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AN EXPERIMENTAL STUDY OF THE EFFECT OF
FIELD TRIPS UPON THE DEVELOPMENT OF
SCIENTIFIC ATTITUDES IN A NINTH
GRADE GENERAL SCIENCE CLASS

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SUMMARY

The term "field trip" as here used, means a carefully planned and evaluated excursion outside the school building which is still an integral part of the instructional program, and in which each student takes an active part.

This study differs from the usual field trip in that —

1. Its purpose was the acquisition of new knowledge by the use of the scientific method.
2. The study was designed with a twofold purpose:
 - a. To give students experience in planning their own trip, and in so doing gaining a functional understanding of the scientific method.
 - b. To give students a genuine addition to their knowledge of their natural surroundings, by evaluating the results of the common practice of frequent burning over.
3. The study was a demonstration of a method of teaching for the acquirement of scientific attitudes.

This study was undertaken in the spring of 1949 with two sections of 34 students each of a 9th grade General Science class of Stillwater Junior High School, in connection with a study of a unit on conservation.

The problem was, to determine whether there is a significant difference in development of scientific attitudes between a class section which experienced field trips, and one which had no field trips but experienced comparable class room procedures under the same teacher.

Design of Experiment

Selection of the Control and Experimental groups was made at random.

Otis Mental Achievement Tests, previously administered, were used as a basis for the I.Q. scores, which were used as one of the matching units in the correlations.

The Scientific Attitudes Tests of Caldwell and Curtis plus teacher made tests were used, one half of the test was administered as an initial test, one half as the final test, in order to avoid the danger of recall.

Members of both Experimental and Control groups were given the first one-half of the test as an initial test; the Experimental group was given the final test after experiencing the field trips, the Control group was given the final test prior to their field trips but after their class-room study.

Organization of Field Trips

The class discussed the proposed trips, and developed their own plan and group organization as follows:

1. The study was to consist in observation and comparison of first-hand evidence of the effects of annual burning over of a nearby area as compared with one which had not been burned over for 25 years.
2. Areas were chosen which were similar in all respects except for the factor of burning.
3. Detailed study of soil, plant, and animal life was planned.
4. Group organization—Each class section of 34 divided itself into five small groups under elected leaders who were to be responsible for the oversight of the entire trip. The teacher's function was purely advisory.
5. Careful planning by students under teacher guidance, made possible two adequate trips of 55 minutes each for each class section. This included a short bus ride to each area.
6. At each area, each group marked off a 4 ft. square sample plot, studied it in detail, and collected samples of all soil, plant, and animal life found there. These samples were taken back to the laboratory, for further study. Field notes on the numbers of each species in the plot, as well as the animal and bird life of the area, were also taken.
7. The collected material was subsequently studied in the class room, the results analyzed, conclusions drawn, compared, and written up.
8. An analysis of student procedure corresponds to Keeslar's list of "Elements of the Scientific Method."

Statistical Analysis of Results of the Experiment

1. The initial scores and final scores in the Scientific Attitudes tests, and the I.Q. scores from the Otis Mental Achievement tests were used as a basis for the Statistical analysis.
2. Pairs from the Experimental and Control groups were matched on the basis of Initial Scientific Attitudes test scores.
3. Final groups of matched pairs of the Experimental and Control groups were checked against the t-model, where a significant difference was found between the two groups.
4. Correlations showed no significant difference in the I.Q. scores of the Experimental and the Control groups, and no sex difference in the Control group.

5. Therefore the results of the experimental study showed a significant difference between the Control and Experimental groups on the final scientific attitudes tests.

Outcomes

The class found a great difference in the soil content, water-holding capacity, plant, and animal life between the areas which were habitually burned and those which were known to have not been burned over for at least 25 years.

On the five unburned four-foot-square plots was found an average of 26 specimens of plant life, and 9 of animal life in each plot.

On the five burned over four foot square plots were found an average of 9 specimens of plant life and 3 of animal. The types in the two areas were also found to be quite different. On the unburned area were specimens of native wild flowers and other woodland types. On the burned over areas, were found hardy weeds and grass — chiefly quack-grass.

Equally startling differences in top soil texture, content, and water-holding capacity were observed in the two areas.

Individual discovery and observation of these results by those students taking the field trips apparently resulted in an increased development of scientific attitudes as measured by the results shown in the scientific attitudes tests administered in this study, since a significant difference was found between the final scores of the Control and Experimental groups.

This significant difference together with the first-hand information obtained from field trips conducted in such a manner as to be a functional application of the scientific method, seem to indicate that the extra effort involved in planning and carrying out such field trips is well worth while.

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AN HISTORICAL VS. CONTEMPORARY PROBLEM- SOLVING USE OF THE LABORATORY PERIOD IN COLLEGE PHYSICAL SCIENCE FOR GENERAL EDUCATION

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The original paper was read as a preliminary rather than as a final report upon a study for which data had just been collected.

General Purpose and Character of This Study

Problem-solving involves learning and experience. It also involves challenges and reveals intelligence. With the lives of all of