

A STUDY OF SUBJECT PREFERENCE TOWARD SCIENCE
OF SEVENTH GRADE STUDENTS ENROLLED
IN THE INTERMEDIATE SCIENCE
CURRICULUM STUDY PROGRAM

by

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Chapter 1

INTRODUCTION

CONTEXT OF THE PROBLEM

Various criteria may be used to determine the value and success of a new science curriculum. In addition to the students' learning of new factual knowledge and acquisition of new science process skills, an important desired outcome is a positive attitude toward science.

Lowery (1967) feels that although the development of attitudes is not specifically planned in each newly developed science unit, a feeling that favorable attitudes are being developed is frequently hoped for and expressed. According to Bruner (1960), with the new curriculum programs in science, there seems to be hope that attitudes are wholesomely and favorably developed toward the subject matter, toward the field of science, and toward study and inquiry. Papers by Blance (1952), Baumel and Berger (1967), and Perrodin (1966) also support the importance of positive attitude development in science education.

A new junior high science program, Intermediate Science Curriculum Study (ISCS), had its beginning at Florida State University in the early 1960's with continued financial support provided by the U.S. Office of Education and the National Science Foundation. (Lovell, 1969) ISCS has rapidly become a very widely adopted science program in junior high schools across the country. In a search of the

literature, however, no study was found which has been conducted to determine how successful ISCS is in developing positive student attitudes toward the subject of science.

SIGNIFICANCE OF THE STUDY

With the increasing popularity of the ISCS program in many junior high schools, it seems appropriate that persons interested in this area of science education take a close look at the effect this program has upon the central participants of the program--the students. It is hoped that this study can begin to answer some questions as to how successful the ISCS program is in developing a positive change in students' attitudes toward the subject of science as indicated by their subject preference scores. Additional questions to which this study seeks answers are: what effect does the training of the teacher and sex of the student have upon his or her preference for the subject of science.

STATEMENT OF THE PROBLEM

One indication of student attitudes toward a subject is their preference for that subject as compared to other subjects. The purpose of this study was to examine seventh grade students' science preferences as related to sex and teacher training. Three specific questions in this study are: (1) What were the differences between male and female students in subject preference toward science during their enrollment in ISCS? (2) What were the differences between workshop-teacher-students and non-workshop-teacher-students in subject preference toward science during their enrollment in ISCS? (3) What were the patterns

of change in subject preference for science during the year the students were enrolled in ISCS?

STATEMENT OF HYPOTHESES

- H_1 : There is no significant difference between male and female students in subject preference toward science during a one year enrollment in ISCS.
- H_2 : There is no significant difference between workshop-teacher-students and non-workshop-teacher-students in subject preference toward science during a one year enrollment in ISCS.
- H_3 : There is no significant change in subject preference toward science of students during a one year enrollment in ISCS.

DEFINITION OF TERMS

Attitude toward science - This was used to describe the emotionalized feeling for or against the subject of science.

Enrollment in ISCS - This consisted of students taking science for one period a day for the entire school year in which the reading, discussions, laboratory work, and testing are based on the Intermediate Science Curriculum Study texts and materials.

Non-workshop-teacher-students - These were students whose science teacher did not have special training on methods of teaching ISCS.

Subject Preference Toward Science - This was determined by the number of times science was checked as the subject liked best by the student when given the Prouse Subject Preference Survey. (1964) This survey presented six school subjects listed in pairs. Each subject was listed five times, but in each case it was combined with a different subject. The student indicated his preference between the pair of subjects. The more times that science was checked as the subject liked best in the pairs the more positive subject preference toward science was indicated.

Workshop teacher-students - These were students whose science teacher had special training on methods of teaching ISCS at a ten day workshop sponsored through Continuing Education at Kansas State University and taught by Dr. Robert James.

Chapter 2

REVIEW OF THE LITERATURE

A survey of the literature reveals that the word attitude is often used with different meanings. Only studies dealing with "attitude" as defined in the previous section will be reviewed. For this emotionalized feeling for or against the subject of science is the type of attitude which the subject preference score can help to indicate. Literature has purposely been deleted which deals with attitude as it applies to the term scientific attitude or scientifically minded persons such as those who possess an open-mind, solve problems rationally, or think critically.

Studies have been conducted to determine how students feel about the subject of science at various grade levels with a variety of attitude-measuring instruments.

In the area of elementary science education, Lowery (1966) conducted an investigation into the attitudes of fifth grade students toward science using his own Projective Tests of Attitudes. The investigator's test consisted of three interwoven projective techniques - a word association test, a thematic appreciation test, and a sentence completion test. He attempted to discover whether a new curriculum material (in this case an Animal Coloration unit developed by the Elementary School Science Project at the University of California) was developing in children positive or negative attitudes toward science.

He also investigated the relationships between attitude changes and socio-economic influences, sex differences, gains or losses in knowledge, and IQ differences. Some of his results that appear pertinent to this study are that: (1) At the start of the study girls in all areas held significantly more positive attitudes toward science than boys. (2) The experimental boys' gains were generally greater than the girls. These gains eliminated the initial significant differences between the sexes in the experimental groups by the end of the study.

In Greenblatt's (1967) study of the relative popularity of certain school subjects in third, fourth, and fifth grades, science occupied a middle rank, being less popular than art, reading, and arithmetic, but more popular than writing, language, and health. Certain conclusions were evident when examining subject preferences on the basis of sex. It was found that boys prefer science and girls prefer music.

In two different surveys of high school students' subject preferences, science was ranked differently each time. In Powell's (1962) survey of seniors' attitudes toward ten fields of study, the overall rank of science was in the "favorable attitude" range of sixth place. Girls expressed a dislike for science with a rank of eighth place but boys put science in third place. Yet in a study by Dugan (1972) involving 105 tenth grade biology students, science ranked number one as the subject liked best.

When Gallagher and Korth (1969) examined attitudes of seniors who had had a course in chemistry or physics vs. those seniors who had taken neither course, some of their findings include the following:

(1) Students who took physics and chemistry demonstrated more favorable attitudes toward science. (2) Girls demonstrated more favorable attitudes than boys toward science and science teachers. (3) Boys demonstrated more favorable attitudes than girls on "myself as a scientist".

In two other studies of college students' attitudes toward science, the outcomes were more positive. In each case the students were prospective elementary teachers. In one study, a questionnaire was constructed and students were asked to rank-order the subject areas of English, mathematics, science, and social studies in response to six statements, two of which were: (1) "I enjoyed courses in this field in college." (2) "I learned the most in courses in this field in college." Science was the most popular first choice in response to both of these items. (Kane, 1968) The study by Dutton and Stephens (1963) used the method of Equal Appearing Intervals for the measurement of attitudes toward elementary school science and found that a large number of these university students expressed favorable attitudes toward science.

Snow and Cohen (1968) tested undergraduate and graduate students in the fields of Life Sciences, Physical Sciences, Social Sciences, and the Humanities to determine attitudes toward one's own and other disciplinary areas within a particular academic context. The results were that all subjects acknowledged that the Physical and Life Sciences are at the apex of the hierarchy.

A study which seems pertinent for the purposes of this investigation was done by Wick and Yager (1966). They administered tests in

a prescribed sequence to junior and senior high classes at the Laboratory School of the University of Iowa for a five year period. The test used was the "Scale to Measure Attitude Toward Any School Subject" developed by Silance at Purdue. Two important observations were made which should be taken note of in this literature review in regard to the problems stated in this study. One deals with patterns of change in student attitude toward science. They found that the mean value of the sequenced responses toward each science subject decreased from fall to spring. This was not usually true of the median, possibly indicating there is generally a certain portion of a class who have a fairly severe drop in attitude toward the course during the year. Many teachers witnessed this situation in the classroom--the exuberant beginner who becomes disillusioned by the discovery that the journey to success is a long hard road. Another important conclusion drawn from their data indicated that what is meant to be a measure of students' attitudes toward a course appears to be highly dependent on the teacher in the classroom.

Perrodin's (1966) study of attitudes toward science also has some direct significance for this study. He devised a projective-type instrument consisting of twenty sentence fragments intended to stimulate pupils to express feelings relative to science. It involved fourth, sixth, and eighth grade boys and girls. In general it appears that fourth graders have very favorable attitudes toward science, favorable attitudes reach a peak in the sixth grade, and decline somewhat at the eighth grade level. Children considered science to be an important school subject. Their responses rated science as being more important

than several other school subjects and many fourth and sixth graders said science was more important than play.

An investigation by Babikian (1971) attempted to determine the reactions of eighth grade science students to the effectiveness of expository, laboratory, and discovery methods of teaching science concepts. The students found all three methods equally interesting, but most of them consider the expository method the easiest, the clearest, and the best method for science teaching.

Although much of the literature reviewed expressed the idea of how important teacher attitudes and actions are in influencing the attitude development of the student, little research could be found which specifically compared the effect of institute or workshop trained teachers vs. non-institute or workshop trained teachers on student attitudes.

The importance of the teacher's role in influencing attitudes toward science was indicated by remarks such as "Pupils cannot learn attitudes that their teachers don't have." (Haney, 1964), and "Success in developing scientific attitudes depends ultimately on the teacher." (Baumel and Berger, 1967).

Orr and Young (1963) did give some insight as to how teachers who attend institutes differ from those who don't. They pointed out that teachers who attend institutes are different from non-institute teachers in that they tend to be better trained in science, more engaged in professional activities, less self-oriented, and likely to have a more aggressive personality.

Chapter 3

RESEARCH PROCEDURES

This study was conducted in a rural Kansas town of approximately 10,000 persons. Two hundred thirty-seven seventh grade science students were surveyed during the 1970-71 school year. Even though the study was conducted using intact groups, it was assumed that student assignment to the groups was random. The grouping of students was heterogeneous with students of all ability levels represented. There were one hundred nineteen males and one hundred eighteen females. The students were taught by four teachers with teacher A having one hundred five students, teacher B sixty-two students, teacher C forty-six students, and teacher D twenty-four students. Teachers A and C had previous training in an ISCS workshop. Teachers B and D did not have this training.

The subject preference for science of students in seventh grade enrolled in the ISCS science program was measured using Prouse's Subject Preference Survey (1964). (See Appendix, p.30) This test was administered at five different times during the school year. The initial administration was soon after the first day of class and the fifth administration was during the fourth quarter of the school year. The other three administrations were given at approximately equal intervals in between the first and last. The surveys were administered by the students' science teachers. The survey was to have no effect

upon the students' grades. A sufficient number of the surveys were supplied to the teachers before the school year began. After each administration, the completed surveys were mailed to the researcher.

The score of each student for subject preference for science was determined by the number of times science was checked by the student answering the survey as the subject liked best. A separate score was recorded for each student for each administration. The higher the score was, the more positive subject preference toward science was indicated. Data from students who missed a survey administration was not used. The following data was recorded on the computer card for each student who had complete data provided:

(1) student number, (2) teacher number, (3) section number, (4) sex, (5) grade, (6) ISCS trained or non-trained teacher, (7) scores for subject preference for science on each of the five administrations.

Chapter 4

RESULTS

The design utilized in this study was the Two Way Analysis of Variance with Repeated Measures. The computer program used was ANOVAT, revised at Kansas State University Computer Center.

Null hypothesis 1 was: There are no significant differences between male and female students in subject preference toward science during a one year enrollment in ISCS. Results in Table 1 show that the mean subject preference score for all male subjects on all administrations of the survey was 2.877 while the mean score for females was 2.893. These scores were not significantly different and null hypothesis 1 is retained.

Table 1. Mean Subject Preference Toward Science Scores and Variances for all Male and Female Students on all Survey Administrations

	Males	Females
Mean Preference Score	2.877	2.893
Variance	1.982	2.057

Hypothesis 2 was: There is no significant difference between workshop-teacher-students and non-workshop-teacher-students in subject preference toward science during a one year enrollment in ISCS.

Students of teachers A and C are designated workshop-teacher-students and students of teachers B and D are designated as non-workshop-teacher-students. Table 2 shows the mean subject preference toward science scores for the students of each of the four teachers. The mean scores of students were: teacher A, 3.308; teacher B, 2.749; teacher C, 3.039; teacher D, 2.444. These means were significantly different at $p < .001$. The workshop teachers, A and C had students with the two highest mean scores while the non-workshop teachers, B and D, had students with the two lowest mean scores. Hypothesis 2 is therefore rejected.

Table 2. Mean Subject Preference Toward Science Scores and Variances for all Students of each Teacher

	Students of Workshop Teachers		Students of Non-workshop Teachers	
	A	C	B	D
Mean Preference Score	3.308	3.039	2.749	2.444
Variance	1.938	1.864	1.912	2.133

Hypothesis 3 was: There is no significant change in subject preference toward science of students during a one year enrollment in ISCS.

Table 3 and Figure 1 show the mean score of each of the five repeated measures for all the students. The scores were:

administration 1, 3.400; administration 2, 3.216; administration 3, 2.769; administration 4, 2.660; administration 5, 2.379. These mean scores were significantly different at $p < .001$. Figure 1 indicated, however, that the pattern of change in subject preference was in a negative, not positive, direction so hypothesis 3 is rejected.

Table 3. Mean Subject Preference Toward Science Scores and Variances for all Students on each Survey Administration

Administration	Mean Preference Score	Variance
1	3.400	1.421
2	3.216	1.739
3	2.769	2.058
4	2.660	2.046
5	2.379	2.406

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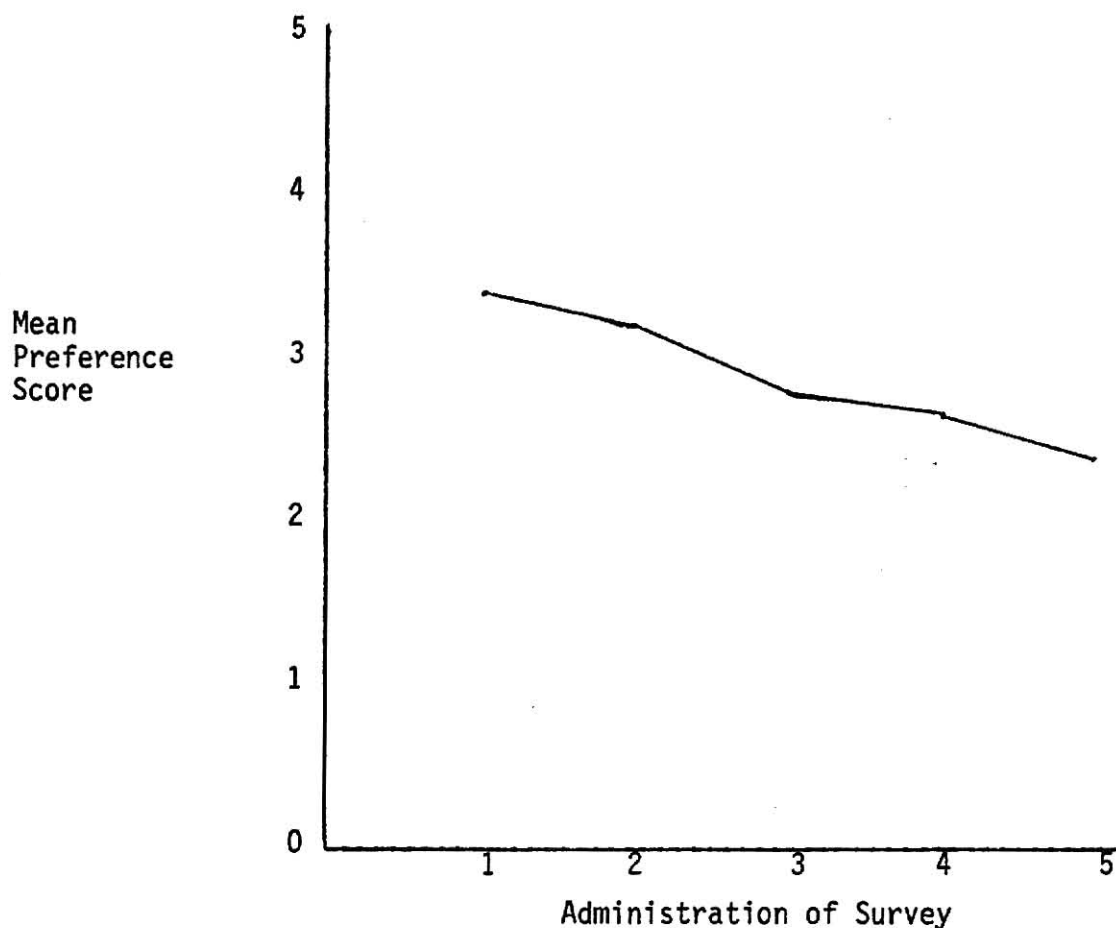


Figure 1. Mean Subject Preference Toward Science Scores for all Students on each Survey Administration

Several interactions were studied for a closer look at the patterns of change in subject preference toward science of the students.

The interaction of sex by teacher is shown in Table 4 and Figure 2. The differences between the mean scores of male and female students of each individual teacher were not significant.

When the interaction of sex by repeated measures (survey administrations) is shown, Table 5 and Figure 3, the differences between the mean scores of male and female students on each administration of the survey again is not significant.

The teacher by repeated measures interaction resulted in a significant difference at $p < .001$ with the given degrees of freedom of 12. (Table 6 and Figure 4)

The results of the complex interaction of sex by teacher by repeated measure are listed in Table 7. No significant difference is indicated in this interaction.

Table 8 shows the statistical results of the mean scores and interactions previously mentioned in this chapter. It can be summarized that no significant differences were evident in the mean scores between the sexes, the interaction of sex by teacher, sex by repeated measures, and sex by teacher by repeated measures. Significant differences did occur at $p < .001$ level when the means of individual teachers, means of each administration of the survey (repeated measures), and interaction of teachers by repeated measures were analyzed.

Table 4. Mean Subject Preference Toward Science Scores and Variances of Male and Female Students of each Teacher

	Mean Preference Score (Variance)			
	Teacher A	Teacher B	Teacher C	Teacher D
Males	3.302 (1.870)	2.778 (2.040)	3.104 (1.885)	2.325 (1.669)
Females	3.314 (2.033)	2.720 (1.813)	2.974 (1.834)	2.563 (2.346)

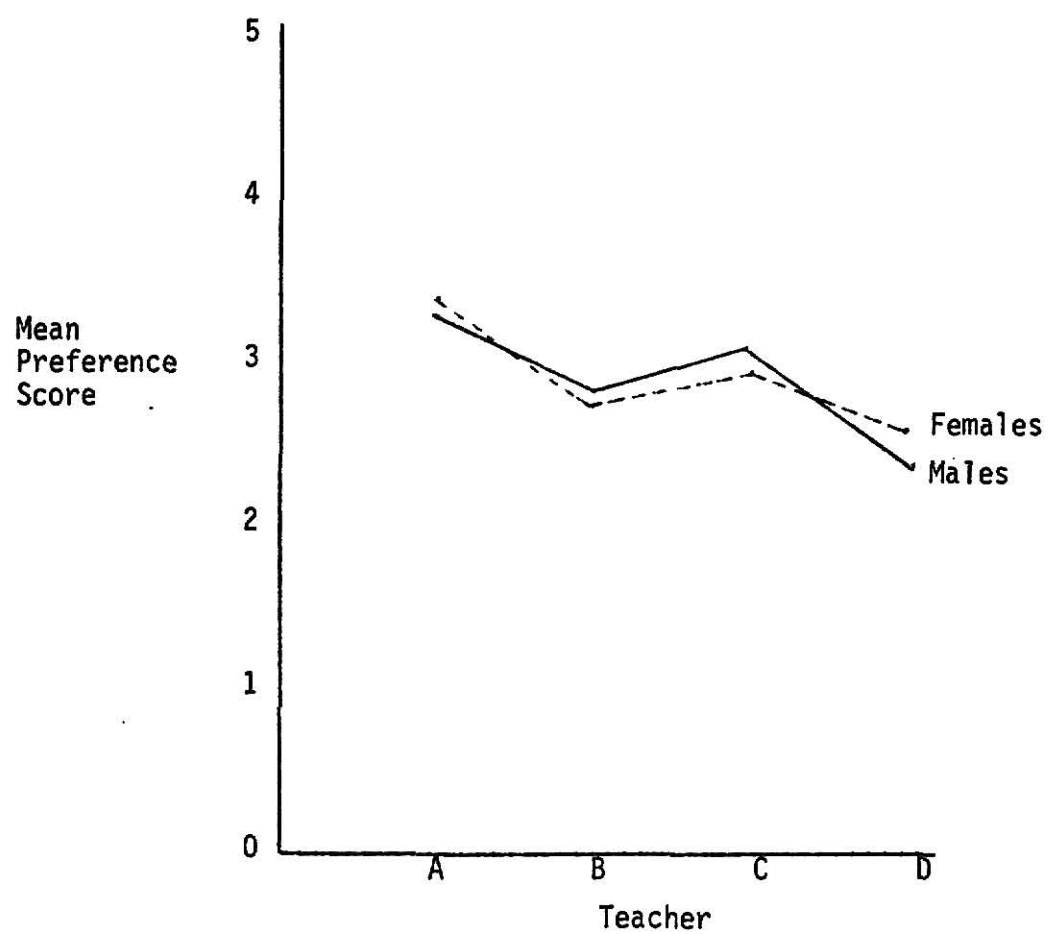


Figure 2. Mean Subject Preference Toward Science Scores of Male and Female Students of each Teacher

Table 5. Mean Subject Preference Toward Science Scores and Variances of Male and Female Students for each Survey Administration

	Mean Preference Score (Variance)				
	Adm.1	Adm.2	Adm.3	Adm.4	Adm.5
Males	3.540 (1.267)	3.153 (1.768)	2.635 (2.319)	2.686 (1.751)	2.372 (2.327)
Females	3.259 (1.537)	3.280 (1.710)	2.904 (1.792)	2.633 (2.343)	2.385 (2.453)

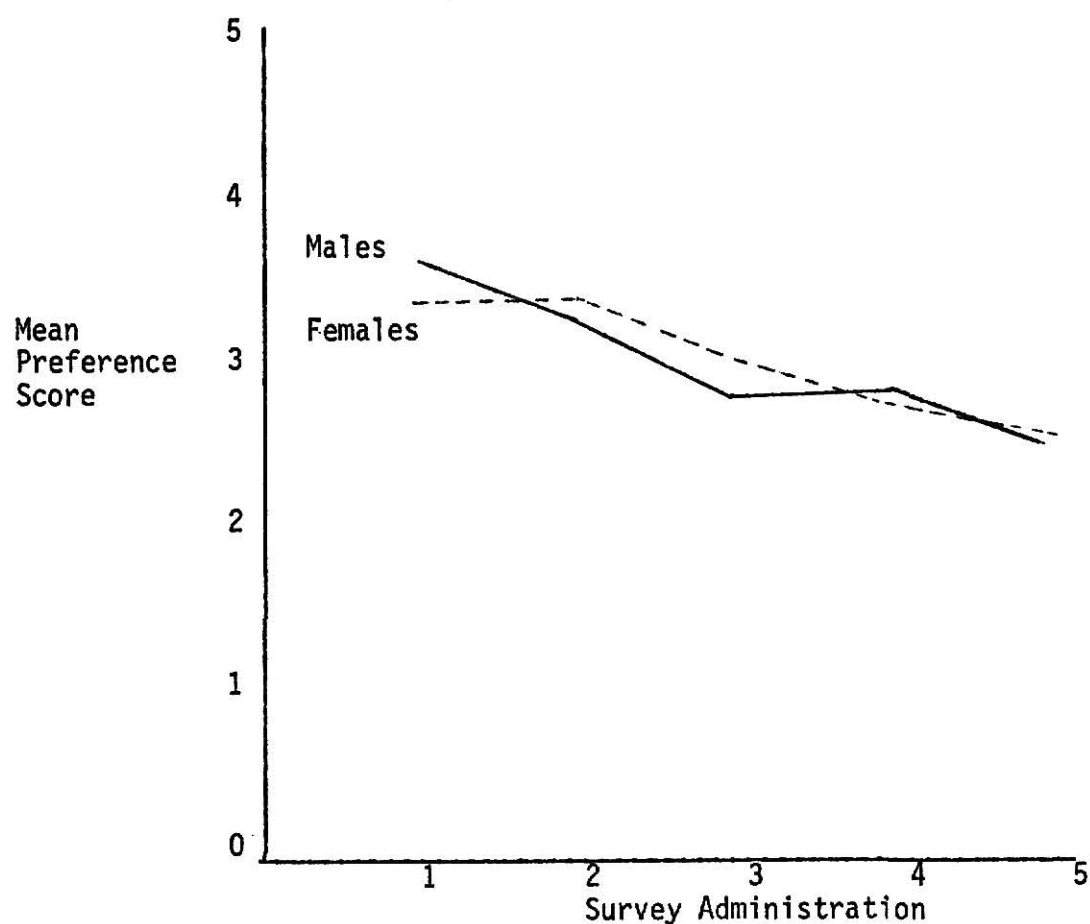


Figure 3. Mean Subject Preference Toward Science Scores of Male and Female Students for each Survey Administration

Table 6. Mean Subject Preference Toward Science Scores and Variances of Students of each Teacher on each Survey Administration

	Mean Preference Score (Variance)				
	Adm.1	Adm.2	Adm.3	Adm.4	Adm.5
Teacher A	3.639 (1.395)	3.432 (1.845)	3.175 (1.989)	3.247 (1.994)	3.045 (2.272)
Teacher B	3.263 (1.368)	2.772 (1.746)	2.719 (2.005)	2.572 (2.020)	2.418 (2.050)
Teacher C	3.478 (1.423)	3.630 (1.190)	3.152 (1.607)	2.413 (1.547)	2.522 (2.336)
Teacher D	3.219 (1.332)	3.031 (1.326)	2.031 (2.332)	2.406 (1.873)	1.531 (2.068)

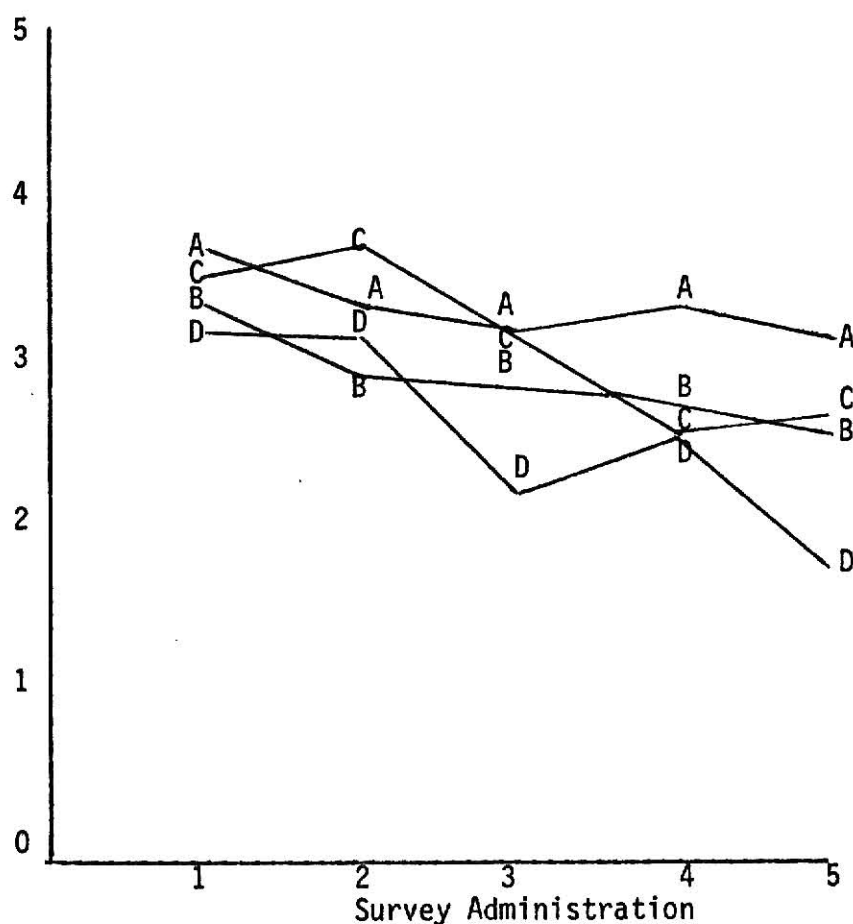


Figure 4. Mean Subject Preference Toward Science Scores of Students of each Teacher on each Survey Administration

Table 7. Mean Subject Preference Toward Science Scores and Variances of Male and Female Students of each Teacher on each Survey Administration

Mean Preference Score (Variance)					
Administration 1			Administration 2		
	Males	Females		Males	Females
Teacher A	3.574 (1.327)	3.705 (1.481)	Teacher A	3.410 (1.750)	3.455 (1.975)
Teacher B	3.556 (1.210)	2.971 (1.342)	Teacher B	2.630 (2.011)	2.914 (1.507)
Teacher C	3.783 (1.214)	3.174 (1.448)	Teacher C	3.696 (1.255)	3.565 (1.115)
Teacher D	3.250 (0.938)	3.188 (1.527)	Teacher D	2.875 (0.359)	3.188 (1.777)
Administration 3			Administration 4		
	Males	Females		Males	Females
Teacher A	3.328 (1.696)	3.023 (2.340)	Teacher A	3.016 (2.049)	3.477 (1.795)
Teacher B	2.667 (2.815)	2.771 (1.376)	Teacher B	2.630 (1.492)	2.514 (2.421)
Teacher C	3.043 (2.389)	3.261 (0.802)	Teacher C	2.348 (1.183)	2.478 (1.902)
Teacher D	1.500 (1.750)	2.563 (2.246)	Teacher D	2.750 (0.938)	2.063 (2.184)
Administration 5					
	Males	Females		Males	Females
Teacher A	3.180 (2.345)	2.909 (2.128)			
Teacher B	2.407 (1.871)	2.429 (2.188)			
Teacher C	2.652 (1.792)	2.391 (2.847)			
Teacher D	1.250 (1.188)	1.813 (2.402)			

Table 8. Statistical Results of Mean Scores and Interactions

	SS	DF	Mean Square	F-value	P
Sex	0.050	1	0.050/4.592	0.011	NS
Teachers	87.684	3	29.228/4.592	6.365	p .001
Sx by Tr	4.007	3	1.336/4.592	0.291	NS
Repeated Measures	117.357	4	29.339	25.151	p .001
Sx by Rm	7.174	4	1.793	1.537	NS
Tr by Rm	42.469	12	3.539	3.034	p. .001
Sx by Tr by Rm	24.473	12	2.039	1.748	NS

Sx = Sex

Tr = Teacher

Rm = Repeated Measures

SS = Sum of Squares

DF = Degrees of Freedom

P = Significance (probability)

NS = Not Significant

Chapter 5

SUMMARY AND CONCLUSIONS

The objective of this study was to examine two hundred thirty-seven seventh grade students' subject preference toward science as they were enrolled for one year in the Intermediate Science Curriculum Study program (ISCS). The students were taught by four science teachers. Two of these teachers had previous training in methods of teaching ISCS in a ten day workshop sponsored through Continuing Education at Kansas State University and taught by Dr. Robert James and two did not have this training. The hypotheses tested were: (1) There is no significant difference between male and female students in subject preference toward science during a one year enrollment in ISCS. (2) There is no significant difference between workshop-teacher-students and non-workshop-teacher-students in subject preference toward science during a one year enrollment in ISCS. (3) There is no significant change in subject preference toward science of students during a one year enrollment in ISCS.

Prouse's Subject Preference Survey (1964) was administered to these students five times during the 1970-71 school year. Their subject preference toward science scores were analyzed by Two Way Analysis of Variance with Repeated Measures, ANOVAT Computer Program, Kansas State University Computer Center. Results of this analysis were:

1. Mean scores of subject preference toward science were not significantly different between male and female students. Hypothesis 1 is retained.
2. Mean scores of students of each of the four teachers were significantly different at $p < .001$ with the two workshop-trained teachers having students with more positive preferences. Hypothesis 2 is rejected.
3. In the interaction of sex by students of each teacher, no significant difference was found.
4. Mean scores for each test administration were significantly different at $p < .001$ and progressed in a negative direction. Hypothesis 3 is rejected.
5. In the interaction of sex by repeated measures, no significant difference was found.
6. In the interaction of students of each teacher by repeated measures, a significant difference was found at $p < .001$.
7. In the interaction of sex by students of each teacher by repeated measure, no significant difference was found.

The generalization of these results is limited by the design of the study. The subjects were sampled from one school district, in one socio-economic setting, and the number of students and teachers is low. These results could only be generalized to similar situations.

The sex of the students in this study didn't appear to be a significant factor in how they preferred science, but the teacher in the classroom was. The importance of the teacher in attitude development had been reported by Haney (1964), Wick and Yager (1966), and Baumel and Berger (1967). Although in this study, the two teachers with training in teaching ISCS had students with more positive preferences toward science, it can not be concluded that the training itself was the cause. Since the training was offered on a voluntary basis, it seems likely that the teachers who did volunteer were inclined to be more interested in science and in improving their teaching

methods than those who didn't volunteer. Orr and Young's study (1963) would seem to verify this. This initial attitude of the trained teachers may be as important of a factor as the training itself.

A possible way to further test whether or not ISCS workshop training for teachers really does increase students' preference for science would be to set up a research situation which involved a greater number of students and teachers than this study. It would be important, also, to randomly assign one half of the teachers to training and one half to no training instead of making it voluntary. Equal numbers of students should be assigned to all teachers.

To interpret the cause of the over-all decline in students' subject preference toward science in this study would be difficult with no more information than is available at this time. Wick and Yager (1966) had similar results when they investigated students' attitudes in each junior and senior high science subjects. They attributed this decrease in the mean scores from fall to spring to a certain portion of the class that began a science course with enthusiasm but became discouraged when it became too difficult. Another possible explanation for the decline is that perhaps some of the students became bored after working in the lab-oriented ISCS materials for awhile. No conclusive explanation, however, could be given until more research on the ISCS program has been done.

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APPENDIX

Prouse Subject Preference Survey

Date _____

Name _____ Age _____ Period of Day _____

School District _____ Grade _____ Teacher's name _____

School _____ Sex: Male _____ Female _____

What page in the core materials are you working on at the present time? _____

Please state your preferences for the subjects you are taking this year by marking an X in the box in front of the subject you like best. These results will in no way affect your grade in this or other courses.

Directions: This is a survey of your likes for school subjects. Each subject is listed several times, but in each case it is combined with one other subject.

Make a choice for a subject in each pair even though you may think you like each subject equally well. Work quickly. Mark an X for the subject you like best.**

<input type="checkbox"/> English <input type="checkbox"/> Physical Ed.	<input type="checkbox"/> English <input type="checkbox"/> Science	<input type="checkbox"/> English <input type="checkbox"/> Civics
<input type="checkbox"/> Science <input type="checkbox"/> Civics	<input type="checkbox"/> Music <input type="checkbox"/> Physical Ed.	<input type="checkbox"/> Mathematics <input type="checkbox"/> Physical Ed.
<input type="checkbox"/> Mathematics <input type="checkbox"/> Civics	<input type="checkbox"/> Physical Ed. <input type="checkbox"/> Science	<input type="checkbox"/> Music <input type="checkbox"/> Science
<input type="checkbox"/> Music <input type="checkbox"/> Civics	<input type="checkbox"/> Mathematics <input type="checkbox"/> Music	<input type="checkbox"/> Physical Ed. <input type="checkbox"/> Civics
<input type="checkbox"/> English <input type="checkbox"/> Music	<input type="checkbox"/> Mathematics <input type="checkbox"/> Science	<input type="checkbox"/> English <input type="checkbox"/> Mathematics

**If a course(s) has been listed which is not in your schedule this semester, please place an X across each pair subjects in that subject(s) occurs.

A STUDY OF SUBJECT PREFERENCE TOWARD SCIENCE
OF SEVENTH GRADE STUDENTS ENROLLED
IN THE INTERMEDIATE SCIENCE
CURRICULUM STUDY PROGRAM

by

JOYCE LYNN CASTEN

B.S., Kansas State University, 1972

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1973

The objective of this study was to examine two hundred thirty-seven seventh grade students' subject preference toward science as they were enrolled for one year in the Intermediate Science Curriculum Study program (ISCS). The students were taught by four science teachers. Two of these teachers had previous training in methods of teaching ISCS in a ten day workshop sponsored through Continuing Education at Kansas State University and taught by Dr. Robert James and two did not have this training. The hypotheses tested were: (1) There is no significant difference between male and female students in subject preference toward science during a one year enrollment in ISCS. (2) There is no significant difference between workshop-teacher-students and non-workshop-teacher-students in subject preference toward science during a one year enrollment in ISCS. (3) There is no significant change in subject preference toward science of students during a one year enrollment in ISCS.

Prouse's Subject Preference Survey (1964) was administered to these students five times during the 1970-71 school year. Their subject preference toward science scores were analyzed by Two Way Analysis of Variance with Repeated Measures, ANOVAT Computer Program, Kansas State University Computer Center. Results of this analysis were:

1. Mean scores of subject preference toward science were not significantly different between male and female students. Hypothesis 1 is retained.
2. Mean scores of students of each of the four teachers were significantly different at $p < .001$ with the two workshop-trained-teachers having students with more positive preferences. Hypothesis 2 is rejected.

3. In the interaction of sex by students of each teacher, no significant difference was found.
4. Mean scores for each test administration were significantly different at $p < .001$ and progressed in a negative direction. Hypothesis 3 is rejected.
5. In the interaction of sex by repeated measures, no significant difference was found.
6. In the interaction of students of each teacher by repeated measures, a significant difference was found at $p < .001$.
7. In the interaction of sex by students of each teacher by repeated measures, no significant difference was found.

The sex of the students in this study didn't appear to be a significant factor in how much they preferred science over their other subjects, but the teacher in the classroom was. Although in this study, the two teachers with training in teaching ISCS had students with more positive preferences toward science, it can not be concluded that the training itself was the cause. Since the training was offered on a voluntary basis, it seems likely that the teachers who did volunteer were inclined to be more interested in science and in improving their teaching methods than those who didn't volunteer.

No conclusive explanation for the over-all decline in students' subject preference toward science can be given until more research on the ISCS program has been done.