

## SCIENCE EDUCATION

Chairman: KENNETH UHLHORN, Science Teaching Center  
Indiana State University, Terre Haute, Indiana 47809

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47306, was elected Chairman for 1972

**Uses of a Student Responder System.** LLOYD L. BODIE, JR., Planetarium Director, Vigo County School Corporation, Terre Haute, Indiana.—Traditionally, educational procedures have required that the instructor have a limited maximum number of students within the classroom. The Student Response System (SRS) has made it possible to bring some of the most important features of the small teaching classes to large group instruction. This paper described the use of SRS by a class of 65 junior and senior students from high schools in Vigo County School Corporation, enrolled in Astronomy, at the Allen Memorial Planetarium. All students had a science and mathematical background. Topics discussed included the strengths and weaknesses of this system as used in our program; the description of the Responder System—the instructor's console, the student units, and the central electronics unit printer; the student's operation of the responder system; the value to the student; and some typical questions asked.

**An Audio-tutorial, Independent Study Program for the Elementary Teacher.** CONRAD CARLYLE HINDS, Department of Education, Ball State University, Muncie, Indiana 47306.—The purpose of this study was to develop and test an audio-tutorial, independent study program on simple machines to meet the individual needs of elementary in-service teachers.

The research was designed to determine how well in-service teachers could learn the specific content involved using this particular approach. Advantage was taken of the teaching skills and methods which teachers employ in their own classes. Pre- and post-tests of the Smith Mechanic Test were administered.

Two samples were drawn from the population of elementary teachers in the Science 590 extension and summer classes at Ball State University. There was a control group of 29 elementary teachers and an experimental group of 48 elementary teachers. The experimental group used the audio-tutorial program. The control group received classroom instruction over the specific content involved.

The difference in means between groups was examined for significance using a two-tailed t-test. No significant difference was found on the pre-test. A significant difference beyond the 0.01 level was found on the post-test ( $t = 2.87$ , 75 d.f.). Each group was considered separately for significance in the mean gain. The control group showed significance at the 0.05 level ( $t = 2.05$ , 28 d.f.). The experimental group showed significance beyond the 0.001 level ( $t = 13.54$ , 47 d.f.).

It was concluded that the audio-tutorial program afforded a much better mode for practice over the specific content involved than did classroom instruction. It was recommended that the program be used in conjunction with elementary pupils to measure any increase in teacher competency more accurately; that the program be used in a teaching situation other than the extension class to measure retention; that the program be used as one mode of presentation in the Science 590 classes; and that administrators institute this program into schools as part of continuing in-service training.

**Training Supervising Teachers to Evaluate and Counsel Pre-Service Teachers on the Basis of Teaching Techniques Derived From Methods Courses.** STANLEY S. SHIMER, LINDA B. KNIGHT, and HAROLD H. JAUS, Science Teaching Center, Indiana University, Bloomington, 47401.—The Indiana University, Bloomington Campus, Triple "T" Program is a professional year internship for pre-service elementary teachers which combines student teaching with basic methods courses. This program assumes that the techniques taught in methods classes are implemented in the classroom. However, it was found that the terminology used in the methods class, indeed, even the teaching techniques covered in the course were unfamiliar to many of the classroom supervising teachers. Thus, there was very little reinforcement of the method topics used by student teachers in the classroom. A package of instructions was developed for the supervising teachers to acquaint them with the topics dealt with in the methods courses and to aid them in reaching competency in evaluating a student teacher's use of these techniques. This enabled supervising teachers to evaluate and counsel the student teachers. It also provided the student teachers with much needed reinforcement and feedback on the use of teaching techniques.

The package consisted of 9 hours of performance-based-instruction on techniques selected from the Science Methods Curriculum, *e.g.*, performance objectives, question asking skills, formative evaluation, teacher responses, systematic instruction and sequencing. Formative Post Tests were designed for each unit and summative evaluation was administered at the end of the 9 weeks. Data indicated that supervising teachers are more able to accurately evaluate and counsel pre-service teachers after receiving this package of instruction.

**An Environmental Science Conservation Course.** H. DOUGLAS SHOCK, Cowan High School, RR 4, Muncie, Indiana 47304.—An environmental science conservation course for the high school level was developed to give students a basic understanding of their environment, of the environmental problems which are facing each of them and to help each student discover his role in making the environment a place worth living. The writer taught the course for 2 years before formalizing it by writing a creative project for the degree of Master of Science at Ball State University. To accomplish this, the following study units were planned: Life Designs, Conservation in Perspective, Ecology, Populations, Soil Resources, Minerals and Energy, Water Resources, Air

Resources, Plant Resources, Animal Resources, Resource Relationships, Recreation, Community Planning, and Careers.

The course was designed to use a wide variety of learning experiences rather than from a single source, such as a textbook. Books, pamphlets, library materials, films, resource people, and field experiences relative to the course of study were planned to enhance the student's awareness of his environment. Group work was encouraged throughout the course to help build a willingness for cooperation.

#### NOTE

**Reading Habits of Prospective Secondary Earth Science and Geography Teachers.** WILLIAM D. BROOKS, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.—At Indiana State University, within the Department of Geography and Geology and in cooperation with the Division of Teaching, all geography and earth science teaching majors are required to take a 2-credit hour course entitled "The Teaching of Geography in the Secondary Schools" (G393). A methods course, G393 meets 4 days each week for 8 consecutive weeks. This 8-weeks period represents the first half of the professional semester while the second half is spent in a student teaching experience under local school and university supervision.

Juniors and seniors prior to the student teaching experience and prior to attaining professional status should be in the process of organizing in-depth knowledge not only in a chosen content area but also in educational theory and practice. It seems obvious that an upper semester junior or senior enrolled in a program leading to professional status should have developed or be in the process of developing a sophisticated reading habit.

The purpose of this study was to examine the reading habits of prospective secondary teachers of geography or earth science.

To test empirically student reading habits, all students enrolled in G393 for six consecutive semesters were asked to submit a one page report each week on anything they had read that could in any way be related to the teaching of geography or earth science. No other directions were given nor were restrictions imposed. Each time the course was given a number of class periods were spent examining and discussing a variety of sources that could be used to acquire knowledge in earth science, geography and education.

First, a total of 258 reports were submitted which represented 113 different sources. Twenty-six of the 113 sources were considered professional-educational journals. Thirty-eight books were critiqued, thus 64 of the 113 sources can be considered excellent sources for acquisition of knowledge.

Second, of the 258 reports 188 were from important journals. Add 39 book reports (one book reported twice) for a total of 157 reports gathered from first-rate information.

Third, 88 reports were gathered from newspapers, layman journals (*Newsweek*, *Time*, etc.) and government agencies. The rest of the reports, 13 in number, were placed in that "catchall" category other.

#### OTHER PAPERS READ

"ISCS" or Implementing Science in a Confusing Situation. JACK BREWER, M.S.D. of Perry Township.

Our Model for I.S.C.S. Based on Five Years Experience. CHARLES E. RICHARDSON, M.S.D. of Lawrence Township.