

# The Learning Impact

## of Animals and Animal Artifacts

by **Jared Bixby** EDUCATION CURATOR | SUNSET ZOO | MANHATTAN KANSAS, **Dr. Gwen Carnes** (ASSISTANT PROFESSOR) and **Dr. Edwin Church** (ASSOCIATE PROFESSOR) SCHOOL LEADERSHIP MIDDLE SECONDARY EDUCATION | EMPORIA STATE UNIVERSITY | USA

**In today's litigious society, complaints filed by animal rights activists and demands placed on schools through the increased accountability of high-stakes testing mandate examination of instructional strategies that use live animals in the classroom. This study was designed to examine how the utilization of animals and animal artifacts as instructional tools in selected fourth-grade classroom instruction influences learning.**

This research examined the cognitive impact of various delivery methods for a life cycle lesson plan delivered to fourth-grade students. Four groups included one led by a teacher and three led by an Education Curator with either live animals only, animal artifacts only, or live animals and animal artifacts. Students participated in pre- and post-tests and all four groups showed significant increase.

### Introduction

Many zoos use animals and animal artifacts in their education programs. However, little research supports live animal or animal artifact use as an educational tool. The researcher hypothesized that students receiving instruction with contact animals and animal artifacts together would result in higher recall achievement than students receiving instruction without contact animals and animal artifacts.

Classrooms across the nation house a variety of animals, but the cognitive impact of those animals as instructional tools is not well-researched (Rud and Beck 2000; Sherwood et al. 1989). Animals have a beneficial influence on student feelings and attitudes. Stories students share about pets at home provide a reason for not allowing animals into the classroom, as suggested by Rud and Beck (ibid.). The use of visual aids, including props like animal specimens, is important when they will make an interpretive presentation more memorable (Ham 1992). The question is whether live animals have a greater visual imagery or novelty impact on recall than do pictures. Knapp and Benton (2005) reported that being in contact with live animals or being able to touch items, such as antlers, did increase participant recall and recognition. They reported touching as a novel experience that added to the cognitive impact of the presentation.

*Zoo educators typically refer to themselves as interpreters.*

*“Interpretation is a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource”.*

*(National Association for Interpretation, n.d.)*

### Animal artifacts

Animal artefacts are defined as objects created on the part of the animal that uses or modifies available material(s). Antlers, webs, cocoons, are examples of animal artifacts.



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Sherwood et al. (1989) examined whether utilizing a live animal or an animal artifact was more effective in improving recall. This study showed increased learning of both themed programs, but the long-term retention was greater,  $p < .001$ , for the program utilizing a live animal. These 45-minute programs were presented to students from one public school district visiting Mystic Marinelife Aquarium. The students were presented the programs outside their school, and the study did not include a control group.

In an effort to examine the impact of live animals in the students' regular learning environment, their classroom, Yerke and Burns (1993) presented a program with live animals in schools. This research showed no significant difference between pre- and post-tests in relation to cognition. It included no control group and was not part of the normal curriculum.

Based on the lack of evidence for the use of visual aids in promoting cognitive growth, the following hypothesis was formed:

*Students receiving instruction with visual aids, live animals and artifacts, will have higher post-test scores than all other instructional groups.*

### Methodology

#### Participants

To investigate the impact of live animals and animal artifacts on learning (measured by unit pre and post tests data), the researcher developed a partnership with seven elementary schools from the Salina School District and St. Mary's School at Salina, Kansas. The schools had the potential to receive a free program/lesson for all classes in their building. The partnership identified six fourth-grade classes per test group.

#### Design

Each of the four test groups consisted of two randomly assigned schools. The structures below describe the test groups:

1. The lesson presented with supplies, such as photos, provided by the researcher.
2. The lesson presented by the researcher with only animal artifacts.
3. The lesson presented by the researcher with only live animals.
4. The lesson presented by the researcher with both live animals and animal artifacts.

#### Procedure

The lesson for each test group covered identical information. Regular teachers provided the instruction for the control group. The researcher provided the instruction for all other groups. The researcher is a zoo educator and has no experience and limited training as a teacher. Teachers in the control group were experienced and licensed. Lessons in both groups were limited to 45-minutes. Information packets were provided with written instructions on administering the pre- and post-tests.

The pre-test was administered prior to lesson presentation. The post-test was administered after instruction. The researcher collected and scored all tests. Teachers were instructed not to answer students' questions regarding the tests and were told to encourage students to "do the best they can." Teachers were told not to assist students who found unfamiliar terms in the pre-test.

Lesson plans developed by the researcher were provided to teachers in the control group. The control group teachers were instructed to present a 45-minute lesson. If students had questions that remained unanswered when the 45-minute period ended, teachers were instructed to refrain from answering questions until after the post-test was given. In addition to the

**Table 1** Descriptive Statistics by Lesson Type.

Lesson Group	N	Means (Std.Dev.)	
		Pre-test	Posttest
Teacher Led	111	12.0360(2.45663)	14.9189(2.58012)
Artifact Only	135	11.7407(3.35680)	14.4889(3.22968)
Live Animals Only	93	11.5806(3.19416)	14.9032(3.20008)
Artifacts and Animals	115	11.4348(2.75340)	13.8435(3.02502)

Note: Maximum score = 20.

**Table 2** Analysis of Variance for Effects of Lesson Artifacts on Cognitive Growth.

Source	df	F	$\eta$	p
Lesson	3	3.065	.02	.028
Within group error	450	(9.145)		

Note: Value enclosed in parentheses represents mean square error.

instructions for the lesson, teachers were provided copies of the pictures to be utilized during the lesson plan. No handouts were given to students, nor did they have homework for the lesson plan.

All lessons were presented to the schools within a 10-week period. Due to the logistical obstacles of working with multiple schools, the lessons were not presented at the same time of day. For example, some schools received the lesson plan before lunch and some received it after lunch. The lessons were presented in the fall to ensure the students had not already received a lesson on life cycles prior to this research project.

### Instrument

The researcher developed multiple-choice pre- and post-tests. Each test included 20 questions that were aligned with the Kansas State Science Standards. The lesson objectives directly related to state science testable benchmarks. Two teachers reviewed the lesson plans and tests. Both teachers agreed that the lesson plans and test were aligned with all objectives. They also concluded that the tests reading difficulty was appropriate for fourth grade students.

### Analysis and Results

Pre- and post-test scores were collected from 24 classrooms with 454 students (see Table 1). Pre-test

scores showed no differences based on group:  $F(3,450) = 0.88$ ,  $p = 4.74$ . Only one type of lesson was administered at each school to control for novelty effects; the school variable could not be controlled. Post-test scores were analyzed using a one-way ANOVA to determine the impact of visual aids on learning. Results showed a significant difference between groups receiving different types of instruction:  $F(3,450) = 3.07$ ,  $p = .03$ , partial eta squared at .20 (see Table 2). Based on Tukey post-hoc, the only difference was that students receiving teacher-led instruction had higher post-test scores than did students receiving instruction that included both live animals and artifacts:  $p = .039$ .

### Conclusion

Although studies have examined the impact of animals and animal artifacts on students, few have focused on the effects those tools have on learning in comparison to traditional teacher-led lesson plans. This research subjected students to one of four treatments. The results did not support the researcher's hypothesis that fourth-grade students receiving instruction with contact animals and animal artifacts together would achieve higher results than fourth-grade students receiving instruction without contact animals experienced. The results were not definitive and should not be used solely to make curriculum/lesson plan decisions at this point.



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The study did not control for or take into consideration the socio-economic status of the students. In addition, that factor could not be controlled for statistically. The two schools that were randomly selected for the group receiving the lesson with live animals and animal artifacts had a student body with over 60% of the students from economically disadvantaged families. In comparison, only one of the two schools whose regular classroom teachers taught the lesson plan had over 60% of its student body from economically disadvantaged families, and the other school had well over 60% of its student body from families that were not economically disadvantaged.

The four schools in the study showed achievement differences on state standardized tests in reading and math, in addition to their economic differences. Science standardized testing scores were not available. Both schools in the test group that showed significantly better post-test scores in this study also scored higher than the other two schools in reading and math on the state standardized tests in third, fourth, and fifth grades. In addition to under-performing on the state standardized tests when compared to the group that received the lesson from the classroom teacher, the two schools that received lessons with live animals and artifacts also scored lower than state averages in fourth-grade reading and mathematics.

Another factor that may have influenced the results of this study was the time limitations applied to each presentation of the lesson. The teachers and the informal educator were instructed to allow no longer than 45 minutes for the lesson. The group that incorporated both live animals and animal artifacts had twice as many visual aids as any other group. The additional visual aids required additional time, which reduced the time available for instruction in comparison to the other classrooms in the study. Thus, the informal educator was forced to change the delivery of the information to a much faster pace, which might have affected learning.

The study did not attempt to control the comparative quality of the instructional skills of the teachers and researcher involved in the study. The researcher, as a zoo curator, had content knowledge but did not have the pedagogical training of the control group teachers.

Finally, life cycles are more difficult to demonstrate with live animals and animal artifacts in comparison to pictures and videos. A significant difference might occur when utilizing live animals and animal artifacts in a lesson focused on comparing and contrasting animal structures and functions.

Further studies must be conducted before any reliable conclusions can be drawn when making decisions about curriculum. Additional studies might examine the effect of grade level on the efficacy of utilizing live animals and/or animal artifacts as visual aids when informal educators present lessons. Studies that controlled the variable of teacher instructional skill would be beneficial.

**Corresponding Author:** Jared Bixby | [bixby@ci.manhattan.ks.us](mailto:bixby@ci.manhattan.ks.us)

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