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ABSTRACT

A study was made to determine 1) whether boys and girls in the same grade level learn equally well from the same types of illustration, and 2) whether identical illustrations are equally effective for boys and girls in the same grade level on tests designed to measure student achievement of different educational objectives. The study showed no significant differences between boys and girls in the ninth through twelfth grades with regard to learning from visual illustrations. This report describes the research methodology of the study and presents 37 data tables derived from the study. (Author/JY)

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**VISUAL LEARNING: AN ANALYSIS BY SEX AND GRADE LEVEL**

**Francis M. Dwyer, Jr.**

**University Division of Instructional Services  
The Pennsylvania State University  
April 1970**

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## Introduction

Extensive research in the field of visual education has established, in fact, that visual aids when used to complement instruction improve student achievement. However, little research has been done to determine whether the same types of visuals are equally effective in facilitating achievement of different educational objectives by boys and girls in the same and in different grade levels. The purpose of this evaluation was to determine (a) whether boys and girls in the same grade level learn equally well from the same type of visual illustrations, and (b) whether identical illustrations are equally effective in facilitating the achievement of boys and girls in the same grade level on tests designed to measure student achievement of different educational objectives.

The data used for these analyses was obtained from a prior study by the author.\*

\* Dwyer, Francis M. A Study of the Relative Effectiveness of Varied Visual Illustrations. Final Report, Project No. 6-8840, Grant No. OEG-1-7-068840-0290. University Division of Instructional Services, The Pennsylvania State University, University Park, 1967.

## Materials

Nine complete 2x2 - inch slide sequences were used in this study. Each sequence consisted of thirty-nine slides. Each slide was designed to illustrate specific information contained in the oral instruction. Five sequences were in black and white and four were in color. A 2000-word instructional unit on the human heart was developed. Material concerning the human heart, its ~~facts~~<sup>parts</sup>, and its processes was selected as the content because it permitted the evaluation of several types of educational objectives.

## Treatment Groups

### Oral Presentation: Group I, Control Group

Students in Group I received oral instruction throughout the entire presentation from a tape recorder. Printed word symbols depicting the proper spelling of the parts of the heart were projected on the screen as they were mentioned in the oral presentation.

### Simple Line Presentation (B & W): Group II

Students in Group II received the same oral instruction as students in Group I. In addition, they received simple line illustrations depicting the form and the relative locations of the parts of the heart as they were mentioned in the oral instruction.

### Simple Line Presentation (Color): Group III

Students in Group III received the same oral instruction as students in Group I. In addition, they received simple line illustrations similar to those received by the students in Group II; however, these illustrations were in color.



Detailed, Shaded Drawing Presentation (B & W): Group IV

Students in Group IV received the same oral instruction as students in Group I. In addition, they viewed detailed, shaded drawings representing the parts of the heart as they were mentioned in the oral instruction. These drawings were more complex than the simple line drawings and more realistically represented the heart and its related parts, rather than merely identifying and locating them as in the former line representations.

Detailed, Shaded Drawing Presentation (Color): Group V

Students in Group V received the same oral instruction as students in Group I. In addition, they received visual illustrations similar to the illustrations received by the students in Group IV; however, these visuals were in realistic color.

Heart Model Presentation (B & W): Group VI

Students in Group VI received the same oral instruction as students in Group I. In addition, they viewed black and white photographs of a heart model while the heart and its related parts were being discussed orally.

Heart Model Presentation (Color): Group VII

Students in Group VII received the same oral instruction as students in Group I. In addition, they viewed colored photographs of a heart model while the heart and its related parts were being discussed orally.

Realistic Photographic Presentation (B & W): Group VIII

Students in Group VIII received the same oral instruction as students in Group I. In addition, they viewed realistic black and white photographs of the heart while the heart and its related parts were being described orally.

Realistic Photographic Presentation (Color): Group IX

Students in Group IX received the same oral instruction as students in Group I. In addition, they viewed realistic colored photographs of the heart similar to the black and white sequence received by students in Group VIII.



## Criterion Measures

Each student in each treatment group participated in his respective instructional presentation, and then received four individual criterial tests designed to measure achievement of specific educational objectives. Scores received on the four criterial tests were combined into a 78-item total criterial test. The students also participated in a delayed retention testing two weeks later at which time they received the same test battery as that which they received for immediate retention. A description of each test and its objective follows:

### Drawing Test

The drawing test (N=eighteen items) provided the student with a list of specific terms corresponding to the parts of the heart discussed in the oral presentation. The students were required to draw a representative diagram of the heart and place the numbers of the listed parts in their respective positions. In this test emphasis was placed on the positioning of the verbal symbols with respect to their concrete referents, not the quality of the diagram they were to draw. The objective of this test was to evaluate learning of specific locations of the parts of the heart.

### Identification Test

This multiple choice test (N=twenty items) required students to identify the numbered parts on a detailed drawing of a heart. Each part of the heart, which had been discussed in the oral presentation, was numbered on the drawing. The students were provided with an answer sheet with corresponding numbers on which they could select the name of the part of the heart which corresponded to the number. The objective of this test was to measure the students' ability to identify numbered parts on a diagram of the heart from information received in the instruction.

### Terminology Test

This test (N=twenty items) consisted of a series of fill-in questions; it was possible for one and only one specific answer to be correct. This test attempted to measure the learner's knowledge of referents for specific symbols or knowledge of the referent which would be most appropriately associated with the use of a specific symbol.

### Comprehension Test

The comprehension test consisted of twenty multiple choice items. Direct reference was made to the position of specific parts of the heart while functioning. The student was then asked to identify the position that other specified parts of the heart would be occupying at that particular moment. This test required that the students have a thorough understanding of the heart, its parts, its internal functioning, and the simultaneous processes which occur during the systolic and diastolic phases. The comprehension test was designed to measure a type of understanding that occurs when the individual understands what is being communicated and when he can use the information being received to explain some other phenomena.

### Total Criterion Test

Scores received on the four individual criterion tests were combined in a composite seventy-eight item criterion test designed to measure total understanding of the concepts presented.

### Procedure

The experimental population for this analysis (immediate retention) consisted of 1,054 ninth, tenth, eleventh and twelfth grade students. Classes of students were randomly assigned to one of the nine treatment groups. The number of students who participated in the delayed retention testing was 1,000; this reduction was caused by student absenteeism (See Table I).

**Table 1. Assignment of Students into Treatment Groups for Immediate and Delayed Retention**

	A. STUDENTS AVAILABLE FOR IMMEDIATE RETENTION TESTING				B. STUDENTS AVAILABLE FOR DELAYED RETENTION TESTING			
	9th	10th	11th	12th	9th	10th	11th	12th
Oral Presentation: Group I	31	31	31	20	31	31	31	18
Simple Line Presentation (B+W): Group II	32	24	32	30	31	22	31	27
Simple Line Presentation (Color): Group III	32	28	24	31	30	27	22	28
Detailed, Shaded Drawing Presentation (B+W): Group IV	28	25	32	37	28	21	28	36
Detailed, Shaded Drawing Presentation (Color): Group V	27	30	33	29	25	28	32	29
Heart Model Presentation (B+W): Group VI	33	25	30	36	31	23	28	34
Heart Model Presentation (Color): Group VII	30	30	22	31	29	25	22	30
Realistic Photographic Presentation (B+W): Group VIII	33	28	33	29	33	27	33	28
Realistic Photographic Presentation (Color): Group IX	30	31	27	19	29	30	25	17

The slide sequence used with the control group at each grade level did not contain visual illustrations of the heart, but did contain printed word symbols designating concepts referred to in the oral instruction. The printed word symbols were employed to facilitate the correct spelling of the terminology used and to enable the students to differentiate between those parts of the heart with similar pronunciation or similar spelling. The same set of printed symbols was used for all nine slide sequences.

The oral instructional unit was presented to the students by means of a tape recorder. During the oral instruction an audio signal cued the instructor to change the slide so that the oral and visual presentations were synchronized and presented relatively the same information simultaneously.

### Results

Analysis of variance was conducted on achievement scores obtained by boys and girls in each of the nine treatment groups and in each of the four grade levels on each of the five criterial measures (immediate and delayed criterial scores). Nineteen of the three hundred sixty analyses indicated that significant differences did exist in achievement scores obtained by boys and girls. Nine of the nineteen significant differences occurred at the twelfth grade level in the treatment receiving

the colored version of the realistic heart presentation. The Bartlett test of homogeneity was conducted on the variance within the two groups (boys and girls) receiving this treatment. The results indicated that significant differences existed which meant that the students in this treatment could not be assumed to have been drawn from the same population. These results invalidated the significant results obtained via the analysis of variance statistic. The ten remaining analyses ( See Tables 2-37) found to represent significant differences followed no general pattern of occurrence and may be attributed to that which might be expected to occur as a result of random chance.

#### Summary

The purpose of this evaluation was to determine (a) whether boys and girls in the same grade level learn equally well from the same types of illustrations, and (b) whether identical illustrations are equally effective for boys and girls in the same grade level on tests designed to measure student achievement of different educational objectives.

The results indicate that in general boys and girls learn equally well from identical types of visual illustrations when they are used to complement oral instruction. Equally important is that it appears there is no special requirements based on



sex for using specific types of visuals to provide maximum achievement of specific educational objectives. Within the limits of this study (ninth through twelfth grade), the results indicate that producers of visualized instructional materials need not develop separate learning materials for students based on sex.

Table 2. Oral Presentation Without Visuals - Ninth Grade

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained By Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	X̄	S.D.	Source of Variability	D.F.	SS	MS	F.	p.
Drawing Test	14 Boys	3.64	2.37	Method	1	2.19	2.18	0.39	n.s.
	17 Girls	4.18	2.35	Error	29	161.68	5.58		
Identification Test	B	6.71	3.07	M		1.36	1.36	0.21	n.s.
	G	6.29	1.96	E		184.39	6.36		
Terminology Test	B	5.64	2.84	M		1.28	1.28	0.16	n.s.
	G	5.24	2.88	E		238.27	8.22		
Comprehension Test	B	10.29	3.67	M		10.48	10.48	0.63	n.s.
	G	9.12	4.36	E		478.62	16.50		
Total Criterial Test	B	26.36	5.15	M		34.57	34.57	1.02	n.s.
	G	24.24	6.32	E		984.27	33.94		

DELAYED RETENTION ANALYSIS

Drawing Test	B	5.00	2.57	M		0.11	0.11	0.02	n.s.
	G	4.88	2.62	E		195.77	6.75		
Identification Test	B	6.93	2.46	M		0.72	0.72	0.12	n.s.
	G	7.24	2.51	E		179.99	6.21		
Terminology Test	B	5.29	2.27	M		0.26	0.26	0.03	n.s.
	G	5.47	3.47	E		259.09	8.93		
Comprehension Test	B	6.36	2.13	M		0.68	0.68	0.12	n.s.
	G	6.06	2.66	E		172.16	5.94		
Total Criterial Test	B	23.71	5.48	M		0.03	0.03	0.00	n.s.
	G	23.65	4.92	E		778.74	26.85		



Table 3. Simple Line Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained By Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	MS	F.	P.
Drawing Test	17 Boys 15 Girls	10.94 9.33	5.13 4.35	Method Error	1 30	20.60 686.27	20.60 22.88	0.90	n.s.
Identification Test	B G	9.59 9.40	4.74 4.10	M E		0.28 595.72	0.28 19.86	0.01	n.s.
Terminology Test	B G	8.24 7.00	4.45 3.27	M E		12.16 481.06	12.16 16.04	0.76	n.s.
Comprehension Test	B G	12.88 10.60	3.64 3.14	M E		41.51 349.37	41.51 11.65	3.56	n.s.
Total Criterial Test	B G	43.76 36.67	15.76 12.55	M E		401.48 6180.39	401.48 206.01	1.95	n.s.

DELAYED RETENTION ANALYSIS

Drawing Test	17 Boys 14 Girls	11.29 11.87	5.50 3.87	Method Error	1 29	2.61 693.26	2.61 23.11	0.11	n.s.
Identification Test	B G	9.82 10.40	5.10 3.74	M E		2.65 612.08	2.65 20.40	0.13	n.s.
Terminology Test	B G	8.71 7.00	5.03 2.80	M E		23.19 513.53	23.19 17.18	1.35	n.s.
Comprehension Test	B G	9.00 7.73	4.21 4.33	M E		12.79 546.93	12.79 18.23	0.70	n.s.
Total Criterial Test	B G	38.82 36.80	18.21 9.31	M E		32.63 6518.87	32.63 217.30	0.15	n.s.

Table 4. Simple Line Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	16 Boys	7.75	5.08	Method	1	48.01	48.01	2.25	n.s.
	16 Girls	10.29	4.03	Error	30	597.86	21.35		
Identification Test	B	8.00	4.40	M		20.15	20.15	0.95	n.s.
	G	9.64	4.85	E		595.21	21.26		
Terminology Test	B	6.12	3.28	M		12.69	12.69	1.34	n.s.
	G	7.43	2.82	E		265.18	9.47		
Comprehension Test	B	10.87	3.30	M		0.29	0.29	0.02	n.s.
	G	11.07	3.75	E		346.68	12.38		
Total Criterial Test	B	32.12	12.50	M		296.69	296.69	1.96	n.s.
	G	38.43	12.05	E		4231.18	151.11		
<u>DELAYED RETENTION ANALYSIS</u>									
Drawing Test	16 Boys	8.62	5.83	Method	1	96.19	96.19	2.62	n.s.
	14 Girls	12.21	6.31	Error	28	1028.11	36.72		
Identification Test	B	6.25	4.17	M		62.49	62.49	3.62	n.s.
	G	9.14	4.13	E		482.71	17.24		
Terminology Test	B	5.81	3.71	M		90.07	90.07	7.80	0.01
	G	9.29	3.00	E		323.29	11.55		
Comprehension Test	B	5.62	3.12	M		1.05	1.05	0.07	n.s.
	G	6.00	4.49	E		407.75	14.56		
Total Criterial Test	B	27.44	14.45	M		632.71	632.71	2.87	n.s.
	G	36.64	15.31	E		6177.15	220.61		

Table 5. Detailed Shaded Drawing Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention  
 B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	12 Boys	9.00	3.72	Method	1	3.24	3.24	0.18	n.s.
	16 Girls	8.31	4.51	Error	26	457.44	17.59		
Identification Test	B	8.67	4.33	M		0.19	0.19	0.01	n.s.
	G	8.50	3.79	E		422.67	16.26		
Terminology Test	B	8.42	3.45	M		0.15	0.15	0.01	n.s.
	G	8.56	3.56	E		320.85	12.34		
Comprehension Test	B	9.33	1.72	M		1.44	1.44	0.19	n.s.
	G	8.87	3.28	E		194.42	7.48		
Total Criterial Test	B	35.42	10.27	M		1.19	1.19	0.01	n.s.
	G	35.00	11.44	E		3124.92	120.19		

DELAYED RETENTION ANALYSIS

Drawing Test	B	9.92	4.08	Method		15.00	15.00	0.75	n.s.
	G	8.44	4.75	Error		520.85	20.03		
Identification Test	B	9.67	4.40	M		16.30	16.30	0.98	n.s.
	G	8.12	3.81	E		430.42	16.55		
Terminology Test	B	7.92	4.19	M		0.07	0.07	0.01	n.s.
	G	7.82	3.62	E		389.35	14.98		
Comprehension Test	B	5.17	1.34	M		3.44	3.44	1.02	n.s.
	G	5.88	2.13	E		87.42	3.36		
Total Criterial Test	B	32.67	10.74	M		42.15	42.15	0.34	n.s.
	G	30.19	11.29	E		3179.10	122.27		

Table 6. Detailed Shaded Drawing Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	14 Boys	9.29	4.32	Method	1	7.04	7.04	0.42	n.s.
	13 Girls	10.31	3.88	Error	25	423.63	16.95		
Identification Test	B	9.86	4.54	M		0.59	0.59	0.03	n.s.
	G	10.15	4.74	E		537.41	21.50		
Terminology Test	B	8.29	4.29	M		13.34	13.34	0.88	n.s.
	G	9.69	3.40	E		377.63	15.11		
Comprehension Test	B	10.43	2.53	M		18.32	18.32	3.05	n.s.
	G	12.08	2.36	E		150.35	6.01		
Total Criterial Test	B	37.86	12.75	M		189.11	189.11	1.23	n.s.
	G	43.15	12.02	E		3845.41	153.82		

DELAYED RETENTION ANALYSIS

Drawing Test	12 Boys	10.00	5.66	Method	1	0.04	0.04	0.00	n.s.
	13 Girls	9.92	4.94	Error	23	708.92	28.36		
Identification Test	B	9.86	5.05	M		3.88	3.88	0.19	n.s.
	G	10.62	3.91	E		514.79	20.59		
Terminology Test	B	8.86	4.38	M		43.81	43.81	3.11	n.s.
	G	6.31	2.93	E		352.48	14.10		
Comprehension Test	B	7.14	4.05	M		0.03	0.03	0.00	n.s.
	G	7.08	3.09	E		328.64	13.15		
Total Criterial Test	B	36.50	15.50	M		215.47	215.47	0.10	n.s.
	G	30.85	13.89	E		5435.19	217.41		

Table 7. Heart Model Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	17 Boys	6.76	3.67	Method	1	5.64	5.64	0.36	n.s.
	16 Girls	5.94	4.30	Error	31	492.00	15.87		
Identification Test	B	8.35	3.08	M		2.41	2.41	0.23	n.s.
	G	7.81	3.43	E		328.32	10.59		
Terminology Test	B	7.00	2.67	M		0.03	0.03	0.00	n.s.
	G	6.94	3.55	E		302.94	9.77		
Comprehension Test	B	10.76	2.93	M		0.02	0.02	0.00	n.s.
	G	10.81	2.83	E		257.50	8.31		
Total Criterial Test	B	32.88	9.30	M		15.75	15.75	0.15	n.s.
	G	31.50	11.45	E		3349.76	108.06		

DELAYED RETENTION ANALYSIS

Drawing Test	17 Boys	9.06	3.29	Method	1	2.03	2.03	0.14	n.s.
	14 Girls	8.56	4.26	Error	29	444.88	14.35		
Identification Test	B	8.88	2.62	M		44.36	44.36	5.51	0.05
	G	6.56	3.05	E		249.70	8.05		
Terminology Test	B	8.18	3.80	M		0.26	0.26	0.01	n.s.
	G	8.00	4.66	E		556.47	17.95		
Comprehension Test	B	7.71	3.60	M		4.87	4.87	0.34	n.s.
	G	6.94	3.99	E		446.47	14.40		
Total Criterial Test	B	34.06	9.43	M		131.64	131.64	1.01	n.s.
	G	30.06	13.23	E		4049.88	130.64		



Table 8. Heart Model Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	15 Boys	9.67	3.85	Method	1	6.53	6.53	0.54	n.s.
	15 Girls	8.73	3.06	Error	28	338.27	12.08		
Identification Test	B	9.07	4.03	M		0.30	0.30	0.02	n.s.
	G	9.27	4.06	E		457.87	16.35		
Terminology Test	B	7.47	2.92	M		0.03	0.03	0.00	n.s.
	G	7.40	3.40	E		281.33	10.05		
Comprehension Test	B	11.27	2.25	M		1.20	1.20	0.22	n.s.
	G	10.87	2.39	E		150.67	5.38		
Total Criterial Test	B	37.07	9.51	M		4.80	4.80	0.06	n.s.
	G	36.27	8.21	E		2209.87	78.92		

DELAYED RETENTION ANALYSIS

Drawing Test	14 Boys	8.53	4.09	Method	1	9.63	9.63	0.79	n.s.
	15 Girls	9.67	2.79	Error	27	343.07	12.25		
Identification Test	B	8.40	4.12	M		12.03	12.03	0.73	n.s.
	G	9.67	3.99	E		460.93	16.46		
Terminology Test	B	7.47	2.92	M		0.03	0.03	0.00	n.s.
	G	7.40	3.31	E		273.33	9.76		
Comprehension Test	B	7.60	2.32	M		2.13	2.13	0.39	n.s.
	G	7.07	2.34	E		152.53	5.45		
Total Criterial Test	B	32.00	11.40	M		28.03	28.03	0.26	n.s.
	G	33.93	9.31	E		3032.93	108.32		

Table 9. Realistic Photographic Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	16 Boys	8.81	3.67	Method	1	52.28	52.28	4.01	n.s.
	17 Girls	6.29	3.55	Error	31	403.97	13.03		
Identification Test	B	7.44	3.18	M		0.34	0.34	0.03	n.s.
	G	7.24	3.70	E		371.00	11.97		
Terminology Test	B	5.31	2.87	M		7.02	7.02	0.70	n.s.
	G	6.24	3.44	E		312.50	10.08		
Comprehension Test	B	10.12	2.60	M		5.49	5.49	0.85	n.s.
	G	10.94	2.49	E		200.69	6.47		
Total Criterial Test	B	31.69	9.96	M		9.96	9.96	0.10	n.s.
	G	30.59	10.06	E		3109.56	100.31		

DELAYED RETENTION ANALYSIS

Drawing Test	B	7.94	3.23	Method		0.03	0.03	0.00	n.s.
	G	8.00	3.74	Error		380.94	12.29		
Identification Test	B	7.44	2.63	M		3.81	3.81	0.39	n.s.
	G	8.12	3.52	E		301.70	9.73		
Terminology Test	B	5.62	2.83	M		2.51	2.51	0.24	n.s.
	G	6.18	3.54	E		320.22	10.33		
Comprehension Test	B	6.19	3.85	M		2.41	2.41	0.23	n.s.
	G	5.65	2.52	E		324.32	10.46		
Total Criterial Test	B	27.06	10.16	M		8.18	8.18	0.08	n.s.
	G	28.06	10.65	E		3361.88	108.45		



Table 10. Realistic Photographic Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	17 Boys	7.88	4.53	Method	1	0.09	0.09	0.00	n.s.
	13 Girls	7.77	4.71	Error	28	594.07	21.22		
Identification Test	B	10.53	4.29	M		31.50	31.50	1.30	n.s.
	G	8.46	5.65	E		677.47	24.20		
Terminology Test	B	8.00	3.18	M		3.53	3.53	0.29	n.s.
	G	7.31	3.90	E		344.77	12.31		
Comprehension Test	B	11.71	2.87	M		1.01	1.01	0.12	n.s.
	G	12.08	2.90	E		232.45	8.30		
Total Criterial Test	B	38.06	12.76	M		72.44	72.44	0.39	n.s.
	G	34.92	14.64	E		5175.86	184.85		

DELAYED RETENTION ANALYSIS

Drawing Test	16 Boys	10.18	3.56	Method	1	8.91	8.91	0.54	n.s.
	13 Girls	9.08	4.63	Error	27	459.39	16.41		
Identification Test	B	10.00	3.64	M		6.28	6.28	0.37	n.s.
	G	9.08	4.66	E		472.92	16.89		
Terminology Test	B	8.12	4.44	M		13.39	13.39	0.70	n.s.
	G	6.77	4.25	E		532.07	19.00		
Comprehension Test	B	7.24	2.54	M		0.18	0.18	0.02	n.s.
	G	7.08	3.33	E		235.98	8.43		
Total Criterial Test	B	35.82	12.69	M		38.47	38.47	0.16	n.s.
	G	33.54	18.54	E		6701.70	239.35		

Table 11. Oral Presentation Without Visuals - Tenth Grade

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	18 Boys	5.61	3.76	Method	1	12.82	12.82	1.11	n.s.
	13 Girls	4.31	2.81	Error	29	335.05	11.55		
Identification Test	B	7.00	2.72	M		3.62	3.62	0.52	n.s.
	G	6.31	2.53	E		202.77	6.99		
Terminology Test	B	6.50	3.31	M		15.29	15.29	1.70	n.s.
	G	5.08	2.50	E		261.42	9.01		
Comprehension Test	B	9.61	2.70	M		1.14	1.14	0.19	n.s.
	G	10.00	1.96	E		170.28	5.87		
Total Criterial Test	B	28.72	9.96	M		38.58	38.58	0.55	n.s.
	G	26.46	5.52	E		2050.84	70.72		

DELAYED RETENTION ANALYSIS

Drawing Test	B	5.39	3.94	M		12.99	12.99	1.20	n.s.
	G	4.08	2.02	E		313.20	10.80		
Identification Test	B	6.11	3.22	M		1.38	1.38	0.16	n.s.
	G	6.54	2.47	E		249.01	8.59		
Terminology Test	B	6.22	2.90	M		3.53	3.53	0.55	n.s.
	G	5.54	1.90	E		186.34	6.43		
Comprehension Test	B	5.67	2.45	M		0.32	0.32	0.07	n.s.
	G	5.46	1.56	E		131.23	4.53		
Total Criterial Test	B	23.33	10.47	M		22.28	22.28	0.31	n.s.
	G	21.62	4.54	E		2111.08	72.80		

Table 12. Simple Line Presentation (D:V)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	10 Boys	14.90	5.13	Method	1	0.08	0.08	0.01	n.s.
	14 Girls	14.78	2.15	Error	22	297.26	13.51		
Identification Test	B	12.50	4.20	M		2.98	2.98	0.16	n.s.
	G	11.79	4.44	E		414.86	18.86		
Terminology Test	B	9.10	3.45	M		14.93	14.93	1.44	n.s.
	G	7.50	3.06	E		228.40	10.38		
Comprehension Test	B	14.10	4.09	M		48.58	48.58	4.22	n.s.
	G	11.21	2.81	E		253.26	11.51		
Total Criterial Test	B	49.40	12.13	M		98.74	98.74	0.89	n.s.
	G	45.29	9.32	E		2453.26	111.51		

DELAYED RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	9 Boys	11.60	6.28	Method	1	12.39	12.39	0.53	n.s.
	13 Girls	10.14	3.46	Error	20	516.11	23.19		
Identification Test	B	10.70	5.01	M		0.10	0.10	0.01	n.s.
	G	10.57	3.52	E		367.53	17.61		
Terminology Test	B	9.90	3.70	M		37.72	37.72	2.82	n.s.
	G	7.36	3.63	E		294.11	13.37		
Comprehension Test	B	8.30	5.46	M		8.80	8.80	0.56	n.s.
	G	7.07	2.40	E		343.03	15.59		
Total Criterial Test	B	38.60	18.37	M		61.34	61.34	0.30	n.s.
	G	35.36	10.77	E		4527.61	205.80		

Table 13. Simple Line Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests.

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	16 Boys	10.19	4.64	Method	1	2.17	2.17	0.08	n.s.
	12 Girls	10.75	5.72	Error	26	682.69	26.26		
Identification Test	B	9.62	4.73	M		7.44	7.44	0.28	n.s.
	G	10.67	5.73	E		696.42	26.79		
Terminology Test	B	8.81	5.14	M		12.57	12.57	0.52	n.s.
	G	10.17	4.63	E		632.10	24.31		
Comprehension Test	B	12.31	4.88	M		0.03	0.03	0.00	n.s.
	G	12.25	3.22	E		471.69	18.14		
Total Criterial Test	B	41.06	16.48	M		52.65	52.65	0.21	n.s.
	G	43.83	14.97	E		6538.60	251.48		

DELAYED RETENTION ANALYSIS

Drawing Test	16 Boys	7.69	5.65	Method	1	2.17	2.17	0.81	n.s.
	11 Girls	8.25	4.39	Error	25	691.69	26.60		
Identification Test	B	9.44	5.07	M		0.15	0.15	0.01	n.s.
	G	9.58	5.02	E		662.85	25.49		
Terminology Test	B	8.00	4.99	M		0.00	0.00	0.00	n.s.
	G	8.00	3.54	E		512.00	19.69		
Comprehension Test	B	8.56	4.47	M		5.50	5.50	0.37	n.s.
	G	7.67	2.74	E		382.60	14.72		
Total Criterial Test	B	33.75	18.69	M		0.19	0.19	0.00	n.s.
	G	33.58	12.98	E		7089.92	272.69		

Table 14. Detailed Shaded Drawing Presentation (B+W)

A. Means and Standard Deviations for students Achieving on the Criterial Tests - Immediate and Delayed Retention  
 B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	13 Boys	9.00	4.06	Method	1	22.92	22.92	1.53	n.s.
	12 Girls	10.92	3.65	Error	23	344.92	15.00		
Identification Test	B	11.85	4.45	M		0.75	0.75	0.04	n.s.
	G	11.50	4.19	E		430.69	18.73		
Terminology Test	B	10.31	4.31	M		5.92	5.92	0.37	n.s.
	G	9.33	3.68	E		371.44	16.15		
Comprehension Test	B	9.31	4.05	M		0.00	0.00	0.00	n.s.
	G	9.33	3.45	E		327.44	14.24		
Total Criterial Test	B	40.31	13.64	M		3.75	3.75	0.02	n.s.
	G	41.08	13.24	E		4161.69	180.94		

DELAYED RETENTION ANALYSIS

Drawing Test	11 Boys	6.62	3.69	Method	1	24.17	24.17	1.87	n.s.
	10 Girls	8.58	3.50	Error	19	297.99	12.96		
Identification Test	B	10.23	3.52	M		0.14	0.14	0.01	n.s.
	G	10.08	4.10	E		333.22	14.49		
Terminology Test	B	8.85	4.34	M		0.00	0.00	0.00	n.s.
	G	8.83	4.02	E		403.36	17.54		
Comprehension Test	B	8.38	4.13	M		2.51	2.51	0.20	n.s.
	G	7.75	2.67	E		283.33	12.32		
Total Criterial Test	B	34.08	13.18	M		19.25	19.25	0.13	n.s.
	G	35.83	10.88	E		3386.59	147.24		



Table 15. Detailed Shaded Drawing Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention  
 B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	15 Boys	13.13	4.17	Method	1	32.03	32.03	1.62	n.s.
	15 Girls	11.07	4.71	Error	28	554.67	19.81		
Identification Test	B	12.07	3.47	M		0.83	0.83	0.05	n.s.
	G	11.73	4.32	E		429.87	15.35		
Terminology Test	B	10.07	3.61	M		13.33	13.33	1.36	n.s.
	G	8.73	2.55	E		273.87	9.78		
Comprehension Test	B	12.80	4.04	M		2.70	2.70	0.22	n.s.
	G	12.20	2.96	E		350.80	12.53		
Total Criterial Test	B	48.07	12.91	M		140.83	140.83	0.97	n.s.
	G	43.73	11.16	E		4077.87	145.64		

DELAYED RETENTION ANALYSIS

Drawing Test	14 Boys	9.80	4.74	Method	1	0.13	0.13	0.01	n.s.
	14 Girls	9.67	4.05	Error	26	543.73	19.42		
Identification Test	B	10.47	3.70	M		4.80	4.80	0.35	n.s.
	G	9.67	3.74	E		387.07	13.82		
Terminology Test	B	8.80	3.43	M		5.63	5.63	0.59	n.s.
	G	7.93	2.71	E		267.33	9.55		
Comprehension Test	B	6.93	3.26	M		0.13	0.13	0.01	n.s.
	G	7.07	2.94	E		269.87	9.64		
Total Criterial Test	B	36.13	12.02	M		26.13	26.13	0.18	n.s.
	G	34.27	11.97	E		4030.67	143.95		

Table 16. Heart Model Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	16 Boys	8.69	2.75	Method	1	7.38	7.38	1.00	n.s.
	9 Girls	7.56	2.65	Error	23	169.66	7.38		
Identification Test	B	9.56	4.02	M		241.94	16.13	0.18	n.s.
	G	8.89	3.41	E		92.89	11.61		
Terminology Test	B	6.37	2.75	M		2.25	2.25	0.28	n.s.
	G	7.00	2.96	E		183.75	7.99		
Comprehension Test	B	7.06	2.24	M		3.06	3.06	0.57	n.s.
	G	6.33	2.45	E		122.94	5.35		
Total Criterial Test	B	31.81	6.58	M		18.92	18.92	0.38	n.s.
	G	30.00	7.91	E		1150.44	50.02		

DELAYED RETENTION ANALYSIS

Drawing Test	14 Boys	4.44	2.45	Method	1	68.61	68.61	5.32	.05
	9 Girls	7.89	5.09	Error	21	296.83	12.91		
Identification Test	B	7.13	3.24	M		4.69	4.69	0.38	n.s.
	G	6.22	4.05	E		289.31	12.58		
Terminology Test	B	5.06	2.59	M		6.33	6.33	1.06	n.s.
	G	6.11	2.15	E		137.83	5.99		
Comprehension Test	B	5.87	1.89	M		4.41	4.41	1.21	n.s.
	G	5.00	1.94	E		83.75	3.64		
Total Criterial Test	B	22.62	7.12	M		38.85	38.85	0.60	n.s.
	G	25.22	9.55	E		1489.31	64.75		



Table 17. Heart Model Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	8 Boys	9.37	3.42	Method	1	0.06	0.06	0.01	n.s.
	22 Girls	9.27	3.33	Error	28	314.24	11.22		
Identification Test	B	9.75	1.83	M		1.09	1.09	0.12	n.s.
	G	10.18	3.52	E		284.77	10.17		
Terminology Test	B	7.00	1.85	M		1.75	1.75	0.15	n.s.
	G	7.55	3.81	E		329.45	11.77		
Comprehension Test	B	6.87	1.81	M		0.83	0.83	0.14	n.s.
	G	6.50	2.56	E		160.38	5.73		
Total Criterial Test	B	33.00	6.72	M		1.47	1.47	0.01	n.s.
	G	33.50	11.38	E		3035.50	108.41		

DELAYED RETENTION ANALYSIS

Drawing Test	7 Boys	7.75	4.59	Method	1	0.25	0.25	0.01	n.s.
	18 Girls	7.55	3.38	Error	23	386.95	16.82		
Identification Test	B	9.25	2.82	M		0.15	0.15	0.01	n.s.
	G	9.09	2.56	E		193.32	8.40		
Terminology Test	B	5.75	2.25	M		11.28	11.28	0.71	n.s.
	G	7.14	3.93	E		360.09	15.65		
Comprehension Test	B	6.50	3.59	M		0.05	0.05	0.00	n.s.
	G	6.59	3.10	E		291.32	12.65		
Total Criterial Test	B	29.62	9.77	M		9.00	9.00	0.06	n.s.
	G	30.86	10.61	E		3032.47	131.83		

Table 18. Realistic Photographic Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	13 Boys	7.38	4.65	Method	1	56.73	56.73	1.98	n.s.
	15 Girls	10.29	5.94	Error	26	717.93	28.72		
Identification Test	B	7.62	5.52	M		43.06	43.06	1.64	n.s.
	G	10.14	4.74	E		656.79	26.27		
Terminology Test	B	5.08	2.53	M		19.68	19.68	1.87	n.s.
	G	6.79	3.79	E		263.28	10.53		
Comprehension Test	B	10.38	2.96	M		5.47	5.47	0.62	n.s.
	G	11.29	3.00	E		221.93	8.88		
Total Criterial Test	B	30.62	11.58	M		175.25	175.25	1.19	n.s.
	G	35.71	11.74	E		3689.93	147.60		

DELAYED RETENTION ANALYSIS

Drawing Test	12 Boys	4.77	3.03	Method	1	112.64	112.64	5.33	n.s.
	15 Girls	8.86	5.67	Error	25	528.02	21.12		
Identification Test	B	7.23	4.90	M		17.83	17.83	0.76	n.s.
	G	8.86	4.80	E		588.02	23.52		
Terminology Test	B	6.31	3.15	M		0.47	0.47	0.06	n.s.
	G	6.57	2.47	E		198.20	7.93		
Comprehension Test	B	5.85	2.64	M		1.76	1.76	0.25	n.s.
	G	6.36	2.68	E		176.91	7.08		
Total Criterial Test	B	24.00	13.38	M		297.45	297.45	1.58	n.s.
	G	30.64	14.02	E		4730.21	188.13		

Table 19. Realistic Photographic Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	20 Boys	7.80	4.42	Method	1	12.68	12.68	0.77	n.s.
	11 Girls	6.50	3.34	Error	29	494.20	16.47		
Identification Test	B	8.80	3.66	M		3.85	3.85	0.37	n.s.
	G	8.08	2.31	E		314.12	10.47		
Terminology Test	B	6.20	2.21	M		3.68	3.68	1.06	n.s.
	G	5.50	1.00	E		104.20	3.47		
Comprehension Test	B	10.35	3.20	M		15.41	15.41	1.91	n.s.
	G	8.92	2.07	E		241.47	8.05		
Total Criterial Test	B	33.70	11.19	M		165.68	165.68	1.81	n.s.
	G	29.00	5.77	E		2744.20	91.47		

DELAYED RETENTION ANALYSIS

Drawing Test	20 Boys	6.05	4.44	Method	1	5.85	5.85	0.36	n.s.
	10 Girls	5.17	3.19	Error	28	486.62	16.22		
Identification Test	B	7.95	4.67	M		17.63	17.63	1.05	n.s.
	G	6.42	2.81	E		501.87	16.73		
Terminology Test	B	5.50	2.61	M		0.83	0.83	0.15	n.s.
	G	5.83	1.75	E		162.67	5.42		
Comprehension Test	B	5.50	2.84	M		0.00	0.00	0.00	n.s.
	G	5.50	2.07	E		200.00	6.67		
Total Criterial Test	B	25.00	11.95	M		22.97	22.97	0.22	n.s.
	G	23.25	6.41	E		3166.25	105.54		

Table 20. Oral Presentation Without Visuals - Eleventh Grade

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention and Delayed Retention Tests

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	17 Boys	3.71	3.18	Method	1	11.48	11.48	1.14	n.s.
	14 Girls	4.93	3.17	Error	29	292.46	10.08		
Identification Test	B	5.41	1.91	M		16.04	16.04	2.62	n.s.
	G	6.86	3.03	E		177.83	6.13		
Terminology Test	B	5.06	1.71	M		11.56	11.56	2.00	n.s.
	G	6.29	3.05	E		167.80	5.79		
Comprehension Test	B	8.71	1.72	M		4.84	4.84	1.09	n.s.
	G	9.50	2.50	E		129.03	4.45		
Total Criterial Test	B	22.88	4.50	M		168.81	168.81	3.40	n.s.
	G	27.57	9.27	E		1441.19	49.70		

DELAYED RETENTION ANALYSIS

Drawing Test	B	4.41	2.06	Method		10.32	10.32	1.44	n.s.
	G	5.57	3.27	Error		207.55	7.16		
Identification Test	B	4.94	3.01	M		26.12	26.12	2.29	n.s.
	G	6.79	3.79	E		331.30	11.42		
Terminology Test	B	4.88	1.65	M		4.44	4.44	0.45	n.s.
	G	5.64	4.34	E		288.98	9.96		
Comprehension Test	B	5.35	1.87	M		3.21	3.21	0.86	n.s.
	G	6.00	2.00	E		107.88	3.72		
Total Criterial Test	B	19.59	5.86	M		126.22	126.22	1.84	n.s.
	G	23.64	10.54	E		1993.33	68.74		

Table 21. Simple Line Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	19 Boys	9.22	6.66	Method	1	0.16	0.16	0.00	n.s.
	13 Girls	9.08	5.92	Error	30	1176.03	40.55		
Identification Test	B	9.72	4.68	M		0.02	0.02	0.00	n.s.
	G	9.77	5.12	E		685.92	23.65		
Terminology Test	B	7.61	4.85	M		7.48	7.48	0.39	n.s.
	G	6.62	3.62	E		557.35	19.22		
Comprehension Test	B	12.17	3.94	M		23.97	23.97	2.06	n.s.
	G	10.38	2.47	E		337.58	11.64		
Total Criterial Test	B	38.94	17.81	M		68.91	68.91	0.25	n.s.
	G	35.92	15.17	E		8151.87	281.10		

DELAYED RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	19 Boys	7.11	5.80	Method	1	0.01	0.01	0.00	n.s.
	12 Girls	7.08	5.31	Error	29	910.70	31.40		
Identification Test	B	8.22	4.05	M		0.00	0.00	0.00	n.s.
	G	8.23	4.32	E		503.42	17.36		
Terminology Test	B	6.72	3.72	M		0.25	0.25	0.02	n.s.
	G	6.54	3.71	E		400.84	13.82		
Comprehension Test	B	8.11	3.14	M		24.55	24.55	2.69	n.s.
	G	6.31	2.84	E		264.55	9.12		
Total Criterial Test	B	30.28	14.40	M		36.56	36.56	0.18	n.s.
	G	28.08	13.99	E		5872.53	202.50		



Table 22. Simple Line Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention  
 B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	10 Boys	9.20	4.21	Method	1	0.00	0.00	0.00	n.s.
	14 Girls	9.21	3.79	Error	22	345.96	15.73		
Identification Test	B	8.20	4.61	M		14.67	14.67	1.05	n.s.
	G	9.79	2.99	E		307.96	14.00		
Terminology Test	B	7.40	2.46	M		2.10	2.10	0.37	n.s.
	G	8.00	2.35	E		126.40	5.75		
Comprehension Test	B	10.60	3.84	M		0.20	0.20	0.02	n.s.
	G	10.79	3.09	E		256.76	11.67		
Total Criterial Test	B	35.40	10.68	M		1.63	1.63	0.01	n.s.
	G	35.93	11.70	E		2807.33	127.61		

DELAYED RETENTION ANALYSIS

Drawing Test	9 Boys	7.40	2.88	Method	1	6.17	6.17	0.47	n.s.
	13 Girls	8.43	4.09	Error	20	291.83	13.26		
Identification Test	B	9.20	3.33	M		0.23	0.23	0.02	n.s.
	G	9.00	3.92	E		299.60	13.62		
Terminology Test	B	5.70	1.77	M		13.38	13.38	1.33	n.s.
	G	7.21	3.19	E		160.46	8.02		
Comprehension Test	B	5.60	1.90	M		4.72	4.72	0.38	n.s.
	G	6.50	2.56	E		117.90	5.76		
Total Criterial Test	B	27.70	7.21	M		43.43	43.43	0.59	n.s.
	G	30.43	9.39	E		1613.53	73.34		

**Table 23. Detailed, Shaded Drawing Presentation (B+W)**

**A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention**

**B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests**

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	X	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	20 Boys	8.90	3.73	Method	1	18.41	18.41	1.29	n.s.
	12 Girls	7.33	3.87	Error	30	428.47	14.28		
Identification Test	B	7.45	4.63	M		18.02	18.02	0.97	n.s.
	G	9.00	3.67	E		554.95	18.50		
Terminology Test	B	9.20	4.48	M		26.13	26.13	1.77	n.s.
	G	7.33	2.35	E		441.87	14.73		
Comprehension Test	B	11.45	4.75	M		3.85	3.85	0.24	n.s.
	G	12.17	2.37	E		490.62	16.35		
Total Criterial Test	B	36.70	14.65	M		76.80	76.80	0.38	n.s.
	G	33.50	13.21	E		5999.20	199.97		

DELAYED RETENTION ANALYSIS

Criteria Measures	N	X	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	18 Boys	7.30	3.66	Method	1	1.10	1.10	0.09	n.s.
	10 Girls	6.92	3.06	Error	26	357.12	13.73		
Identification Test	B	8.45	4.57	M		34.13	34.13	1.50	n.s.
	G	10.58	4.19	E		589.87	22.68		
Terminology Test	B	8.25	4.02	M		0.05	0.05	0.00	n.s.
	G	8.33	2.57	E		380.42	14.63		
Comprehension Test	B	7.45	3.35	M		3.01	3.01	0.11	n.s.
	G	8.08	6.46	E		671.87	25.84		
Total Criterial Test	B	31.45	13.50	M		5.85	5.85	0.03	n.s.
	G	32.33	7.57	E		4095.62	157.52		



**Table 24. Detailed. Shaded Drawing Presentation (Color)**

**A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention**      **B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests**

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	X	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	15 Boys	8.73	4.53	Method	1	13.13	13.13	0.55	n.s.
	18 Girls	10.00	5.19	Error	31	744.93	24.03		
Identification Test	B	11.27	4.68	M		5.83	5.83	0.29	n.s.
	G	12.11	4.27	E		616.71	19.89		
Terminology Test	B	6.67	3.04	M		60.63	60.63	4.63	0.05
	G	9.39	4.03	E		405.61	13.08		
Comprehension Test	B	11.47	3.36	M		4.01	4.01	0.41	n.s.
	G	12.17	2.92	E		302.23	9.75		
Total Criterial Test	B	37.80	13.36	M		281.60	281.60	1.50	n.s.
	G	43.67	13.95	E		5808.40	187.37		

DELAYED RETENTION ANALYSIS

Drawing Test	14 Boys	6.53	5.30	Method	1	95.20	95.20	3.70	n.s.
	18 Girls	9.94	4.87	Error	30	796.68	25.70		
Identification Test	B	7.93	5.19	M		21.53	21.53	1.16	n.s.
	G	9.56	3.40	E		573.38	18.50		
Terminology Test	B	6.60	3.20	M		97.70	97.70	5.27	0.05
	G	10.06	5.03	E		574.54	574.54		
Comprehension Test	B	6.73	3.39	M		16.81	16.81	1.88	n.s.
	G	8.17	2.62	E		277.43	8.95		
Total Criterial Test	B	27.73	14.15	M		825.47	825.47	4.39	0.05
	G	37.78	13.35	E		5832.04	188.13		

Table 25. Heart Model Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	X	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	11 Boys	8.18	3.25	Method	1	21.60	21.60	1.37	n.s.
	19 Girls	6.42	4.31	Error	28	440.27	15.72		
Identification Test	B	8.91	3.51	M		10.45	10.45	0.61	n.s.
	G	7.68	4.44	E		477.01	17.04		
Terminology Test	B	7.64	3.23	M		7.03	7.03	0.73	n.s.
	G	6.63	3.02	E		268.97	9.61		
Comprehension Test	B	10.91	3.56	M		16.54	16.54	1.65	n.s.
	G	9.37	2.93	E		281.33	10.05		
Total Criterial Test	B	35.55	11.89	M		248.01	248.01	1.87	n.s.
	G	29.58	11.31	E		3715.36	132.69		

DELAYED RETENTION ANALYSIS

Drawing Test	9 Boys	7.45	3.86	Method	1	38.50	38.50	2.49	n.s.
	19 Girls	5.11	3.97	Error	26	432.52	15.45		
Identification Test	B	7.36	3.04	M		4.29	4.29	0.51	n.s.
	G	6.58	2.83	E		237.18	8.47		
Terminology Test	B	8.18	4.71	M		19.09	19.09	1.09	n.s.
	G	6.53	3.85	E		488.37	17.44		
Comprehension Test	B	6.82	2.89	M		4.08	4.08	0.52	n.s.
	G	6.05	2.76	E		220.58	7.88		
Total Criterial Test	B	29.73	13.40	M		216.09	216.09	1.74	n.s.
	G	24.16	9.69	E		3486.71	124.53		

**Table 27. Realistic Photographic Presentation (B+W)**

**A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention**

**B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests**

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	19 Boys	7.79	4.22	Method	1	1.51	1.51	0.07	n.s.
	14 Girls	7.36	5.12	Error	31	662.37	21.37		
Identification Test	B	10.84	4.02	M		41.56	41.56	2.50	n.s.
	G	8.57	4.16	E		515.95	16.64		
Terminology Test	B	7.58	5.09	M		19.71	19.71	0.75	n.s.
	G	9.14	5.20	E		818.35	26.40		
Comprehension Test	B	11.16	4.23	M		6.73	6.73	0.45	n.s.
	G	12.07	3.27	E		461.45	14.89		
Total Criterial Test	B	37.89	13.80	M		2.33	2.33	0.01	n.s.
	G	37.36	16.09	E		6795.00	219.19		

DELAYED RETENTION ANALYSIS

Drawing Test	B	6.11	5.09	M		9.91	9.91	0.37	n.s.
	G	7.21	5.31	E		834.15	26.91		
Identification Test	B	7.32	3.90	M		2.36	2.36	0.14	n.s.
	G	7.86	4.42	E		527.82	17.03		
Terminology Test	B	7.47	4.59	M		1.67	1.67	0.70	n.s.
	G	7.93	5.61	E		787.67	25.41		
Comprehension Test	B	6.47	4.36	M		30.80	30.80	2.12	n.s.
	G	8.43	2.87	E		450.17	14.52		
Total Criterial Test	B	27.37	15.73	M		142.39	142.39	0.54	n.s.
	G	31.57	16.95	E		8187.85	264.12		

**Table 28. Realistic Photographic Presentation (Color)**

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	X	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	15 Boys	8.07	4.57	Method	1	26.22	26.22	1.60	n.s.
	12 Girls	6.08	3.26	Error	25	409.85	16.39		
Identification Test	B	10.07	4.50	M		49.81	49.81	3.03	n.s.
	G	7.33	3.42	E		411.60	16.46		
Terminology Test	B	6.60	1.88	M		10.70	10.70	4.75	0.05
	G	5.33	0.78	E		56.27	2.25		
Comprehension Test	B	7.40	2.67	M		5.40	5.40	0.92	n.s.
	G	6.50	2.07	E		146.60	5.86		
Total Criterial Test	B	32.73	9.74	M		124.22	124.22	1.66	n.s.
	G	28.42	7.03	E		1871.85	74.87		

DELAYED RETENTION ANALYSIS

Drawing Test	14 Boys	6.47	4.73	Method	1	28.02	28.02	1.88	n.s.
	11 Girls	4.42	2.31	Error	23	372.65	14.91		
Identification Test	B	6.87	3.60	M		25.35	25.35	2.57	n.s.
	G	4.92	2.43	E		246.65	9.87		
Terminology Test	B	5.73	2.52	M		3.59	3.59	0.96	n.s.
	G	5.00	0.60	E		92.93	3.72		
Comprehension Test	B	6.27	2.94	M		31.78	31.78	5.68	0.05
	G	4.08	1.31	E		139.85	5.59		
Total Criterial Test	B	25.60	11.95	M		344.00	344.00	3.86	n.s.
	G	18.42	4.60	E		2230.52	89.22		

**Table 29. Oral Presentation Without Visuals - Twelfth Grade**

**A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention**

**B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests**

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	4 Boys	7.20	4.09	Method	1	31.21	31.21	2.02	n.s.
	16 Girls	10.06	3.89	Error	18	293.74	15.46		
Identification Test	B	8.40	2.51	M		4.61	4.61	0.35	n.s.
	G	9.50	3.86	E		249.20	13.12		
Terminology Test	B	6.80	1.30	M		2.59	2.59	0.18	n.s.
	G	7.62	4.24	E		276.55	14.56		
Comprehension Test	B	13.60	3.78	M		35.15	35.15	4.60	0.05
	G	10.56	2.42	E		145.14	7.64		
Total Criterial Test	B	27.80	16.30	M		349.26	349.26	1.86	n.s.
	G	37.37	12.90	E		3558.55	187.29		

DELAYED RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	4 Boys	5.60	5.46	Method	1	42.43	42.43	2.01	n.s.
	14 Girls	8.94	4.33	Error	16	400.14	21.06		
Identification Test	B	4.80	3.27	M		63.26	63.26	3.77	n.s.
	G	8.87	4.29	E		318.55	16.77		
Terminology Test	B	4.80	2.77	M		77.57	77.57	5.15	0.05
	G	9.31	4.13	E		286.24	15.07		
Comprehension Test	B	4.60	4.67	M		24.29	24.29	2.25	n.s.
	G	7.12	2.80	E		204.95	10.79		
Total Criterial Test	B	19.80	14.18	M		721.55	721.55	3.68	n.s.
	G	33.56	13.95	E		3724.74	236.04		



Table 30. Simple Line Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	13 Boys	10.31	3.90	Method	1	19.66	19.66	1.02	n.s.
	17 Girls	11.94	4.74	Error	28	541.71	19.35		
Identification Test	B	9.15	4.36	M		6.84	6.84	0.38	n.s.
	G	10.12	4.12	E		499.46	17.84		
Terminology Test	B	8.46	3.73	M		18.79	18.79	0.99	n.s.
	G	10.06	4.79	E		534.17	19.08		
Comprehension Test	B	11.38	2.96	M		22.13	22.13	1.85	n.s.
	G	13.12	3.79	E		334.84	11.96		
Total Criterial Test	B	39.31	11.61	M		233.79	233.79	1.29	n.s.
	G	44.94	14.70	E		5073.71	181.20		
<u>DELAYED RETENTION ANALYSIS</u>									
Drawing Test	13 Boys	7.08	5.16	Method	1	38.16	38.16	1.21	n.s.
	14 Girls	9.35	5.40	Error	25	784.81	31.43		
Identification Test	B	8.00	4.56	M		24.50	24.50	0.90	n.s.
	G	9.82	5.16	E		676.47	27.15		
Terminology Test	B	8.69	4.01	M		24.86	24.86	1.26	n.s.
	G	10.53	4.74	E		553.00	22.12		
Comprehension Test	B	7.77	3.72	M		0.00	0.00	0.00	n.s.
	G	7.76	3.99	E		421.37	16.85		
Total Criterial Test	B	31.23	15.38	M		292.26	292.26	0.96	n.s.
	G	37.53	17.28	E		7618.54	304.79		

Table 31. Simple Line Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	20 Boys	11.90	3.57	Method	1	0.56	0.56	0.04	n.s.
	11 Girls	12.18	4.09	Error	29	409.44	14.12		
Identification Test	B	9.70	4.35	M		10.37	10.37	0.69	n.s.
	G	10.90	2.74	E		435.11	15.00		
Terminology Test	B	10.20	4.88	M		37.25	37.25	2.17	n.s.
	G	7.91	2.12	E		498.11	17.18		
Comprehension Test	B	13.40	3.41	M		24.41	24.81	2.96	n.s.
	G	11.55	1.37	E		239.53	8.26		
Total Criterial Test	B	45.20	11.44	M		50.01	50.01	0.52	n.s.
	G	42.55	5.57	E		2797.93	96.48		

DELAYED RETENTION ANALYSIS

Drawing Test	18 Boys	9.95	3.83	Method	1	5.24	5.24	0.40	n.s.
	10 Girls	9.09	3.18	Error	26	379.86	13.10		
Identification Test	B	9.15	4.02	M		4.09	4.09	0.26	n.s.
	G	9.91	3.75	E		447.50	15.43		
Terminology Test	B	9.15	3.87	M		22.65	22.65	1.90	n.s.
	G	7.36	2.46	E		345.10	11.90		
Comprehension Test	B	9.95	2.82	M		9.09	9.09	1.34	n.s.
	G	8.82	2.14	E		196.59	6.78		
Total Criterial Test	B	38.20	9.38	M		64.65	64.65	0.93	n.s.
	G	35.18	5.83	E		2012.84	69.41		

Table 26. Heart Model Presentation (Color)

A. Means and Standard Deviation for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	13 Boys	7.31	4.42	Method	1	86.19	86.19	5.37	0.05
	9 Girls	11.33	3.28	Error	20	320.77	16.04		
Identification Test	B	7.08	2.72	M		24.48	24.48	2.39	n.s.
	G	9.22	3.80	E		204.48	10.22		
Terminology Test	B	7.46	3.28	M		5.14	5.14	0.36	n.s.
	G	8.44	4.42	E		285.45	14.27		
Comprehension Test	B	11.08	3.38	M		1.45	1.45	0.12	n.s.
	G	10.56	3.78	E		251.15	12.56		
Total Criterial Test	B	32.92	7.48	M		162.13	162.13	1.91	n.s.
	G	38.44	11.31	E		1697.15	84.86		

DELAYED RETENTION ANALYSIS

Drawing Test	B	4.46	3.78	M		40.53	40.53	2.00	n.s.
	G	7.22	5.40	E		404.79	20.24		
Identification Test	B	6.31	2.81	M		21.82	21.82	2.78	n.s.
	G	8.33	2.78	E		156.77	7.84		
Terminology Test	B	6.92	3.55	M		2.13	2.13	0.12	n.s.
	G	7.56	5.00	E		351.15	17.56		
Comprehension Test	B	6.08	3.20	M		0.01	0.01	0.00	n.s.
	G	6.11	4.31	E		271.81	13.59		
Total Criterial Test	B	24.38	11.08	M		188.20	188.20	1.05	n.s.
	G	30.33	16.21	E		3575.08	178.75		

Table 32. Detailed Shaded Drawing Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention  
 B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	17 Boys	11.12	4.46	Method	1	23.01	23.01	1.11	n.s.
	20 Girls	12.70	4.65	Error	35	727.96	20.80		
Identification Test	B	11.53	4.20	M		3.54	3.54	0.16	n.s.
	G	12.15	5.05	E		766.79	21.91		
Terminology Test	B	9.59	5.05	M		88.98	88.98	3.70	n.s.
	G	12.70	4.78	E		842.32	24.07		
Comprehension Test	B	13.94	3.72	M		0.78	0.78	0.06	n.s.
	G	13.65	3.66	E		475.49	13.59		
Total Criterial Test	B	45.53	14.44	M		316.69	316.69	1.25	n.s.
	G	51.40	17.06	E		8867.04	253.34		

DELAYED RETENTION ANALYSIS

Drawing Test	17 Boys	9.00	5.63	Method	1	88.31	88.31	3.55	n.s.
	19 Girls	12.10	4.38	Error	34	871.80	24.91		
Identification Test	B	9.53	4.86	M		45.31	45.31	2.19	n.s.
	G	11.75	4.27	E		723.99	20.69		
Terminology Test	B	9.06	4.22	M		99.54	99.54	3.84	n.s.
	G	12.35	5.72	E		907.49	25.93		
Comprehension Test	B	7.35	3.08	M		91.01	91.01	7.13	.05
	G	10.50	3.94	E		446.88	12.77		
Total Criterial Test	B	34.94	15.90	M		1392.23	1392.23	5.41	.05
	G	47.25	11.15	E		9002.69	257.22		

Table 33. Detailed Shaded Drawing Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	13 Boys	12.23	3.54	Method	1	6.57	6.57	0.42	n.s.
	16 Girls	13.19	4.25	Error	27	420.75	15.58		
Identification Test	B	12.15	4.10	M		19.73	19.73	1.37	n.s.
	G	13.81	3.53	E		388.13	14.38		
Terminology Test	B	13.54	3.53	M		25.87	25.87	1.93	n.s.
	G	15.44	3.76	E		361.17	13.38		
Comprehension Test	B	15.85	2.34	M		2.55	2.55	0.37	n.s.
	G	15.25	2.84	E		186.69	6.91		
Total Criterial Test	B	53.77	4.71	M		113.66	113.66	2.47	n.s.
	G	57.75	8.07	E		1243.31	46.05		

DELAYED RETENTION ANALYSIS

Drawing Test	B	11.23	3.59	Method		0.79	0.79	0.04	n.s.
	G	11.56	4.75	Error		492.25	18.23		
Identification Test	B	11.69	3.77	M		2.31	2.31	0.18	n.s.
	G	11.12	3.50	E		354.52	13.13		
Terminology Test	B	13.69	2.90	M		6.24	6.24	0.55	n.s.
	G	14.62	3.69	E		304.52	11.28		
Comprehension Test	B	10.31	2.59	M		0.98	0.98	0.09	n.s.
	G	9.94	3.84	E		301.71	11.17		
Total Criterial Test	B	46.54	7.03	M		3.63	3.63	0.04	n.s.
	G	47.25	10.44	E		2228.23	82.53		



Table 34. Heart Model Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention	B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests								
	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	22 Boys	11.41	3.67	Method	1	3.32	3.32	0.24	n.s.
	14 Girls	10.79	3.72	Error	34	463.68	13.64		
Identification Test	B	12.00	3.80	M		11.17	11.17	0.80	n.s.
	G	10.86	3.63	E		475.71	13.99		
Terminology Test	B	9.55	4.69	M		0.08	0.08	0.00	n.s.
	G	9.64	4.25	E		656.67	20.49		
Comprehension Test	B	11.91	3.37	M		32.47	32.47	2.91	n.s.
	G	13.86	3.30	E		379.53	11.16		
Total Criterial Test	B	44.18	13.11	M		7.90	7.90	0.05	n.s.
	G	45.14	11.30	E		5268.99	154.97		
<u>DELAYED RETENTION ANALYSIS</u>									
Drawing Test	20 Boys	9.00	4.25	Method	1	0.70	0.70	0.04	n.s.
	14 Girls	9.29	3.97	Error	32	584.86	17.20		
Identification Test	B	9.00	3.96	M		17.46	17.46	1.04	n.s.
	G	10.43	4.31	E		571.43	16.81		
Terminology Test	B	8.86	4.18	M		1.52	1.52	0.09	n.s.
	G	9.29	4.23	E		599.45	17.63		
Comprehension Test	B	8.41	3.91	M		0.61	0.61	0.04	n.s.
	G	8.14	3.35	E		467.03	13.74		
Total Criterial Test	B	35.00	13.71	M		39.29	39.29	0.20	n.s.
	G	37.14	14.26	E		6587.71	193.76		

IMMEDIATE RETENTION ANALYSIS

DELAYED RETENTION ANALYSIS

Table 35. Heart Model Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	23 Boys	11.04	4.35	Method	1	6.46	6.46	0.36	n.s.
	8 Girls	10.00	3.74	Error	29	514.96	17.76		
Identification Test	B	11.00	5.02	M		9.27	9.27	0.38	n.s.
	G	9.75	4.80	E		715.50	24.67		
Terminology Test	B	9.61	3.95	M		9.03	9.03	0.50	n.s.
	G	8.37	5.10	E		525.35	18.12		
Comprehension Test	B	11.78	3.19	M		5.55	5.55	0.50	n.s.
	G	12.75	3.73	E		321.41	11.08		
Total Criterial Test	B	43.57	14.25	M		47.04	47.04	0.21	n.s.
	G	40.75	16.41	E		6351.15	219.01		

DELAYED RETENTION ANALYSIS

Drawing Test	23 Boys	8.26	3.09	Method	1	0.40	0.40	0.02	n.s.
	7 Girls	8.00	4.38	Error	28	344.43	12.29		
Identification Test	B	9.26	4.08	M		0.08	0.08	0.01	n.s.
	G	9.37	3.20	E		438.31	15.11		
Terminology Test	B	8.13	3.57	M		3.29	3.29	0.21	n.s.
	G	8.87	4.61	E		429.48	15.31		
Comprehension Test	B	7.74	3.03	M		0.79	0.79	0.10	n.s.
	G	7.37	2.13	E		234.31	8.36		
Total Criterial Test	B	33.39	12.88	M		0.00	0.00	0.00	n.s.
	G	33.37	13.29	E		4885.35	174.46		

Table 36. Realistic Heart Presentation (B+W)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention		B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests							
Criterial Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	P.
Drawing Test	19 Boys	10.63	5.23	Method	1	1.44	1.44	0.05	n.s.
	10 Girls	11.10	5.70	Error	27	785.32	29.09		
Identification Test	B	9.16	4.50	M		8.55	8.55	0.46	n.s.
	G	10.30	3.86	E		498.63	18.47		
Terminology Test	B	9.84	4.72	M		7.33	7.33	0.33	n.s.
	G	10.90	4.70	E		601.43	22.28		
Comprehension Test	B	11.63	4.13	M		4.94	4.94	0.38	n.s.
	G	12.50	2.27	E		352.92	13.07		
Total Criterial Test	B	41.26	15.67	M		86.66	86.66	0.38	n.s.
	G	44.90	14.21	E		6234.58	230.91		
<u>DELAYED RETENTION ANALYSIS</u>									
Drawing Test	19 Boys	8.42	4.94	Method	1	0.21	0.21	0.01	n.s.
	9 Girls	8.60	4.72	Error	26	639.03	23.67		
Identification Test	B	9.05	4.31	M		2.75	2.75	0.15	n.s.
	G	9.70	4.08	E		485.05	17.96		
Terminology Test	B	8.11	4.67	M		16.66	16.66	0.82	n.s.
	G	9.70	4.22	E		551.89	20.44		
Comprehension Test	B	7.16	3.92	M		0.84	0.84	0.07	n.s.
	G	6.80	2.74	E		344.13	12.75		
Total Criterial Test	B	32.79	16.11	M		26.48	26.48	0.12	n.s.
	G	34.80	12.74	E		6130.76	227.07		

Table 37. Realistic Heart Presentation (Color)

A. Means and Standard Deviations for Students Achieving on the Criterial Tests - Immediate and Delayed Retention

B. Analysis of Variance of Achievement Scores Obtained by Boys and Girls on the Immediate and Delayed Retention Tests

IMMEDIATE RETENTION ANALYSIS

Criteria Measures	N	$\bar{X}$	S.D.	Source of Variability	D.F.	SS	M.S.	F.	p.
Drawing Test	7 Boys	9.43	4.69	Method	1	221.08	221.08	24.29	.01
	12 Girls	16.50	1.45	Error	17	154.71	9.10		
Identification Test	B	8.29	3.99	M		240.85	240.85	26.92	.01
	G	15.67	2.27	E		152.10	8.95		
Terminology Test	B	7.71	3.82	M		156.64	156.64	9.18	.01
	G	13.67	4.29	E		290.10	17.06		
Comprehension Test	B	11.86	3.53	M		27.11	27.11	2.75	n.s.
	G	14.33	2.90	E		167.52	9.85		
Total Criterial Test	B	37.29	12.98	M		2149.06	2149.06	18.68	.01
	G	59.33	9.27	E		1956.10	115.06		

DELAYED RETENTION ANALYSIS

Drawing Test	7 Boys	4.14	3.58	Method	1	436.86	436.86	49.30	.01
	10 Girls	14.08	2.27	Error	15	133.77	8.87		
Identification Test	B	6.71	1.98	M		234.68	234.68	50.86	.01
	G	14.00	2.00	E		67.43	4.57		
Terminology Test	B	6.71	2.81	M		234.68	234.68	16.75	.01
	G	14.00	3.86	E		211.43	14.08		
Comprehension Test	B	6.43	2.44	M		133.16	133.16	27.50	.01
	G	11.92	1.83	E		72.63	4.84		
Total Criterial Test	B	24.00	8.96	M		3591.00	3591.00	35.55	.01
	G	52.50	9.69	E		1515.00	101.00		