

Living on Earth Ecological Literacy Project Year Three Evaluation

conducted by

Rockman et al
Independent · Insightful · Informative

San Francisco, CA

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I learned that sometimes you can change how people feel about the world or change the world. (ELP 8th grader, New York)

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Introduction

As described in the Living on Earth 2003 report to the NSF, the Living on Earth's Ecological Literacy project (ELP) offers "a comprehensive, flexible curricular framework that includes an integrated approach to field-based environmental studies, investigative journalism and computer-based radio production and engineering in middle and high school settings." The 2002-03 school year marked Year Three of the three-year, NSF-funded Ecological Literacy Project.

Rockman et al, an educational research firm headquartered in San Francisco, conducted an independent evaluation of the ELP Year Two program activities (Char and Rockman, 2002), and continued evaluation of the Year Three program. The Year Three evaluation was designed to provide project staff with information on how the ELP curriculum was received by teachers and students in five participating schools who constituted the core set of schools that began with the project during Years One or Two. Evaluation activities during Year Three included observations of the Summer Teacher Institute held in August 2002 and post-program student surveys administered to the five schools in May 2003. Teachers were also asked to respond to a teacher survey in June 2003, to offer their feedback and reflections on their ELP experience.

Description of Participating Classrooms

The Year Three evaluation focused on five science teachers who used the ELP curriculum beginning in either Years One or Two, and continued classroom use this past year. Teachers taught in five different locations around the country: Los Angeles, California; Wilton, New Hampshire; New York City; Chicago, Illinois; and Camden, New Jersey.

Table 1: Participating Schools and Teacher Experience with ELP

School	Years Teacher Has Field-tested ELP
Crenshaw High School (Los Angeles)	Years 1, 2 and 3
Wilton-Lyndeborough Cooperative High School (Wilton, NH)	Years 1, 2 and 3
Harbor School of Arts and Environment Charter School (New York City, NY)	Years 1, 2 and 3
Queen of Peace High School (Chicago, IL)	Years 2 and 3
Camden High School (Camden, NJ)	Years 2 and 3

The five teachers varied considerably in their level of teaching experience. Two were relatively new to the teaching profession, with three and six years of teaching experience, while two were veteran teachers, with 18 and 30 years of teaching experience. The fifth teacher had a moderate amount of teaching experience of nine years

Collectively, the teachers chose to use the ELP across a wide range of grades this past year, ranging from 8th through 12th grades. Interestingly, each teacher implemented the ELP curriculum with a different grade of students. A total of 135 students participated in the study.

Table 2: Students per Grade Level

School	Grade of students using ELP	Number of students completing survey
Harbor School of Arts and Environment Charter School	8 th graders	12
Queen of Peace High School	9 th graders	60
Wilton-Lyndeborough Cooperative High School	10 th graders	12
Camden High School	11 th graders	35
Crenshaw High School	12 th graders	16
Total		135

(See Appendix A for a further description of the five classrooms, and the varied ways that ELP was implemented.)

The five teachers were also asked to complete a short written questionnaire delivered via e-mail. Three of the five teachers submitted completed questionnaires. Perspectives from these three teachers are integrated into the student findings below.

A sixth teacher, who taught in Chicago and participated in ELP both during Year 2 and Year 3, did not return either completed student surveys or the teacher questionnaire.

Description of Year Three Curriculum

The Year Three ELP curriculum built on the one implemented during Year Two, which was structured around the production of three different types of audio pieces of varied, inherent complexity: the commentary, the interview and the feature story. To work through this progression, students were given the time and hands-on opportunity to acquire writing and production skills, build expertise, and create a final, polished product.

Based on teacher feedback from the Year Two evaluation, some schools this year also developed full radio shows for broadcast on the LOE website, giving “classrooms a common end goal and providing the school and each student with a comprehensive professional product. Students selected appropriate content from work produced in the classroom, exercising editorial decision-making. They also wrote and voiced host narratives, selected music, and digitally edited the show, playing professional roles of reporter, producer, engineer and talent... Also new this year was the production of new and more dynamic types of pieces, including radio diaries, sound portraits and vox pops.” (Living on Earth NSF Report, 2003).

Findings from the Year Three Evaluation

Responses to the student survey revealed that students viewed the ELP as an enriching opportunity to grapple with environmental issues in their local communities, and to strive, through a committed, sustained effort, to produce high quality journalistic pieces for radio. In response to the survey, students described how, through this process, the ELP increased their own environmental awareness and dedication towards environmental efforts, and helped them acquire important research, writing and technological skills. Students also appreciated their contact and relationship with their local producer mentor, citing that the contact was meaningful and provided insights into the rewards and challenges of radio journalism. These findings are discussed in further detail below.

1. Increased Environmental Awareness

First of all, students recognized the way in which the ELP was a curricular blending of science, journalism and technology. When asked which subject areas were addressed by the ELP, roughly three out of four students indicated its connections to science (81%), journalism (72%) and computer technology (77%).

Students indicated that they felt they had learned a considerable amount in the area of science and the environment, particularly relating to an increased awareness of environmental issues in their communities. In the surveys, students rated how much they felt they learned in a variety of specific scientific and environmental areas, using a six-point scale (0 = Did not do this activity; 1 = Learned nothing at all; 2 = Learned a little; 3 = Learned some; 4 = Learned a good amount; 5 = Learned an incredible amount.)

Over three-fifths of the students indicating that they learned either a “good amount” or an “incredible amount” regarding the role that they can play in the well-being of their communities (69%), and the relevance of environmental science in their local communities (67%). Students’ assessments of their learning to do background research on an environmental science issue, or depth of knowledge about specific environmental issues were slightly lower, with a little more than half indicating learning at least a good amount in these two areas (56% and 51%, respectively).

Figure 3: Percentage of Students Who Reported Learning Either a “Good Amount” or “Incredible Amount” in Science/Environment Areas

	Year 3	Comparison w/ Year 2
Understanding the role I can play in the well-being of my community	69%	N/A
Understanding the relevance of environmental science in my local community	67%	63%
How to do background research on an environmental science issue	56%	68%
Depth of knowledge about specific environmental science topics	51%	57%

Range for science sub-areas in Year 3: 51% - 70%; Mean = 60%

Students’ reported levels were generally comparable with Year 2 findings. Students’ assessment of their learning to do background research on an environmental science issue, however, was lower than that reported in Year 2.

This emphasis on environmental awareness, rather than learning of specific environmental science content, was reflected in students’ open-ended responses as well. When asked to describe two important things they had learned about science and the environment through the course, four out of ten students (42%) described their **heightened environmental awareness**. (“[I learned that] our water supplies almost went dry because of the drought and how much water we waste,” “What we do in our neighborhood effects everyone else in the world by contributing to the pollution problem.”) One 9th grader in Chicago said that her ELP project made her realize that “We as humans pollute the world more than we think. Before this I never really considered the gases and fumes that buses and other vehicles give off. We use most of the earth’s resources.”

A New Hampshire student described what she had learned about the bi-directional influence of people and the environment in this way:

I learned that people’s living habits, such as how often they drive and how much electricity they use, have a great impact on the environment. And that the environment plays a vital role in everyone’s life, regardless of where they live, because all of mankind is affected by factors like pollution, the preservation of natural resources, and the effects of global warming.

A little over a third of students (36%) described their learning of **specific science topics** relating to their ELP commentaries or other journalism products. Written responses were typically short, naming a topic or issue. Topics varied widely across classrooms, depending on the focus of their projects, ranging from watersheds, water quality and water use, air and noise pollution, and nutrition, to urban problems of rats and trash and their effects on the environment. On a broader note, 13% spoke about how the ELP made them aware of the **role of science in their own everyday lives and the world around them** (“Science effects everything around us from our town’s water supply to the economy,” “Science is all around. Absolutely everything has to do with science.” “Science is everywhere in our front and backyards. Everywhere.”)

About a fifth of the students (19%) mentioned an **increased sense of environmental activism**, both from local and global perspectives. Students spoke of the potential power of change emanating both from individual actions, and those from a larger, mobilized community.

We must recycle and preserve the environment. We must work with one another to improve our environment. If we preserve energy, by using less power, we can improve the environment.

Sometimes all it takes to prevent a potentially huge environmental problem is just a little cooperation between a large number of people.

Of note, a number of students described this power of change in terms of communication, education and advocacy, rather than simply through actions such as recycling or changes in personal consumption habits. As one 8th grader in New York City expressed, “Any one person with a voice can help their environment by encouraging government officials to help.”

A small group of students commented specifically on the important role that communication and journalism can play in people’s environmental awareness, which in turn can affect their environmental practices.

[I learned] that by standing up and educating the world about a serious issue one can make a difference.

I learnt the relevance of the people’s educational awareness of their environment to maintaining the environment.

Science and technology can be used to get messages to people pertaining to problems in the environment.

Living on Earth helps to give you an idea on what others think about their environment and brings up issues that should be taken care of.

In summary, students' accounts of the most important things they had learned about science and the environment clearly reflected the ELP's emphasis upon environmental awareness and activism. Rather than discuss scientific topics, content knowledge or research processes pertaining to environmental science per se, many students described issues, places and situations in their communities concerning environmental problems and concerns, and ways in which the ELP prompted them to consider changes in their own behavior and to become a more active advocate of environmental issues.

In their responses to the questionnaires, the three teachers expressed differing opinions on the primary learning benefits of the ELP. For two, the learning value was primarily seen in terms of communication and stemming from the journalistic aspects of the ELP.

The third teacher felt strongly that the ELP had given her students an important forum in which to connect to environmental issues.

ELP provides the students opportunities, a vehicle to learn more about their local environment and transfer that knowledge to other community members...The students also rose to the challenge of identifying and addressing local environmental issues in their neighborhoods and in our school. (Teacher A)

2. Increased Sense of One's Community

Given the ELP's emphasis on issues in one's local community, students reported that their ELP experiences had increased their awareness of their communities. When asked to describe two important things they had learned about their communities, a third of the students (33%) described environmental information about their local communities, while 16% described specific environmental needs and problems of their communities. For example, students in Camden described what they had learned about the Cooper River, their local water shed and water treatment plant, and how some of the conditions had changed over time. Students in Chicago described their increased understanding and appreciation of the diversity of environments in their urban neighborhoods, and the ways in which people were affected by noise pollution across the city.

Several students also commented on how the ELP had enabled them to become more observant about their communities ("I was able to look at my neighborhood in more detail." "I have observed more how things look." "I learned that the smallest things in my community, such as the lights outside or the noise pollution, affects the people that live in my community, including myself.")

By focusing on their immediate communities, roughly one in five students (19%) expressed a greater appreciation for their own communities:

When I did my commentary on my community, I realized that where I live is not bad at all.

There is a lot more to Camden than what people think.

I realized how beautiful and clean my community is and I shouldn't take it for granted.

We are a community a lot more fortunate than other communities and neighborhoods. Since we are so lucky, we should take better care of it.

This greater appreciation for their own communities seemed to arise in part from the opportunity to exchange of journalistic pieces with other ELP classmates and classrooms, and learning about other teens' communities. As one 11th grader in New Hampshire expressed, "Based on the Living on Earth commentaries we have heard, our community has very different concerns than other communities. For example, we rarely have to deal with the noise and pollution of heavy traffic, like students in urban cities."

In the private school in Chicago, students were drawn from different neighborhoods across the city. Through their research and work on their commentaries, students realized the diversity of environments across the city, and how this affected each of them as individuals and their communities. One of the girls in this Chicago classroom remarked, "My community is very peaceful. I thought of it before but [realized more] when the other students talked about theirs. I live in an environment that is noisy at times because of my expressway, but at night it's pitch black and I can see all the stars."

About a fifth of the students (19%) expressed not only an appreciation for physical aspects of their communities, but a sense of their community's self efficacy:

My local community is doing a lot to solve its problems.

Camden can improve with the help of the community.

*When a whole bunch of people complain about one thing, it gets done.
Nothing can be accomplished without persistence.*

I learned that if we work together, set goals and try, we'll succeed in one way or another.

In sum, through their ELP projects, students portrayed an increased awareness of their local environment, regarding environmental information, needs and problems pertaining to their local communities. At the same time, students expressed a greater appreciation for their communities, both in terms of physical qualities and conditions and in "social capital," and a sense of their community's self efficacy in working together to tackle local problems.

3. Learning of Journalistic Skills, Processes and Work Approaches

Students indicated that they felt they had learned a good deal about journalism, with at least two-thirds of all students reported learning either a "good amount" or an "incredible amount for most of the specific areas of journalism addressed in the ELP. Areas in which

they rated the highest amount of learning concerned the conducting of interviews (78%) and delivering a spoken piece effectively (71%), followed by what makes a great story in journalism (67%) and how to make a story fair and objective (64%).

Figure 4: Percentage of Students Who Reported Learning Either a “Good Amount” or “Incredible Amount” in Journalism Areas

	Year 3	Comparison w/ Year 2
How to conduct a good interview	78%	78%
How to deliver a spoken piece effectively	71%	Not asked
What makes a great story in environmental journalism	67%	70%
How to make a story fair and objective	64%	68%
How to construct a story angle	49%	Not asked

Range for journalism sub-areas in Year 3: 49% - 78%; Mean = 66%

These findings were quite consistent with students’ responses in Year 2.

When asked to describe the two most important things that they’ve learned about journalism, the most predominant student response concerned **writing**, with four of out ten students (42%) describing how the ELP enhanced their writing skills and their understanding of the kinds of writing involved in journalism.

I learned to write with feeling and emotion and I wrote as descriptively as I could.

In order to have a good story, you need a good topic and a catchy introduction.

In journalism, the tone/mood needs to be more relaxed and light instead of using long, complicated words or sentences, and a lot of description is necessary, as pictures can not be shown.

When writing an informative piece, one should balance the amount of facts with an interesting story or statistics to keep the readers’ attention. A piece will be more effective if it is organized; the reader/listener should be able to follow the story or information without getting confused.

You’ve got to put in many details. It sounds awesome when you close it with your opening sentence.

Several students also conveyed the use of journalism to present and instill a sense of advocacy:

Journalism helps express different opinions. Broadcasting the opinions from journalists allows others to share their perspective.

To make an effective story you have to discuss subjects of interest, concern or future problems, so that the readers will want to do something about it.

Conducting interviews with local experts was a large part of many of the ELP projects. Accordingly, one fourth of the students (25%) described learning surrounding their **conduct of interviews**. As in our Year 2 evaluation, some of this learning concerned the asking of good questions, the importance of being informed and prepared, and the ways to be considerate and respectful towards individuals you interview.

When interviewing, always give a clear question. Have your notes with you and your team should be prepared.

The way you phrase questions is very important for the answers. Surprising people with questions gives the best answers.

How to phrase questions so they don't seem biased. Don't ask "yes" or "no" questions.

Always allow and give the person that you are interviewing time to answer your question. Always keep the question short, to the point, and sweet.

The best interviews are sometimes a conversation.

Students also described learning about the process of **conducting research** as part of putting together journalistic piece. About a fifth of the students (19%) described what they had learned about research, and the process of gathering background information on a particular topic, taking notes, and the importance of being open and objective in journalistic reporting:

It is important to keep an open mind about any topics you are dealing with; bias should not come into play.

It takes more than your own knowledge to make the story great.

Don't be one-sided, and look at everyone's opinion.

As a journalist, you need to take every lead you can for finding information and interviewees for whatever subject you're working with.

A little more than a fourth of all students (27%) offered comments related to learning important lessons about **"doing work"** while producing their ELP pieces, either concerning the effort involved in, or approach to working in journalism. Some students

(14%) commented on the significant level of effort involved in journalistic work, particularly the number of revisions and drafts involved in producing a piece:

It takes a long time to get your paper how you want it. How each word or sentence that is said makes a difference.

It needs to be revised many times to be a good piece of work.

It takes a whole lot of time and writing. It can be fun at times but also tedious.

Much research and recording must be done for even the smallest of segments.

Others (13%) offered more general statements concerning more attitudes toward work, regarding hard work and doing one’s best (“Practice makes perfect. Patience”; “Take time to do your best), staying focused, being able to take and accept criticism, and expressing one’s ideas openly and honestly (“Express your mind! Don’t be afraid to share your ideas;” “Just be yourself. Always state the truth.”).

This aspect of doing authentic work involving intense, sustained effort was also reflected by students’ assessment of learning in the area of work productivity. As one student expressed, “I learned that time management and organization are both crucial in the construction of radio pieces.” As in Year 2, over two-thirds of the students reported learning a good amount about how to work effectively in teams, how to plan out projects and assignments, and how to manage their time to complete tasks on schedule.

Figure 5: Percentage of Students Who Reported Learning Either a “Good Amount” or “Incredible Amount” in Areas of Work Productivity

	Year 3	Comparison w/ Year 2
How to work effectively in teams	75%	74%
How to plan out projects and assignments	68%	73%
How to manage my time to complete tasks on schedule	64%	68%

Range for work sub-areas in Year 3: 64% - 75%; Mean = 69%

Despite the clear demands and high expectations posed by ELP teachers and producer mentors, students rated the ELP project work highly appealing, testimony to the engaging challenge and authentic, meaningful work it provided students. One Chicago 9th grader put it this way, “When you put your all into your writing, it turns out to be a success.”

All three teachers were positive about the ways in which the ELP engaged their students in authentic journalism work, and bolstered students’ communication skills. At the same time, they acknowledged the considerable amount of class time and teacher and student effort that needed to be devoted to this endeavor. As the three teachers expressed,

[I see as the main educational benefits] learning to communicate – write, speak, question – more clearly and effectively. When working on their commentaries, students wrote draft after draft with more precision and more persistence than they had ever been required to do before. When recording, we made them do take after take to get it right, something they had never done before. When preparing for their web cast, each group had particular assignments. Many had to do interviews. They did practice interviews and learned what questions worked and what didn't. Did they expand their environmental knowledge? Yes, to a degree, but I think this was secondary to the communication processes. (Teacher B)

I observed the self-esteem of many students increase as they found that they complete a radio piece and “speak” in a public forum. Many students are afraid of public speaking but they all did a good job. The students that produced the web show did a great job in planning and interviewing the teachers and the administrators. (Teacher C)

It took the whole first semester for the students to complete their commentaries... They wrote four drafts, two of which were edited by my mentor and myself....The students loved writing personal commentaries because it allowed them to share their voice – something discouraged in science...These students had an avenue to share their opinion. I have students who can say that they were on the radio and people cared! Students started doing better in class and it solidified a bond with me. They are better students, writers, producers and people for this program. (Teacher A)

4. Understanding of Radio Genres

Several survey items probed in greater depth students' understanding of the different radio genres covered in their ELP course, such as commentaries, interviews, and feature stories. In general, students displayed a good understanding of how interviews enhance a feature story. Some described the ways in which interviews added factual details and credibility by providing information from experts or people familiar with the issue featured:

Interviews can back up a produced piece with facts from a scientist, doctor, etc., to make the point clear that this person knows what they are talking about and believe certain ideas on the piece. Makes the listener more aware of the situation, in a sense.

An interview strengthens and enhances a produced piece because it gives a “primary resource” feel to the piece. An interview adds a first-hand experience from someone who has been there or done it, rather than a piece based solely on research from books, etc.

It gives the person who is listening to it or reading it proof of why you believe or helps support the information given. It's like a back-up information thing.

Others spoke about interviews providing multiple perspectives on the topic:

[An interview] provides you with a different perspective or a wider perspective which can give you ideas and support your work. Sometimes it is good to include how other people feel about a situation or topic.

An interview gets the opinions of other people and gains insights on other perspectives.

It allows the piece to have alternative ideas on an issue.

Some students described about how interviews make the radio feature more immediate, vivid, and lively:

It brings life into a production and makes it more interesting.

It brings you closer to feeling and picturing you in the subject they're talking about to better understand what they're talking about.

It gives it more spirit, like the sounds and people talking about the subject.

One student summed up the value of interviews in the following way:

The interview can provide the listener with an in-depth view of a subject, and can liven up a piece. Various interviews with different people about the same topic provides listeners with a variety of opinions and ideas about the same subject.

Students were also able to describe a variety of radio genres, and what made them different and distinct from one another. The genres that most ELP students had worked with were commentaries and interviews. Many students could accurately describe how commentaries were more like personal stories or narratives told by a single person, while interviews were question and answer formats involving multiple people addressing a particular topic. Several quite eloquently spoke of some of these differences:

A commentary is a piece written that describes a personal memory, opinion, etc. It is descriptive and read by one person (most likely its writer.) An interview, however, consists of asking informative questions of a person who is somehow connected to the subject. There are two or more voices, and more spur of the moment.

Commentaries are stories, told in first person, about something that is meaningful and special to, or a concern of, the person telling the story. The narrator tells the story and what it means to them. Interviews are a genre where a person asks a question or another person about a certain topic. In an interview, the one who is being interviewed tells more what they do or about something rather than the more story-like style of a commentary.

Commentaries are like short stories; they can be personal experiences, current news events, ideas, descriptions, etc. They are written by one person and read (on the radio) by one person. Interviews are pieces that have a person (or more) asking a person (or more) questions about a certain subject, whether it be something they've experienced or are educated in. They are different from commentaries because they are recorded with more than one person speaking, and they are in question and answer form.

A small number of students also commented on other genres, such as vox pops, and radio diaries, and were able to indicate how vox pops solicit views of different people, and radio diaries capture personal accounts of an individual's life.

A vox is a story that pertains to many people and usually has a very general topic; voxes usually contain more than one voice.

A commentary is when you express your feeling about a topic. A vox pop is when you get the views of the people on a topic.

Radio diaries are about your own life or stuff that revolves around it (personal things). Featured stories are about people's opinion on things.

In summary, students displayed a rich range of knowledge gained in the area of journalism. They described skills they had gained in writing, conducting interviews, and doing research. They also displayed a good grasp of a variety of different radio genres – most notably commentaries and interviews – in terms of what was involved in doing a good interview, how interviews enhance feature stories by providing multiple viewpoints, expert opinions, and liven up the immediacy of the topic, and a range of characteristics that distinguishes the two genres. The authentic task of producing a professional radio piece also resulted in students describing important insights about “doing work”, and the effort, challenge, and work values involved in creating a journalistic piece. Many also reported learning various work productivity skills, such as working effectively in teams, project planning and time management.

5. Utilizing Digital Technology for Radio Production

In addition to addressing environmental issues and journalism, the ELP offered opportunities for students to work with a variety of digital technologies in the production of their radio pieces. Students reported learning a good amount in the area of technical

production. Over half of the students indicated that they had learned at least a good amount about how to use specific equipment and software tools, and gained both skills and confidence in conducting field recordings. Students’ assessments of their learning were generally consistent with that found in Year 2.

Figure 6: Percentage of Students Who Reported Learning Either a “Good Amount” or “Incredible Amount” in Areas of Technical Production

	Year 3	Comparison w/ Year 2
How to set up a Mini-Disc recorder for recording and playback	64%	69%
Feeling comfortable and confident recording in a variety of situations	60%	70%
What good field recording techniques are needed to capture sound	59%	55%
How to edit using Pro-Tools	57%	53%

Range for technical sub-areas in Year 3: 57% - 64%; Mean = 60%

When asked to describe the two most important things they learned about technology and radio production, a third (32%) described learning to use **specific equipment and software**, namely the mini-disc recorder and pro-tool software for editing.

A third (34%) described production skills and techniques, and aspects of the production process. Some students described **field recording techniques** and ways to get the best sound quality possible:

Mic levels greatly affect the sound quality of a recording.

The slightest sound can be picked up so always be in a closed area unless you want to pick up that sound.

Don't hold the mike too close to your mouth or the person you're interviewing.

In order to level the sound, both people must speak at the same voice level.

Others spoke about learning about the **editing process** and value of technology in facilitating that process:

I learned how to cut your interview piece and how to only include the most important or the information I need and want.

Technology allows for cutting and replacing sounds in the piece and changing voice volumes in one part can be done without changing them everywhere.

Technology can help fix errors in recordings like spaces of dead air or background noise.

A few students described some of the **subtleties of a radio piece as an aural form**, and the effective ways to combine sound effects, music and speech:

Sounds in the background and word pronunciation can change the mood of a piece.

When using a mini-disc recorder, it s necessary (better) to record at least 30-45 seconds of background sound to let the listener imagine what it is really like.

It is very important in enhancing our commentaries to have music during each commentary.

One student expressed the medium in this way, “[Radio] allows for many things to be possible and you can be creative with it.”

As with their discussion of journalism, students described learning about the considerable amount of **time and effort** involved in radio production, with roughly a fourth of students (22%) commenting on the level and kinds of work involved, and the collaborative team approach necessary in radio production:

It is always necessary to REVISE, REVISE, REVISE. A produced and finished piece is only as well done and complete as the effort given to make it.

Radio production is a lot of work that requires more time and dedication than I had expected.

You need to work as a team to accomplish your work. It takes patience to work with technology.

You need to get along with others. Pay close attention to every detail.

In summary, students reported learning a good amount about the technical aspects of radio production. Working with equipment and software such as a mini disc recorder and pro-tools editing software. Students offered tips on field recording techniques, such as microphone placement, things to consider when finding a location to record, and suggestions for those being recorded. They enjoyed learning how to use pro-tools, and were aware of how it facilitated the editing process, and furthered one’s aim to include the most important information, maximize sound quality, and organize segments into an optimal flow. In addition to incorporating speech in their radio pieces, students also recognized how sound effects and music could enhance their work. By working with these technical tools to produce a broadcast quality radio piece, students were acutely

aware of the significant time and effort involved, and the ways in which they need to work collaboratively as a team to get the job done.

At the same time, the technical requirements posed by the ELP are not insignificant. One teacher who had changed schools this year underscored the ELP’s technical overhead, in terms of computer hardware and technical support, in the following way:

[My new school] has very limited technology to use, so we only had two computers for 14 kids, and LOE had to pay for these computers to be upgraded (add more memory) so that we could even use them at all. The school had virtually no one who could help me with technology support, like how to burn CD’s, etc...[It is important to] make sure the school has enough of the right technology and technology staff willing to help.

6. Benefiting from the Producer Mentor

A key component of the ELP was the use of a local radio producer who served as an on-going presence in each ELP classroom, as a “producer mentor.” In their work with students and teachers, producer mentors shared first-hand knowledge, techniques and work samples of radio journalism. Students also learned about what kinds of people are drawn to radio journalism, and some of the special attractions, and challenges, of careers in radio journalism.

As with the rave reviews of producer mentors expressed by ELP teachers, the presence of the producer mentor was extremely well received by students. Nine out of ten (91%) students reported that they found having a producer mentor working with their class valuable either a “good amount” (64%) or “an incredible amount” (27%). When asked what they learned about the radio profession from their producer mentor, responses were richly varied. Approximately one fourth of the students indicated that they had learned about the hard work and commitment necessary for the profession (28%), various journalistic skills regarding interviewing, use of technical equipment, and radio/sound production (26%), and about the field and profession of journalism (21%). Sample responses are provided in Figure 7.

Figure 7: Students’ Views on What They Learned from their Producer Mentor

Area of Learning	Sample of Responses
Hard work and commitment necessary for the profession	<p><i>The radio profession allows you to travel, have fun, and be creative, but requires hard work and diligence.</i></p> <p><i>It takes a lot of dedication and time to be in that profession.</i></p> <p><i>It takes a lot of work and you must not be shy because you need to talk to others a lot.</i></p>
Journalistic skills regarding interviewing, use of technical equipment, and radio/sound production	<p><i>I’ve learned about the importance of sound and different ways to portray emotions. I learned about interviewing and different types of radio pieces.</i></p> <p><i>I learned many things having to do with sound. Never let the person you’re interviewing take the mike. Keep</i></p>

	<i>control over the interview.</i>
Field and profession of journalism	<p><i>The producer plays an important job. They have to make sure that everything is done on time and put together correctly.</i></p> <p><i>I learned it was very fun to be a writer and commentator, and that by being a commentator, you get to meet a lot of people.</i></p> <p><i>There is more than just speaking on the radio. There is journalism, multimedia and many more opportunities.</i></p>

Students commented that their producer mentor had helped them learned about some of the complex and subtle aspects of radio production, and there being “more than meets the ear.” Several students mentioned that they found it particularly helpful to hear some of the commentaries that the producer mentors themselves had produced, as examples from their own work:

I learned that radio is not as simple as it sounds. For every noise heard on the radio, it is taken into account how this will affect the listener and their feelings towards what he or she is hearing.

It takes a lot to talk on a radio station. Even though you are not seen you have to make sure you are detailed and vocally there.

I learned a lot of valuable things from my producer mentor. I learned the requirements and processes that must be made and followed to produce a good piece. I realized that there is more to the radio profession than just recording and speaking.

Our producer mentors taught us about what kind of voice and sound is needed for commentaries and gave us good examples from their own experience on the radio for us to work with.

He did a good job helping us with our commentaries and he brought good insight to the class by making the classes listen to his own commentaries.

Interestingly, about one tenth of the students (11%) described broader “**work/life**” lessons that they felt they had learned from their producer mentor, such as the need for hard work and perseverance (“There’s nothing you can’t do if you put your mind to it” “As many times as you mess up, don’t give up”), taking constructive criticism, and the importance of enjoyment derived from your work (“You have to know what you’re doing and like what you’re doing in order to be good at it.”)

Several students specifically stated that contact with their producer mentor had in fact heightened their interest in journalism as a career.

Being a part of this project has only strengthened my desire to work on the radio.

This is something I would really be interested in pursuing when I go to college. It's a great profession because it combines writing skills, social skills, and technical skills.

That it is a very interesting and knowledgeable profession. This experience encouraged me to look more into journalism than I had already done before.

In summary, students were highly positive about the benefits of having a local producer mentor in their classrooms. By contact and an ongoing working relationship with the mentor, students reported learning about the hard work and commitment necessary for the profession, greater insights about the journalistic skills involved, a better understanding of the intricacies of producing high quality radio pieces, acquisition of important “work ethics”, and an increased interest in pursuing a possible career in journalism.

The three teachers were unanimous in expressing that they would not have been able to take on, nor complete the ELP projects if it had not been for their producer mentor. Teachers expressed that the technical skills and background, editing and mixing time, and real-life professional expertise were critical to the success of the ELP.

I could not have finished any of the editing and mixing if it were not for the producer mentors' assistance. With over 50 students, the amount of work for commentaries, feature stories, and a web show was overwhelming. They interacted well with the students and the kids looked forward to their visits. (Teacher C)

My producer mentor was essential in editing the students' commentaries. We e-mailed her the kids' drafts and she emailed back comments and questions. She came to the classroom a few times and presented different lessons such as the use of sound, finding a topic, who to interview, how to interview, etc. She came once or twice during the web cast process to give the students' feedback on their process and this helped them. We are counting on her to pull our web cast together. Everything she did was helpful and much needed. (Teacher B)

Simply put, you can't do the program without the mentor. Having a mentor with teaching experience or the desire to teach was critical. My mentor developed a personal rapport with my students outside of myself. They began to trust him and internalize his comments and suggestions. I have been blessed with two wonderful mentors. They add the real-world context to the program. I can say the same thing as the mentor, but hearing it from him makes all the difference. (Teacher A)

Given the significant classroom demands placed upon the producer mentors, teachers also voiced the need for the mentors to be paid by Living on Earth in a more prompt, and timely manner.

7. Overall Appeal and Perceived Value and Reward of the ELP

Despite the high level of effort and exacting standards required by the ELP, students reported that the experience to be highly enjoyable. Three out of four students (75%) indicated that they enjoyed the ELP either very much (48%) or “an incredible amount” (27%).

Students offered few suggestions for improving the curriculum, with 39% either indicating that the curriculum was fine as is (17%), or that they had “none” or no suggestions. (22%). (An additional 15% of students left this item blank.) The main two suggestions that a small number of students offered was that they had more opportunity to have field trips to allow them visit some of the places discussed in their projects (7%), or that they had had been given more class time to devote to ELP (6%).

The multiple roles required of the ELP – as writer, technician, presenter, and producer – provided students with a variety of roles to enjoy, and in which to become skilled. As one student expressed, “It takes a lot of people to produce a whole radio show.”

The roles of writer and technician were the ones that students felt most skilled doing, chosen by 32% and 28% of students, respectively. These were also the two roles that students reported enjoying the most. While not quite as popular, the roles of presenter and producer also offered additional roles that a number of students enjoyed and gained skills. Despite the appearance that writer and technician roles were simply selected by about one quarter of the students (at levels of chance), in several ELP classrooms these two roles were chosen by about half the students.

Figure 8: Students’ Views on Roles

Team Role	Role Felt Most Skilled Doing	Role Enjoyed the Most
Writer	32% (range: 18% - 50%)*	27% (range: 17% - 50%)
Technician	28% (range: 12% - 42%)	31% (range: 14% - 47%)
Producer	19% (range: 17% - 23%)	16% (range: 8% - 25%)
Presenter	16% (range: 15% - 25%)	22% (range: 6% - 42%)

*Range reported across the 5 schools

Interestingly, students’ choice of role that they found most enjoyable did not necessarily correspond to that which they felt most skilled doing. While 62% of students indicated the same role, 38% indicated differing roles. Thus, students did not simply enjoy the role that they felt most skilled doing, but seemed to find aspects of different roles rewarding on their own accord.

Students seem to have found the writer role much more enjoyable this year, as compared to in Year 2. In Year 2, only 19% of students indicated that they enjoyed the writing role the most, as compared with 27% in Year 3. Comparison with Year 2 data also revealed an increase in students' perceived skill and enjoyment of the technician role. As discussed earlier, students were able to describe a variety of different writing and technical skills they had acquired through the ELP.

Figure 9: Students' Assessment of Roles, by Years 2 and 3

Team Role	Role Felt Most Skilled Doing	Role Enjoyed the Most
Writer	Year 2: 38% Year 3: 32%	Year 2: 19% Year 3: 27%
Technician	Year 2: 20% Year 3: 28%	Year 2: 21% Year 3: 31
Producer	Year 2: 17% Year 3: 19%	Year 2: 25% Year 3: 16%
Presenter	Year 2: 18% Year 3: 16%	Year 2: 30% Year 3: 22%

When asked what they were most proud of in their radio projects, students offered a wide array of responses. Many students described being proud of particular radio pieces they had created, and their **accomplishments concerning interviewing, writing, editing and technical production:**

My commentary. I felt a sense of accomplishment and pride that I wrote, recorded, and edited my own piece.

I was most proud when I did my first interview ever in my whole life over the phone with Mr. Tyo, and Ms. Sotto said it was one of the best ever she heard.

I was proud of the descriptions in my commentary. I worked hard for revise to make my piece sound good on the radio and make it so the people listening could really imagine what I was talking about.

The background music – it gives the piece a different vibe. The tone of the music gives it a better feeling.

Editing commentaries so seamless that I was told by the teacher that she couldn't tell where it had been cut.

How well I came to know how to use a mini disc recorder and my ability to problem solve when one arose with the MDR.

Other students pointed to the **insights and new knowledge they had gained about their topic and their communities**. Students described being proud of learning more about the subject they researched, finding out new things about their environment, and learning about aspects of their communities for which they felt proud.

I worked on a project about rats in New York City and the information I found was incredible, extraordinary, fascinating.

The commentary because it really showed me and I really looked at my neighborhood in a different perspective.

That I got a chance to interview someone and learn more about my community. And how we have a place for children to go.

When I heard that people cared about their neighbors and wanted to change or fix their neighborhood. They were telling people around the world that not everything is perfect, but if we as a community work together, we can achieve.

A number of students commented on being proud of the fact that their **projects focused on real issues of their own choosing**, ones in which they felt personally invested, and enabled them to voice their own views and opinions.

They were based on our own ideas, whether it be the topics for our commentaries or the set up for our audio diary.

It was a real problem I got to express.

What I talked about and got off my chest.

Speaking in my own personal voice.

One girl reported how self-affirming her ELP experience was, and her surprise that “I got to express my feelings and people actually want to hear it.”

The fact that the ELP enabled students to produce **radio pieces that were actually broadcast and available on the web** clearly was a source of pride for those whose pieces were chosen. At the same time, the broadcasting of selected pieces did not seem to detract from the enthusiasm of other students, who took pride in the quality of their own work, and in their classmates’ work.

[I was most proud of] having the opportunity to present my commentary which was on the radio and it was www.LOE.org. I did not expect to accomplish that and I did. I was very happy and proud of myself to hear my commentary recorded and played, rather than just read off paper.

Although I wasn't on the radio or anything, I was proud of my stories. I thought I had a lot of good points and cool stuff in my commentaries.

I enjoyed how many students' commentaries were good, so good that they were played online and some on the radio.

In summary, students found the ELP highly engaging, and found that the multiple roles of writer, technician, producer and presenter offered them different areas in which to become skilled, and to enjoy. They expressed taking pride in many types of accomplishments, from those involving interviewing, writing, editing and technical production, to new insights and knowledge about their topic and local communities. Students also took great pride in focusing on real issues of their own choosing that they felt passionate about, and that the pieces that they and their classmates produced were actually broadcast and available on the web.

8. Classroom Implementation Issues

All three teachers emphasized the significant amount of time required to utilize the ELP effectively. Two of the teachers expressed some concerns about the ways in which the ELP completed with class time that they felt they needed to devote to other science areas in biology (e.g., genetics, evolution, etc.) and the demands upon their curriculum placed by adherence to state testing. One teacher suggested that the ELP was ideally presented as part of a class dedicated to the environment, rather than mixed in with other topics like biology or chemistry.

One teacher expressed that the current materials had more realistic goals in terms of products and process, so that success was more readily attainable. Another teacher noted that she was pleased that this year some of her students' pieces were used on the air, whereas none had previously. Both points speak to an improvement over their Year 2 experiences, when teachers had expressed that the LOE was requiring production standards and criteria they felt were neither appropriate or realistic for their students, and their disappointment in having so few students pieces broadcast or available on the web.

As noted in our Year 2 report, the ELP demands that teachers possess a clear understanding not only of science, but of journalism and technical production as well. The producer mentor was a critical component to the ELP's success, as were sufficient materials and training pertaining to journalism and technical production. It is important to note that all five ELP teachers participating in Year Three had at least one or two years of experience with the curriculum, yet were still struck by the significant time and learning demands it placed upon its teachers.

Some of the challenges posed by the ELP regarding time, resources, and support was summarized by one teacher in the following way:

Teachers need resources, support and time to successfully incorporate new curricula into their classroom. Resources: both technological and journalistically. We are not producers or journalists; we are science

teachers. If you give us a task, we will do it – IF we have all the resources necessary. If it becomes too cumbersome – forget it. Support: having a great mentor, IT person, and a dedicated Living on Earth editor is essential... Time: it takes time to figure out what this program is and how you want to integrate it into your classroom. It didn't happen the first or second year. It was the third year when my class produced airable work.

Concluding Comments

I love this project. I want to continue working in this program because it integrates all of the elements I am looking for – cooperative learning, environmental education, community service learning AND it breaks new ground in understanding how ecological identity is formed in urban settings. That work is rich with possibilities. The environmental movement needs to change and I think this program helps to do that. (Teacher A)

That a radio show isn't just a show that people don't care about. I learned it has some learning points that are interesting and people actually care about science and the environment. (ELP 9th grader, Chicago)

***Appendix A: Description of Year Three ELP Classrooms
(edited excerpts from the Living on Earth 2003 NSF report)***

Wilton-Lyndeborough Cooperative High School in Wilton, New Hampshire : Wilton is a small, rural town in New Hampshire. The teacher used the ELP as part of an AP environmental science course of 10th graders. Students enrolled for a semester and received one credit in Computer Technology and/or science. The interdisciplinary course focused on Journalism and English as well as the sciences. The class met daily for 50 minutes.

Harbor Charter School for the Arts and Environment in Harlem, New York is the only middle school participating in the project. This teacher used the ELP with a group of eighth graders. The curriculum enhanced a long established field-based study of the Harlem Meer (a man-made lake in the north end of the city) in Central Park. The school's connection with the city's Department of Parks and Recreation is a research-based program in which the students supply scientific data to the city about the water quality of the Harlem Meer. For the bulk of the project, students based their radio work on field studies that they were conducting at the Meer. Students focused on water quality, seasonal changes, flora and fauna, and the impact of the surrounding city on the lake. They also studied the impact of "open green space" on the health and well being of community residents and the impact of traffic on the water quality of the Meer. Student also explored other environmental issues like public housing quality, the lives of city rats and the effect of the citywide smoking ban on kids.

Crenshaw High School in Los Angeles, California is one of the largest public high schools in Los Angeles. Students come from the inner city of Los Angeles and span socio-economic, ethnic and academic abilities. This teacher used the ELP as the basis of an AP environmental Science class for Juniors and Seniors and ran five days a weekly, using the Eco Club for production. They studied the politics of establishing green-space in the African-American urban communities, potential for alternative energy sources based on the current energy crisis in California, nutrition standards and practices in their school and other topics.

Queen of Peace High School in Chicago, Illinois is an all girls catholic charter high school. This year, the teacher used the ELP with 70 girls integrating technology, science and environmental journalism into both an AP Science class and a regular science class. The students developed stories of local place and their personal environmental impact on society by considering the overarching topics of consumer behavior and overpopulation. They have also explored issues around public transportation and other local issues. A lab with MiniDisc recorders and computers was set up at the school for the program. This program is closely aligned with the science curriculum and acts as an exhibition of learning.

Camden High School in Camden, New Jersey is considered one of the four poorest schools in the United States, and was included in Kozol's *Savage Inequalities*. Juniors and seniors from a science classroom were trained in the digital technology of radio

journalism once a month for four hours to develop stories that explain their research to the general public. Most interviews and feature pieces at Camden highlighted an ongoing class study of the water quality of the Cooper River. Other topics included a local children's garden, the poor conditions of local roads, and the affects of local drug activity on the community and its members.