DOCUMENT RESUME

ED 088 616 RC 007 736

AUTHOR McCartin, Rosemarie; Schill, William John
TITLE An Experiment with Three Methods of Instruction for Indian Elementary School Children.
PUB DATE 74
NOTE 21p.; Paper to be presented at the 1974 AERA Annual Meeting, Chicago, Ill., April 19, 1974

EDRS PRICE MF-$0.75 HC-$1.50
DESCRIPTORS Academic Achievement; *American Indians; Audiovisual Instruction; Educational Research; Elementary Grades; *Elementary School Students; *Instructional Design; Learning Characteristics; Methodology; Research Projects; Reservations (Indian); *Student Characteristics; *Student Testing; Textbooks; Visual Learning
IDENTIFIERS *Quinault Reservation; Washington State

ABSTRACT

The report detailed an experiment with 3 methods of instructing American Indian children in Taholah Elementary School (Quinault Reservation, Washington State). To assess the relative value of instructional methods in the school, 2 conditions had to prevail. The content of the lessons was to be unknown to pupils at all grade levels, and the content should be of general interest to the students. To satisfy these conditions, the study of the nature of cities was selected for its interest appeal. The 3 instruction methods were: (a) a method that relied totally on textual materials that the students have to read; (b) a method that required the text to be presented orally by the teacher with supplemental pictures; and (c) a visual presentation with large overheads followed by an oral teacher presentation. The experiment used a 3x3x3 design. The 3 dimensions--grade, concepts, and methods--were each divided into 3 parts. The 6 grades were divided into 3 groups: 3-4, 5-6, and 7-8. A total of 104 pupils were used in the experiment. Analysis of student achievement by the individual concepts across methods yielded an F-ratio which was not sufficiently large to be significant. The F-ratio on the central place concept was .15, on the special function concept .24, and on the break-of-bulk concept it was 1.1. (FF)

AN EXPERIMENT WITH THREE METHODS OF INSTRUCTION FOR INDIAN ELEMENTARY SCHOOL CHILDREN

by

Rosemarie McCartin

William John Schill

University of Seattle
Seattle, Washington

TO BE PRESENTED AT THE 1974 AERA ANNUAL MEETING

April 19, 1974
Chicago, Illinois

TABLE OF CONTENTS

AN EXPERIMENT WITH THREE METHODS OF INSTRUCTION FOR INDIAN ELEMENTARY SCHOOL CHILDREN

I. INTRODUCTION

The major portion of this report will detail an experiment with three methods of instructing Indian children in elementary school. The experiment was one part of a three-part project. The other two parts, (1) an in-service course for teachers and teacher aides and, (2) a monthly program for residents of Taholah which can best be called an introduction to educational concepts, will be treated in less detail.

SETTING

The Quinault reservation is a 272,000 acre triangular piece of land set on the Southwest corner of the Olympic National Park and extending to the Pacific Ocean. The reservation has beaches, rivers, lakes, and forests. These natural resources have been raped by the white man for pleasure and by business for profit. The policy of the Bureau of Indian Affairs, in past years, was to force the sale of reservation lands and the resources with the hope that it would compel the Indian to integrate into the larger culture. This policy has resulted in the Quinault tribal council retaining possession of only 5000 acres while the remainder is parceled, pieced, distributed, leased, and mired in complex allocations to persons many of whom do not live on the reservation. With all that, much of the rain-soaked natural beauty remains.

There are slightly over one thousand Indians living on or adjacent to the Quinault reservation. Taholah, seat of the Tribal Nation, has approximately 600 residents and to the north Queets has 200 residents. Taholah is in the process of modernizing its housing and tribal buildings. The village has a store, two restaurants, a fire station, public health office, library and Community Action Program building, and an elementary school. The school houses most of the village activity and is justifiably the source of considerable pride.

Taholah Elementary School is part of the state system of public instruction. In addition to kindergarten through grade eight, the school has an exemplary pre-school program. There is one teacher for each grade and about twenty students per grade. Special funding has permitted the employment of Indian mothers from the village as teacher aides.

The duties of the teacher aides range from classroom housekeeping chores to assisting in instruction. The assignments of individual teacher aides is dependent upon their ability and the ability of the teacher to accept the concept of a para-professional in the classroom. The University of Washington during the previous year conducted a course for parents and teachers. At that time, the tribal leaders became acquainted with one of the authors of this report. The mutual respect that developed facilitated the request for another course. The extension course, EDHED 499, is still in progress

and there are no plans to formally evaluate the results.

As was mentioned earlier, the Quinault Indians are proud of their elementary school. This pride leads to considerable involvement in the educational enterprise. A number of community volunteers assist in the school as teachers of beading, chess, checkers, etc. The tribal council has an education committee which makes recommendations concerning special programs and activities. The members of the education committee considered it appropriate to seek more information about current educational concepts. As a consequence, BIA funding was secured for monthly educational presentations for interested adults of Taholah. In this case, as with the extension course, there were no plans for formal evaluation.

The rapport established among teachers, teacher aides, tribal members and the University of Washington faculty members working with them contributed greatly to the planning and conduct of the experiment about to be described.

For its size, the Taholah school has what might appear to some an inordinate amount of extracurricular activities. It has field trips that range far and wide, to Hoquiam, the nearest large city, and to the metropolitan areas of Seattle and Vancouver, B.C. The audio-visual equipment and learning and teaching aids of various kinds were considered beyond those available to teachers and students of the typical elementary school, and approach those available to the affluent suburban elementary schools in metropolitan areas.

Given the field trips, extracurricular activities, and the

variety of teaching and learning aids, there is a feeling that sometimes even the teachers lose track of where the day's activities are going. Interestingly enough, the students seem to be able to master the diversity and maintain a sense of direction. Indeed, the students are not only at home in the school, they often appear to be its proprietors!

It is essential to note here that the Indian students at the Taholah school have no bilingual problems. They have mastered English and much to the chagrin of a number of the older people, the Quinault language has all but disappeared. It might be expected by the uninformed that health problems would detract from the educational achievement of the Indian students at Taholah. This, however, is not the case. Just as there are no bilingual problems, there are few, if any, unattended health problems. There is a Public Health Service Clinic within two blocks of the school. The Public Health nurse, doctor, and dentist make periodic checks of all the students. It was concluded that the health care available is sufficient to the needs and considerably beyond what is available to most elementary school children.

II. STUDENT CHARACTERISTICS

Antecedent data were collected to permit the discussion of student characteristics that follow and to permit the testing of hypotheses related to the experiment which is described in detail later. Data were gathered from the school records on each student

in grades three through eight inclusive. Age and sex were recorded because the literature on elementary school children's achievement show both age and sex to be correlates of achievement. The literature indicates family status and sibling order are somewhat correlated with school achievement, although studies in these areas do not show a strong or consistent relationship. Therefore, data were compiled on these family variables. Days absent the previous year was recorded as an index of attendance behavior.

Past achievement was recorded in the form of scores on the COMPREHENSIVE TEST OF BASIC SKILLS (CTBS). Scores were available from tests administered in the spring of 1970 and again in 1971. Of the 104 children in the study, test scores for both years were available for 56 children in the study, 1970 test scores for 58, and 1971 test scores for 93.

The age range of the students at the Taholah school is consistent with that of elementary schools throughout the country because, like most elementary schools, Taholah has a social promotion process. However, this social promotion process is tempered by allowing for assignment to a classroom based on the assessment of the achievement level of each pupil. The statistical relationship between age and grade in the Taholah school is represented by a correlation of .94. Age and grade, which are highly correlated, are usually highly related also to achievement in the basic skills. Both age and grade are correlated with the total score on the Comprehensive Test of Basic Skills (CTBS). These correlations are age and Total CTBS score, .43; grade and Total CTBS score, .49, both of which are sig-

nificant at the .01 level of confidence. The correlations cited account for a small portion of the total of variance. Another way of saying this is that some factors other than age and grade are beginning to operate in terms of achievement, as pupils progress through the elementary school.

Girls typically have higher academic achievement than do boys. At the Taholah school, this is not the case. The correlation between sex and academic achievement as measured by the Total CTBS battery is a mere .05, which could very well have occurred by chance.

Family cohesiveness, number of siblings, and sibling order are thought to be important variables which contribute to the achievement of the child. To ascertain the relationship in the Taholah population, the child's family was coded as being either a nuclear family with the mother and father and children living together or "other" meaning that there had been some modification of that design, e.g., the mother was gone, the father was gone, there was a stepfather, stepmother, etc. The correlation between family mode and achievement was not sufficiently high to be significant, the exact correlation being -.18. The relationship of family mode and IQ as measured by the Otis Lehman Intelligence Test was -.01.

There is some thought in educational circles that the number of children per family has an influence upon the intelligence and achievement of the children. This stems from the concern for the capability of the family not only to support, but to provide a variety of learning activities for the children, etc. In the Taholah school, the

number of children in the family was recorded on each child's card and this was then correlated with the rest of the variables. The correlation between the number of children in the family and achievement and number of children and IQ were respectively, -.02, and -.21, neither of which are sufficiently high to be significant. In terms of rank order of siblings, there appears to be no relationship (r=-.02).

The lack of attendance as a variable is often used to explain achievement deficits for certain groups of ethnic children. Inspecting the attendance records of the Taholah school children, it was found that their attendance is very good in the grades 3 through six. In the seventh and eighth grade, the attendance records become spotty for a few female students.

III. REVIEW OF LITERATURE ON INDIAN CHILDRENS' LEARNING AND ACHIEVEMENT

A characteristic of educational research is that when any group is measured, a wider range of learning abilities is found within the group than is found between any two groups. Keep in mind that any individual in a given group has his own style of learning. How a person learns depends upon the child-rearing practices to which he is exposed, the values and attitudes held by those around him, and his physical characteristics. In other words, a child with a given genetic make-up interacts with an environment in which he is placed. The changes due to the interaction between child and environment constitute his learning.

Each child differs from any other, but are there similarities within a group of people which allow us to make some statements about

how it interacts with the environment--how they learn? Among the American Indian people, living on a reservation, we may expect a consistent set of values to be manifest in behavior and so expect that the children of the reservation perceive the environment, i.e. to learn in similar ways.

Although few have studied how the children of a given Indian tribe learn, there is much information on how they score on tests. On non-verbal intelligence tests, Indian children have the same average scores and show the same range of performance as white children (Havighurst, 1957). In reviewing the literature, Havighurst (1957) found that all of the studies since 1935 using non-verbal tests support the conclusion that there is no significant difference in intelligence between Indians and white children. Indian children have the same average IQ scores and range of performance between tribes and between communities within tribes as white children between and within communities.

The most commonly employed non-verbal IQ test used with Indians is the Goodenough Draw-A-Man Intelligence Test (DAM). Another is the Grace Arthur Performance Test of Intelligence. The DAM is a test of mental alertness which does not require language skills. Test results from several studies show normal IQ's for Indian children tested on the DAM (Havighurst, et al, 1946; Levensky, 1970; Cundick, 1970).

Recently, an extensive study of Indian elementary school pupils was conducted by the National Study of American Indian Education. The DAM test was administered to 1,700 Indian children. The average IQ was 101.5. This is slightly superior to, though not significantly different from, the average of white children (Levensky, 1970).

Indian children show relative strengths in handling visual tasks. Visual imagery and form perception is reflected in spelling skills, Coombs (1958) observed that Indian children did best academically in spelling. This relative superiority in spelling continues in older Indian children as well as in younger (Coleman, 1966).

Indian children often do well on visual motor performance subtests while doing less well on verbal subtests (Cundick, 1970; Garber, 1968). On the Illinois Test of Psycholinguistic Ability, e.g. Pueblo and Navajo pupils scored highest on visual motor sequencing and visual motor association subtests.

Typically, Indian children possess limited verbal skills and fail to perform well on verbal intelligence tests. Scores on verbal intelligence tests differ from non-verbal tests. In one study, a group of 30 Sioux pupils was tested one year apart with two different instruments. The average IQ score from the Grace Arthur Performance Test of Intelligence which is non-verbal, was 102.8. The average IQ score from the Kulhmann-Anderson Test, a verbal test requiring reading ability, was 82.5 (Havighurst and Hilkevitch, 1944). This indicates both (1) the verbal deficiencies in handling standard English as reflected by the low scores of Indian children and, (2) the discriminatory nature of verbal intelligence tests when used with Indian pupils.

Most studies indicate that Indian pupils' performance on intelligence and achievement tests is better in the elementary grades than in the junior and senior high school (Peterson, 1948; Coombs, 1958; Levensky, 1970).

Performance on tests may reflect to some extent the kind of content or the process of teaching which has led to learning on the part of the Indian child.

It appears that the American Indian child has greater facility in learning when visual methods of instruction are used (Shears) and performs less well when tasks and tests are saturated with verbal content such as reading tasks (Snider). Somewhere in between lies the oral method of presenting.

IV. CONCEPTS AND METHODS

To assess the relative value of instructional methods in the Taholah school, two conditions had to prevail. The information or content of the lessons was to be unknown to pupils at all grade levels, and the content should be of general interest to the pupils. To satisfy these conditions, the study of the nature of cities was selected for its interest appeal. Chauncy Harris and Edward Ullman (Annals of the American Academy of Political and Social Science, CCXLII, Nov. 1945, 7-17) propose the following as types of city functions:

1. Cities as central places performing comprehensive services for a surrounding area.
2. Transport cities performing break-of-bulk and allied services along transport routes.
3. Specialized-function cities performing one service such as mining, manufacturing, fishing or recreation for larger areas.

The concepts as presented by Ullman had not been translated into textual material for elementary grade children, however, they have been presented in a senior high text.

Text material was prepared covering the three concepts at the 3rd grade readability level, as measured by Fry formula (Maginnis in The Reading Teacher, March 1969.) for grades three and four. In addition, another text was written for the upper grades. (See Appendix A)

It was judged that one class period of approximately thirty minutes would be appropriate for the presentation of each of the three concepts.

The literature provided some evidence, though inconclusive, that Indian children may learn best when the learning situation provides visual and oral cues in preference to a written text. Therefore, three methods were selected, each placing emphasis upon either a written, oral or visual mode of presentation. In method one, the text presentation provided for a set of written textual materials and pictures, one for each of the three concepts. In method two, the same material was presented orally by the teacher. Pictures used to clarify the concepts were 10 x 12" versions of those appearing in the text. In method three the teacher used an overhead transparency of the same pictures as those used in the written and oral presentation. The projections were the point of departure for the presentation of the concepts.

V. EXPERIMENTAL CONTROLS

The experiment used a 3x3x3 design. The three dimensions, grade, concepts, and methods were each divided into 3 parts. The six grades were divided into three groups: third-fourth, fifth-sixth, and seventh-eighth.

The three concepts to be presented were: central place city, special function city, and break-of-bulk city. The three methods used have been discussed, namely: a. method that relied totally on textual materials that the students had to read, b. method that required the textual materials to be presented orally by the teacher with supplemental small pictures to facilitate student understanding. c. a visual presentation with large overheads that conveyed the concepts that were then explained orally by the teacher.

To guard against teacher-learning interaction each of the three teachers was randomly assigned across grade levels, concepts and treatments so that each of the three teachers used each method with a grade level and taught each concept to a grade level.

The students were assigned randomly to treatments. So within the third and fourth grade there was a randomized assignment of the students to text, oral or visual presentations. The same was true for fifth, sixth, and seventh and eighth.

To assess whether the random assignment resulted in groups that did not differ in past achievement, the CTBS which had been administered in 1971 was analyzed using analysis of variance across the three assignment groups to test for significance of difference in

basic background understanding. There were no significant differences across the groups on any of the subscores or on the total CTBS score. (This data is reported in Appendix B).

The criterion test of knowledge about central place cities, special function cities, and break-of-bulk cities was graded in terms of total score, scores as they relate to the three concepts, and scores as they relate to the three methods used to present the test questions. The pretest scores were analyzed by analysis of variance and again there were no significant differences across the student assignment groups. (These data are presented in Appendix B.)

VI. EVALUATION INSTRUMENT

The criterion test was designed to measure the performance of Taholah pupils on three concepts presented across three types of questions. Twenty-one items yielded a total score and six subscores. (See Appendix A)

The subscores were for the concepts: central place, break-of bulk, and special function. The items were also scored for the method in which the questions were posed to the student, i.e., oral questions, written items and items requiring interpretation and production of pictures and geographic symbols.

The administration of the criterion test required twenty to thirty minutes. It was administered one day prior to the experiment and again immediately after the third concept had been presented. Of the 104 pupils, 102 took the pretest and 96 were present for the

post test.

VII. LIMITATIONS

The short exposure to teaching methods, i.e. three sessions of thirty minutes, may have been insufficient to demonstrate significant changes in performance. Each session was taught by a different teacher unfamiliar to the pupils, and the grouping of the students was new as was the classroom arrangement. This could also have detracted from learning.

Although new verbal concepts were introduced, neither the oral nor the visual group saw the new terms. Some visual familiarity with the new concepts during the presentations might have facilitated understanding and recognition during the criterion test, thus operating to the advantage of the textual group and to the disadvantage of the pupils in the oral and visual method groups.

Participation in the lessons taught in this experiment was held to the minimum. To keep conditions constant across the three methods, a lecture or didactic presentation was used in the oral and visual groups, thus eliminating the penalty for the textual group where no opportunity for inquiry or question-answer approach existed. The lack of student participation may have detracted from learning in all three cases.

The criterion tests were administered immediately after instruction was completed. Therefore, there was no attempt to assess differential retention across teaching methods.

VIII. TREATMENT OF THE DATA

The study was designed and conducted to test one basic hypothesis that grew out of the literature on the education, especially of Indian children, but also of elementary school children in general. This hypothesis was as follows: the students who receive instruction using the visual communications method will do significantly better than the students who receive instruction in the same concepts orally, or through reading a text. Further, the students who receive instruction orally will do significantly better than the students who have only the textual material available to them. To restate this, it is a directional hypothesis that says the three groups will differ in their measured achievement, with the visual group being highest, the oral group next highest, and the textual group the lowest. This hypothesis was tested by taking the criterion test scores and subjecting them to a simple analysis of variance. The resulting F-ratio was .685.

There is a temptation to talk about the results of the treatment even though there seem to be no significant differences across the groups. Researchers typically avoid the temptation. In this case we elect not to. In one respect, since the study used all of the students in grades 3 through 8 at Taholah, it was not a sampling process. Probability statistics legitimately could be avoided. If that were the case, we could then quote the means of the measured achievement and see if there were differences across the three groups.

The means of the results from the criterion tests are 8.5 for the group that received instruction by a text method, 9.4 for the group that received instruction by the visual method, and 9.6 for those who received the instruction orally. So even by dismissing probability statistics, and looking only at the mean criterion scores, the hypothesis is still not substantiated because the means are not in the expected direction.

Analysis of student achievement by the individual concepts across methods yields an F-ratio which is not sufficiently large to be significant. The F-ratio on the central place concept was .15, on the special function concept .24, and on the break-of-bulk concept it was 1.1. Again, yielding to the temptation to look at the mean scores even though there are no significant differences, we find that for the central place concept, the mean achievement was as hypothesized, text lowest, oral second, visual highest. The same was true on the special function concept, but the break-of-bulk concept differed. In the break-of-bulk concept, text was lowest, but visual was second, and oral was highest.

Given the differential reading ability and comprehension of the students by grade, it was deemed desirable to look at the effects by treatment and grade level. Using the same basic hypothesis, the analysis of variance was run in the resulting nine grade-method groups. When the criterion test scores are analyzed by treatment method and by age, grade level, there is a significant difference across the groups for total test score and the subscores by concept. Looking

at the means across the methods within the grade groupings, the scores increase from text to oral to visual for the third and fourth grade. They increased from text to oral to visual for the fifth and sixth grade, but for the seventh and eighth grade, text is the lowest, visual the second, and oral is on the top.

It would be nice to be able to say that the result of many weeks of preparation, three days of instruction, followed by many weeks of analysis, led to at least some trend which would permit us to tell you that visual and oral instruction had been demonstrated to work better with Indian children than textual instruction. But, alas, we cannot say that with any degree of certitude.

BIBLIOGRAPHY

1. Bill, Willard. Recent Developments in Indian Education, Newsletter of the College of Education, University of Washington, Seattle, Washington, Winter, 1972.

2. Coleman, James S. Equality of Educational Opportunity. U.S. Government Printing Office, Washington, D.C., 1966.

3. Comprehensive Tests of Basic Skills, California Test Bureau, McGraw-Hill Book Company, 1969.

4. Coombs, L.M. The Indian Child Goes to School: A Study of Interracial Differences. Department of Interior, Bureau of Indian Affairs, Washington, D.C., 1958.

5. Cundict, Bert P. "Measures of Intelligence on Southwest Indian Students." Journal of Social Psychology, 1970, 81, 151-156.

6. "Focusing on Indian Education," College of Education Record, University of Washington, Seattle, Washington, May, 1971.

7. Garber, Malcolm. Classroom Strategies: Culture and Learning Styles. Vol. 1; Southwestern Cooperative Educational Lab. Albuquerque, NM, June, 1968.

8. Harris, Chauncy and Edward Ullman. "The Nature of Cities," Annals of the American Academy of Political and Social Science, Nov. 1945, pp. 7-17.

9. Havighurst, Robert J. "Education among American Indians: Individual and Cultural Aspects." Annals of the American Academy of Political and Social Science, CCCXI: 105-115, May, 1957.

10. Havighurst, Robert J. ; Minna K. Gunther and Inee Ellis Pratt, "Environment and the Draw-A-Man Test: The Performance of the Indian Children." Journal of Abnormals and Social Psychology, 41: 50-63, 1946.

11. Levensky, Kay, "The Performance of American Indian Children on the Draw-A-Man Test." National Study of American Indian Education, Series III, No. 2, Final Report, March, 1970, ERIC.

12. Maginnis, G.A. "Fry's Readability Graph: Extended Through Preprimer Level," The Reading Teacher, March, 1969.

13. Peterson, Shailer A., How Well are Indian Children Educated? U.S. Department of the Interior, U.S. Indian Service, Washington, D.C., 1948.

14. Quinault Tribal Community Action Agency. Overall Economic Development Program, 1971. Unpublished Report, Taholah, Washington, May, 1971.

15. Shears, Brian T. "Aptitude, Content, and Method of Teaching Word Recognition With Young American Indian Children." Unpublished Dissertation, University of Minnesota, 1970.

16. Snider, James G. and Arthur Coladarci, "Intelligence Test Performance of Acculturated Indian Children," California Journal of Educational Research, Vol. XI, No. 1, pp. 34-36 and 37, January 1960.