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EFFECT OF GROUP SIZE ON ACHIEVEMENT IN AGRICULTURAL MECHANICS EDUCATION

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Scientific advancements in recent years have brought about a technological explosion in the areas of Agricultural Mechanics. No longer is agricultural mechanization referred to as the farm shop since it encompasses far wider ranges of skill development than those involving the use of tools.

Population pressures in the United States have caused the number of individuals entering college to increase in the past decade. The number of students seeking an education in agriculture has risen concurrently, and the need for qualified persons in agricultural occupations has also risen sharply. These conditions have created pressures upon the educational institutions to prepare a greater number of individuals with more diverse skills for an increasing array of occupations.

Appropriations for additional staff, facilities, and other instructional aids are restricted, and equipment available for instruction in Agricultural Mechanics is limited in many instances. These conditions make it necessary for Agricultural Mechanics classes to be divided into smaller groups for effective participation by the learners.

A recent study conducted by the authors investigated the effect of group size upon achievement in Agricultural Mechanics subject matter in an effort to provide some of the answers to the problems facing today's educators. The group size studied was pairs and fours, and the students were classified into two levels of mechanical comprehension, high and low. The unit of instruction was Principles of Electrical Wiring taken from an electricity on the farm course, and was taught at two leading agricultural education institutions, the University of Missouri-Columbia, and the Wisconsin State University-Platteville.

The research was directed at determining if differences existed in cognitive achievement and motor skill development of students of two levels of mechanical comprehension working in groups of two and in groups of four members.

The study was conducted with 32 students at the two institutions who enrolled for and completed courses in farmstead electrification during the fall semester, 1970. The unit, developed by the investigators included ten, 50 minute class periods and five, 100 minute laboratory periods of instruction at each institution.

Results of the study indicated that performance on the cognitive achievement tests apparently was not affected by the size of the group in which the student participated in the laboratory. Also, the size of group in which the student worked did not affect his motor skill development in this experiment.

The differences in cognitive test scores of the students of different levels of mechanical comprehension approached significance at the p. 10 level of probability which was considered inadequate for rejection in the experiment. Examination of the means however indicated that students in higher levels of mechanical comprehension tended to score higher on cognitive achievement tests. The correlation coefficient computed on these test variables was significantly different from zero at the p. 10 level of probability. The development of motor skills however was apparently not affected by the student's level of mechanical comprehension.

Students enrolled at the University of Missouri-Columbia scored higher on both pretest and posttest measures of cognitive achievement than did students taking the course at the Wisconsin State University-Platteville. However, examination of the motor skill test means indicated that students at Wisconsin State University-Platteville were considerably faster in accurately completing the test exercise than the students at the University of Missouri-Columbia.

This cognitive difference could possibly be explained by the significant difference in the scores of students of two levels of mechanical comprehension at the two institutions. Students at the Wisconsin State University-Platteville who scored low on the mechanical comprehension test also scored significantly lower on the cognitive achievement tests regardless of the size of group in which they worked. There was no interaction between the student's level of mechanical comprehension and the school of attendance to affect his response on the motor skill test.

The student's level of mechanical comprehension and the size of the group in which he performed did not interact to influence his ability to achieve on the cognitive level of learning. This interaction as measured by the motor skill tests, however, approached significance at the p. 10 level of probability. It was suggested that students with low mechanical comprehension could achieve in groups of two members.

The findings of this study suggest that students in college level Agricultural Mechanics courses can be divided into groups consisting of as many as four members without decreasing the effectiveness of laboratory learning when available equipment is limited. Group formation in these laboratory classes should consist

of random assignment of students of varying levels of mechanical comprehension to effect a heterogeneous unit as students possessing low levels of mechanical comprehension perform as well as those in the upper levels under these conditions.

Finally, cognitive levels of achievement of students enrolled at various institutions will differ. It must be recognized that these differences exist at the time of enrollment, and at the time of the completion of an instructional unit. The amount of academic gain is approximately parallel. Motor skill development in Agricultural Mechanics subject matter will also vary at different schools regardless of whether the students work in groups of two or groups of four members. Therefore, greater emphasis should be given to testing motor skill development in these classes.

Further research should be conducted to evaluate the effects of mechanical comprehension level and group sizes greater than four members upon the student's motor skill development. Additional investigations shall also be conducted in other Agricultural Mechanics courses at other insitutions to test the effects of group size and level of mechanical comprehension upon learning.

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