South Carolina's Wildlife Conservation Workshop: a 7-Year Case Study

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Abstract: The Wildlife Conservation Workshop was developed by the South Carolina Chapter of The Wildlife Society to provide K-12 teachers with hands on experiences and research results related to wildlife management. Because education programs such as this workshop generally have limited resources, prioritization of curriculum improvement efforts is essential. This paper demonstrates how to improve an on-going program based on open-ended critiques.

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Since the outset of the wildlife management profession, scientifically rigorous research regarding biological systems has been crucial for understanding ecological phenomena and providing a respectable and unbiased source of information (Sanderson et al. 1979, Romesburg 1981, Romesburg 1991, Hanley 1994). Wildlife managers have hoped that the public would recognize this information as being worthy of careful consideration when controversial issues regarding our environment arise (Swerdfager 1990). However, many current political issues and other daily news make many of us question whether individual citizens spend much time reflecting about the relationship humans have with the world of which we are a part. Wildlife

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management professionals have grown to realize that sound stewardship of our lands requires the public to value long-term ecological thinking as well as sustainable natural resource use (Adams and Thomas 1986, Benson and Pomerantz 1990, Salwasser et al. 1990).

This is why we must be willing to expand the realm of our profession's duties to include human dimensions research which will help lead to effective environmental education. We must continue to increasingly support natural resource education efforts and the tools that can improve them (Sanderson et al. 1979, Siemer et al. 1987, Adams and Eudy 1990). Human dimensions research involving rigorous social science research can only help us to bridge the communication gap we have with the public regarding our ecological knowledge (Adams and Thomas 1986, Siemer et al. 1987, Swerdfager 1990, Gigliotti 1990). Many environmental education programs have been established over the last few decades. However, few have been evaluated to determine whether our efforts are effectively communicating and encouraging natural resource stewardship. Educators have historically stressed the importance of evaluating the effectiveness of environmental education programs (Volk et al. 1984, Stout and Peyton 1988, Benson and Pomerantz 1990, Gray 1993). Curriculum developers should not rely only on intuition to determine how effective their educational reform efforts have been (Stout and Peyton 1988). Stout and Peyton (1988) discuss in detail the value of critiquing environmental education programs. They explain that rigorous evaluation will unmask both strengths and weaknesses of a curriculum. Although written critiques of a course are recognized by educators as a tool for evaluating programs in general, we were unable to find examples of this technique in the conservation literature regarding wildlife educational programs. Adams and Thomas (1986) found that out of 7,571 published articles dealing with wildlife education, only 5 dealt with information and education methodologies. This paper hopes to contribute to this literature through 3 goals. First, to present other wildlife educators with a 7-year case study evaluation that demonstrates how to evaluate a natural resource continuing education program using easily administered open-ended critiques. Secondly, to identify common praises, weaknesses, and suggestions for improvement using these critiques. Lastly, to determine the commonality and significance of these remarks so that future curriculum reform efforts can be prioritized. Because educational programs generally have very limited resources, prioritization of curriculum improvement efforts is essential.

The Wildlife Conservation Workshop

The Wildlife Conservation Workshop is a 6-day long course that has been held annually since 1982 at the Webb Wildlife center in the Coastal Plain of South Carolina. Teachers wrote open-ended critiques at the end of each workshop from 1989–1996, with the exception of 1993. Teachers from South Carolina, North Carolina, Georgia, and other states are provided room and board in a renovated plantation home. An adjacent training facility is used as a lecture hall during the week. The Webb Center, operated by the South Carolina Department of Natural Resources

(SCDNR), currently manages 3,346 ha and ≥ 100 km of roads and trails that provide access for observation and other teaching purposes during the workshop. The workshop was initiated by the South Carolina Chapter of The Wildlife Society as an interdisciplinary effort to teaching wildlife conservation as a means of reducing misconceptions regarding wildlife management. The South Carolina Department of Natural Resources, Clemson University, Savannah River Ecology Laboratory, U.S. Fish and Wildlife Service, U.S. Forest Service, and other organizations have helped administer the workshops. The South Carolina chapter of The Wildlife Society's curriculum initiatives and goals have been supported by and are concurrent with The Wildlife Society's stance on conservation education (TWS 1990).

Multiple conservation agencies have come together to provide support for the workshop's objectives in hopes that teachers will 1) learn ecological information derived from rigorous scientific sources focusing on delivery strategies such as hands-on and field trip experiences; and 2) motivate teachers to actively teach their students this information in a more confident and unbiased manner so that natural resource conservation and stewardship will be advocated to a larger citizenry. Attitudes towards conservation can be reinforced and changed through experiences which help people to appreciate and understand natural resource conservation (George 1967). Teachers are taught through both the affective and cognitive domains of learning as described by Crompton and Sellar (1981) using various teaching delivery methods. Many outdoor experiences are provided and have been proven to be successful in other education programs to help significantly influence wildlife knowledge and attitudes (Crompton and Sellar 1981, Morgan and Gramann 1989, Race et al. 1990). Successful environmental education results from programs which begin teaching affectively followed by cognitive activities (Gigliotti 1990).

Teachers who completed the course were asked to provide written constructive criticism just prior to adjournment from the week-long course. They were specifically asked to provide aspects of the workshop that they liked and disliked as well as suggestions for improvement. The critiques were entirely open-ended. Teachers were free to critique any aspect of the formal and non-formal curriculum experience using any amount of prose and time they wished. Time spent on the critiques by teachers varied by teachers and by years. The average number of teachers annually participating in The Wildlife Conservation Workshop was 22 and ranged from11 in 1989 to 29 in 1990. Most years, enrollment was at capacity for the facility.

This workshop would not be possible and would not have achieved the success it has without the support of the Webb Wildlife Center Personnel, Lewis Rogers, Swinton Thomas, Dianne Thomas, and Thomas Swayngham, or the active and enthusiastic involvement of many SCNDR personnel who serve each year as the key speakers.

Methods

In order to evaluate the open-ended critiques, a list of thematic labels were created as each of the critiques ($N = 155$) were initially read. Afterwards, many labels were combined and rearranged to minimize the overlapping of recurring themes

which teachers commonly stated regarding weaknesses/recommended changes and strengths of The Wildlife Conservation Workshop. Five major headings were then created to organize the critiques' contents: 1) enjoyed the overall experience, 2) regretted the overall experience, 3) specific remarks toward the course, 4) references to the workshop's atmosphere, and 5) other suggestions for improving the workshop experience. Major headings were divided into sublevels which represented specific teacher comments. These major headings and sublevel headings were used to compile all teachers' comments within a given year. The number of different critiques that were indicative of a thematic label were tallied and converted to a percentage based on the total number of workshop participants.

To facilitate prioritization of the workshop's reform efforts, suggestions for improvement were divided into 2 categories. Category A, "annually recurring suggestions," was established to highlight ideas that teachers consistently mentioned throughout the workshop's history. Category B, "case-year suggestions," pointed out specific aspects of the workshop within a given year that had been inadequately addressed. Some of these comments pointed out factors that were especially sensitive when inadvertently not addressed by organizers and/or instructors in a given year. Therefore, we hypothesized that these kinds of suggestions would be more numerous during earlier workshops. Both categories of these suggestions were further subdivided into 2 levels of importance based on recurring frequency of specific comments. Annually recurring suggestions were considered (1) consistently recurring if they were mentioned during either 4–5 out of 7 different years or (2) occasionally recurring if they were mentioned during 3 out of 7 different years. Case-year suggestions were considered (1) important problems for that year if they were mentioned in 20% or more of the number of critiques or (2) minor problems if mentioned in 15%–19% of the number of critiques for the year.

Because some suggestions were contradicted by somewhat related, but contrasting compliments, while others were accompanied directly by related contradictory compliments, the categories mentioned previously were grouped into 3 importance levels based on their detectibility. These levels were necessary due to the need for prioritization of suggestions and by the nature of open-ended critiques. Level I teacher comments did not have any related contradictory compliemints and were considered the most important. In other words, these are the comments that workshop instructors should address first. Teacher comments included in level II were those that had clearly polarized contradictory compliments. Whereas level III comments had contradictory compliments associated with them that were not as specific.

Results and Discussion

Aspects of Workshop That Were Identified as Strengths

All but one of the 155 attendees gave specific examples to support that they enjoyed The Wildlife Conservation Workshop (Table 1). Many teachers (38.1%) expressed their appreciation to the workshop's organizers. Twenty-six percent of the

Table 1. Common remarks indicating strengths of the Teacher Wildlife Conservation Workshop based on teachers' open-ended critiques during 1989–1996.

	Year							
	1989	1990	1991	1992	1994	1995	1996	Overall
$\bar{x}$ number of words per critique	124	95	61	64	74	88	54	80
number of teachers who attended and submitted a critique	22	29	22	11	25	24	22	155
Strengths indicated by teachers	*% critiques with such remarks*							*% total*
I. Enjoyed the overall experience	100	97	100	100	100	100	100	99.4
a. thanked those responsible for the workshop	36	38	18	18	52	46	45	38.1
b. newly fostered/rekindled respect for natural resources stewardship	27	14		9	28	25	5	16.1
c. will now be able to teach children better	9	7	9	36			9	7.7
d. planned on encouraging other teachers to attend the workshop	9	14	5	9	12	13	27	12.9
e. want to take an advanced or second level course	9		32		16	21	9	12.9
f. did not or could not make any recommend changes		24	27	36	20	21	59	25.8
II. Remarks towards the course								
a. instructors demonstrated much knowledge/expertise	41	69	64	73	56	63	32	56.1
b. instructors demonstrated much enthusiasm	27	55	32	73	52	33	18	40.0
c. exceptional content	14	38	23	73	36	38	32	33.5
-variety specifically mentioned		17	9	27	16	21	9	13.5
d. well organized agenda	41	24	9	36	24	25	18	24.5
e. learned a tremendous amount	45	66	27	27	44	54	55	47.7
f. specific aspects of the learning process they enjoyed								
-field trips	36	48	77	82	40	21	5	41.3
-hands-on activities	36	45	41	27	12	21	23	29.7
-classroom lectures and format	9	17	5		8			6.5
-slides	18	14	9					6.5
III. Referred to the workshop's atmosphere								
a. exceptional accommodations	9	24		45	24	42	55	27.1
b. exceptional hospitality	27	38	55	36	28	54	50	41.3
c. exceptional food	18	55	32	36	40	71	41	43.2
d. exceptional leisure opportunities	9	55	64	27	16	50	18	35.5

critiques did not include any recommended changes for the workshop. Some of the teachers wrote that they could not make any suggested changes because nothing should change. Some teachers (16.1%) wrote that they developed or rekindled a genuine respect for natural resources and stewardship because of the workshop. Thirteen percent of the attendees wanted to take a related advanced-level course in the future. Some teachers (7.7%) also mentioned that after having completed the course they would be better able to teach their students about natural resources and/or stewardship. None of the critiques suggested a regret for having attended the workshop.

There were several aspects of The Wildlife Conservation Workshop that teachers complimented in their critiques. Over half of the attendees (56.1%) felt like the instructors demonstrated much knowledge and expertise. Perhaps this response was due to the interdisciplinary approach of the course which involved as instructors a

wide array of biologists and land managers with specific expertise. Forty-eight percent of the teachers wrote that they learned much about wildlife conservation and natural resource management. Many attendees (40.0%) remarked on how enthusiastic the instructors were towards their field and teaching others about it. Enthusiasm of instructors is considered very important by educators as a crucial factor in teaching effectively. While over a third of the number of critiques recognized that the academic content of the workshop was exceptional, 13.5% mentioned that they enjoyed the variety specifically. One fourth of the teachers wrote they felt the agenda was well organized. There were 4 aspects of the learning process that were repeatedly mentioned and complimented. Field-trips were most often mentioned (41.3%) as a worthwhile and enjoyable learning process. The second most enjoyed process was hands-on activities (29.7%). Classroom lectures/formats and slide presentation were each praised in 6.5% of the number of critiques.

The positive atmosphere or learning environment of the workshop was often mentioned. This suggests that the environment at the Webb Wildlife Center was exceptionally conducive to learning about natural resource conservation. Food (43.2%) and hospitality (41.3%) were greatly appreciated by the teachers. The evening leisure opportunities (canoeing, nature walks, skeet shooting, fishing, and social events) were mentioned in 35.5% of the number of critiques as being appreciated, and 27.1% of the teachers wrote that the accommodations were exceptional.

Weaknesses and Suggestions for Improving the Workshop

Fifty-one different specific categories (thematic labels) of weaknesses and suggestions were identified among the critiques. Of these, 12 recurring or case-year suggestions were identified as being common—either significant or slightly significant within 1 of the 3 importance levels (Tables 2, 3). Four of these 12 were found in both annually recurring suggestions and case-year suggestions. However, the 3 suggestions

Table 2. Annually recurring suggestions for improving the Wildlife Conservation Workshop for Teachers, based on teachers' open-ended critiques, 1989–1996.

	Significant	Slightly Significant
	Mentioned in 4–5 out of 7 years	Mentioned in 3 out of 7 years
Level I[a]	No comments made	No comments made
Level II[b]	1. Too many slides and/or videos (cc: $\bar{x}$ = 6.5; r = 0–18)[c] 2. Want more hands-on activities that can be used in their classrooms (cc: $\bar{x}$ = 29.7; r = 12–45)[c] 3. Want more field trips/outdoor activities (cc: $\bar{x}$ = 41.3; r = 5–82)[c]	No comments made
Level III[d]	1. Let teachers introduce themselves at the outset of the workshop (well organized agenda $\bar{x}$ = 24.5%; r = 9–41%)	1. Want free time to explore area (well organized agenda $\bar{x}$ = 24.5%; r = 9–41%)

a. Suggestions for improvement that had no contradicting compliments.

b. Suggestions for improvement directly contradicted by compliments. Data for contradicting compliments follows in parentheses.

c. $\bar{x}$ = mean percentage per year of contradicting compliments; r = range among all years.

d. Suggestions for improvement contradicted by related contrasting compliments, which are presented in parentheses.

Table 3. Case-year suggestions for improving the Wildlife Conservation Workshop for Teachers, based on teachers' open-ended critiques, 1989–1996.

	Significant	Slightly Significant
	Mentioned in ≥20% of critiques in any given year	Mentioned in 15 – 19% of critiques in any given year
Level I[a]	1. Fix details of receiving college credit at low cost to teachers (1992).	1. Divide teachers into smaller groups for hand-on activities (1989). 2. Send list of activities before course starts so teachers can bring appropriate clothes (1991).
Level II[b]	1. Too many slides and/or videos shown (1995 cc = 0). 2. Want more field trips/outdoor activities (1994 cc = 21) 3. Want more hands-on activities that can be used in their classrooms (1991 cc = 41; 1995 cc = 21)	1. Want more hands-on activities that can be used in their classroom (1992 cc = 27). 2. Want more field trips/outdoor activities (1992 cc = 82).
Level III[c,d]	1. Add certain themes such as non-game, birding, wetlands, etc. [1989]. (exceptional variety in content $\bar{x}$ = 13.5; r = 0–27) 2. More scientific literature based on wildlife research [1989] (exceptional content $\bar{x}$ = 33.5; r = 0–27).	1. Desire morning field trips versus afternoons [1991] (well organized agenda $\bar{x}$ = 24.5; r = 9–41). 2. Let teachers introduce themselves at onset of workshop [1989] (well organized agenda x = 24.5; r = 9–41) 3. Put together a booklet telling about local plants, birds, etc. [1989]. (learned a great amount $\bar{x}$ = 47.4 ; r = 27– 66)

a. Suggestions for improvement that had no contradicting compliments. Year when comment was made is in parentheses.

b. Suggestions for improvement directly contradicted by compliments. Year reported and percentage of contradicting compliments (cc) in that year follow in parentheses.

c. Suggestions for improvement contradicted by related contrasting compliments (presented in parentheses). Year when suggestion was made is in brackets.

d. $\bar{x}$ = mean percentage per year of contradicting compliments; r = range among all years.

found within the most important level of comments (level I) were only found in case-year suggestions (Table 3). None of these comments, which suggested a specific problem with a given aspect of the workshop within a single year, occurred after 1992. This suggests that efforts to improve the curriculum based on the critiques were successful. No suggestions were classified as a level I, category A, comment.

The 4 comments that were found in both categories A and B of suggestions included: 1) too many slides and/or videos shown; 2) wanted more hands-on activities that can be used in their classrooms; 3) wanted more field-trips/outdoor activities; and 4) let teachers introduce themselves at the outset of the workshop. These comments, however, all had contradictory compliments. Because the "too many slides and/or videos shown" comment occurred in both categories, was found in the more significant section and most important position of both categories, and only had a total mean of 6.5% contradictory compliments among all years, special consideration has been given to minimizing—but not eliminating—the frequency and duration of audio visual use at the workshop. Evidence also suggests that teachers who attended the Wildlife Conservation Workshop preferred learning in small (i.e. 3–5 people) observation groups.

Matters of curriculum content also were brought up. In 1989, the first year when critiques were collected, teachers requested a greater variety of curricular themes regarding wildlife conservation. The workshop was modified and this comment has not been an annually recurring suggestion.

There were some managerial matters regarding the workshop that were commented on by the teachers, especially during the earlier years. Improving the ease of obtaining course credit and sending a detailed list to participants of activities and needed supplies before each course began were early problems that were corrected.

A Sunday night social was added in response to critiques that requested time at the beginning of the workshop for introductions. Additionally, name tags were made for the first day, and individual pictures were taken, labeled with names, and placed on a display that was left up during the entire workshop. These actions apparently still provided an incomplete introduction since critiques continued to contain a request for time for introductions. Therefore, a more formal time for each teacher to stand up and provide a brief autobiography will be added to the opening session of the workshop schedule. This should enable teachers to more quickly become familiar with their peers and to promote information exchange.

Finally, another recurring suggestion was that speakers provide written handouts of the information that they cover. Each year, instructors have made an effort to provide information in the form of a variety of handouts, printed brochures, and posters. These were eagerly accepted by the teachers. However, the critiques continue to request additional written detail. This example shows that one distinct advantage of the continued use of the critiques is that they will continue to point out problem areas that have not been completely alleviated. An increased emphasis will be placed on future workshops to provide complete handouts of the information presented by speakers. These handouts will be collected before the workshop and bound in a workshop manual that will be given to the teachers at the beginning of the workshop. This will enable the teachers to take fewer notes and to participate more fully in discussions.

Conclusions

Past attempts to improve this wildlife conservation workshop based on open-ended critiques resulted in many improvements. The number of common suggestions, as previously defined in this paper, identified in any given year was greatest in 1989 when critiques were first administered in the program. Since then, common case-year suggestions have decreased or been non-existent. Annual efforts to improve the workshop based on these critiques is probably why no common annually recurring suggestions existed within the most important level of comments (those having no contradictory compliments). All of the common annually recurring suggestions in the other 2 importance levels had contradictory compliments. For these reasons we feel that, through annual reform efforts, the workshop has been improved over the last 7 years and is satisfying teachers' perceived needs.

Teachers indicated weaknesses and suggested improvements regarding delivery

methods of instruction, matters of curriculum content, and managerial matters. Through this evaluation of 7 years of critiques, 2 factors were identified that need further efforts to correct. First, our evidence indicates that teachers valued peer acquaintanceship at the outset of the education program. Allowing class time for teachers to introduce their professional and personal interests to their peers can stimulate the exchange of teaching ideas related to wildlife conservation. Secondly, more detailed handouts covering information presented need to be developed, so that teachers can concentrate on what is being presented rather than on the mechanics of taking notes.

All but 1 of the 155 teachers who have taken the course since 1989 indicated they benefited from and enjoyed the wildlife conservation workshops. Enthusiasm, dedication, and expert knowledge of the conservation workshop instructors were commonly praised by teachers. Credibility and trustworthiness are recognized factors that also influence attitude change (Morgan and Gramann 1989). The instructors feel that these aspects in combination with cooperative efforts, common goals, and an interdisciplinary approach are key ingredients to a successful wildlife conservation workshop for teachers.

Open-ended critiques have proved to be a useful tool in our case study. We feel while our content analysis of open-ended critiques, using annual classes as units may fail to recognize individual teacher's articulated enthusiasm towards certain aspects of the course, that this education evaluation has identified common strengths and weaknesses and provided insight into important factors which will become priority for future improvements.

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