condition C--Normal division of classroom space
(one 5' x 5' blackboard unit on casters)

⊙ Receiving Room--Condition C--Normal division of classroom space
(one 5' x 5' blackboard unit on casters)

EXHIBIT XIII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL B[o]

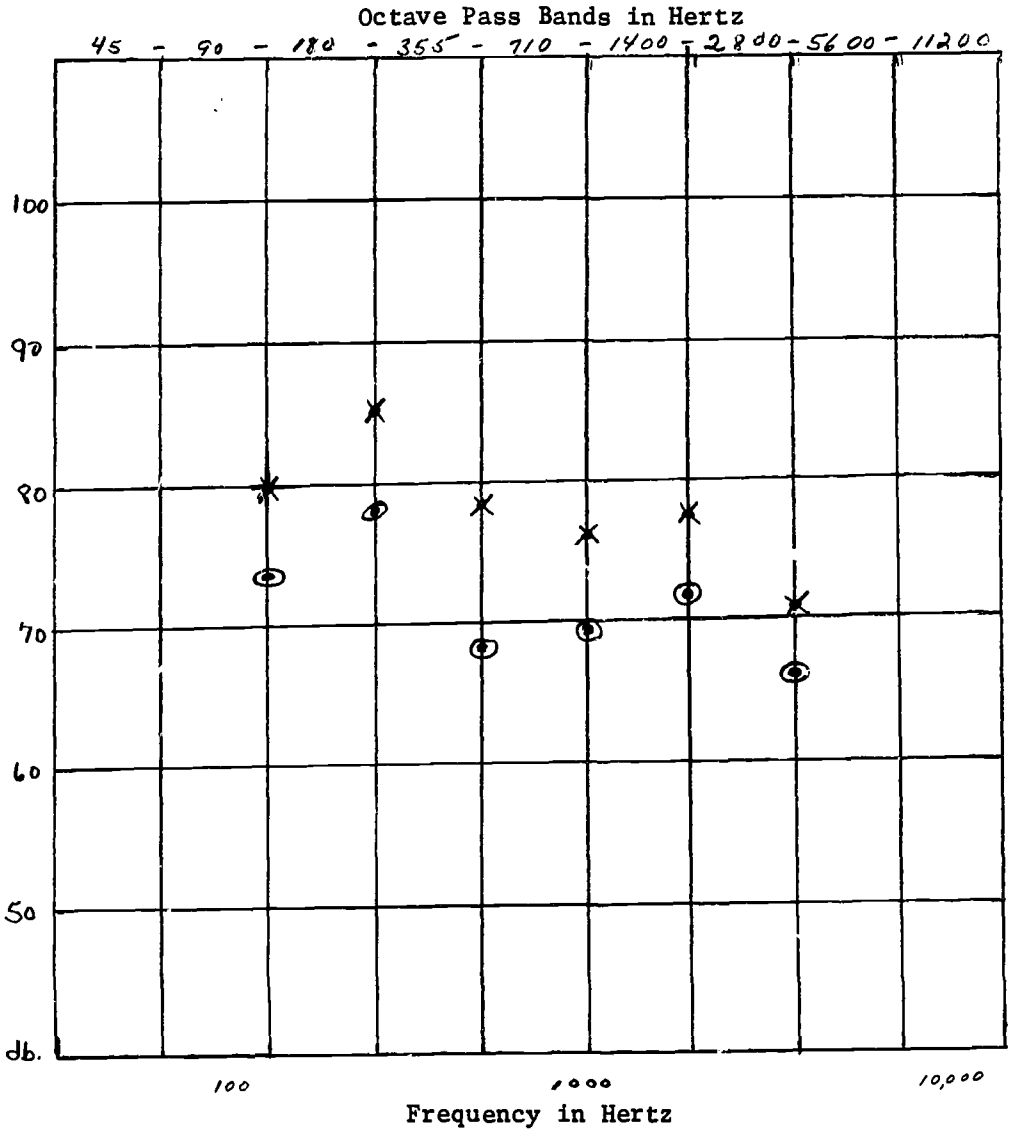


✕ Source Room--Condition D--Normal division of instructional space (movable cabinets and panel dividers)

⊙ Receiving Room--Condition D--Normal division of instructional space (movable cabinets and panel dividers)

EXHIBIT XIV

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL B°

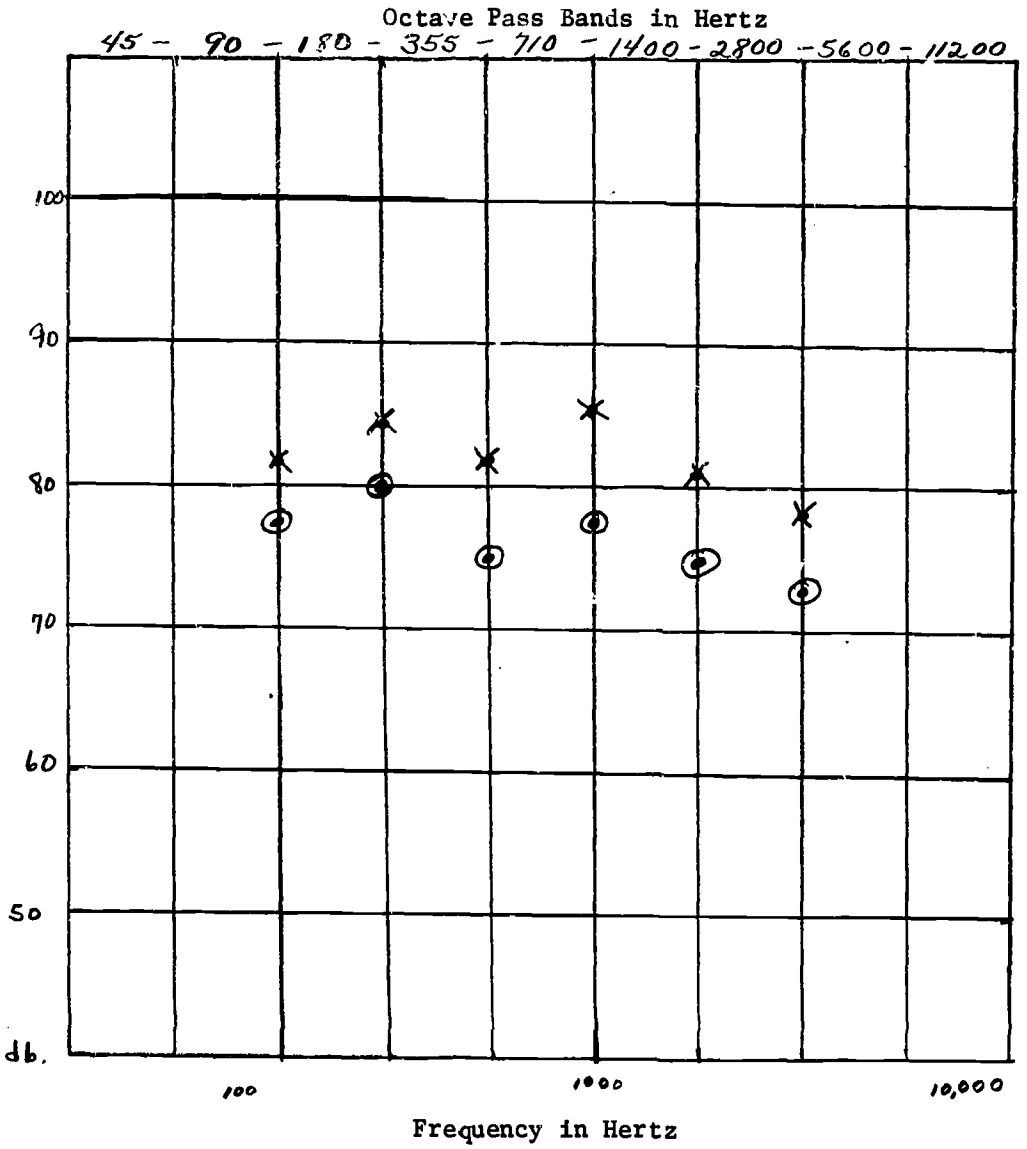


✕ Source Room--Condition C--No classroom dividers

⊙ Receiving Room--Condition C--No classroom dividers

EXHIBIT XV

SOUND LEVEL READINGS IN DECIBELS OF NOISE TRANSMISSION BETWEEN INSTRUCTIONAL AREAS OF SCHOOL C

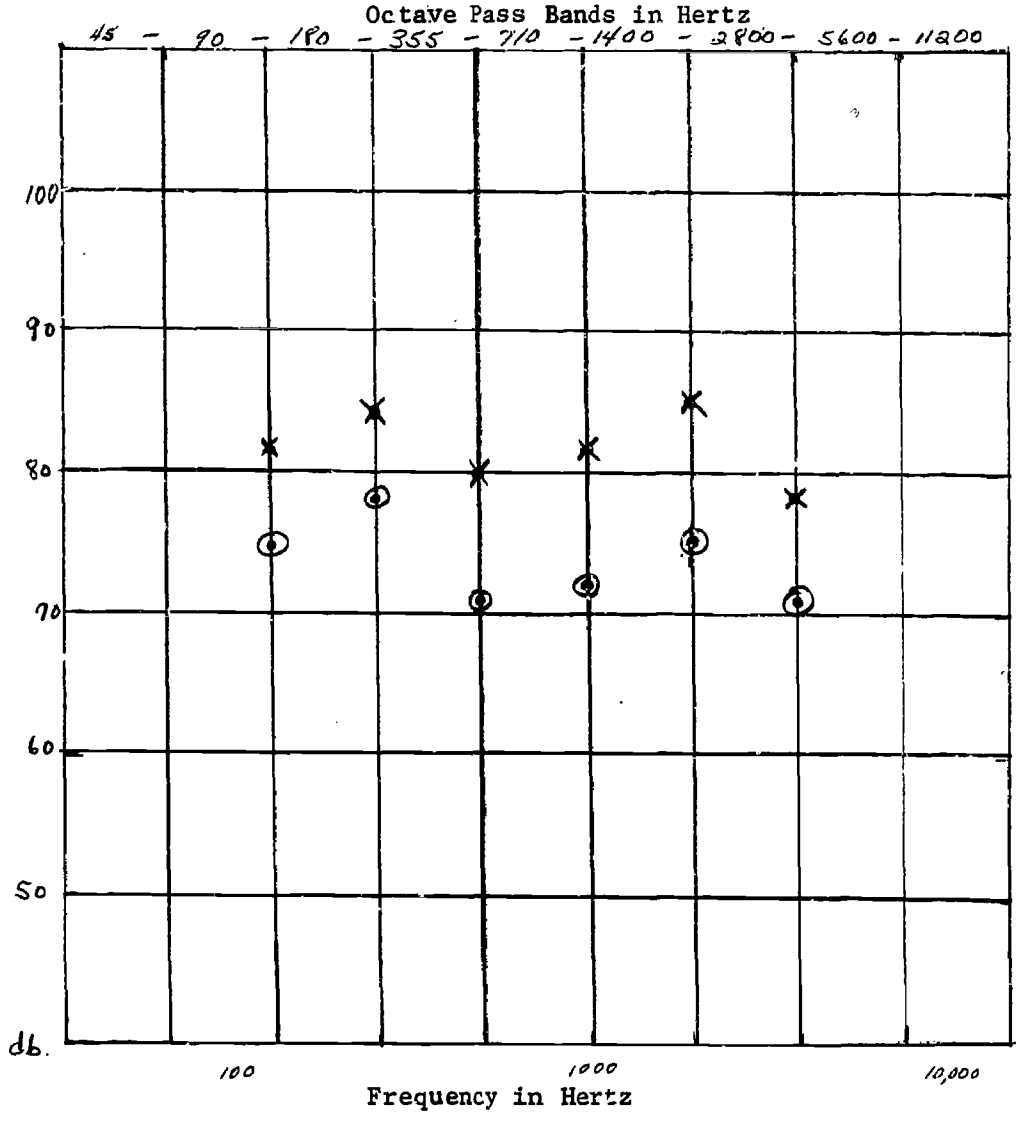


✕ Source Room--Condition D--Normal division of instructional space (cabinets on casters)

⊙ Receiving Room--Condition D--Normal division of instructional space (cabinets on casters)

EXHIBIT XVI

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL S[O]

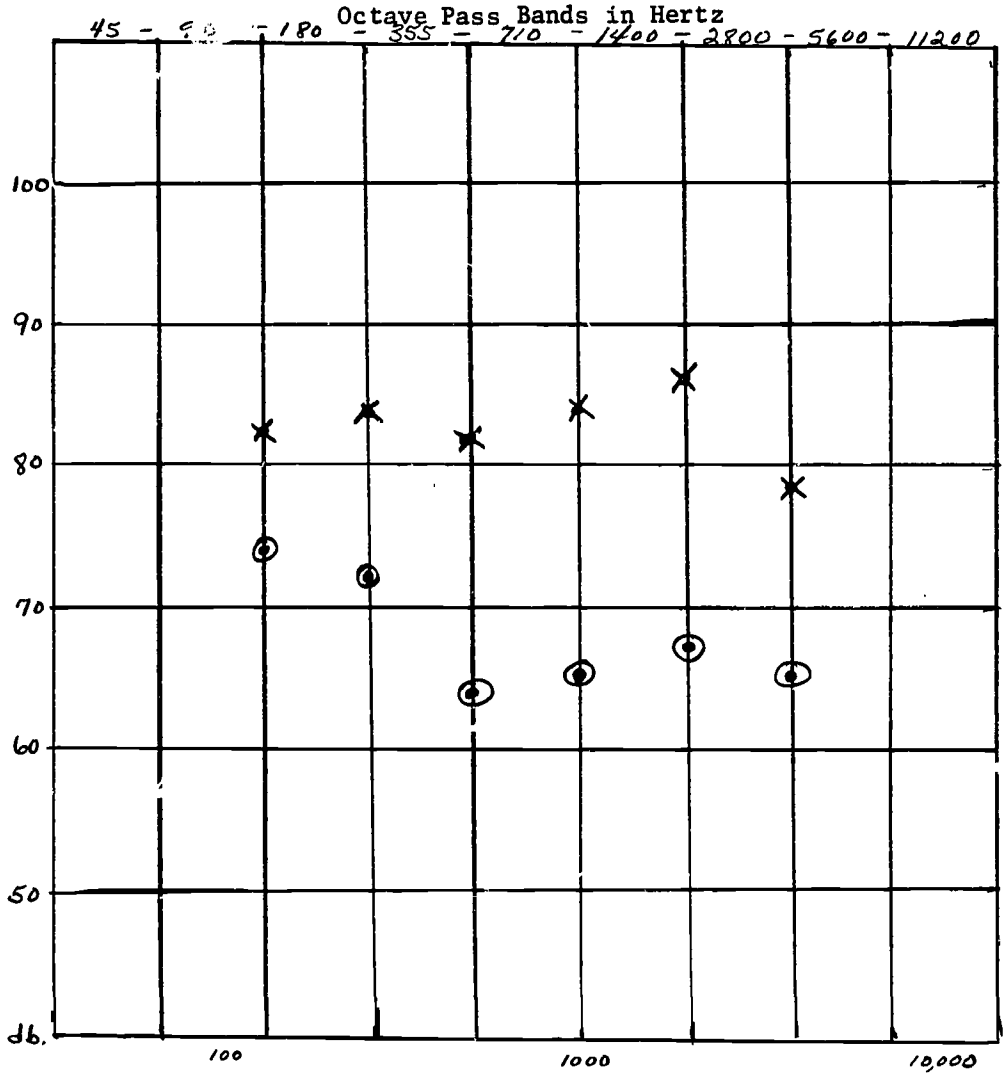


✕ Source Room--Condition D--Normal Division of instructional space (cabinets on legs, 5' in height)

⊙ Receiving Room--Condition D--Normal division of instructional space (cabinets on legs, 5' in height)

EXHIBIT XVII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL S[o]

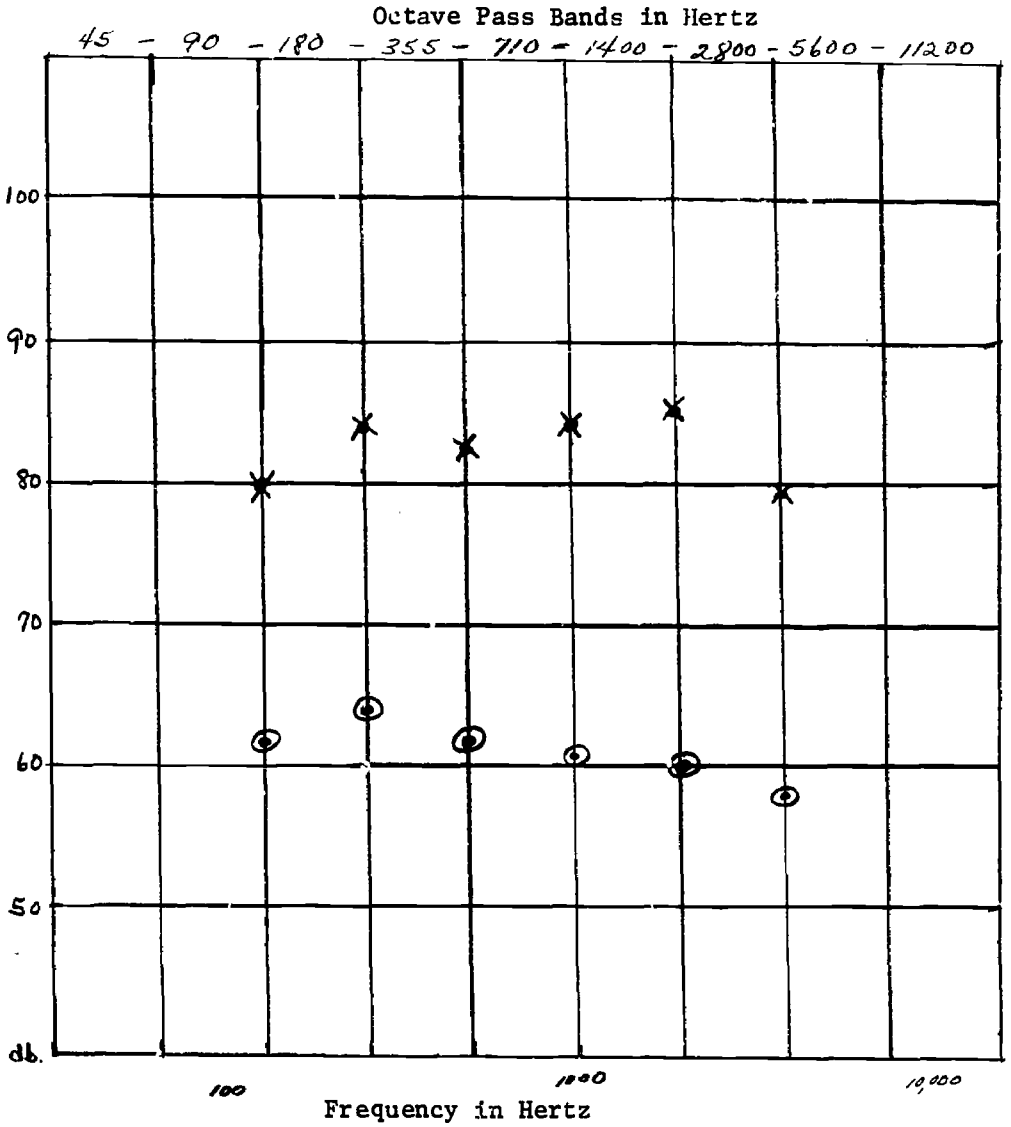


✕ Source Room--Condition E--Normal division of instructional space (operable folding plastic walls)

⊙ Receiving Room--Condition E--Normal division of instructional space (operable folding plastic walls)

FXHIBIT XVIII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL S[O]

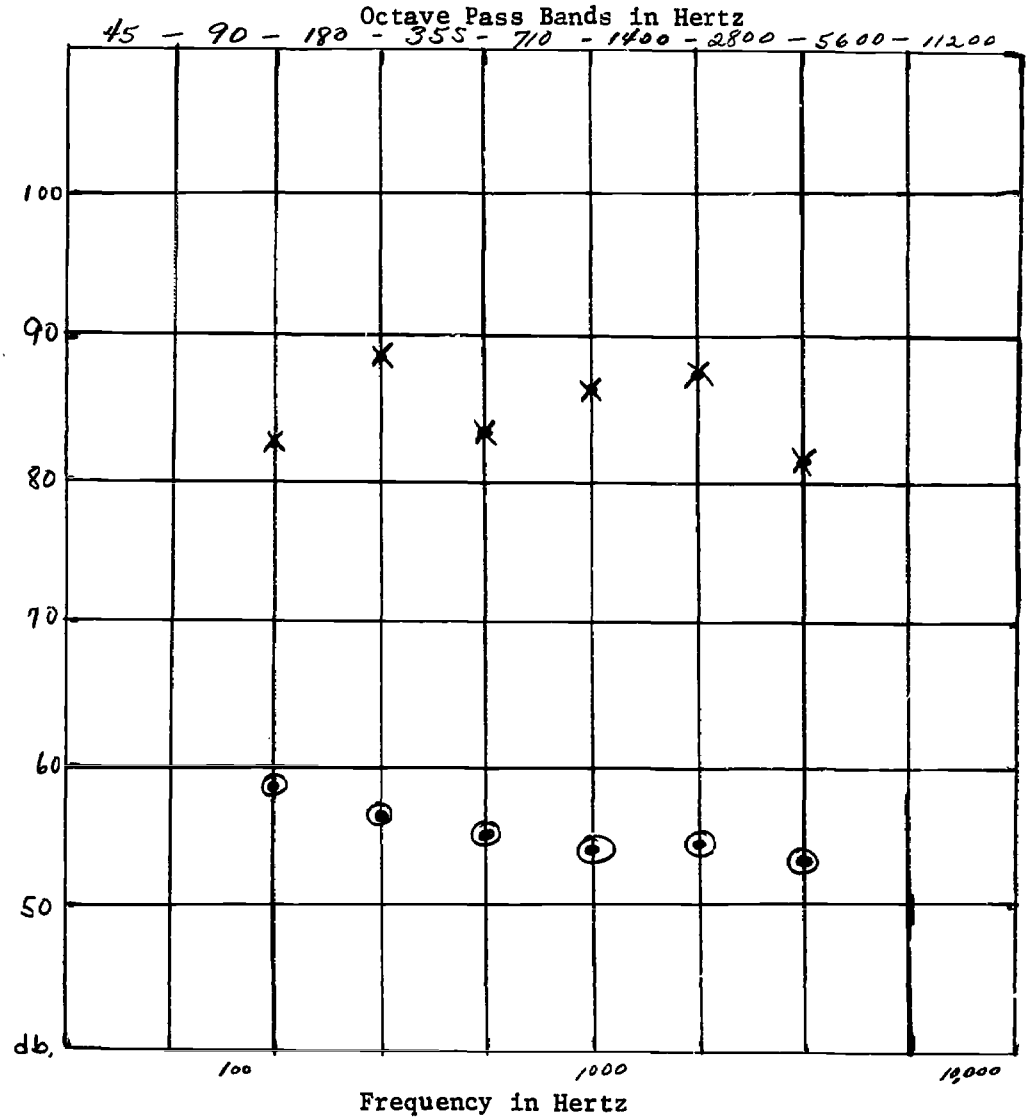


✕ Source Room--Condition F--Normal division of instructional space (3 permanent walls, no doors, floors tiled)

⊙ Receiving Room--Condition F--Normal division of instructional space (3 permanent walls, no doors, floor carpeted)

EXHIBIT XIX

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL A[C]

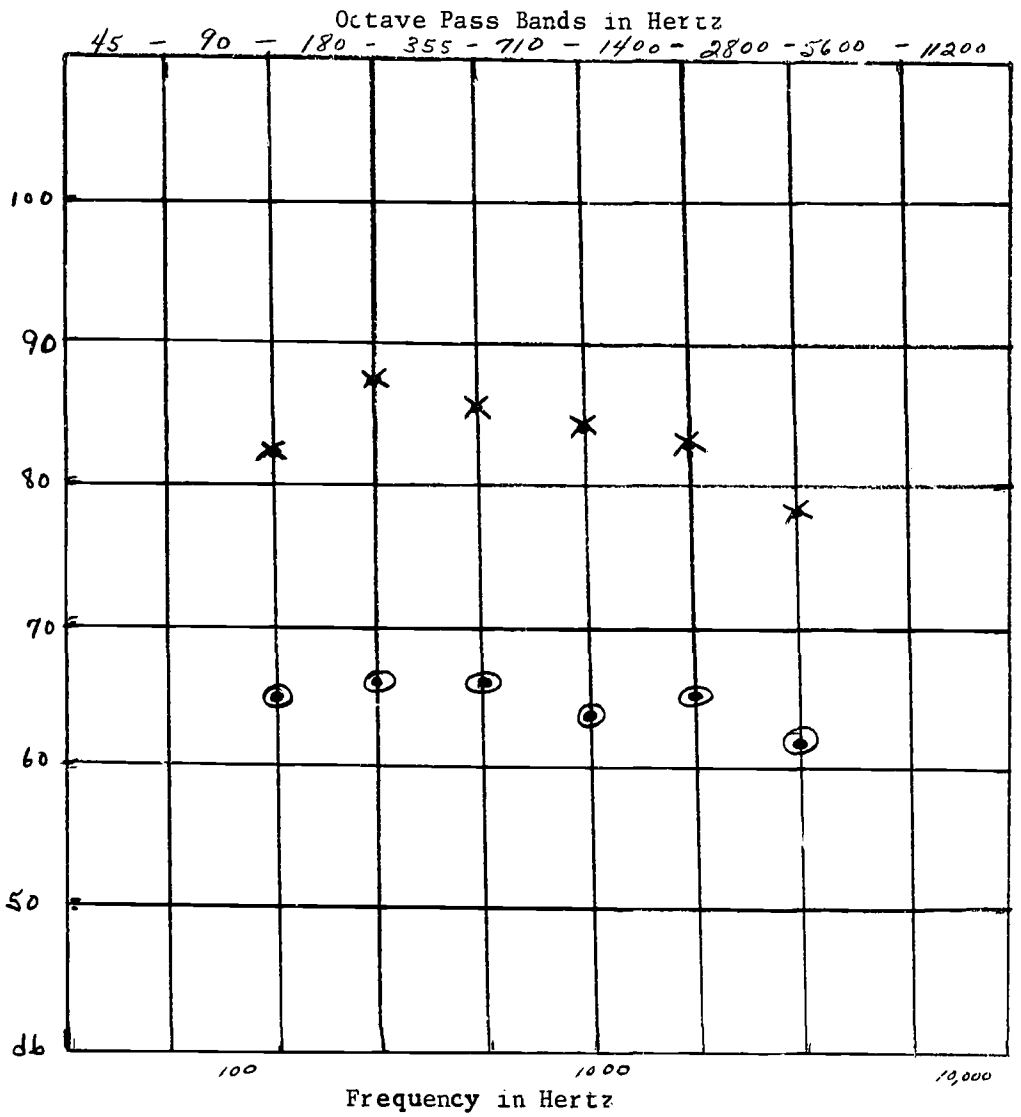


✕ Source Room--Condition A--Doors closed and windows closed

⊙ Receiving Room--Condition A--Door and louvers closed

EXHIBIT XX

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL A[C]

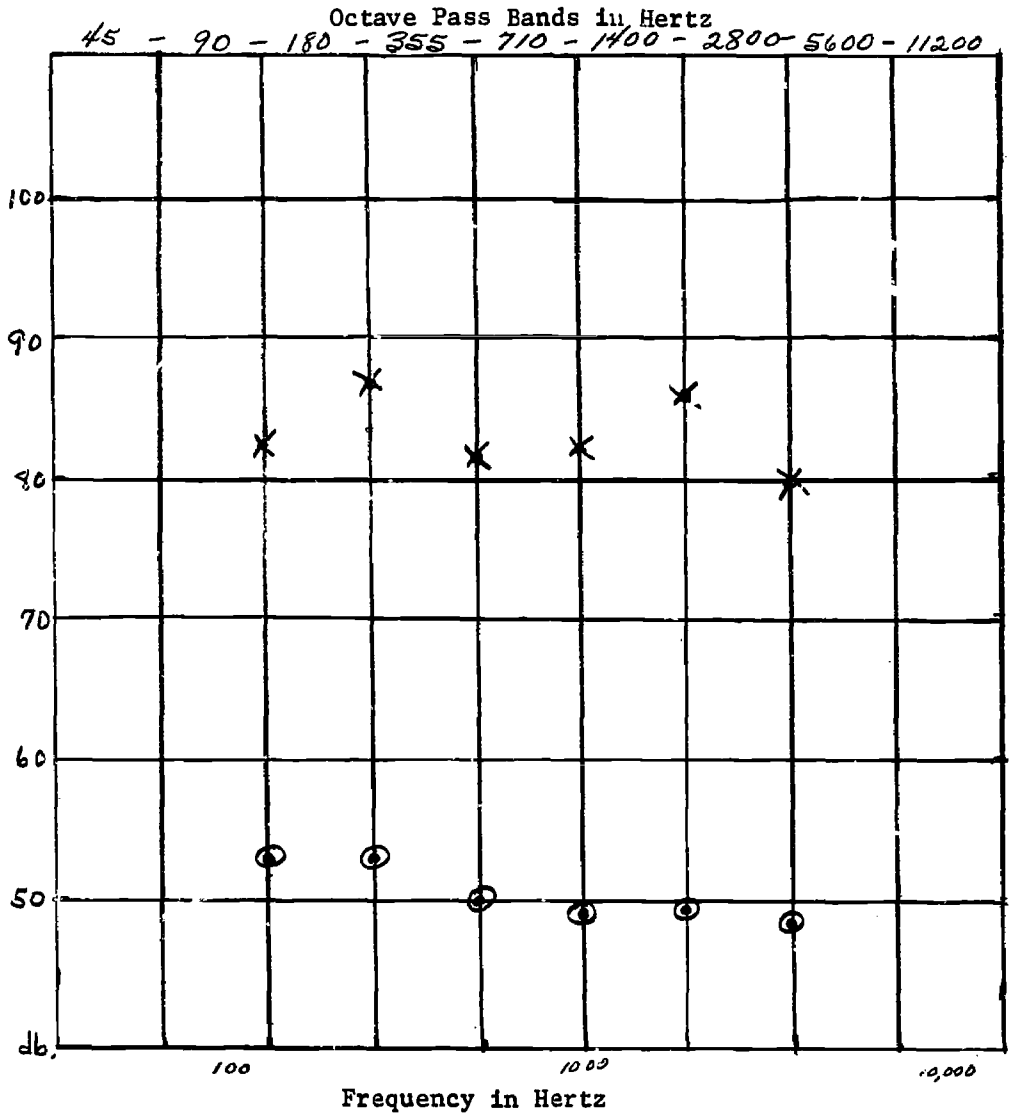


✗Source Room--Condition B--Door and louvers open

⊙Receiving Room--Condition B--Door and louvers open

EXHIBIT XXI

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL B[illegible]

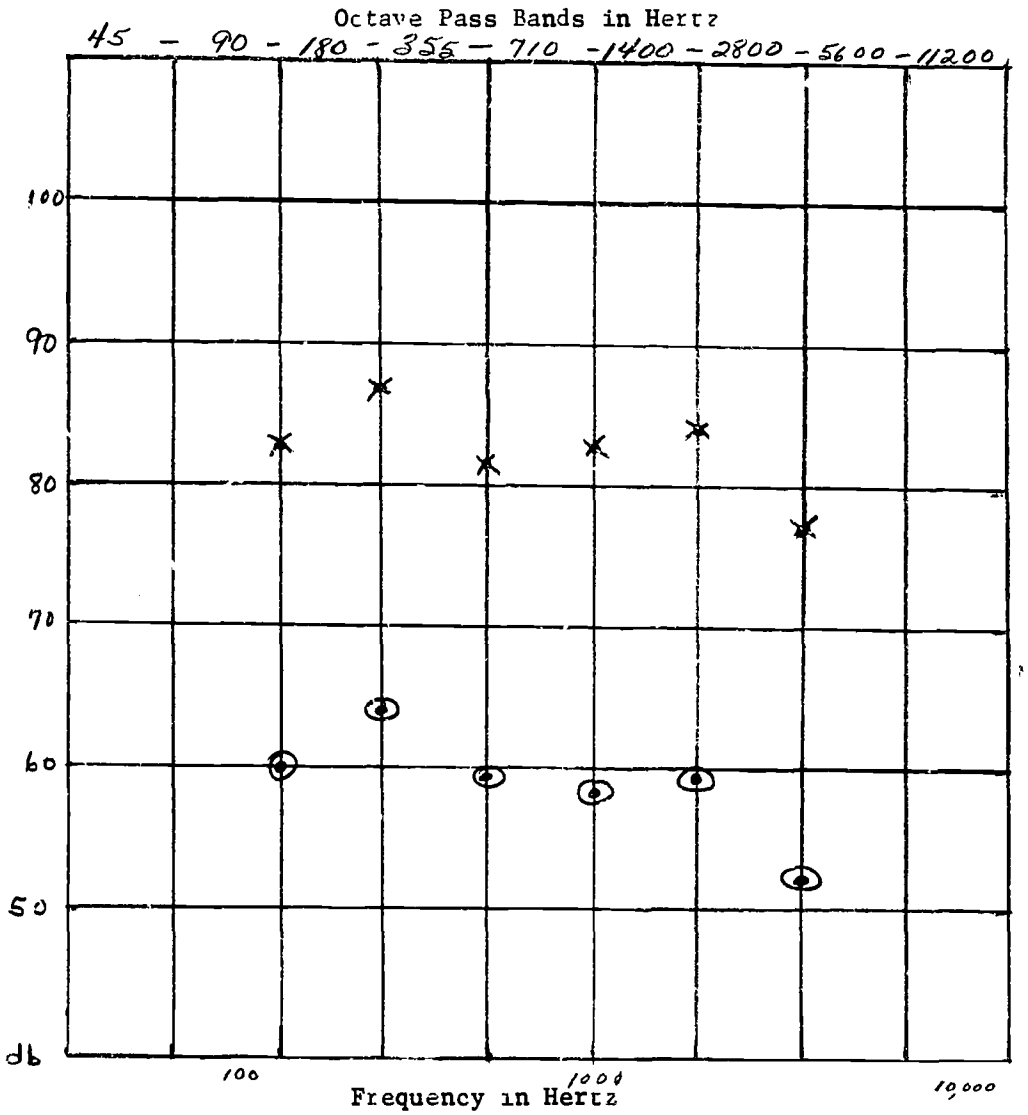


X Source Room--Condition A--Door and transom closed

⊙ Receiving Room--Condition A--Door and transon closed

EXHIBIT XXII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL B[c]

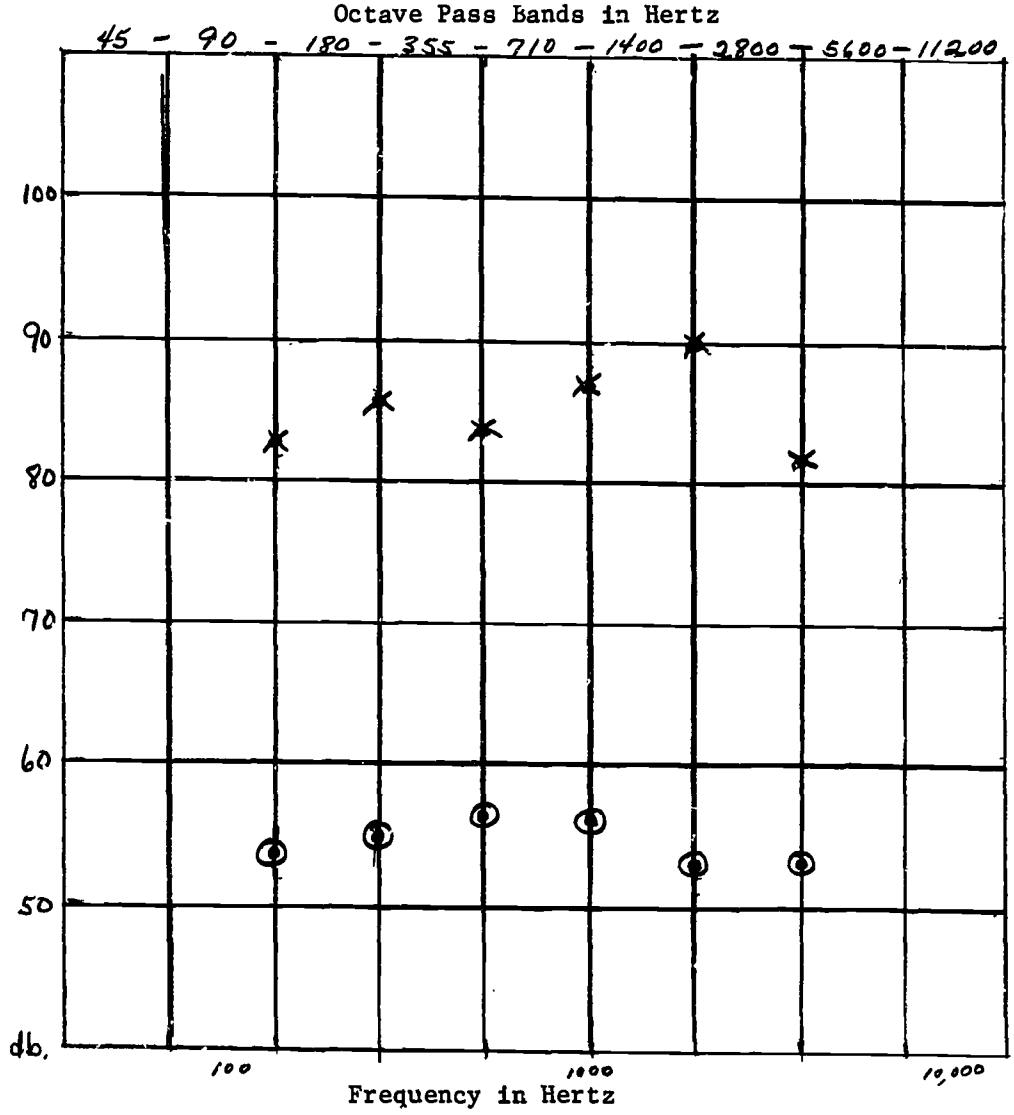


✕ Source Room--Condition B--Door and transoms open

⊙ Receiving room--Condition B--Door and transons open

EXHIBIT XXIII

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL C[c]

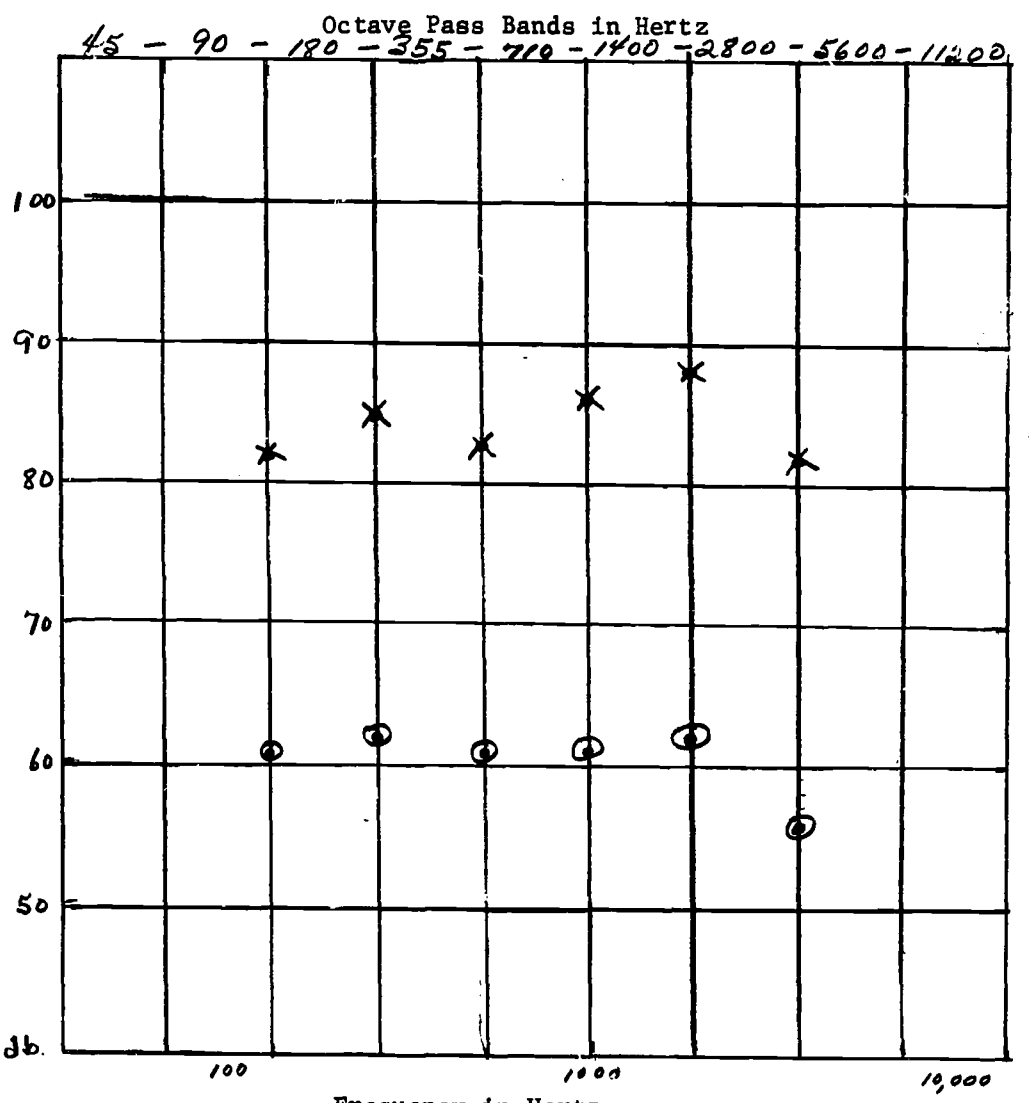


✕ Source Room--Condition A--Doors closed

◉ Receiving Room--Condition A--Doors closed

EXHIBIT XXIV

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL C[C]

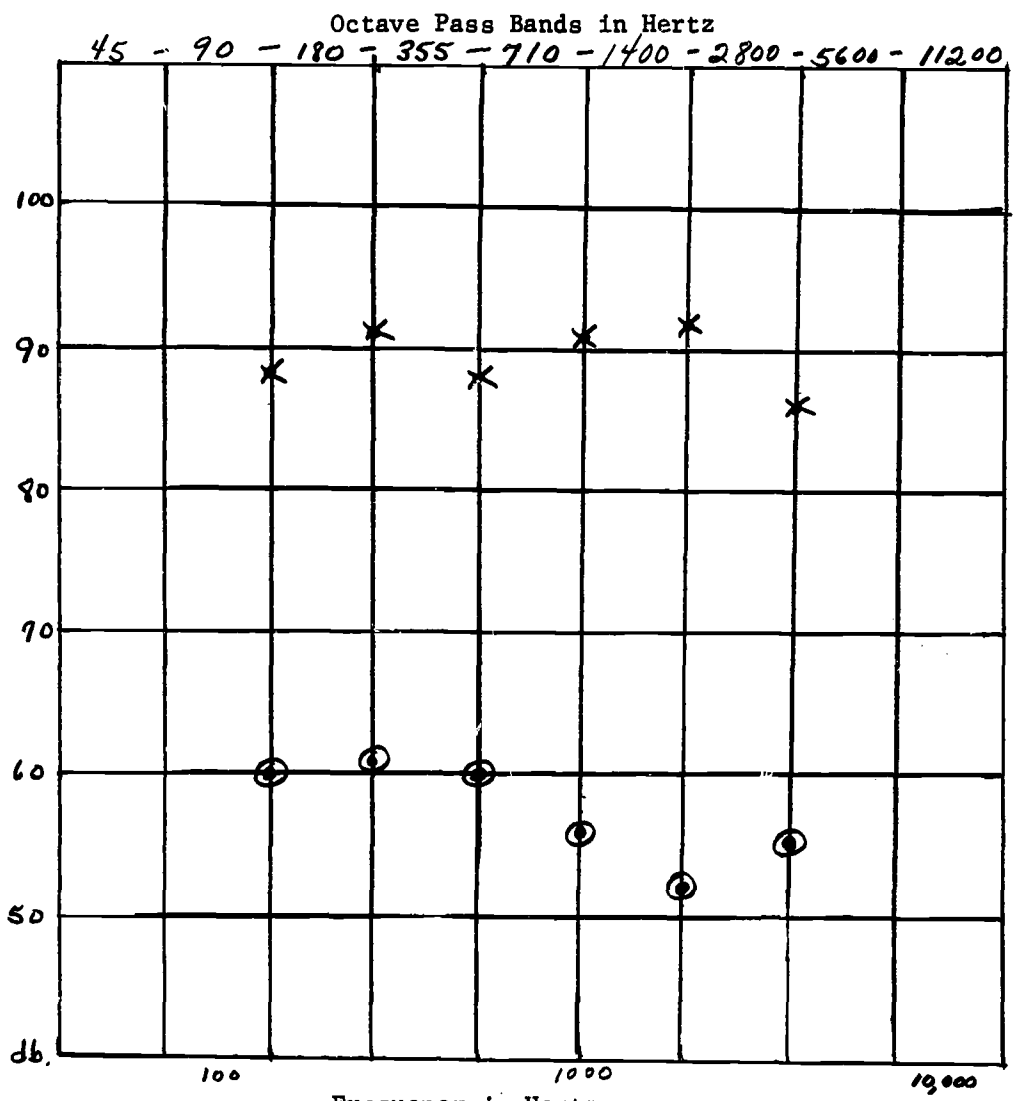


X Source Room--Condition B--Doors open

⊙ Receiving Room--Condition B--Doors open

EXHIBIT XXV

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL S[C]

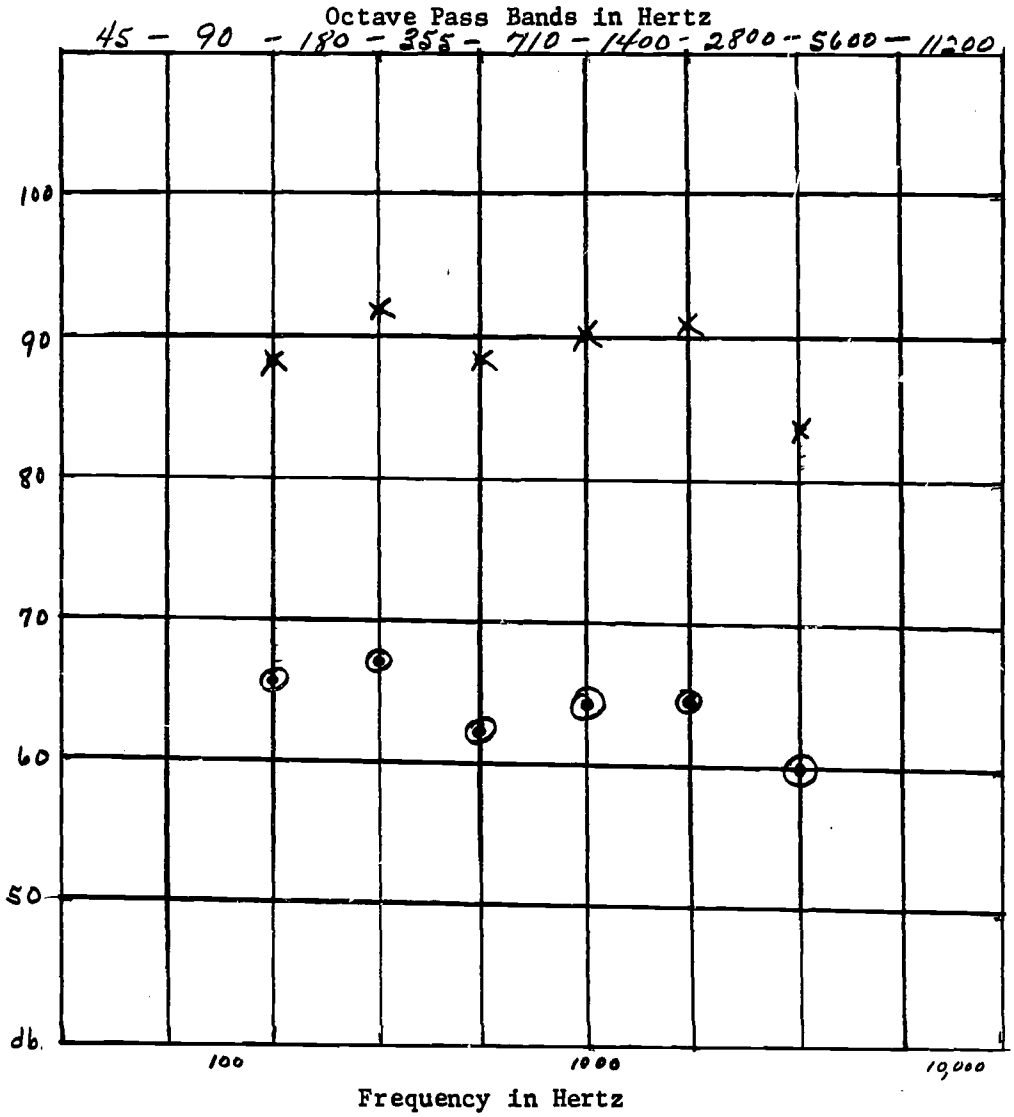


✕ Source Room--Condition A--Doors closed

⊙ Receiving Room--Condition A--Doors closed

EXHIBIT XXVI

SOUND LEVEL READINGS IN DECIBELS
OF NOISE TRANSMISSION BETWEEN
INSTRUCTIONAL AREAS OF SCHOOL S^C



✕ Source Room--Condition B--Doors open

⊙ Receiving Room--Condition B--Doors open

EXHIBIT XXVII

DESCRIPTION OF PHYSICAL CHARACTERISTICS OF INSTRUCTIONAL AREAS OF OPEN-PLAN AND CONVENTIONAL-PLAN SCHOOLS A, B, C, AND S

Open-Plan School A

1. Walls	Painted concrete block
2. Ceiling	Acoustical tile
3. Floor	Carpet
4. Size (approx.)*	22' x 30'
5. Space Dividers	None
6. Windows (outside)	None
7. Transom Windows	None
8. Doors (corridor)	None

Open-Plan School B

1. Walls	Painted concrete block
2. Ceiling	Acoustical tile
3. Floor	Carpet
4. Size (approx.)	25' x 27'
5. Space Dividers	Wooden cabinets and Formica panels on casters
6. Windows (outside)	None
7. Transom Windows	None
8. Doors (corridor)	None

Open-Plan School C

1. Walls	Brick
2. Ceiling	Acoustical tile (slanted ceiling)
3. Floor	Carpet
4. Size (approx.)	26' x 30' (average, wedge shaped)
5. Space Dividers	Wooden cabinets on casters
6. Windows (outside)	2 - 1' x 5' block glass
7. Transom Windows	None
8. Doors (corridor)	None

*In open-plan schools, size is considered space occupied by one instructional unit or class.

Open-Plan School S

1. Walls	Brick
2. Ceiling	Laminated wooden beams, acoustical tile
3. Floor	Carpet
4. Size (approx.)	24' x 30' (average, wedge shaped)
5. Space Dividers	Wooden cabinets, folding plastic walls
6. Windows (outside)	1 - 3' x 5' with outside metal louvers
7. Transom Windows	None
8. Doors (corridor)	None

Conventional-Plan School A

1. Walls	Glazed tile
2. Ceiling	Acoustical tile (slanted ceiling)
3. Floor	Asphalt tile
4. Size (approx.)	24' x 27'
5. Space Dividers	None
6. Windows (outside)	Wall of windows
7. Transom Windows	3 to corridor
8. Doors (corridor)	1 to corridor

Conventional-Plan School B

1. Walls	Painted concrete block
2. Ceiling	Acoustical tile
3. Floor	Asphalt tile
4. Size (approx.)	22' x 30'
5. Space Dividers	None
6. Windows (outside)	Wall of windows
7. Transom Windows	3 to corridor
8. Doors (corridor)	1 to corridor

Conventional-Plan School C

1. Walls	Plaster
2. Ceiling	Acoustical tile
3. Floor	Asphalt tile
4. Size (approx.)	24' x 30'
5. Space Dividers	None
6. Windows (outside)	4 - 4' x 8'
7. Transom Windows	None
8. Doors (corridor)	2 to corridor

Conventional-Plan School S

1. Walls	Plaster
2. Ceiling	Acoustical tile

3.	Floor	Carpet
4.	Size (approx.)	22' x 27'
5.	Space Dividers	None
6.	Windows (outside)	Wall of windows
7.	Transom Windows	None
8.	Doors (corridor)	2 to corridor