Educators’ Needs
Assessment Survey of Climate Change Education In and Out of the Classroom

A review of the literature in the area of climate change education shows a number of surveys (Buhr, 2011, Johnson, 2011) looking at the needs of K-12 classroom teachers, as well as their knowledge as it relates to climate change. Additionally, several national surveys have been conducted (Yale Project on Climate Change Communication 2009, 2010, 2011, 2012, 2013) that gauge the attitudes and knowledge of Americans on climate change. Recognizing that the needs of informal and environmental educators may be different than formal K-12 educators as it relates to climate change education, we developed a needs assessment survey for distribution to the North American Association for Environmental Education (NAAEE) members and other educators who may integrate climate change in their educational settings. The results of this survey were meant to inform and support the creation of a product developed by NAAEE’s Climate Change Education Professional Learning Community, supported by EECapacity.

Survey Instrument Development

Objectives of the survey included determining:

- What do formal and informal educators know about climate change?
- What do formal and informal educators do with what they know about climate change (this includes action/service learning applications)?
- What do formal and informal educators need to integrate climate change into their educational settings?
- What climate change education resources are formal and informal educators using?
- What audiences do formal and informal educators work with and engage regarding climate change?

The survey questions were developed through an iterative process that involved:

- Collection of previous surveys that had been conducted related to climate change, environmental, and science education (see end of this section for references used)
- Identification of questions from previous surveys that align with the survey objectives
- Refining questions for survey consistency
- Narrowing down questions to accommodate for survey length
- Sharing survey with EECapacity climate change education community for comments
- Finalizing survey and entering into Survey Monkey for distribution

The final survey included 31 questions, both multiple choice and open responses.

**Survey Sample**

Our main goal in gathering information through this needs assessment was not to have a closed survey, but to get as much input as rapidly as possible given the time constraints of the project. Respondents were solicited via email; in some cases directly, in some cases via an announcement in e-newsletters put out by parent organizations and in one case a Facebook post. Details of listservs utilized are found below (Table 1). The emails included objectives of the survey and gave a deadline for responding. The survey opened August 6, 2013 and closed September 13, 2013, with the intent of catching formal and informal educators while they were in teaching mode.

**Table 1: Listservs Reached**

<table>
<thead>
<tr>
<th>Email Listserv or Organization</th>
<th>Number of Subscribers (to listserv or newsletter)</th>
<th>Number of Emails Sent</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Association for Environmental Education</td>
<td>1600</td>
<td>3</td>
</tr>
<tr>
<td>National Science Teacher’s Association</td>
<td>60,000 members- posted to website and sent to listservs once</td>
<td>1</td>
</tr>
<tr>
<td>Louisiana Association for Environmental Education</td>
<td>900</td>
<td>1</td>
</tr>
<tr>
<td>Social Studies and Science Teachers in NE Ohio</td>
<td>495</td>
<td>1</td>
</tr>
<tr>
<td>Climate Literacy Network</td>
<td>407</td>
<td>2</td>
</tr>
<tr>
<td>National Council of Social Studies Environmental and Sustainability Education Online Community</td>
<td>84</td>
<td>1</td>
</tr>
</tbody>
</table>
Survey Demographics

A total of 316 individuals attempted the survey. However, only 225 (71.2%) completed the entire survey. Thus, the sample size for the latter half of the survey was less than 316.

Drs. Pat Stephens Williams and Ray Darville of Stephen F. Austin State University, Nacogdoches, TX, completed the Results Analysis.

Respondents were asked to identify their membership in related organizations in a check-all-that-apply type of question (see Table 2). They indicated that they were members of 337 organizations, or about one membership per respondent. Table 9 shows the results of the number of responses, percent of responses, and percent of cases. For organizational memberships, the National Science Teacher’s Association (NSTA) was the most frequently identified (43.0% of responses and 56.9% of cases) while the North American Association for Environmental Education (NAAEE) was second most frequently identified (35.9% of responses and 47.5% of cases). Combined these two organizations represent about 80% of all individuals participating in the survey.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Responses</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>The US Partnership for Education K-12 NANS listserv Sustain12</td>
<td>429</td>
<td>1</td>
</tr>
<tr>
<td>Environmental and Sustainability Education Facebook Group</td>
<td>58</td>
<td>1</td>
</tr>
<tr>
<td>National Center for Geography Education</td>
<td>5000</td>
<td>2</td>
</tr>
<tr>
<td>Minnesota Association for Environmental Education</td>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>Rhode Island Environmental Education Association</td>
<td>228</td>
<td>1</td>
</tr>
<tr>
<td>New England Environmental Education Alliance</td>
<td>280</td>
<td>1</td>
</tr>
</tbody>
</table>
Respondents were asked to self-identify the type of educator they were (Table 3). Most were formal educators (43.0%) followed by informal educators (29.1%). Some (25.9%) indicated that they saw themselves as both a formal and informal educator, while a handful self-identified as neither.

Table 3. Type of Educator

<table>
<thead>
<tr>
<th>Educator Type</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal educator</td>
<td>136</td>
<td>43.0%</td>
<td>43.0</td>
<td>43.0</td>
</tr>
<tr>
<td>Informal educator</td>
<td>92</td>
<td>29.1%</td>
<td>29.1</td>
<td>72.2</td>
</tr>
<tr>
<td>Both formal and informal educator</td>
<td>82</td>
<td>25.9%</td>
<td>25.9</td>
<td>98.1</td>
</tr>
<tr>
<td>Neither formal nor informal educator</td>
<td>6</td>
<td>1.9%</td>
<td>1.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>316</td>
<td>100.0%</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Educator type and memberships were cross tabulated to present a more detailed picture of respondents (Table 11). Formal educators were most likely to be NSTA members (72.6% of cases) while informal educators were most likely to be NAAEE members (77.8%).

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1National Association for Interpretation  
2National Council for Social Studies  
3National Council for Geographic Education  
4Association for Zoos and Aquariums  
5Association of Science Technology Centers
The majority of all respondents teach climate change to grade 9-12 students, adults, or university/preservice/in-service students. A large percentage also taught to formal and grades 6-8. The top four types of courses taught by classroom teachers represented environmental science, life science, earth science and physical science, with environmental and earth science being the areas where climate change is most often included.

**Survey Respondents and Climate Change Education**

Overall, educators self-reported being fairly or very well-informed about climate change, though there was a significant difference between how well-informed formal and informal educators felt they were on “how the climate system works” and “ways to communicate about climate change to students,” with formal educators feeling more informed than informal. While 77% of respondents felt climate change was relevant to their subject area, 94% felt it was extremely or very important to teach their audience about climate change.

When asked the focus of their lessons on climate change, 5 of the 10 foci offered were selected by more than 50% of the respondents (see Table 4). Educators focused least often on civic engagement (19.7%), adaptation (29.7%), social, political and economic ramifications of climate change (31.9%), and climate solutions (38.1%).

**Table 4: Focus of climate change lessons, highest to lowest**

<table>
<thead>
<tr>
<th>Focus</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The greenhouse effect, human activity</td>
<td>85.0%</td>
</tr>
<tr>
<td>Impacts of climate change on wildlife and plant life</td>
<td>77.9%</td>
</tr>
<tr>
<td>Impacts of climate change on people and property, not in your area</td>
<td>63.7%</td>
</tr>
<tr>
<td>Mitigation– things people can do to lessen their impact on climate forces</td>
<td>59.3%</td>
</tr>
<tr>
<td>Impacts of climate change on people and property in your area</td>
<td>57.5%</td>
</tr>
<tr>
<td>Climate solutions-hands on action taking initiatives and the skills to perform them</td>
<td>38.1%</td>
</tr>
</tbody>
</table>

When compared, formal educators were more likely than informal educators to focus on: adaptation, causes of climate change, local impacts, social, political and economic ramifications, and civic engagement while informal educators were more likely to focus on mitigation, impacts not in local area, impacts on people and property in area, impacts on wildlife and plant life, and climate solutions.

When asked about what Climate Literacy Principles their course covered, respondents identified, “Human activities are impacting the climate system”,...
“Climate change will have consequences for Earth system and human lives,” and “Humans can take action to reduce climate change,” as the top three. Educators identified where they usually found their educational resources on climate change from a list of 13 different sources. Course textbooks were most often selected followed by the internet.

**Educator Needs**

Overall, 53.1% of all educators said they were either extremely confident or very confident teaching climate change. Yet comparing formal and informal educators, 58.9% of formal educators saw themselves as either very confident or extremely confident, while only 37.7% of informal educators saw themselves this way. In addition, over 10% of informal educators were either not very or not at all confident, whereas only 4% of formal educators saw themselves this way.

The greatest barriers identified to teaching climate change were time to develop and search for curriculum resources and the budget to develop new resources.

When asked what resources were needed to effectively teach about climate change two items tied (n = 165) for the highest counts:

- Content information that links climate change impacts to your local/regional wildlife
- Information about up-to-date regional/global climate science

Financial resources had a rank of three (n = 144). Only 17 respondents indicated that they had no need for resources.

Educators were asked three questions (question 19) about whether they had adequate resources for teaching climate change. Responses provided were "disagree", "agree", and "strongly disagree". Some 34.4% of respondents (n=78) indicated that they disagreed or did not have adequate resources to teach the science of climate change while 65.6% either agreed or agreed strongly, indicating that they did have adequate resources. Opinion toward adequate resources for integrating climate solutions had a larger percentage disagreeing. About 45.5% of respondents (n = 95) said they disagreed — they believed that they did not have sufficient resources. Just over half of the respondents (54.5%) agreed or strongly agreed that they had adequate resources. Finally, we asked respondents whether they had adequate resources for teaching the ramifications of climate change. This particular item had the largest percentage of disagreement with 59.1% (n = 130) indicating that they did not have adequate resources. Only 40.9% said they
agreed or strongly agreed with the statement that they had adequate resources for teaching about ramifications of climate change.

Sources

We asked respondents in an open-ended question to identify their top sources of educational resources for teaching about climate change (question 21). Some 179 respondents provided sources. The data were transformed into a word cloud (http://www.wordle.net/). Wordle is a tool for generating “word clouds.” It gives “greater prominence to words that appear more frequently in the source text.” In other words, the more frequently a word appears in the text, the larger the word appears in the word cloud. The word cloud for this question highlights NOAA, NASA, Internet, books, IPCC, EPA, and journals. Additionally, respondents were asked to identify in an open-ended question (question 22) their top sources for teaching their audience about or for facilitating climate solutions. Data were analyzed for the 180 respondents answering this question using the word cloud approach. Top words of prominence include NOAA, internet, NASA, NSTA, textbook, journals, EPA, Time, and book.

Recommendations and Next Steps

Based on the findings of the survey we recommend the following actions:

1) Locate, share and develop resources that include content information with links to climate change impacts to local/regional wildlife and information about up-to-date regional/global climate science. Make the location of these resources widely known.

2) Locate, share and develop resources that highlight the political, social and economic ramifications of climate change and focus on learning and applying civic engagement skills.

3) Develop and provide professional development for informal educators to increase their confidence in teaching climate change.
We will continue to analyze the results of this survey and develop a lengthier literature review and discussion. Long-term goals involve developing a more controlled survey that includes a knowledge assessment for educators.

References Used

Assessments:


*Global climate change as seen by zoo and aquarium visitors*. Brookfield, IL: Chicago Zoological Society.


Rationale:

Simmons, B. (2011). *Climate change education in the formal k-12 setting: lessons learned from environmental education*. Eugene, OR: The National Academies Board on Science Education Committee on Human Dimensions of Global Change Division of Earth and Life Studies.


Questions in Surveys developed from:

National Survey of Zoo and Aquarium Visitors, CLiZEN questionnaire.
Source: Alejandro Grajal, PI Climate Literacy Zoo Education Network, Brookfield Zoo

2013 NOAA Climate Stewards Pre-Assessment
2013 NOAA Climate Stewards Education Project Needs Assessment
2013 NOAA Climate Stewards Needs Assessment
Source: Peg Steffen, Education Coordinator NOAA

Parks Climate Change Survey
Source: Carol Lavoie, Project Manager, Applied Research Northwest

Understanding Global Change questionnaire
Source: Mark S. McCaffrey, Programs and Policy Director, National Center for Science Education

Other Material: