

# Evaluating the Impact of a Conservation Education Program in the Kalinzu Forest Reserve, Uganda

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**“Environmental education does not work!” That’s the argument of many field conservation workers. In fact, a recent article (Struhsaker et al. 2005) stated that environmental education programs in African protected areas had no relationship to conservation success or even positive attitudes from local people. Fundamental to this analysis is the perception that all environmental education programs are equal in terms of increasing knowledge and changing attitudes and behaviors. However, not all education is equal. This may be an assumption among environmental educators, but it is simply not true.**

So when are all environmental education programs not created equally? How do we know if an environmental education program is increasing knowledge or if it positively affects attitudes and behavior? Frankly, the only way to know for sure is to conduct formal evaluations. Formal evaluations in an informal education setting can be extremely challenging to accomplish, but the value of this information is undeniable. Here, we report on a formal evaluation of a conservation education program conducted at the Kalinzu Forest Reserve (KFR) through a partnership between the National Forest Authority of Uganda, the Uganda Ministry of Education and Sports, Jane Goodall Institute – Uganda, and Disney’s Animal Kingdom.

## The Program

The education program at KFR was focused on delivering four key messages and pro-environmental actions that a Primary Five student, elementary school grade five in the U.S., could take. Between May and November 2004, 847 Primary Five students from 18 rural schools near KFR were brought to the reserve to participate in the program. Students were transported in groups of 12 to KFR where they participated in the four hour program. Upon arrival, students were lead into the interpretive center

where they were administered the pre-program evaluation (see below). Following completion of the evaluation, students participated in an education program that was focused around four key messages (Table 1).

**Table 1.** The four key messages of the conservation education program at Kalinzu Forest Reserve. These key messages were used to help us identify our five evaluation questions for the program.

### KEY MESSAGES

1. KFR is home to a diversity of plants and animals.
2. Kalinzu is an important forest for our community, now and in the future.
3. Habitat conservation is necessary to protect the future of plants and animals.
4. Each of us is a guardian of the forest.

### EVALUATION QUESTIONS

1. Name two animals that live in the Kalinzu Forest.
2. Name two environmental problems in the Kalinzu Forest.
3. List two ways you can help wildlife and the environment.
4. What do you like most about the forest?
5. Which word best describes the forest?



Students participating in guided forest walks where they learn about the ecology of the forest environment.

Students participated in four activities and a forest walk designed to increase environmental knowledge, engender positive attitudes toward the environment, and encourage pro-environmental behaviors. The program was centered on five modules:

1. The size of Africa
2. Wildlife diversity
3. Adaptations to the forest
4. Threats to the forest
5. Actions children can take to help wildlife.

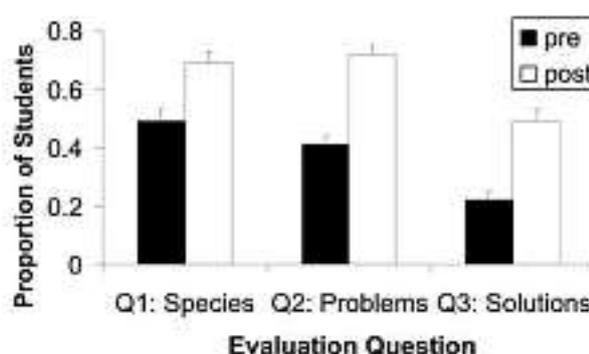
### The Evaluation

Students were presented with a paper-based five-question evaluation (Table 1). The questions were designed to assess knowledge, attitude, and behavior about the environment in general and KFR in particular. Questions were read aloud in English and Ruyankole by the instructors. Students wrote their answers in either English or Ruyankole. Students were given an identical post-assessment survey upon completion of the program. Answers written in Ruyankole were translated into English by the forestry staff.

To assess the improvement in performance for Questions 1-3, evaluations were summarized at the school level ( $n = 18$ ) for the proportion of students that provided two correct answers for the questions. Additionally, at the school level we calculated the proportion of students that reported a positive attitude in Question 5. We assessed Questions 1, 2, 3, and 5 by using a paired-samples t-test. We categorically summarized responses to Question 4 in the pre- and post-conditions. To evaluate the relationship between attitude and knowledge/behavior, we generated contingency tables for responses at the student level and calculated phi-coefficients to determine if positive attitude was related to knowledge level or behavior in either the pre- or post-program conditions.

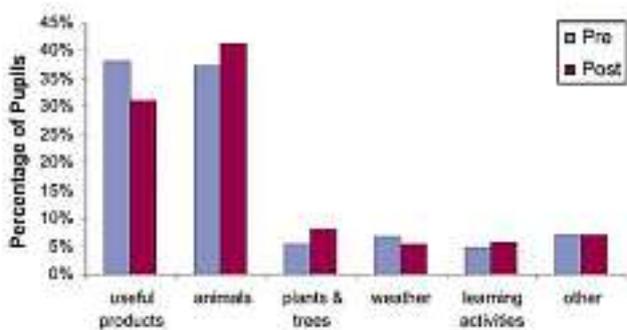
### The Results

Following participation in the program there was a statistically significant increase in the number of pupils that could correctly identify animals that lived in KFR ( $t_{17} = -8.92, P < 0.001$ ) (Figure 1). There was also a qualitative change in answer types. While “monkey” was the most common answer in both conditions, there was a marked decrease in the number of responses relating to domestic animals and savannah dwelling animals, such as “elephant”, “zebra”, and “giraffe”, after the program. Additionally, there were several new correct answer categories, including “insects” and “lizards”.



**Figure 1.** The mean proportion and standard error of students from each school who were able to correctly answer questions one through three increased after participating in the education program.

After completion of the program there was a significant increase in the number of pupils who were able to name two environmental problems ( $t_{17} = -8.309, P < 0.001$ ) (Figure 1). Deforestation-related problems remained the most common answer, along with soil-related issues, including erosion and excessive digging in the forest for tubers and medicinal plants. The lack of safety in the forest, and lack of material resources in the area were common answers during the pre-survey, but the number of these responses decreased dramatically after the program. After completing the program there was a significant increase in the number of children that were able to name pro-environmental behaviors ( $t_{17} = -8.304, P < 0.001$ ) (Figure 1). The most common answers in the post-program survey were decreasing cutting and burning of the forest, providing food, water, and medicine for wildlife, planting new trees, and decreasing hunting and pet-trade pressures on wildlife. There was also a significant decrease in the number of responses for behaviors that were impractical for children, including building more forest preserves and making more laws.



**Figure 2.** After the program there was a slight increase in the number of children who reported that they liked the animals in the forest over the fact that the forest provided useful products. There was also an increase in the number of children that reported that they liked plants/trees and the educational activities of the program.

The responses pupils gave for what they liked most about the forest were grouped into distinct categories (Figure 2). These data show that children most enjoyed animals and the useful products that the forest provides. Although these two categories reversed their rank in the post-program assessment, the change in responses was relatively small and both categories remained much higher than all the other responses combined. For Question Five, when choosing the word that best describes the forest there was a small but significant increase in the number of positive responses following participation in the education program (pre: 72% vs post: 83%,  $t_{17} = -6.072$ ,  $P < 0.001$ ).

Finally, in an effort to determine the relationship between attitude and knowledge, we correlated attitude in the pre- and post-program evaluations with performance on Questions 1-3 (Table 2). In the pre-program evaluations, positive attitude was associated only with being able to name 2 environmental problems. In the post-program evaluation, having a positive attitude was related to both naming environmental problems and naming environmentally responsible behaviors.

**Table 2.** Correlations indicate the relationship between positive/negative attitude and knowledge as assessed by Questions 1-3 in the program evaluation. Values in table represent Phi-coefficients ( $n = 847$  for all tests).

	PRE-PROGRAM ATTITUDE	POST-PROGRAM ATTITUDE
Question 1	- 0.038	- 0.002
Question 2	0.087*	0.078*
Question 3	0.023	0.083*

\* indicates  $P < 0.05$



Students were transported to and from the forest reserve via a mutato or passenger van.

### What is the value of evaluation?

Education evaluation is important because it provides objective information about the program. For example, overall knowledge gain in this program was substantial and baseline performance levels of these children were related to complexity of the knowledge. For example, while half of the students were able to name two animals that lived in the reserve prior to the program, only 20% were able to name two environmentally helpful behaviors. This finding is consistent with other research on environmental knowledge of African youth (Ali 2002; Johnson-Pynn and Johnson 2005). Thus, future education programs in this area can be aimed at building a more complex understanding of the natural world through the effective use of goals and key messages that inform and engage people. This approach differs from the presentation of complex ecological projects and issues, the more common approach used by field conservationists to educate and communicate their research results to local people.

Students showed an overall positive attitude toward the environment and positive attitude appears to be related to performance on the more complex environmental issues, such as threat and actions. Children in this study also show a high degree of ecophobia and a large percentage of children expressed fear relating to the forest and the dangers it harbors. Additionally, students appeared to have a utilitarian view of the environment. Thus, attempts at building environmentally responsible behaviors should focus on not only increasing knowledge but also creating positive attitudes. Also, future programs should consider the existing environmental attitudes of the children in this area. This information would have been unavailable without a formal evaluation.



We have utilized the findings from this study to provide feedback to the forestry staff who conducted the program to enhance their communication with the children. As such, the findings were used to improve the program. Additionally, the findings have been used as empirical evidence for the National Forest Authority as to the value of the program. These results have generated a great deal of support from Ugandan governmental agencies. Additionally, these data can be used by educators as evidence of past success when seeking other funding sources for programs. Finally, these data allow us to better prepare future programs to impact knowledge, attitude, and behavior of children in Uganda.

It is estimated that less than half of tropical education programs achieve their objectives (Norris and Jacobson 1998), and there is a growing call for evaluation of environmental education programs (Vaughan et al. 2003). We advocate a change in the paradigm of environmental education in tropical Africa toward an emphasis on goal-based key messages that are understandable and useful to the audience and evaluation of all education programs to determine if these goals are being met. It is only by the formal evaluation of education programs that we can be sure we are meeting our goals. Additionally, formal evaluation can provide information to improve the administration of these programs. Education is one of the best tools for engaging people about wildlife and ecosystems, and only through evaluation can we know if our education programs are accomplishing what we say they are. ♦

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Students used interactive props during the education program to learn more about the relationship between animals and the environment.

