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Student Attitudes Toward Personalized Instruction at Mankato State College

EARL L. LAMONT *

ABSTRACT — A preliminary study was conducted on the Individual Personalized Instruction botany laboratory initiated at Mankato State College spring quarter of 1969. Three quarters of the IPI were compared with three quarters of traditional botany laboratory classes that were attended by students prior to the inception of the IPI laboratory. The IPI students achieved as well as or better than the traditional botany laboratory students, according to their lecture test scores and final course grade. Student attitude was positive toward the IPI, which was indicated by responses to a questionnaire.

The Individual Personalized Instruction laboratory for Biology 1014, a general botany course, was implemented Spring quarter of 1969 at Mankato State College. An objective evaluation was undertaken to compare student achievement and attitude in the self-instructional laboratory with student achievement and attitude in a traditional laboratory.

The Individual Personalized Instruction (IPI) teaching method was used only for the laboratory segment of the botany course. Lecture sessions were fundamentally the same for both the IPI and the traditional laboratory classes. Instruction for the individual student was personalized in that he could work by himself at his own pace and also was afforded the personal attention of the botany instructor when needed. The IPI student could spend as little or as much time in the laboratory as he wanted and could come whenever it was convenient. There was no set weekly meeting time for the laboratory portion of Biology 1014 other than the open hours of the Learning Resource Center.

Student Procedure

IPI students come to the Learning Resource Center which houses the IPI facility whenever they choose and sign in on individual index card at the main desk, and also request the appropriate materials from the secretary. These materials include a cassette audio tape recorder, tapes for a specific lesson, and a key to open the carrel door for the desired laboratory lesson. The student exchanges his student identification card for the required materials and carrel key.

Doors of the carrels, shown in Figure 1 are marked with numbers to identify the exercises for which they are set up. A carrel containing materials pertaining to a specific exercise is shown in Figure 2. The student checks the inventory list to make sure everything needed for the

lesson is there. Then he can proceed with the assigned lesson in sequential order as prescribed by the audio instruction obtained from the tape.

Preliminary study

This preliminary evaluative study of the IPI laboratory teaching method was not conducted in a completely scientific manner in that no control group was designed to parallel the experimental group. Students registering for Biology 1014 automatically received the IPI laboratory and no traditional laboratory was offered at that time. Comparisons were made on the basis of class records and attitudes of the students.

The primary objectives of this study were to see whether the IPI laboratory approach met the educational needs of the students better than the traditional laboratory approach and to ascertain the attitudes of the students toward each teaching method. Most students had experienced traditional lab work in other courses prior to attending the IPI laboratory.

Records of examination scores from the traditional laboratories for Spring and Fall quarters of 1968 and for Winter quarter of 1969 were used for comparison with the IPI records for Spring quarter, First Summer Session, and Fall quarter of 1969. One lecture class with several IPI sections of Biology 1014 was offered each quarter and all were taught by the same instructor, Dr. Verona Burton.

Lecture tests that included identical items were administered all quarters. The same laboratory materials were covered during the six quarters; however, oral quizzes were given in the IPI whereas objective quizzes were used to evaluate student comprehension under the traditional method. Therefore, lecture test scores were used as a basis for statistical comparison of achievement in the two different types of laboratory teaching methods. Final course grades also were compared.

Review of literature

Current literature indicates that the IPI or Auto-Tutorial technique is becoming increasingly popular in

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Study carrels used for individual, personalized instruction

a wide range of disciplines. The long established knowledge of individual differences and the methods whereby these qualities in people can be utilized to a greater degree to provide for a more vital and relevant educational experience for the vast range of students is being explored once again with positive results. Results are positive from the point of view of student achievement and attitude toward teaching methods in specific academic courses.

In 1961, realizing a need for additional instruction for his slower freshman biology students, Dr. S. N. Postlethwait devised supplemental lecture audio tapes that could be used in conjunction with the biology textbooks and laboratory manuals by the students enrolled in the general biology course at Purdue University. This technique was so successful that he innovated a program for all the biology students, whether slow or fast, and called it the Audio-Tutorial teaching method. Through the use of audio tapes, recorders, and a study guide for student self-instruction, the professor was freed to tutor and guide the students while each studied and learned at his individual pace. Because of the significant increase in student motivation and achievement, the audio tutorial approach to teaching has been accepted and adapted to fit the needs of other disciplines at Purdue as well as at other institutions.

The Colorado State College Laboratory School in Greeley, Colorado, set up an individual program of instruction in biological science during the 1966-67 school year. Individual instruction also was used for students enrolled in the Principles of Biology course at the State University College in Brockport, N.Y. Students learned biology in an Audio-Video-Tutorial Program which was established in 1967-1968.

The Audio-Visual-Tutorial approach to teaching geography was utilized at Carroll College, Waukesha, Wisconsin, and at Western Michigan University. Preliminary results at both institutions were positive for individualized instruction. Teacher education has also benefited from individualized instruction at the University of Tennessee as well as at the University of Minnesota High School.

At a recent Audio-Tutorial Systems Conference of institutions employing the approach sponsored by Dr. Postlethwait and the Purdue Biology department, papers were presented detailing the utilization and implementation of the programs at each of the attending schools. Papers came from twenty-three universities, nine colleges, nine Junior colleges, six high schools, three elementary schools, one Hospital School of Nursing, and one commercial airline. The papers included projects pertaining to nineteen major disciplines which included twenty-seven specific courses, seven of them in biology.

The presentations were positive toward the audio-tutorial technique and the findings were similar to results obtained in this study covering the areas of student achievement and attitude toward academic course work offered on this plan. The general consensus was that the students enrolled in audio-tutorial courses had a positive attitude favoring it over the traditional lab approach. Audio-tutorial work seemed to help the student achieve a higher level of competence within the area of study and at an accelerated rate. Only a few reports suggested no difference in academic achievement. There were no reports that the audio-tutorial method lowered achievement.

Described by many names, Audio-Tutorial, Audio-Visual-Tutorial, Auto-Tutorial, Individualized Personalized Instruction, or Individually Prescribed Instruction, this approach to teaching is being used across the nation in many disciplines, but is still so new that concrete statistical analyses of its effectiveness are still being compiled. However, enough data has been assembled to show a strong trend toward increased student achievement and positive attitude by the participants.

When the innovative IPI lab course in Biology 1014 was initiated at Mankato State, Dr. Burton was interested in the feasibility and comparative adequacy of various methods of teaching a botany laboratory class.

Student evaluation in the previous traditional classes included written objective laboratory quizzes, two objec-

tive lecture tests, and an objective final examination. Laboratory quizzes, given weekly, provided attendance records. In the IPI laboratory classes, student evaluation included the same written objective tests and final examination. Students maintained records of time spent in the carrels. However, oral laboratory quizzes replaced the written objective laboratory quizzes of the traditional setup.

The same textbooks were used and the basic laboratory materials were the same in both cases, including a variety of living plants, prepared plant material, and microscope slides. Incorporated in the IPI laboratories were 35mm 2x2 slides of pertinent related material shown only in lecture to the traditional sections.

The three lecture test scores were compared to see if IPI students showed change in performance on the tests. A limited statistical evaluation of test scores for all six classes was made.

A questionnaire was formulated and administered to the students by the author at the end of Spring quarter, First Summer Session, and Fall quarter of 1969 prior to the final lecture examination. Positive, neutral, and negative questions were asked to check student attitudes toward their IPI experience.

Student names and student numbers were taken from the class rosters and were used to obtain other performance information from the registrar's office. The Grade Point Average, year, classification, sex, age, major subject, and the number of classes being taken were tabulated and the information was used to make a comparison of the types of students enrolled in each of the six terms.

Results from mixed group

Students enrolled in the botany classes were a heterogeneous group and consisted of a cross-section of all major subject areas and were a mixed group of freshmen, sophomores, juniors, and seniors. Their ages ranged from seventeen to forty-six. Individual grade point averages for the IPI students ranged from 1.14 to 4.0 and for the traditional students from 1.14 to 3.93. It was found, however, that the average grade point for the three groups of IPI students were somewhat higher than the three other groups. The three IPI groups had an overall average of 2.46; the traditional groups had an overall average of 2.31. This may reflect somewhat in the higher

achievement shown by the IPI students, but was not specifically studied.

Table I shows the total number of IPI students for each quarter and the total number in the traditional course each quarter receiving each letter grade and the grade distribution percentages for each quarter.

Arithmetic means, computed by the author, indicated achievement in the lecture tests was somewhat higher in the IPI groups than in the traditional groups. Computations were made for four of the six quarters, but the traditional Spring quarter of 1968 and the IPI Spring quarter of 1969 were more alike in respect to the total number of students enrolled, the types and number of questions asked on the lecture tests, and the time of year and length of the quarter. Students were similar in college year classification for these two quarters. Enrollment was 68 students during Spring quarter of 1968, and 69 students during the 1969 Spring quarter for the botany course.

The statistical computations were based upon results from two lecture tests and one final examination for a total of 180 points. The computation of the arithmetic mean indicated that the mean score for the IPI class was higher than that of the other sections. For the IPI the mean score was 131.96, compared with 119.46.

The standard deviation (sigma) for the two quarters analyzed showed a better score for the IPI group. The IPI sigma score was 28.0, the traditional group sigma score was 23.60. This indicates that the IPI students ranged farther and varied more from the mean and, therefore, were more heterogeneous than the other group. Computation for the quartile information also indicated a wider range for the IPI sections.

There appeared to be a correlation between the time students spent in the IPI laboratory and their achievement, as indicated by final course grades. On the average the "A" student spent more time in the IPI laboratory than the "B" student, the "C" student less time than the "B" student but more than the "D" student. For example, the average time spent in the IPI laboratory for the "A" students Spring quarter of 1969 was 1,294 minutes and the average time the "E" students spent was 420 minutes. Theoretically, each student in the traditional lab course would have spent thirty periods or 1,500 minutes in lab

TABLE 1. Percentage comparison of student grades earned during six quarters.

Grades and Percentage*	QUARTER AND YEAR					
	Spring 1968	Fall 1968	Winter 1969	Spring 1969	1st SS 1969	Fall 1969
	68	33	84	69	21	50
A.....	8	5	19	33	8	15
%.....	12	15	23	48	38	30
B.....	13	5	15	15	10	12
%.....	19	15	18	22	48	24
C.....	31	15	30	14	3	13
%.....	46	46	36	20	14	26
D.....	10	8	11	4	0	6
%.....	15	24	13	6	0	12
E.....	6	0	9	3	0	4
%.....	9	0	11	4	0	8

* Percentages are rounded to the nearest whole number.

during each ten-week quarter. However, holidays, shorter quarters, and the laboratory final exam could reduce the actual time to a minimum of 1,200 minutes under the traditional system.

Questionnaire Results

The questionnaire asked students to compare the traditional lab with the IPI, as most had experienced one or more traditional laboratories.

The questionnaire on attitude was administered to the IPI students on the last day of the lecture class session in each of the three quarters and without advance notice. Because of absences, not all students enrolled in the botany classes answered the questionnaire. However, 75 per cent of the 69 students enrolled Spring quarter, 99 per cent of the 21 students enrolled First Summer Session, and 78 per cent of the 51 students enrolled Fall quarter answered the questionnaire.

Student responses to the questionnaire indicated an increase in positive attitudes toward the IPI with each succeeding quarter. This may have been due to the correction of problems which were associated with 69 students sharing seven or fewer tape recorders and three 2x2 slide projectors, the lack of reliability of the initial equipment, the audio tape quality, and the inconsistency of recording-playback reproduction quality during Spring quarter of 1969. These problems have been corrected and improvements have been made with each succeeding quarter and, therefore, may be reflected in the increase in positive attitude toward the IPI laboratory procedure.

In addition to the objective questions, the students were given the opportunity to comment subjectively on three questions. They were asked to make suggestions for improvement of the IPI. The need for more equipment, particularly recorders and projectors, was stated in thirty-three of the responses for Spring quarter of 1969. There were fourteen comments about the need for more equipment and better quality of tapes by students enrolled during First Summer Session but only one comment about the tape quality for Fall quarter.

Students were given the opportunity to state what they disliked about the IPI. Again the lack of equipment and inconsistency of the sound was cited by many of the students enrolled during Spring quarter; a few of the students enrolled during First Summer Session also made comments about the lack of equipment. However, students in the class Fall quarter did not comment about the lack of equipment nor the quality of the tapes.

When asked what they liked best about the IPI, the majority of students from all three quarters stated that the flexible scheduling possible for laboratory time and the freedom to work independently, taking as much time as they needed was most beneficial. Other comments indicated that students liked the oral quizzes every week, being able to repeat the instructional tapes, the individual help and contact with the instructor, and that they felt the IPI was conducive to learning.

This study showed that students generally felt that the IPI laboratory type of program provided for individual

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A typical table-top study setup

differences in personal background and rate of learning. The flexibility of scheduling laboratory work also helped somewhat in alleviating the deadline pressures of other classes for some students.

The majority of the students enrolled in the IPI stated they liked the freedom of independent study; and, if given a choice, they would choose the Individual Personalized Instruction laboratory over the traditional laboratory. The use of oral quizzes, administered by the IPI instructor, provided immediate feedback and positive reinforcement. It also served as an extension of the one-to-one ratio that helped promote learning by each individual.

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