

NE-COSEE at WHOI
Report on 2003 Survey of Education and Outreach Activities

Introduction

In 2002, The National Science Foundation funded seven Centers for Ocean Sciences Education Excellence (COSEE) around the country. These Centers are working to determine the best methods of incorporating research into ocean sciences education. The goal of the New England COSEE is to strengthen the New England region's capacity to develop and provide high-quality ocean science education in both formal and informal settings, by understanding the needs of, working with, and facilitating interactions between educators, researchers, and the public. The NE-COSEE group at WHOI is working to understand and address the needs of researchers in their effort to contribute to ocean sciences education.

As a first step in this process, an online survey was developed to: 1) collect baseline data on current involvement in education and outreach activities, and 2) assess the needs of researchers in regards to their participation in education and outreach.

Methodology

The survey was developed through surveymonkey.com, an online survey tool. The survey was disseminated via email to the entire WHOI community (approximately 770 individuals) on March 6th, 2003.

In conjunction with the survey, presentations were made to each department at WHOI to increase awareness of the NE-COSEE name, goals, and efforts. After each presentation, the survey was resent to each department in an effort to ensure the best response to the survey as possible.

Department	Date	Presenter
Geology and Geophysics	1/17/03	Debbie Smith
Physical Oceanography	3/5/03	Debbie Smith
Biology	3/13/03	Debbie Smith
Applied Ocean Physics and Engineering	3/26/03	Debbie Smith
Marine Chemistry and Geochemistry	4/11/03	Andrea Thorrold

The survey consisted of nine questions: three addressing baseline data on education and outreach activities, three addressing needs assessment, one attitudinal assessment section consisting of three statements about education and outreach activities, and two demographic questions.

The survey was open for a total of six weeks and was closed on April 18th, 2003.

Results

The survey was designed so that respondents were not required to answer every question; therefore, the total number of respondents varies slightly for each question and is so indicated.

The survey generated 120 unique responses from across the WHOI community, resulting in an overall response rate of about 15%. Demographic information regarding position (Figure 1) shows that the majority (88%) of respondents were from people directly involved in research: scientists (including tenured and untenured scientists and postdoctoral investigators), technical staff and students. As this is the audience the NE-COSEE at WHOI will be targeting with future activities, the survey responses are considered to represent the views of this community. When asked whether education was part of the respondent's job description, only 21% of the 113 that responded to this question said that some portion of their salary was based on participating in education or outreach at any level.

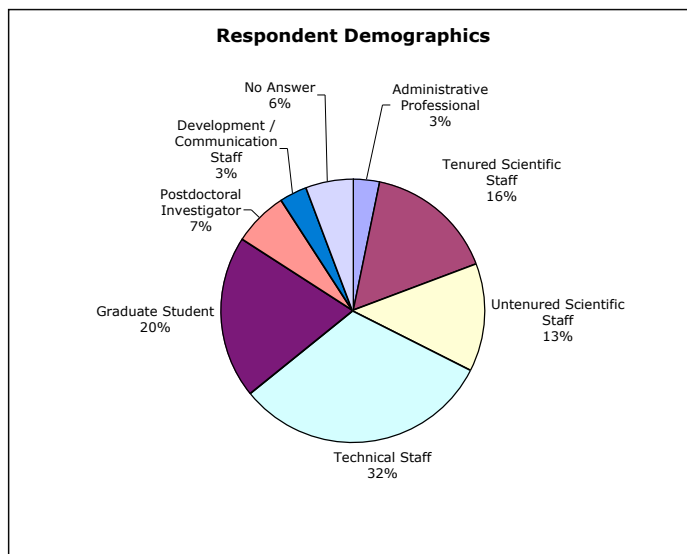


Figure 1. Demographic breakdown of survey respondents (n=120) by position held at WHOI (<http://www.who.edu/administration/dirres/overview/appt.html>).

Baseline Data on Education and Outreach Activities

One of the goals of this survey is to set a baseline of the amount and type of education and outreach activities that are currently being conducted by members of the WHOI community. To collect this information, respondents were asked to list the education or outreach efforts in which they have participated. The responses to this open-ended question were then categorized by type of activity. The results show that 80% of respondents have participated in some type of education or outreach activity, with participation in science fairs (judging and mentoring) and visits to K-12 classrooms being the activities most often listed (Figure 2). Many respondents have participated in a variety of activities making the total percentage of participants greater than 100%.

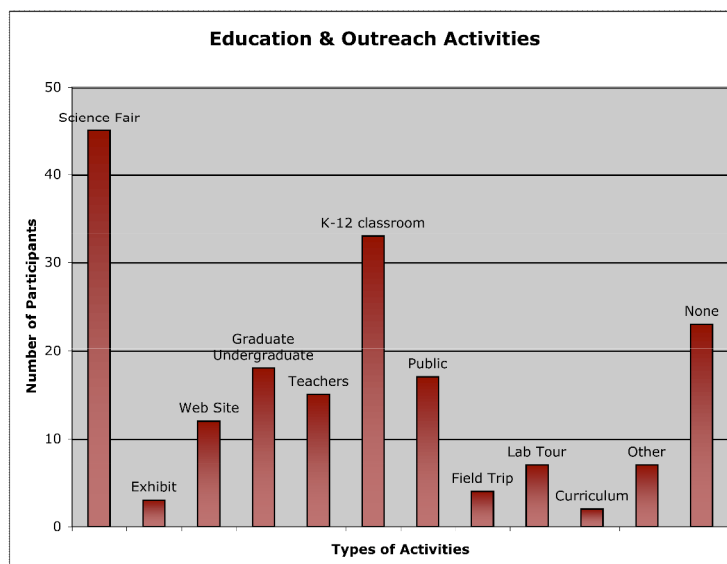


Figure 2. Distribution of types of education and outreach activities in which respondents (n=117) have participated. Types of activities were categorized from responses to an open-ended question.

The survey was also designed to gather information about the reasons for participation in education and outreach activities and asked the question: “why do you participate in education/outreach activities?” Although responses to this question were open-ended, the reasons for participation in education/outreach activities could be classified into more general categories. The most frequently cited reasons for participation in education and outreach activities were personal satisfaction (e.g., rewarding, fulfilling, enjoyable), responsibility and obligation, personal links to the community, and feedback to research (e.g., exposure, reputation, support).

When asked “what types of education/outreach activities would you be interested in doing?”, almost 75% (of 114 respondents) were interested in presenting in a school or classroom setting. Other activities that were selected by more than 50% of respondents are: mentoring a student (59%), judging a science fair competition (58%), and participating in a professional development workshop for teachers (52%).

Assessing Needs related to Education and Outreach

If scientists are interested in pursuing education and outreach activities, but are not doing so, what are the barriers that are preventing their participation? The second half of the survey was designed to assess what resources, incentives, and skills are needed in order to increase participation in education and outreach activities of interest.

Three questions were asked to assess needs related to: resources, incentives, and knowledge/skills:

- What resources would you need to pursue education/outreach activities?
- What incentives would increase the probability of your participation in education/outreach activities?
- What additional knowledge or skills would you need to pursue education/outreach activities of interest?

For each question, there were choices provided as well as the option of “other” with space for explanation. Respondents were able to select as many choices as apply to their situation.

Through this grant, the NE-COSEE at WHOI is primarily targeting individuals directly involved in research. Therefore, in addition to the overall response from all survey respondents, the results of the following questions were analyzed to see if there were differences in involvement in education and outreach activities between scientists at different points in their careers. A breakdown of responses to these questions by position or point in career path is provided for each area and the differences are discussed as appropriate.

Needs Assessment Question 1: What resources would you need to pursue education/outreach activities?

The overall survey response showed the top responses as “more of my own time” (81.1%) and “funding” (50.5%). Time and funding seemed to be universal issues regardless of how the responses were divided by demographics (Figure 3). When postdoctoral investigators were viewed independently, it is noted that they raised the need for a “consultant to design activities” (50%) as the second most highly chosen response after time.

Response	Overall	Tenured	Early Career	Technical	Grad Student
More of my own time	81.1%	63.2%	91.3%	86.1%	87.5%
Funding	50.5%	47.4%	73.9%	52.8%	37.5%
Consultant to help design activities	23.4%	21.1%	47.8%	13.9%	16.7%
Additional personnel to implement activities	18.9%	31.6%	43.5%	2.8%	8.3%
Other	15.3%	5.3%	17.4%	13.9%	20.8%
None	9.0%	31.6%	0.0%	2.8%	0.0%
Total number of respondents	111	19	23	36	24

Figure 3. Responses to the question “What resources would you need to pursue education/outreach activities?”, with the most frequently selected response highlighted in red and second most frequently selected response in blue. Overall = total number of respondents (n=111 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Early Career = untenured scientific staff + postdoctoral investigators + visiting investigators; Technical = technical staff; Grad Student = graduate student.

Needs Assessment Question 2: What incentives would increase the probability of your participation in education/outreach activities?

Overall, the respondents chose “feedback on impact of activity” as the primary incentive for involvement (51.4%). No other response was selected by more than 50% of the respondents, but the second most frequently chosen response was “career advancement / promotion” (30.6%). When the data are broken down by demographics, “career advancement / promotion” becomes more important (60.9%) to the early career scientists (a grouping of untenured scientists and postdoctoral investigators), while feedback becomes a close second (56.5%) (Figure 4). It is interesting to note that “requirements from funding agencies” is most often chosen as an incentive to participate in education and outreach activities by tenured scientists (42.1%), while this response ranks low in the overall response frequency. This difference is most likely related to who works with, and has accountability to, funding agencies. The only other obvious difference in the data concerns graduate students who show interest in honorarium as the second most frequently selected response (33.3%) following feedback.

Response	Overall	Tenured	Early Career	Technical	Grad Student
Feedback on impact of the activity	51.4%	31.6%	56.5%	55.6%	62.5%
Career advancement / promotion	30.6%	10.5%	60.9%	33.3%	16.7%
Honorarium	25.2%	21.1%	26.1%	25.0%	33.3%
Other	24.3%	36.8% *	21.7%	30.6%	12.5%
Requirements from funding agencies	19.8%	42.1%	34.8%	5.6%	8.3%
None	16.2%	15.8%	4.3%	16.7%	20.8%
Total number of respondents	111	19	23	36	24

Figure 4. Responses to the question “What incentives would increase the probability of your participation in education/outreach activities?”, with the most frequently selected response highlighted in red and second most frequently selected response in blue. Overall = total number of respondents (n=111 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Early Career = untenured scientific staff + postdoctoral investigators + visiting investigators; Technical = technical staff; Grad Student = graduate student. * Although “other” is the second highest response for tenured scientific staff, analysis of the open-ended responses showed a repetition of responses from question one (i.e. funding and time).

What additional knowledge or skills would you need to pursue education/outreach activities of interest?

Responses to this question showed strong interest in two of the choices provided: “understanding the needs of the education community” (59.3%) and “how to get involved” (50.9%). Exploring differences in demographics shows that an understanding of how to get involved is less important to tenured scientists who are further along in their careers (Figure 5), but “information on writing education/outreach proposals” is still important to some (38.9%). This result is similar to the responses from the technical staff who rank those responses in the same order (understanding the needs of the education community, 54.3%; information on writing proposals, 42.9%). Graduate students place more importance on how to get involved (79.2%) which is consistent to follow-up discussions (outlined in discussion section).

Response	Overall	Tenured	Early Career	Technical	Grad Student
Understanding needs of education community	59.3%	61.1%	77.3%	54.3%	66.7%
How to get involved	50.9%	22.2%	77.3%	40.0%	79.2%
Information on writing edu/outreach proposals	38.9%	38.9%	45.5%	42.9%	33.3%
Familiarity communicating to other audiences	34.3%	33.3%	50.0%	37.1%	29.2%
How to find consultants	18.5%	22.2%	31.8%	11.4%	20.8%
None	14.8%	27.8%	4.5%	11.4%	4.2%
Comfort in talking to students	13.9%	0.0%	13.6%	28.6%	8.3%
Other	10.2%	11.1%	9.1%	11.4%	4.2%
Total number of respondents	108	18	22	35	24

Figure 5. Responses to the question “What additional knowledge or skills would you need to pursue education/outreach activities of interest?”, with the most frequently selected response highlighted in red and second most frequently selected response in blue. Overall = total number of respondents (n=108 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Early Career = untenured scientific staff + postdoctoral investigators + visiting investigators; Technical = technical staff; Grad Student = graduate student

Attitudinal Assessment

Respondents were asked to rate their reaction to three statements about education/outreach activities. Each statement is listed below along with a figure depicting the responses from our five demographic groups (note: untenured scientific staff is shown here without being grouped with postdoctoral investigators).

Statement 1: Education/outreach activities should be a required component of research proposals.

In general, this statement received similar reaction from all five demographic groups and from the respondents taken as a whole (Figure 6). While there are some who tend to agree with this statement, the majority of respondents disagreed that education or outreach activities should be required as a component of research proposals.

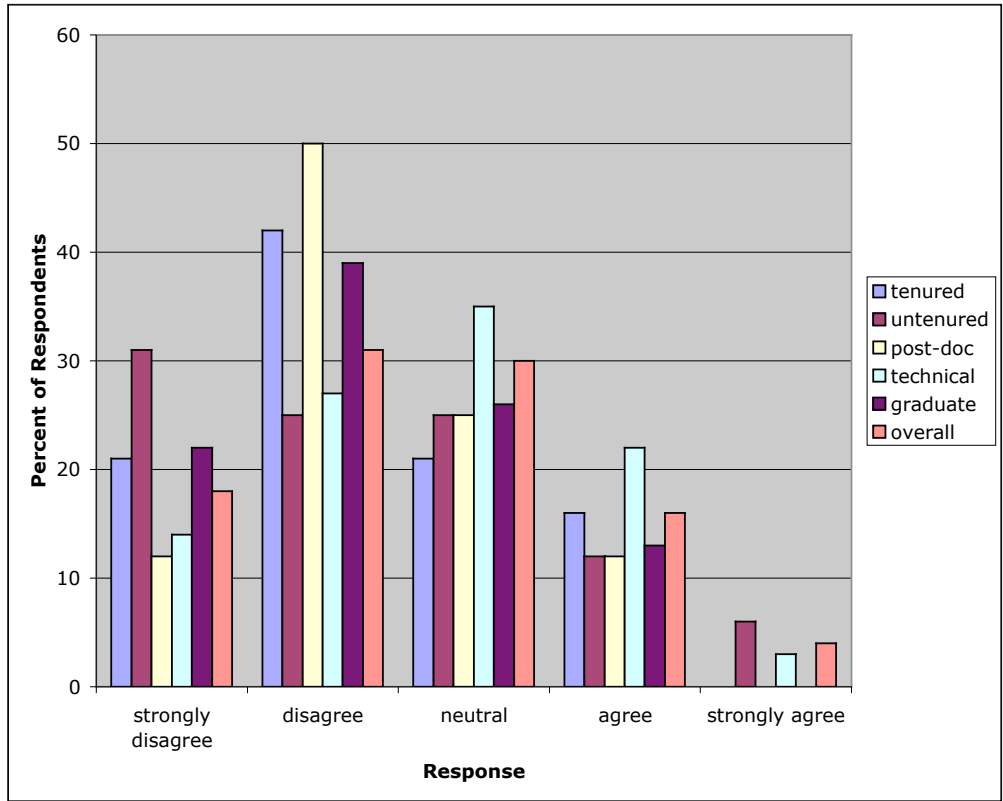


Figure 6. Distribution of responses to the statement: Education/outreach activities should be a required component of research proposals. Overall = total number of respondents (n=112 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Untenured = untenured scientific staff + visiting investigators; Post-doc = postdoctoral investigators; Technical = technical staff; Graduate = graduate student.

Statement 2: Scientists should be responsible for initiating education/outreach activities

Overall, this statement shows a relatively normal distribution of responses with most respondents being neutral in their reaction to the statement (Figure 7). While most groups reflected a similar pattern in distribution of responses, a noticeable difference between groups is illustrated by the responses in the two early career categories – untenured scientific staff and postdoctoral investigators. Postdoctoral investigators are more likely to disagree with this statement while untenured scientists tend to agree.

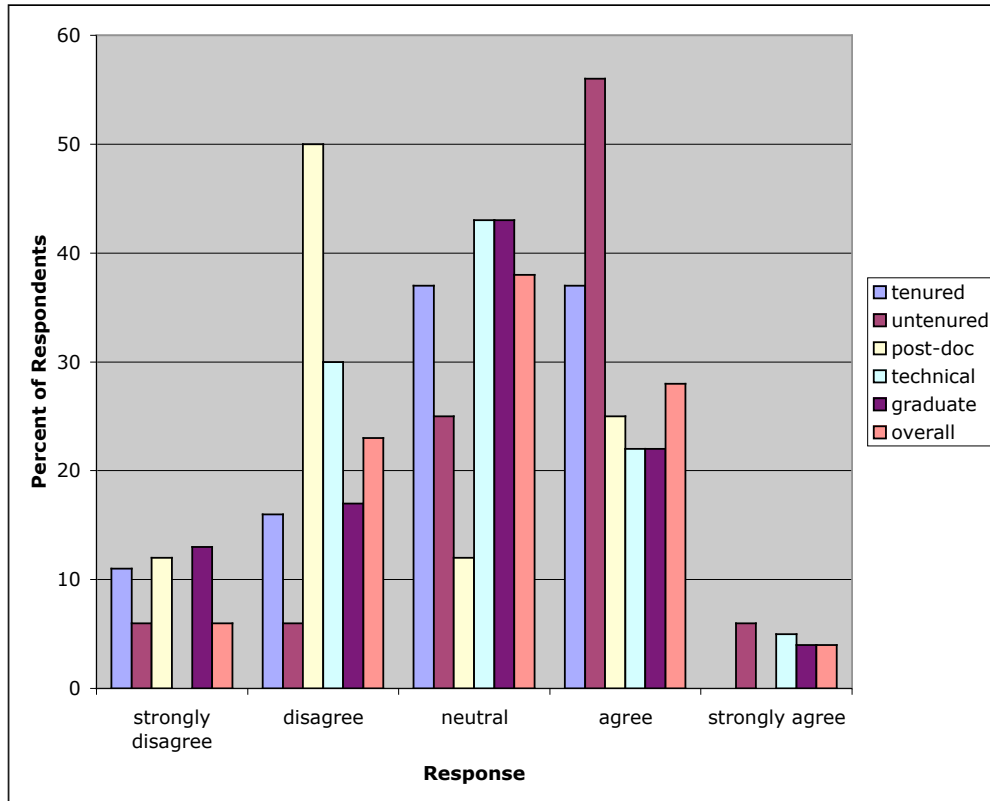


Figure 7. Distribution of responses to the statement: Scientists should be responsible for initiating education/outreach activities. Overall = total number of respondents (n=112 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Untenured = untenured scientific staff + visiting investigators; Post-doc = postdoctoral investigators; Technical = technical staff; Graduate = graduate student.

Statement 3: Participation in education/outreach activities should be considered in the promotion process.

The results show a general agreement with this statement both for the overall respondents and with each demographic group (Figure 8). The majority of respondents agreed that participation in education or outreach activities should be considered in the promotion process.

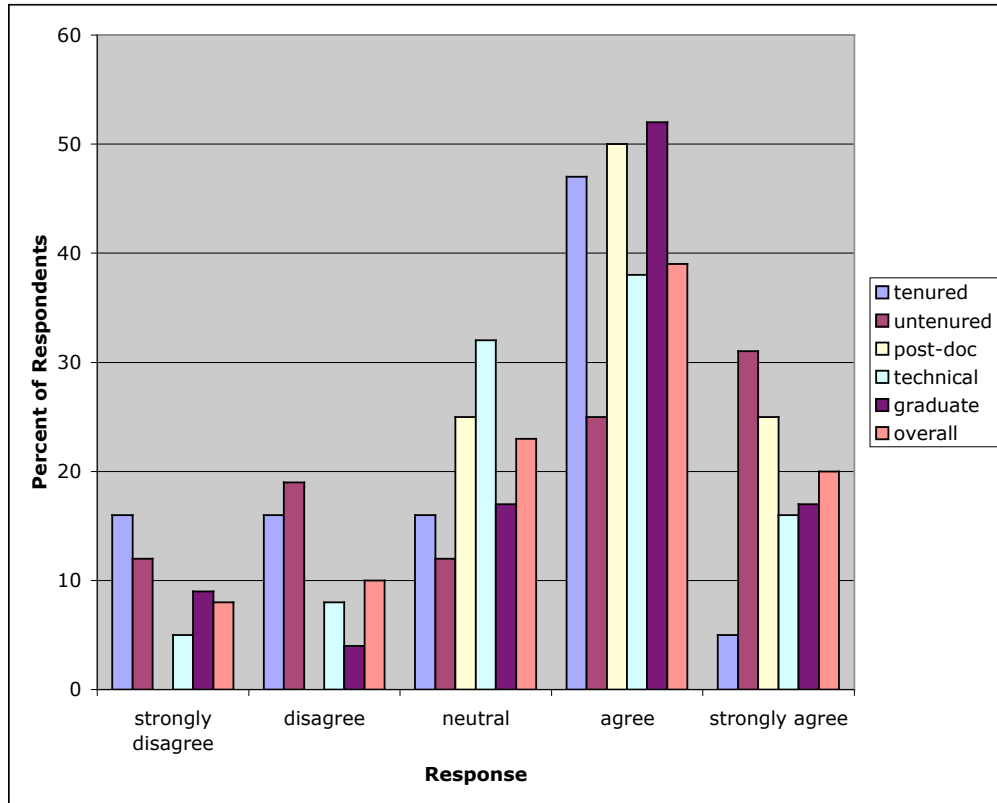


Figure 8. Distribution of responses to the statement: Participation in education/outreach activities should be considered in the promotion process. Overall = total number of respondents (n=112 for this question). Categories of respondents are defined as follows: Tenured = tenured scientific staff + scientist emeritus; Untenured = untenured scientific staff + visiting investigators; Post-doc = postdoctoral investigators; Technical = technical staff; Graduate = graduate student.

Discussion with Science Advisory Group

The survey was distributed with the intention that the results would help to direct future NE-COSEE efforts. To that end, the NE-COSEE at WHOI team convened a meeting of a group of WHOI scientists to review the survey results and proposed activities designed to address the needs highlighted by the survey. The following is a summary of the discussion that resulted from that meeting.

Survey Data Discussion Group (July 1st, 2003). This meeting was organized in an effort to verify and elaborate on the results of the online survey. The scientists were chosen to provide representation from each department at WHOI and provided feedback on the survey questions, design and responses. Reaction to proposed NE-COSEE activities was also provided.

The first main discussion point was in regards to the types of activities that satisfy the National Science Foundation's (NSF) broader impacts criterion (Criterion II). Is there a difference

between what one would include in the synergistic activities section of his/her CV and what is outlined in addressing Criterion II? There are definite differences in how the scientists respond to this question. The differences seem to be related to departmental affiliation. Are these differences a reflection of differences in NSF divisions/programs? The question also was raised as to whether or not the outreach needed to be particular to the proposed research? Is more general involvement in outreach activities acceptable? Concerns were also raised regarding the difficulty in fulfilling Criterion II without an undergraduate program at WHOI resulting in a competitive disadvantage for WHOI scientists.

Another question was raised regarding whether or not NSF expects “outreach for free”. Will NSF written and panel reviewers accept a proposal budget that requests adequate funds to do education or outreach activities? These questions could not be answered here, but showed that researchers feel a need for clarification from funding agencies.

Discussion next turned to the issue of participation in education/outreach activities not being considered in the promotion process at WHOI. The point was made that working with graduate students is not counted in this process, so there is little hope that other education/outreach activities will be. There was some discussion regarding the circular situation of funding requirements: funding is needed to do research which is necessary to publish which counts directly toward promotion. At WHOI, participation in education and outreach activities is not required for promotion, but is now a requirement for receiving funding from some agencies. For some, it has been suggested that participation in these activities is often looked upon as detrimental to one’s research career. One instance was offered where the submission of a proposal that required a strong educational component was discouraged. A point was made that “many scientists will say that participation in education/outreach is important, but they are not putting it into practice by supporting it at the institution.”

Members of the group stressed the need for scientists to work with and encourage participation from members of underrepresented groups. We have not addressed how NE-COSEE is going to work in this regard, but will discuss this issue further.

In summary, scientists mentioned that they are looking for:

- logistical help (people who can organize opportunities)
- “go-to” people at WHOI
- awareness of activities going on in the WHOI community
- help with educational “buzz words”
- assistance in finding foundations/other funding sources for education/outreach
- connections with others who have written Informal Science Education (ISE) proposals
- feedback on the activities they participate in

Graduate Student Meeting (July 9th, 2003). A graduate student representative was invited to join the discussion group, but was unable to attend the meeting. Some unique perspectives were gained from a follow-up individual meeting with a graduate student and are reported here.

Many graduate students are interested in participating in education and outreach activities for a variety of reasons as shown by the survey. It was conveyed that some students feel that it would be helpful if participation in outreach were a mandatory part of the Joint Program requirements. If participation were mandatory, it is felt that students would have some leverage to enable them to participate in education activities.

The graduate students at WHOI are already working together on some outreach initiatives of interest. They feel they have things to offer (the community), but are trying to figure out how to get involved. They already have an established network (email lists, monthly meetings, etc.) that can be used to help get the word out about education and outreach opportunities.

Students are mindful of the fact that, after graduating, they may be moving on to other institutions that require education experience. The question for them is where and how to get this experience at WHOI. Graduate students represent a potential resource to tap for participants in education and outreach activities as well as workshops that help to improve communication and teaching skills.

Conclusion

This education and outreach survey has met an immediate need to collect baseline data on education and outreach activities at WHOI and is available as a template to be used at a variety of institutions in the New England region as well as throughout the COSEE network. Next steps break down into short-term and long-term projects addressing both the needs that have come out of the survey itself as well as the bigger issues that have been brought to light through the survey discussion group. These short-term projects will form the basis of the NE-COSEE at WHOI work for the next year, while the long-term issues will be tackled over the next few years of this project. Additional information will be updated on the NE-COSEE at WHOI web site: <http://necosee.who.edu>.