

Statistical Analysis SOAP Versus LOSS

Executive Summary:

Juan is finishing up his Master's Project in the Teacher Education Program at San Jose State University. He has conducted a Post-Test Only Control Group Design to determine the effectiveness of the new Social Organization and Policy curriculum versus the "traditional" Low Option Social Studies program. Juan figured that the best way to get the help he needed was to consult various members of the EDIT 221 Educational Research Course, SJSU Foothill Cohort to aid in the data analysis.

He has two research questions that he would like answered using an Analysis Of Variance (an ANOVA). Using the 23-point attitude scale, he would like to know if there is a difference in the Social Studies attitudes between the mean scores of students treated with SOAP materials and those treated with LOSS materials. Second, by using the 100-point social studies content test, he would like to know if there is a difference in Social Studies content knowledge between the mean scores of students treated with SOAP materials and those treated with LOSS materials.

Finally, Juan was curious as to whether there was a relationship between the student's social studies attitude, social studies content knowledge, reading ability, and problem solving ability. He was wondering in what direction, if any, this research can be extended.

Part 1: Descriptive Statistics

Experimental Group: *Mean, Standard deviation, minimum, maximum, and range for: Social Studies Attitude, Social Studies Content, Reading, and Problem solving*

X₁ : SS Attitude

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
19.3	2.793	.51	7.803	14.474	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
11	23	12	579	11401	0

Social studies attitude contained a mean of 19.3 out of 23 maximum with a standard deviation of 2.793. The minimum score was 11 with a range of 12.

X₂ : SS Content

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
90.333	11.454	2.091	131.195	12.68	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
55	100	45	2710	248608	0

Social studies content contained a mean of 90.33 out of 100 possible, with a standard deviation of 11.454. The minimum score was 55 with a range of 45.

X₃ : Reading

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
2.1	.662	.121	.438	31.513	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
1	3	2	63	145	0

The mean score for the reading experimental group was 2.1 out of a maximum of 3, with a standard deviation of .662. The minimum was 1 with a range of 2.

Experimental (Continued:)

X₄ : Prob.Solv

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
8.633	1.189	.217	1.413	13.767	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
6	10	4	259	2277	0

The mean score for problem solving was 8.633 out of a maximum of 10, with a standard deviation of 1.189. The minimum was 6 with a range of 4.

Control Group: *Mean, Standard deviation, minimum, maximum, and range for: Social Studies Attitude, Social Studies Content, Reading, and Problem solving*

X₁ : SS Attitude

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
15.267	3.29	.601	10.823	21.549	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
9	22	13	458	7306	0

The mean score of social studies attitude was 15.267 out of 22 maximum, with a 3.29 standard deviation. The minimum score was 9 with a range of 13.

X₂ : SS Content

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
76.433	15.995	2.92	255.84	20.927	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
45	100	55	2293	182681	0

Social studies content contained a mean score of 76.433 out of a maximum of 100, with a standard deviation of 15.995. The minimum score was 45 with a range of 55.

Control: (Continued)

X₃ : Reading

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
1.933	.64	.117	.409	33.087	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
1	3	2	58	124	0

Reading came in with a mean of 1.933 out of a maximum of 3, with a standard deviation of .64. The range of scores was 2 with a minimum of 1.

X₄ : Prob.Solv

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
7.6	1.404	.256	1.972	18.479	30
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
5	10	5	228	1790	0

The problem solving control group had a mean of 7.6 out of 10 maximum, with a standard deviation of 1.404. The range and minimum were 5.

Total: Mean, Standard deviation, minimum, maximum, and range for:
Social Studies Attitude, Social Studies Content, Reading and Problem solving

X₁ : SS Attitude

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
17.283	3.646	.471	13.291	21.094	60
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
9	23	14	1037	18707	0

The mean for social studies attitude was 17.283 out of a maximum of 23 with a standard deviation of 3.646. The minimum of 9 and the maximum of 23 give a range of 14.

X₂ : SS Content

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
83.383	15.471	1.997	239.359	18.554	60
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
45	100	55	5003	431289	0

The mean for social studies content was 83.383 out a 100 possible, with a standard deviation of 15.471. The range is 55 with a minimum of 45.

X₃ : Reading

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
2.017	.651	.084	.423	32.267	60
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
1	3	2	121	269	0

The mean for the reading group was 2.017 out of a maximum of 3, with a standard deviation of .651. The range for this group was 2 with a minimum of 1.

X₄ : Prob.Solv

Mean:	Std. Dev.:	Std. Error:	Variance:	Coef. Var.:	Count:
8.117	1.391	.18	1.935	17.139	60
Minimum:	Maximum:	Range:	Sum:	Sum of Sqr.:	# Missing:
5	10	5	487	4067	0

The mean for problem solving was 8.117 out of a possible 10 with a standard deviation of 1.391. The range and minimum was 5.

Analysis:

For social studies attitude, it seems that the standard deviation in the control group was greater than the experimental group. The mean although was greater for the experimental group than the control group. The range of scores was greater in the control group than in the experimental group.

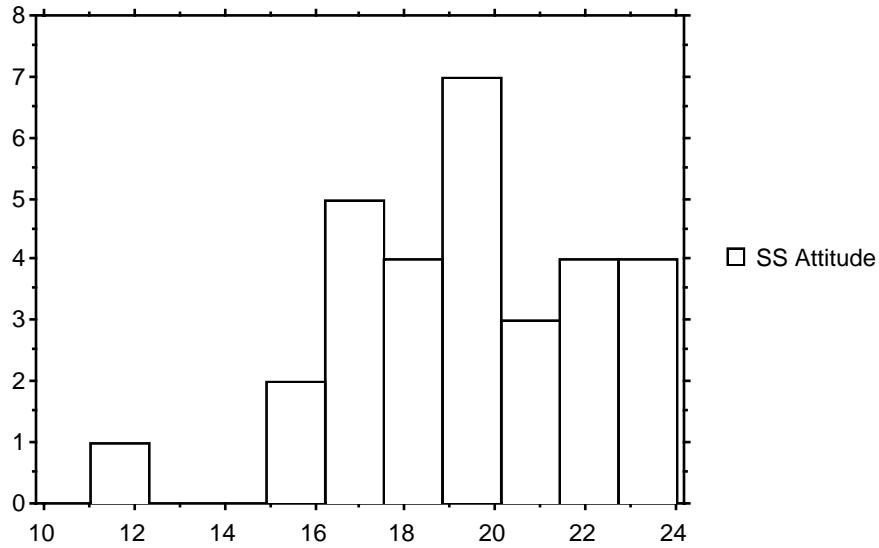
For social studies content, the mean was greater in the experimental group than the control group. The control group had a higher standard deviation and a higher range of scores than the experimental group.

Reading does not exhibit significant difference between the mean, standard deviations, and ranges of scores of the experimental group and the control group. The probable cause of these results comes from the small maximum of scores. An examiner could only get a score of 1 or 2 or 3 out of 3.

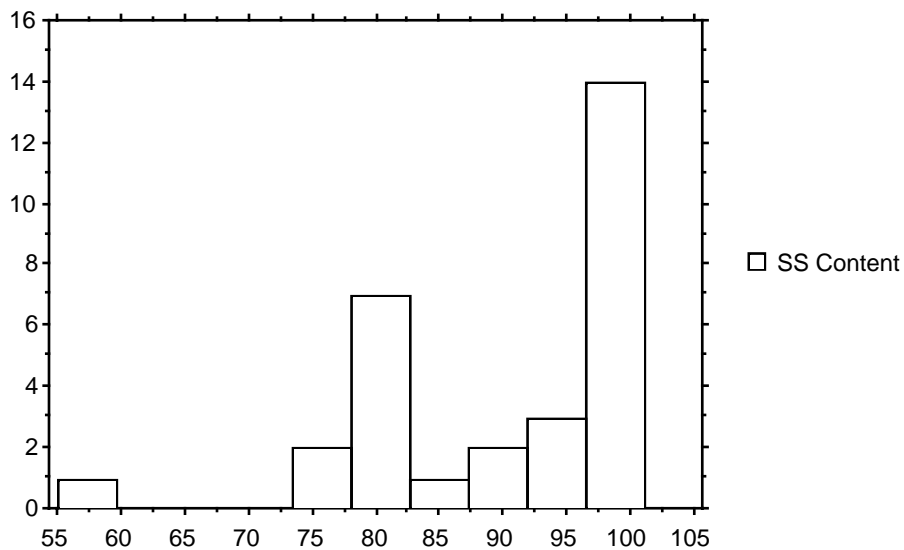
Problem solving also does not exhibit significant difference between the mean, standard deviations, and ranges of scores of the experimental group and the control group. The probable cause of these results comes from the small maximum of scores. An examiner could only get a score from 1 to 10.

Description of Histograms for Experimental, Control, and Total group measuring: *Social Studies Attitude, Social Studies Content, Reading, and Problem Solving*

Experimental

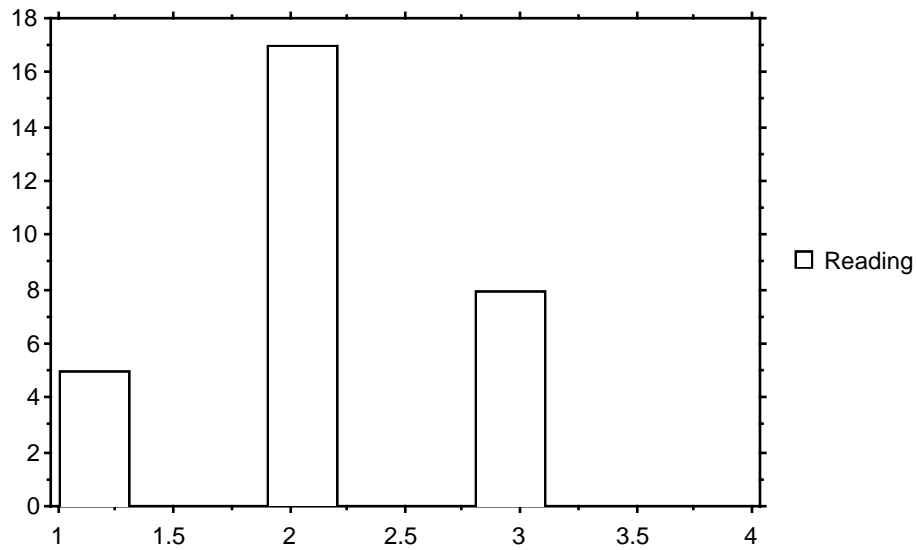


The histogram for the frequency distribution for the social studies attitude seems to exhibit a normal bell curve.

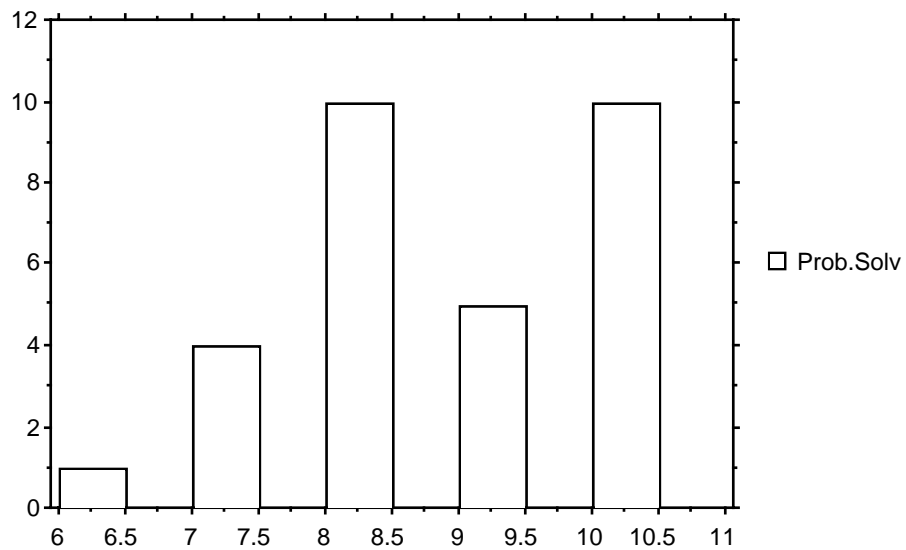


The data for this histogram is positively skewed.

Experimental: (Continued)

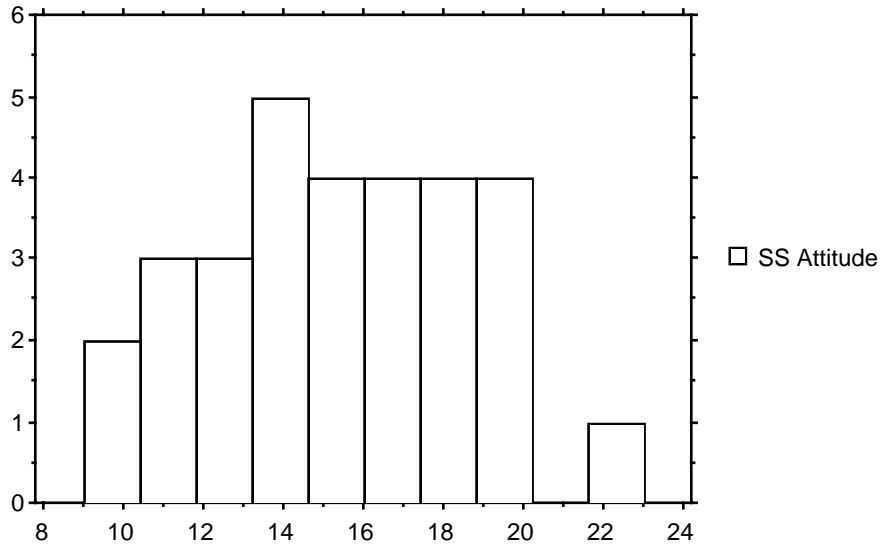


The data for this histogram seems to exhibit a normal bell curve.

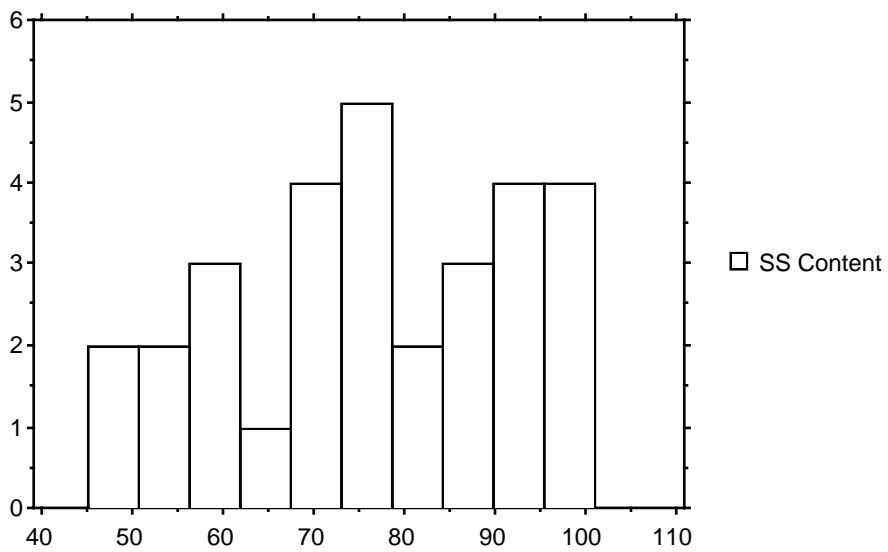


This is an example of a Bi-Modal and positively skewed histogram.

Control

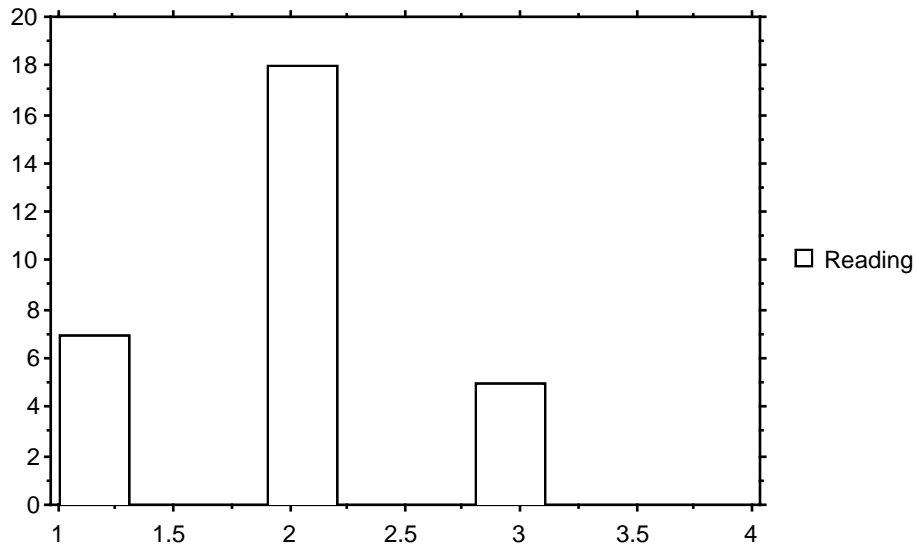


The data tends to exhibit a bell curve with a cluster in three areas.

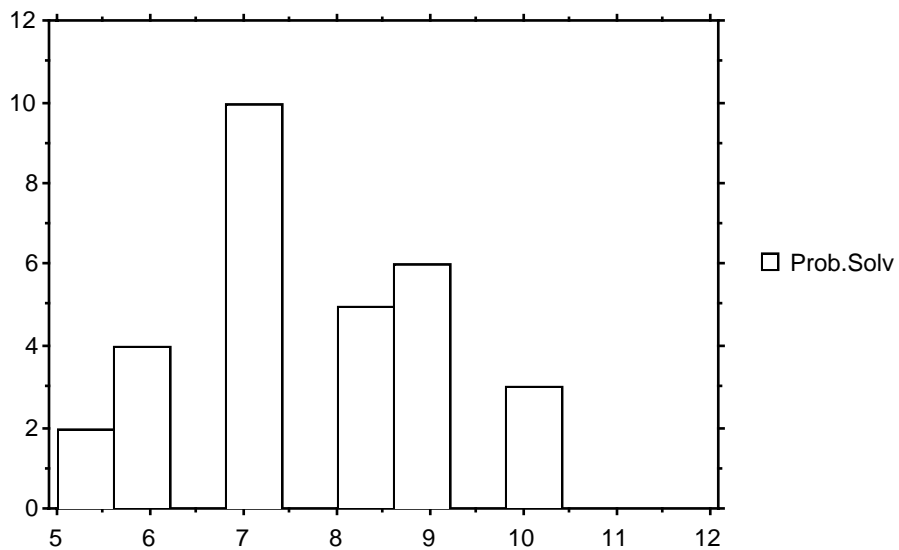


The data for the graph seems to exhibit a normal distribution or a bell curve.

Control (Continued)

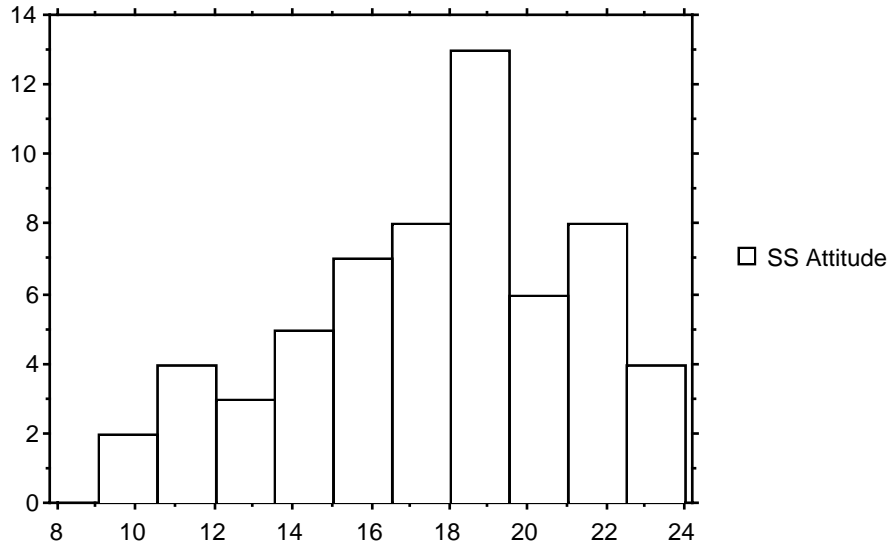


The data for the graph seems to exhibit a normal distribution or a bell curve and is clustered in three areas.

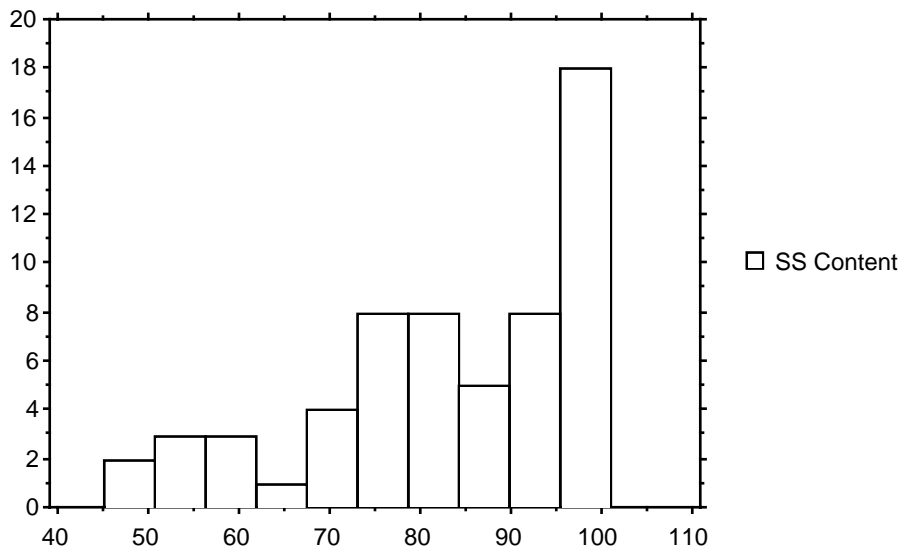


This histogram appears to be a negatively skewed wide bell curve.

Total Group

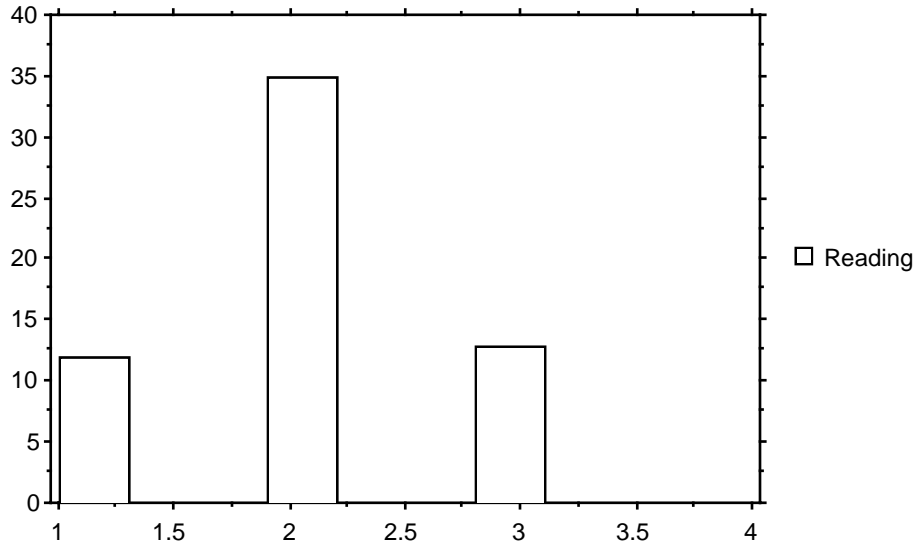


The histogram for the frequency distribution seems to be positively skewed.

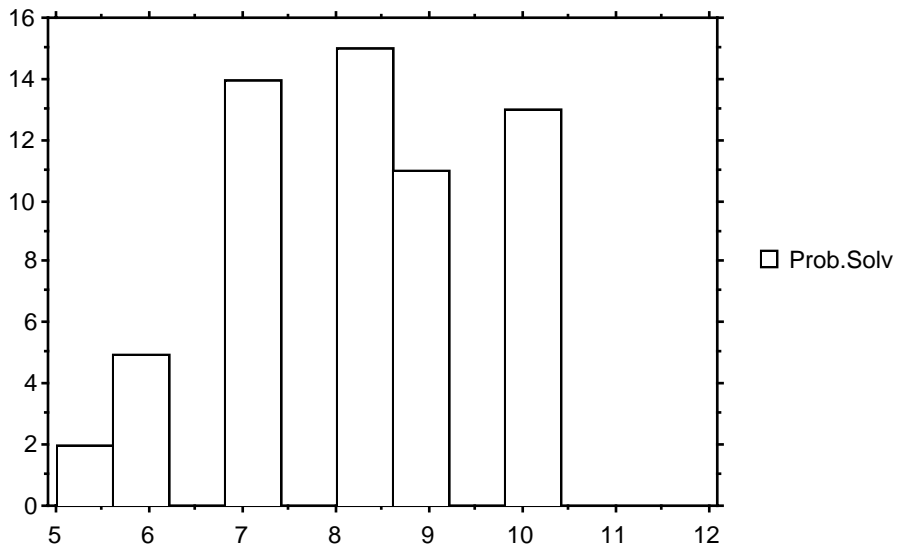


The data for this histogram is positively skewed and it tops out at 100.

Total Group (Continued)



The data for this histogram seems to be positively clustered in three areas



The data contained in the histogram seems to top out at the maximum.

Part 2: Analysis of Variance (ANOVA)

Research question:

Is there a difference in Social Studies attitudes (as measured by the 23-point scale) of mean scores of students treated with SOAP materials and those treated with LOSS materials?

ANOVA for Social Studies Attitudes

One Factor ANOVA X₁: Group Y₁: SS Attitude

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	1	244.017	244.017	26.201
Within groups	58	540.167	9.313	p = .0001
Total	59	784.183		

Model II estimate of between component variance = 7.823

Analysis:

The calculated F of 26.201 is greater than the critical F of 2.07. Therefore, it can be concluded that there is a statistically significant difference in social studies attitudes between the mean scores of students treated with SOAP materials and those treated with LOSS materials.

Research question:

Is there a difference in Social Studies content knowledge (as measured by the 100-point social studies content test) between the mean scores of students treated with SOAP materials and those treated with LOSS materials?

ANOVA Social Studies Content Knowledge

One Factor ANOVA X 1: Group Y 1: SS Content

Analysis of Variance Table

Source:	DF:	Sum Squares:	Mean Square:	F-test:
Between groups	1	2898.15	2898.15	14.976
Within groups	58	11224.033	193.518	p = .0003
Total	59	14122.183		

Model II estimate of between component variance = 90.154

Analysis:

The calculated F of 14.976 is greater than the critical F of 2.07. Therefore a statistically significant difference exists between the social studies content knowledge between the mean scores of students treated with SOAP materials and those treated with LOSS materials.

Part 3: Correlation and Future Research

Research question:

Is there a relationship between the student's social studies attitude, social studies content, reading ability, and problem solving ability?

Correlation Matrix for Variables: X₁ ... X₆

	Group	Gender	SS Attit...	SS Cont...	Reading	Prob.Solv
Group	1					
Gender	0	1				
SS Attitude	-.558	-.097	1			
SS Content	-.453	-.081	.953	1		
Reading	-.129	-.026	.084	.058	1	
Prob.Solv	-.375	-.133	.822	.835	.185	1

Analysis:

The strongest correlations seem to be between a student's social studies attitude and a student's social studies content knowledge and problem solving ability. A recommendation of further research is suggested to determine whether a student's attitude toward social studies will affect his or her performance on learning social studies content knowledge and problem solving abilities.

Furthermore, there seems to be some correlation between a student's group and his or her social studies attitude and content. A recommendation of further research should be explored to determine if anything should be done with the SOAP treatment and the LOSS treatment. Further study could potentially lead to one treatment being favored over the other.

Finally, there is no relationship between a student's gender and the group that he or she was assigned to in this study.

