A Comparative Study of the Effectiveness of Two Methods of Teaching Science in Grade Five *

by

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It was the purpose of this study to find out which of the two methods — the Traditional Method or the Process Approach — is more effective in teaching grade five science as revealed by the academic achievement of pupils. At the start of the experiment the null hypothesis was adopted which stated that the Traditional Method was as effective as the Process Approach in teaching grade five science.

The experiment was conducted in Pavia Pilot Elementary School, District of Pavia, Division of Iloilo, and the subjects used were two groups of grade-five pupils matched on the basis of sex, age, mental ability and science background. There were one hundred ten pupils divided into the two groups of fifty-five pupils each. There were fifty-seven boys and fifty-three girls distributed into four sections. Two sections were composed of twenty-seven pupils each and another two sections, of twenty-eight pupils each.

The exact age of each pupil was expressed in months in order to make their ages easily comparable.

The raw scores in the Mental Ability Test and the Grade Four Achievement Test were transmuted into derived scores. The obtained derived scores in these two tests were added together to get the composite score. Composite scores were

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used for matching the two groups as to science background and mental ability.

To test the equatedness of the two groups in the four factors mentioned, the mean and the standard deviation of each group, in age and in composite score, were computed. The mean differences between the two groups, in age and in composite score, were tested for significance with the use of the critical ratio and were found not significant at the .05 level. The difference between the standard deviations of the two groups from each mean was also tested for significance to determine the variability or the homogeneity of the two groups. It was found out that the difference between any two standard deviations was not significant, their critical ratios being less than 1.96. On the basis of these criteria, Group One and Group Two were presumed to be matched and equated.

The Process Approach was used with Group One and the Traditional Method was used with Group Two. The experiment covered two units of study. The daily subject matter was the same for both groups. The subject matter was taken from **Elementary Science 5, A Curriculum Guide for Teacher's Use,** issued by the Bureau of Public Schools.

Both groups of two sections each were taught by the same teacher (the experimenter herself). Provisions were made to make the classroom atmosphere in all classes similar. The experimental sections of group one were called "Camia" and "Sampaguita." Their respective periods for Science were in the first periods in the morning and afternoon sessions. The sections "Rosal" and "Azucena" composed the control group, or group two. Their science periods follow after those of the experimental groups. Both groups used the same textbook and references when a need was felt for reading materials.

The investigator gave the names of fragrant white flowers to the four matched sections because these were heterogeneous groupings. They were all on equal footing in that no section was higher or "better" than the others. This treatment follows the trend of the "continuous progression scheme" of the Bureau of Public Schools.

During the actual experimental teaching, three tests were given to both groups. Two of these were unit tests given after each unit was finished and the third was the final achievement test. All these three tests were composed of 100 items each. These tests were analyzed for validity and reliability and refined by the investigator herself in her capacity as district science coordinator, with the help of Mr. Martin Jones, Peace Corps Volunteer on

Science and Mathematics. To help in the evaluation the investigator further sought the opinion of grade-five science teachers in the District of Pavia, the guidance counselor, the principal, the District Supervisor, and the Division Science Supervisor.

All of these persons were of the opinion that the test covered the important items of the new science guide for grade five and were appropriate for grade five.

To test the reliability of the final achievement test, the internal consistency was computed. The data of this test was subjected to statistical treatment and the reliability coefficient of .93 was obtained. This is considered relatively high consistency, and the final achievement test was presumed to be reliable for the purpose of the experiment.

The test results from the two unit tests and the final achievement test showed that Group One taught under the Process Approach consistently got significantly higher means than Group Two under the Traditional Method. The critical ratios for all three tests being 3.63, 5.06, and 3.95. A critical ratio of only 1.96 was needed to show that the difference between the means is significant at the .05 level.

The difference between the standard deviations of the two groups whether in the pre-testing or in the final achievement test was not significant at the .05 level. It shows therefore that Group One and Group Two had almost the same variability after the experimental teaching. The method of teaching did not seem to show any effect on the variability of the two groups.

A sub-study was made to compare achievement between the two equated sub-groups of superior pupils.

From the results of this sub-study of superior pupils, Sub-group One-A which was taught under the Process Approach, had a significantly higher achievement than Sub-group Two-A taught under the Traditional method.

Another sub-study was made to compare the achievement between the remaining half of the cases which were called lower pupils in this experiment. These two were also matched initially.

From the results of this sub-study, it was found out that Sub-group One-B had a significantly higher achievement in the final achievement test than Sub-group Two-B. The lower pupils taught under the Process Approach had a much higher achievement, therefore, than the lower pupils taught under the Traditional Method.

CONSCLUSION

The results of the experiment, as revealed by the final achievement test results, showed that the differ-

ence between the mean achievement of the two groups was significant at the .05 level. The null hypothesis was therefore rejected and method one or process approach was considered a better method in teaching grade five science as far as the pupils in the Pavia District were concerned. The Process Approach seems equally effective with "low" pupils as with "superior" pupils.

RECOMMENDATIONS

On the basis of these findings, the following recommendations are given:

1. The Process Approach be the method used in teaching science throughout the Elementary grades one to six, all over the country.
2. Teacher-training institutions include the teaching of the Process Approach as a part of the required courses in the methods of teaching.
3. All elementary-grade teacher in the field now be trained in the Process Approach of teaching science through in-service training program or summer and Saturday classes.
4. Similar studies be conducted with bigger intermediate groups, and also at the primary levels, grades one to four.