Applied Environmental Education & Communication
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713657640

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Online Publication Date: 01 April 2007
To cite this Article: Kuhar, Christopher W., Bettinger, Tammie L., Lehnhardt, Kathy, Townsend, Stephanie and Cox, Debbie (2007) 'Into the Forest: The Evolution of a Conservation Education Program at Kalinzu Forest Reserve, Uganda', Applied Environmental Education & Communication, 6:2, 159 - 166
To link to this article: DOI: 10.1080/15330150701598213
URL: http://dx.doi.org/10.1080/15330150701598213

Applied Environmental Education and Communication, 6:159–166, 2007

ISSN: 1533-015X print / 1533-0389 online
DOI: 10.1080/15330150701598213

Routledge
Taylor & Francis Group

Into the Forest: The Evolution of a Conservation Education Program at Kalinzu Forest Reserve, Uganda

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While there are many conservation programs in east Africa, relatively little is invested in environmental education or capacity building within the community. With this in mind, the National Forest Authority of Uganda, the Ugandan Ministry of Education and Sports, Disney's Animal Kingdom®, and the Jane Goodall Institute—Uganda entered into a partnership to produce an environmental education curriculum for the Kalinzu Forest Reserve. This program was designed with outside educators/researchers as consultants with content driven by the local stakeholders. Here we describe how evaluation at multiple levels within the program has impacted the evolution of this program. We also include lessons that were learned and changes that were made in the content as well as the administration of the program.

ENVIRONMENTAL EDUCATION IN UGANDA

Situated at the convergence of grassland savannahs, mountain ridges, and lowland tropical forest, Uganda is positioned at a crucial point for biodiversity. Once described by Winston Churchill as the "pearl of Africa," Uganda contains diversity in habitat and species seldom found in a country of its size. However, the natural treasures of Uganda are threatened as they are in other areas throughout the world. Uganda is home to over 17 million people (Uganda Bureau of Statistics, 2006), and 85% of the population survives on agriculture, whereas 90% of the nation's energy comes from wood and charcoal (Arumadari, 2002). The annual cost of deforestation in Uganda, in terms of lost income, is estimated at between 2.75 and 5.5 million dollars annually (NEMA, 2000).

As is the case in many places in the world, environmental education is not part of the national curriculum in Uganda. The government has few resources available, many teachers have not attended university, and the biology curriculum in the school system tends to focus on practical agro-economics, with little

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to no discussion of the role plants and animals play in the ecology of the natural world or the long-term impact that disruption of this system can have on humans.

Little contribution to the environmental education effort in Uganda has been made by outside researchers and educators. There is surprisingly little research or evaluation on environmental education in Africa (but see Ali, 2002; Johnson-Pynn & Johnson, 2005; McDuff, 2000), and virtually none on education programs in Uganda. Although there are many long-term conservation programs in east Africa, many of them focus on one aspect of conservation, usually the biological system or the species-specific interests of the researchers, and invest very little in environmental education or capacity building in the community.

With this in mind, we entered into a partnership whereby the National Forest Authority of Uganda (NFA), the Ugandan Ministry of Education and Sports (MES), Disney's Animal Kingdom©, and the Jane Goodall Institute—Uganda (JGI—Uganda) would partner to produce an environmental education curriculum for the Kalinzu Forest Reserve (KFR). This program would develop the skills of NFA staff to facilitate the presentation of the education program and to conduct regular evaluation of the education and conservation impact, and enhance the existing Education Center at KFR.

Although the overall model of our program (needs assessment, training, development, evaluation) does not differ drastically from traditional environmental education programs, our model is different in the relationship between the outside educators/researchers and the local stakeholders. This program was designed with outside educators/researchers serving largely as consultants to the program while content was driven by stakeholders within the country. Additionally, even though this program was conducted at a forest reserve in a rural part of Uganda, it was conducted in cooperation with the MES. What follows is a description of the program from its inception in 2003 through its progress at the end of 2005.

THE KALINZU FOREST RESERVE

The Kalinzu Forest Reserve abuts the Maramagambo Forest Reserve, which together cover 584 km^2 in western Uganda (Howard et al., 1996). The KFR, itself occupying 137 km^2, is located in the Bushenyi district of western Uganda. It is home to one of the richest and most important bird communities in Uganda and several internationally rare butterfly species (Howard et al., 1996). Nearby researchers study chimpanzees that inhabit this forest. These chimpanzees have been the subject of several research studies (Hashimoto, 1995; Hashimoto et al., 1999, 2000). The presence of these scientists has had a positive impact on KFR as they employ local Ugandans in the research, and it is through the efforts of these researchers that the Education Center was built at the reserve. The Education Center is located on the northeast edge of the Kalinzu Forest Reserve along the main road running from Ishaka to Kyambura Wildlife Reserve.

Although there is a tradition of biological monitoring at KFR, only a limited conservation education program was in existence. As a result, the four partners were brought together with local stakeholders, including local school teachers and community leaders, to begin developing a plan to utilize the Education Center for conservation education programming. First, sufficient capacity building was required such that NFA staff could conduct the programs and the evaluations. Because many forestry staff members lacked a background in conducting and evaluating education programs, it was determined that several training workshops would be conducted. These workshops would emphasize interpretive techniques and the communication of key environmental messages. After these workshops were completed the education curriculum for this project was developed and laid on the foundation of the interpretive techniques. This allowed forestry staff to learn a skill that would be usable beyond the scope of this

Table 1
The six guiding principles of Interpretation that were first introduced by Freeman Tilden serve as the foundation of the interpretive profession

1. The purpose of interpretation is to inspire and to provoke people to broaden their horizons.
2. The purpose of interpretation goes beyond providing information to reveal deeper meaning and truth.
3. Interpretation should present a complete theme (message) or thesis and address the whole person.
4. To spark an interest, interpreters must relate the subject to the lives of the participants.
5. Interpretations for children, teenagers, and seniors should follow fundamentally different approaches.
6. The interpretive presentation should be designed as a story that informs, entertains, and enlightens.

particular education program and be adaptable to other programs throughout the country.

Second, it was decided this program would be based on the principles of interpretation (Beck & Cable, 1998) (see Table 1). Through the use of interpretive techniques, children would be encouraged to participate in the learning process by engaging in environmentally themed activities. The goal of the program was to increase environmental knowledge but more importantly encourage positive attitudes toward the environment and environmentally friendly behaviors by making a connection between the children and the forest. This approach is in contrast to the traditional didactic primary school lectures that are normally delivered. Although it was different from the traditional approach, NFA, MES, and JGI—Uganda staffs were open to this new program style.

Finally, it was determined that an empirical measure of the impact of the program was necessary to both justify contributions to the program for all partners and to provide feedback to the forestry and education staffs. This would provide information to better develop their skills as environmental educators. It was determined that forestry staff should also conduct the evaluation component, as this training would build additional skills. Training on evaluation techniques was also provided.

BUILDING CAPACITY

Once the objectives were agreed on by the stakeholders, a training plan was implemented to begin developing the skills of the NFA staff that would be the heart of the program. An initial Environmental Educators Workshop was conducted at the Education Center in February 2004. The workshop was attended by 22 participants, including foresters and educators from the Kalinzu Forest Reserve, Queen Elizabeth and Kibale National Parks, as well as local wildlife club leaders and primary school teachers.

Staff from JGI—Uganda and Disney's Animal Kingdom© facilitated the workshop and led the participants in group activities and instructed on interpretive and evaluation techniques. During the workshop, materials, group activities, and interpretive techniques were modeled. This allowed participants to experience the techniques they were going to be required to implement. We also administered a pre–post questionnaire to monitor the knowledge gained in the workshop and to model evaluation techniques. Forestry staff reported that Tilden's Six Principles of Interpretation (see Table 1) and skills around developing an educational conversation were the most valuable aspects of the workshop. Overall, feedback from the workshop participants was extremely positive.

Near the end of the workshop, the specific curriculum for the KFR education program was developed. The plan was for the participants to define appropriate key messages and actions for their area. JGI—Uganda and Disney's Animal Kingdom staff served as facilitators throughout the message and action development process but the actual content was developed by local people. After the messages and actions were defined, four key messages (Table 2), and eight conservation actions (Table 3) were selected for use in the program. The key messages and their associated actions were incorporated with the activities that had been modeled during the

Table 2
Four key messages developed by Ugandan staff for use in the education program

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.

opening days of the workshop. Three activities were included in the final version of the program, as well as a guided forest walk. With the guidance of Disney's Animal Kingdom® staff, a pre–post evaluation questionnaire was designed for implementation with the program.

THE PROGRAM

With the approval of MES, arrangements were made with schools surrounding KFR to bring Primary Five students to the reserve in small groups. Schools were selected for their proximity to KFR, but due to the large size of the forest reserve, most of the schools were not within a timely walking distance of the Education Center. Therefore, students were transported to the reserve in a small van, and group size was limited to 15, the number of children plus a teacher, that could be safely transported. It should be noted that this is the first time many of these children had ridden in a motor vehicle, so the program immediately became a highly memorable experience for them.

Table 3
Eight key conservation actions developed by Ugandan staff for use in the education program focusing on behaviors that could be performed by Primary Five level students

1. Teach others to respect and care for plants and animals.
2. Report problems affecting plants and animals to elders or relevant authorities.
3. Learn more about plants and animals by observing them in your area, reading books, or joining a club.
4. Be careful not to damage trees and other plants.
5. Do not scare, harm or kill animals.
6. Pick-up litter and do not drop your rubbish on the ground.
7. Instead of using natural forests, plant trees in your community for domestic use.
8. Reduce the number of plastic bags you use.

Once the students arrived at the reserve they were administered a pre-program questionnaire. Students were provided a copy of the questionnaire in English, the official language of Uganda. However, the questions were read out loud in both English and Ruyankole, the prevalent language in this area, as some of the students were still developing their English skills. After completing the questionnaire, the students participated in the program, which lasted approximately four hours. They participated in three activities that emphasized the diversity of wildlife in the forest, the adaptations of animals in the environment, threats to wildlife, and actions that one can take to help wildlife. They also participated in a guided forest walk.

Because the students in this program lived near the forest reserve, most of them had previously entered the forest reserve with an adult. Permits are required for most activities in the forest (i.e., firewood and medicinal plant collection). It is common practice in this area of Uganda for parents to tell their children stories of wild animals and bad people found in the forest, similar to Western culture's "Little Red Riding Hood." Leopards, chimpanzees, monkeys and bush pigs all live in the forest and are dangerous. So, it can be unsafe for children to go there without an adult.

In this program, a forest reserve guide accompanied children on a forest walk to show them the beauty of the forest but keeping to a safe area where known predators are rarely seen. For many students, the guided walk provided the first safe, educational opportunity for them to enter the forest reserve in an effort to learn about and appreciate the forest. As a result, the forest walk proved to be a highly memorable experience for many students.

After completion of the program, students completed an identical post-program questionnaire before being transported back to their school.

EVALUATING THE PROGRAM

The response to the program was highly positive with 847 children participating in the program in 2004 and nearly 1,200 students completing the program in 2005. Overall, the data revealed a strong improvement in knowledge after completion of the program and an overall positive utilitarian, view of the environment. There was a relatively smaller increase in performance on questions that addressed changes in attitude and behavior relating to the environment and evidence for difficulty with in-depth comprehension of environmental processes (see Kuhar et al., 2007) for a more complete discussion of the evaluation process). This is similar to the findings of Ali (2002), who found superficial comprehension of environmental knowledge, and a socioeconomic perspective in Kenyan children participating in wildlife clubs, and Johnson-Pynn and Johnson (2005), who found a lack of awareness of larger scale ecological relationships.

From the evaluation data we produced reports that graphically displayed the positive impact the program was having on the students. These reports were distributed to KFR staff, as well as officials from the Ugandan National Forest Authority and the Ugandan Ministry of Education and Sports. These reports provided consistent feedback to these agencies that their goals were being met and provided them concrete facts to show their managers about the outcomes of programs at the reserve.

LESSONS LEARNED

Throughout the development of this program, there were many challenges that were addressed along the way. The first of these challenges was the need to provide sufficient training to the forestry staff who would assume the role of environmental educators. Following the completion of the first educator's workshop, the forestry staff began preparation for the beginning of the education program. Throughout the preparation they received additional coaching from JGI—Uganda staff that was available to troubleshoot problems and make modifications to techniques and content based on the results of the evaluation surveys. Additionally, forestry staff participated in a workshop on environmental education in Entebbe, Uganda several months after the first workshop. After the first year of the program, forestry staff participated in a third workshop where they presented the education program for JGI-Uganda and Disney's Animal Kingdom© staff to allow for constructive feedback on program delivery technique and content. All of the workshops followed the model of the initial workshop. By participating in multiple workshops, forestry staff was allowed to fine tune their presentations and gain a more thorough understanding of interpretation techniques. The staff reported that the use of multiple trainings and constant evaluation of performance was beneficial to them. They said that as their knowledge increased, they took away a deeper understanding of the material that allowed them to adjust their teaching styles.

However, feedback goes both ways. Because these were new techniques for the guides and they were incorporating a "Ugandan" style into the delivery, they too provided input on changes for the program. The need to deliver much of the content in both English and a local language, the need to explain biological concepts (many of which did not have words in the local language) and the cultural tendency for detailed discussion of topics, resulted in the activities taking longer than originally predicted. As a result, we decided to remove some of the original content in order to stay on schedule and meet the time constraints of the forest staff and the local schools.

It is important to note that instructors quickly adapted to some of the new teaching techniques, such as the use of questions to stimulate discussion. This adaptation to an interactive teaching style probably reflects the oral tradition in Uganda that focuses on discussion

and debate—having discussions is consistent with traditional culture. However, whereas some props were used appropriately, the use of items such as puppets was much more challenging for the instructors. Puppets are extremely uncommon in this part of Uganda and were unfamiliar to both the instructors and the pupils.

Even techniques that the instructors enjoyed when they were being demonstrated in the workshop were often difficult to implement. It took much practice for them to be comfortable using interactive teaching styles. Additionally, the children were not used to this teaching style and were initially slow to respond to the instructors. In typical classrooms that may have 100 children, orderly conduct is a must and children are not encouraged to move around, call out answers, or ask questions of the teacher. Therefore, in the initial programs, all parties were gaining experience and adjusting, but the children quickly adapted to the interactive, small group style of learning. As a result, we learned that all activities should be assessed in the local communities, as local educators, as well as students, may not be comfortable with some modalities.

Throughout the evaluation process with the students it became apparent that using English in a classroom setting was challenging for Primary Five students in this area. However, when we consulted with the MES, they requested instruction and evaluation should continue in English with the local language, Ruyankole, being used to support the materials. In the Ugandan education system, Primary Five is the age at which English is required to be used in the classroom. MES viewed the use of English in this program as another way to reinforce the children's language skills thus further complementing the National curriculum. We compromised by using both English and a local language, but the students' lack of command of English made categorizing and scoring answers on open-ended questions challenging because of spelling and grammar errors. In the development of a subsequent program at another location in Uganda, we opted to focus the program on Primary Six students. In this setting, the participants are a year older and have completed an entire academic year using English. We feel the students' better command of the English language will enable us to evaluate the new program in more detail.

There were also challenges in developing appropriate evaluation questions for the program. In our first attempt at evaluation at this site, we tried using multiple choice questions. We found many students had difficultly with only choosing one answer on these types of questions. For example, the goal of one question was to assess attitude toward the forest and required students to pick one term they felt best describes the forest. This taught us that not only are students' unfamiliar with the concept of multiple choice questions with a single correct answer, their attitudes toward the forest are complex and may include both positive and negative emotions. In later evaluations, we have asked students to select as many answers as were appropriate and provided many different responses as choices. It should be noted that we continue to show only a minor increase in positive attitudes toward the forest after the program (Kuhar et al., 2007). This may be the result of a number of factors including a ceiling effect due to overall positive attitudes toward the forest, the program's ineffectiveness at changing attitudes or an ineffective question. We recommend further evaluation of program-assessment questions and a greater focus on environmental attitudes in Africa to help determine the cause.

One of the evaluation criteria in conservation partnerships should be the satisfaction of the local stakeholders. The response from local people regarding the program was extremely positive. In fact, the reviews were sufficiently positive that after completing the 2005 program season, we were asked by NFA to develop a new program at another one of their forest reserves.

But what is the ultimate measure of success of a conservation education program? Although stakeholder satisfaction is important, the ultimate goal of this, and many other conservation programs, is to change behavior of the target audience to positively impact the environment. Our education program was focused

on teaching people what they could do to help the environment, for example, decreasing deforestation and illegal hunting. However, our written pre–post evaluations are limited to the assessment of knowledge about behaviors that can impact the environment and not the actual performance of these behaviors. In other words, we are able to ask participants if they know what behaviors they can perform and if they are willing to perform pro-environmental behaviors, but these survey methods do not get at whether the behaviors are actually being performed. To make the measurement of success even more complicated, there is a final evaluation step which requires a connection between the new behaviors being performed (if indeed they are being performed) and a positive change, or at least a slowing of negative change, in the environment.

In lieu of formal assessments of behavior change and its environmental impact, we do have anecdotal information relating to positive environmental change. Data from a snare removal study in KFR (Hashimoto et al., in press) indicate the fewest number of snares were removed from forest areas neighboring schools that participated in the education program as opposed to other areas of forest that neighbor schools that have not participated in the program. As one of the conservation actions suggested by this program was to not harm or kill animals in the forest, these data may indicate a behavior change as a result of the conservation education program, that is, fewer snares are being set because participants were motivated to change their behavior. Unfortunately, we do not have data from these areas before the conservation education program began, so we cannot say with certainty that the lower numbers of snares in the area adjacent to our school programs was solely a result of the conservation education program. Additionally, our program targets Primary 5 children. Although these children may assist their parents in setting snares, the decision to snare is probably not solely theirs. Other information from adults in the community has lead us to suspect that parents may actually learn from their children. We send the children home with a bookmark that lists positive actions they can take to help the environment and encourage them to share this information with their friends and family. We are currently testing this hypothesis of "children teaching parents" in a program at another reserve.

CONCLUSION

Although there are many conservation education programs throughout the world, some researchers suggest environmental education programs have no measurable impact on biological success (Struhsaker et al., 2005). However, these broad analyses of environmental education tend to lump all programs together, even though not all programs are created equally. In the past, everything from holistic education programs to simply passing out stickers has been considered environmental education. We feel that environmental education should be positioned along with biological conservation activities and capacity building to be truly effective. Moreover, environmental education efforts (and all conservation efforts for that matter!) tend to be more successful when they begin with a needs assessment of the stakeholders in the area. Although many conservation projects conduct an impromptu needs assessment, it is often conducted from the perspective of outsiders. Local people should be consulted during the development and implementation of programs to ensure the community's needs are being met. It is only after all parties involved in the program have agreed on the objectives, context, and definitions of the program that any evaluation of the success can be conducted (Kleiman et al., 2000).

We also believe programs should be administered by the local people whenever possible. This may involve considerable capacity building and regular on-site management of the program in its early stages, but the overall buy-in from those involved with the program is worth the effort. Additionally, when local people are provided these opportunities their status in the community is often elevated. This

elevation in status tends to build goodwill toward the project, which can translate to support from local stakeholder as well as government leaders, a vital component to long-term success of a program.

Finally, we feel strongly that all conservation projects, not just conservation education projects, should contain an evaluation component. These assessments can not only determine the impact of the program, but they can be used to assess the process by which the results are achieved (Kleiman et al., 2000). Evaluation of environmental education programs can be particularly valuable because the data that are collected can be used as evidence of the effectiveness of the program and this evidence can strongly impact the policies of officials within the local governments and funding agencies.

Only by combining biological programs, environmental education programs, and capacity building in the area can conservation programs expect to have large impacts and continue to adapt in an uncertain future. We encourage other organizations involved in one or more of these components to give serious consideration to incorporating all three elements into their conservation program.

ACKNOWLEDGMENTS

We thank Musiime Patrick Rwobusheru, Bushenyi Zone Manager for the National Forest Authority. We thank Lukumo Norman, District Education Officer in the Bushenyi District. We thank Byamakama Lawrence, Mugabe Robert, and Ssezibwa Hussein for their work in administering the program and evaluations. We thank all of the schools that have participated in the program. We thank Chie Hashimoto and Takeshi Furuichi for securing funds for the Interpretive Center. We thank two anonymous reviewers for their input and improvements on this article.

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