Learning Naturally:

An Evaluation of Student Response to Nature Art and Illustration

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Dr. Gutrich's ES 494C

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Introduction:

Traditionally, children's environmental science education involves reading information from textbooks and taking tests on what has been learned. Some children fail to become engaged by this approach, complaining that textbooks are difficult and boring. Such disengaged students may simply memorize facts for tests without really understanding or appreciating the science behind them. The popularity of *Bill Nye the Science Guy®* and Gary Larson's *The Far Side®* suggest that children and the general public find science education appealing when humor is built in. This raises a question: would including art and emotion in the education curriculum lead children to a deeper interest in and better understanding of environmental science?

My study investigated the effectiveness of nature art (graphics and photography) versus traditional scientific illustration as a medium to teach school children about nature and natural sciences. Specifically, I was testing to see if children statistically chose a certain image as their favorite or inspirational, more often than the other images.

Methodology:

Approximately 20 students each from second and sixth grades were individually called from their classrooms in Yreka, California, to be surveyed on their reactions to three sets of pictures. The picture sets depicted 1) beavers, 2) whales, and 3) the natural history of Hawaii. Each picture set consisted of three pictures displayed on a poster board. One picture was a scientific illustration, such as seen in a textbook or field guide. The second picture was a nature photograph with emotional elements, such as a dramatic wildlife photograph from *National Geographic*. The third picture was an emotional, fantasy drawing, portraying wildlife (see Appendix A).

The students were asked which picture was their favorite. An assistant would then cover up the picture that was the student's favorite and ask them which of the remaining pictures was their favorite,

in order to identify their second-ranked and third ranked favorites. Responses were recorded on an IPad using the Qualtrics® survey software. The procedure was repeated with the same set of pictures, this time asking the students which picture inspired them to learn more about the subject shown.

Each student was then shown two more poster boards and was asked the same questions about their favorites and inspiration to learn.

Results and Discussion:

Before collecting data, a null and alternative hypothesis were established. The null hypothesis was that student would should no preference to the various types of art they were shown and therefore the distribution would be random. The alternative hypothesis was that students would show a preference toward specific pieces.

It was assumed that students in the younger grade would show a favorite preference toward the emotional fantasy drawing and older students would prefer the scientific illustrations or the nature photograph.

Qualtrics® software provided the totals of the sampled children's responses. As an example, the responses to the picture set depicting beavers are shown in Appendix B. The results were surprising. The second graders most often chose the nature photograph as their favorite on all three boards. The nature photograph was ranked highest as the picture that most inspired them to learn on two of the three boards.

In the sixth grade sample, the nature photograph was also most often chosen as the favorite piece. On two of the three boards, most of them chose the nature photograph as the picture that most inspired them to learn.

After data was collected, with the help of the statistics professor, the data was entered in an SPSS® statistical software database. The data was organized by the number of total numbers of rank values the students chose on the specific pictures. It was decided to run a Chi^2 statistical test at the .05 significance levels on the picture totals.

Before the Chi^2 test was run, six databases were set up. The first four were the second grade favorite rankings, second grade inspirational rankings, sixth grade favorite rankings, and sixth grade inspirational rankings. The last two were the favorites and inspirational rankings from all the surveyed students combined. In all of the databases, the Pearson Chi^2 coefficient was greater than .05, therefore the null hypothesis was failed to disprove (see Appendix C).

Conclusions:

This study is limited but provided insights in to the thoughts and preferences of Yreka school children in terms of nature education. This study suggests further research should be done in different communities with a larger sample. A larger sample would enable more in depth statistical analysis to be performed. Performing studies in different communities would consider if different communities would be correlated with different student preferences. In the current study, the nature photograph was most popular. Future studies could look to see if nature photograph's trend continued in different schools. A board examining different types of nature photographs could be evaluated, looking to see if children are attracted by the emotional elements or the photograph itself. By using this study as a guide and knowing its limits, future studies can better examine and analyze these possible variables.

Appendix A – Example of Poster Board with Picture Set

Exhibit A

Image source Greg Newbold.

Exhibit B

Image © Statesman's Journal.

Exhibit C

Image © Tony Zuvella.

From the left: scientific illustration, nature photograph and nature art piece.

Appendix B – Budget Details

Investigator, Parker Flickinger, will perform construction of voting exhibits and materials.

Southern Oregon University has agreed to allow the researcher to conduct his data analysis and write his reports on their computers. His research will also coincide with classes he is enrolled in, such as ES 386 Environmental Data Analysis.

Appendix C – Stakeholders & Professional Contacts:

Assistance was provided by:

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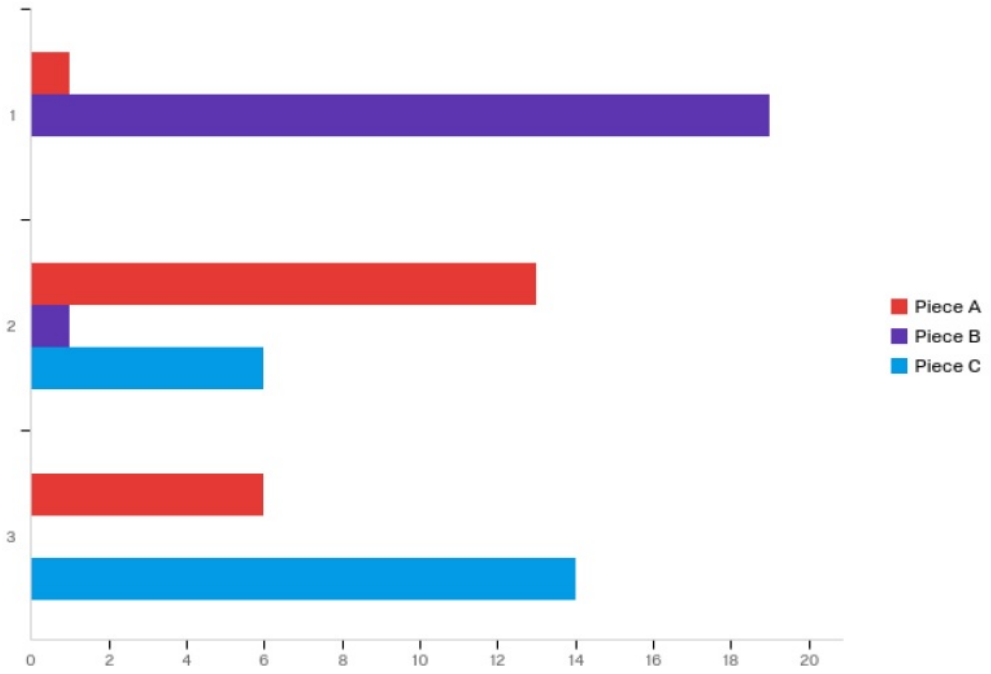
Appendix D - Qualtrics® Summaries

Default Report

Evergreen School

March 6th 2017, 6:50 pm MST

Q1 - Please rank the art pieces from your favorite to least favorite? (Beavers)

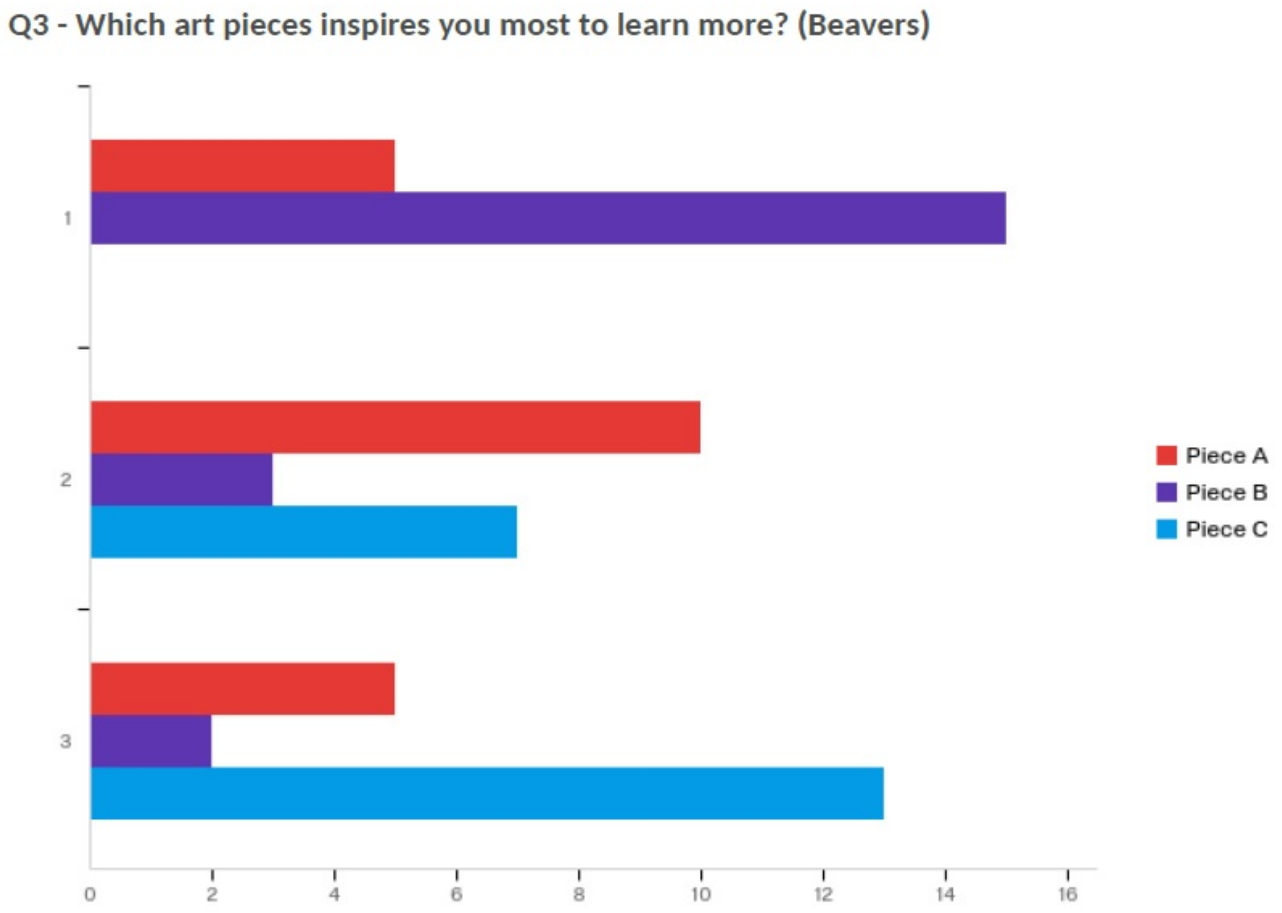


#	Question	1		2		3		Total
1	Piece A	5.00%	1	65.00%	13	30.00%	6	20
2	Piece B	95.00%	19	5.00%	1	0.00%	0	20
3	Piece C	0.00%	0	30.00%	6	70.00%	14	20

Figure 1: Summary of Second graders' favorite choices on Beaver board.

(#1 = favorite, #2 = second-ranked, #3 = third-ranked)

(Piece A = Scientific Illustration, Piece B = Nature Photograph, Piece C = Nature Fantasy Drawing)



#	Question	1		2		3		Total
1	Piece A	25.00%	5	50.00%	10	25.00%	5	20
2	Piece B	75.00%	15	15.00%	3	10.00%	2	20
3	Piece C	0.00%	0	35.00%	7	65.00%	13	20

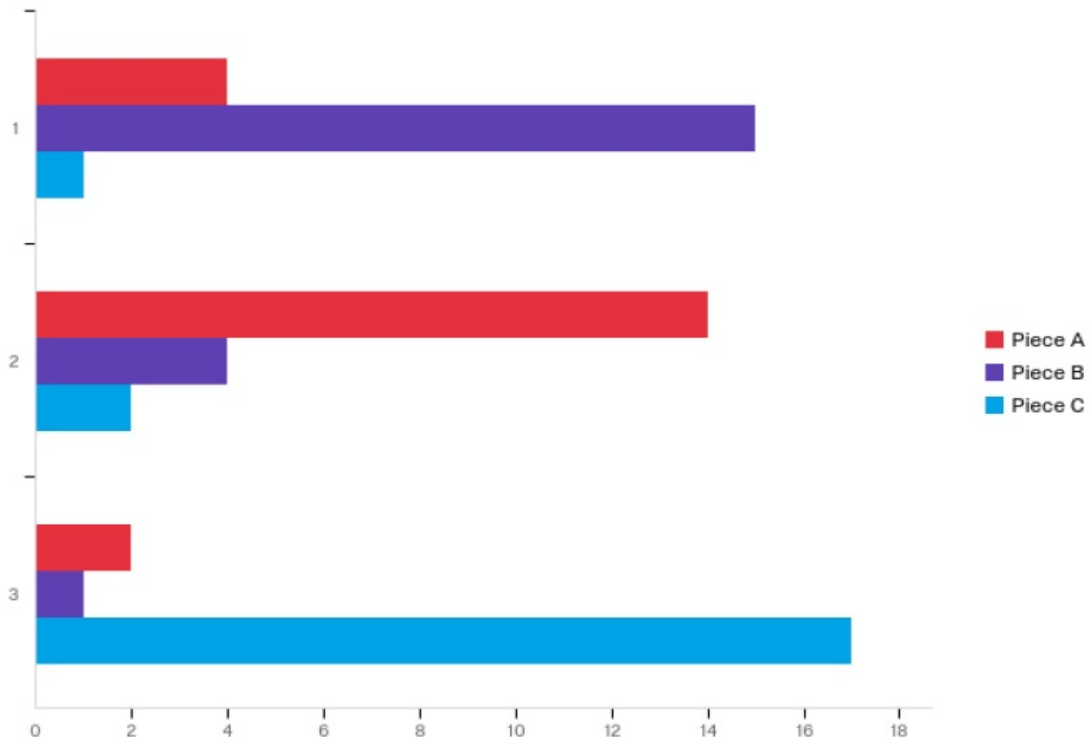
Figure 2: Summary of Second graders' learning choices on Beaver board.

Default Report

Jackson St School

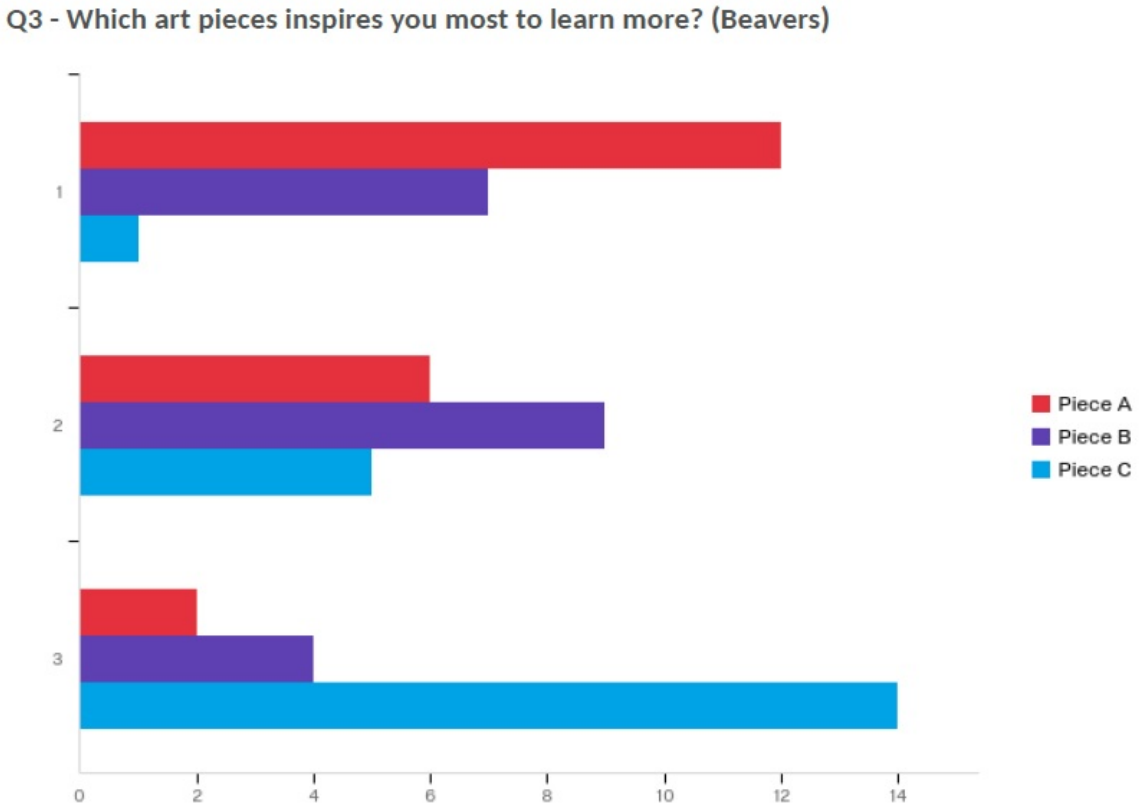
March 4th 2017, 5:45 pm MST

Q1 - Please rank the art pieces from your favorite to least favorite? (Beavers)



#	Question	1		2		3		Total
1	Piece A	20.00%	4	70.00%	14	10.00%	2	20
2	Piece B	75.00%	15	20.00%	4	5.00%	1	20
3	Piece C	5.00%	1	10.00%	2	85.00%	17	20

Figure 3: Summary of Sixth graders' favorite choices.



#	Question	1		2		3		Total
1	Piece A	60.00%	12	30.00%	6	10.00%	2	20
2	Piece B	35.00%	7	45.00%	9	20.00%	4	20
3	Piece C	5.00%	1	25.00%	5	70.00%	14	20

Figure 4: Summary of Sixth graders' learning choices.

Appendix E – Chi^2 results

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.000[a]	22	.297
Likelihood Ratio	29.139	22	.141
N of Valid Cases	18		

a. 36 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 5: Chi^2 test results of Second graders' favorite responses.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.000[a]	22	.211
Likelihood Ratio	31.232	22	.091
N of Valid Cases	18		

a. 36 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 6: Chi^2 test results of Second graders' learning responses.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.500[a]	18	.489
Likelihood Ratio	20.822	18	.289
N of Valid Cases	18		

a. 30 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 7: Chi^2 test results of Sixth graders' favorite responses.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.000[a]	22	.583
Likelihood Ratio	24.641	22	.315
N of Valid Cases	18		

a. 36 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 8: Chi^2 test results of Sixth graders' learning responses.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.000[a]	30	.368
Likelihood Ratio	37.144	30	.173
N of Valid Cases	36		

a. 48 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 9: Chi^2 test results of total students' favorite responses.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.500[a]	32	.102
Likelihood Ratio	49.648	32	.024
N of Valid Cases	36		

a. 51 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

Figure 10: Chi^2 test results of total students' learning responses.

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