

**Longitudinal Impacts Survey Results, DLESE Data Services and AccessData  
Workshops 2004-2009**

**Evaluation Report**

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## Executive Summary

- Response rate was fairly good, considering the fact that no incentive was offered.
- Response to the survey was well-distributed among participants at all six workshops.
- Most respondents had been put on a team by workshop staff or invited by colleagues.
- As was seen in surveys collected at the workshops, participants recall the team breakout time as the most valuable part of the workshop.
- The poster session and Datasheet were remembered as being the least valuable parts of the workshop.
- About half the respondents had attended more than one workshop. A number of these people commented that being familiar with the workshop process was helpful in subsequent workshops.
- Most respondents said their team's chapter was either complete or on its way to completion, though over 20 respondents didn't know what the status of their chapter was.
- About a third of the respondents contributed to the Datasheet after the workshop.
- The majority of respondents contributed to their EET chapter after the workshop. Curriculum developers assigned the completion of the chapter were mostly confident that the chapter either was or would be completed.
- Almost all respondents who teach reported that participation in the workshop had impacted their teaching. Those who have used them described a variety of chapters and methods of use for the chapters.

- **Primary roles at the workshop were fairly well represented, with the most common being educator, followed by curriculum developer, software specialist, and data provider. Only four primary scientific researchers responded. Additional roles reported included a dozen or more for each role, with the most common being educator.**
- **Many participants described a variety of positive effects in their work as a result of their attending the workshop; examples of these effects were new partnerships, new perspectives, increased use of data in the classroom, and a greater understanding of opportunities for this sort of work.**

## Introduction

All 240 workshop attendees 2004 through 2009 were invited to participate in this online survey. There were 55 responses over the winter of 2009-2010 (December through February). The response rate was 23%. The average length of time to complete the survey was 19 minutes.

Responses to each question are summarized in the section below. Bar graphs display quantitative data. Bullets show direct quotes; these are presented in italics. For some of the direct quotes, the workshop and/or professional role are shown in parentheses after the quote. Summary comments are presented in bold text. Workshops are denoted by the first letter of their location—**N**ew Hampshire, **B**reckenridge, **M**arlborough, **T**ucson, **P**ortland, **C**olorado Springs.

## Survey Results

The first question was **Which workshop(s) did you attend? (Check all that apply.)** Responses are shown in Figure 1. **There was a fairly even response across all workshops.**

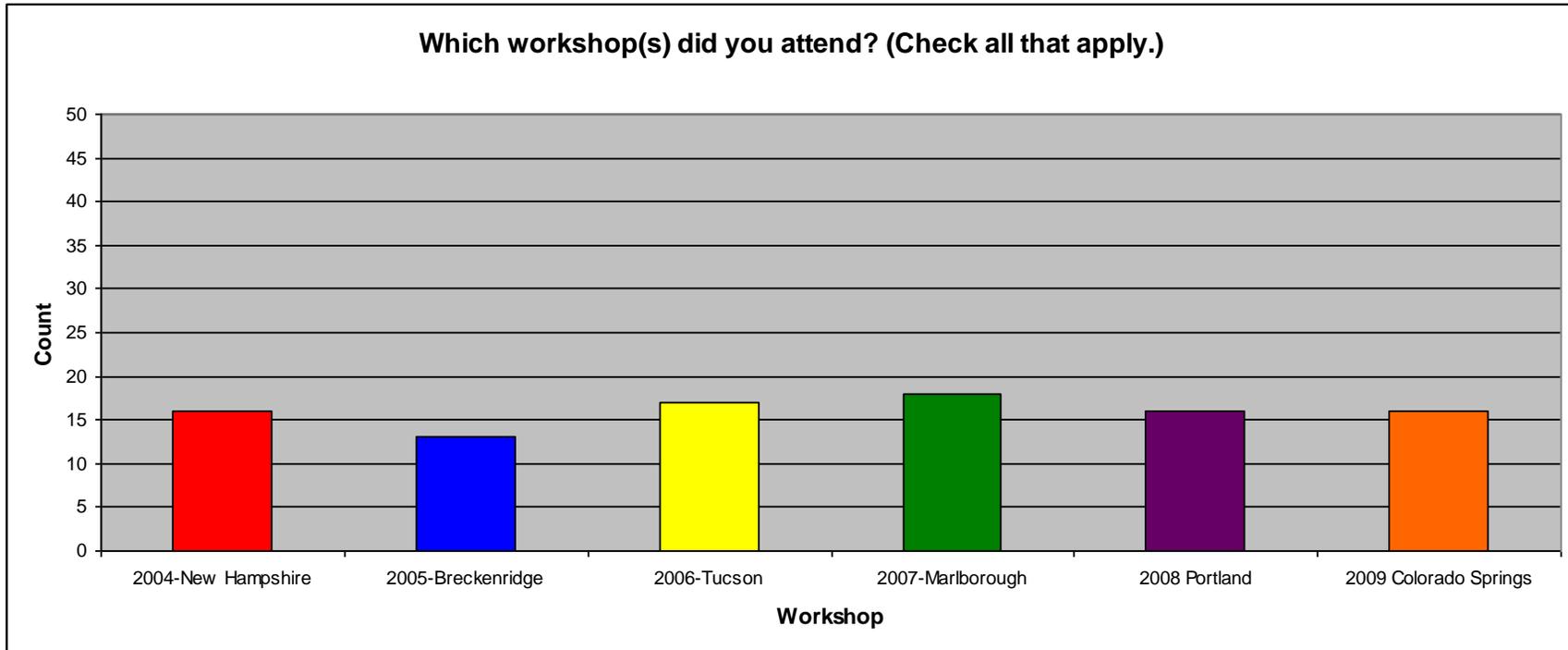


Figure 1. Workshop(s) attended by respondents.

*Open-ended responses were as follows:*

- *similar workshop in 2008 @UMass Teaching with New Geoscience Tools*
- *Colorado I believe 2005*

The next question was **Which of the following describes how you came to be on your team(s)? (Check all that apply.)** Responses are shown in Figure 2. **Many respondents were put on a team by the workshop staff; most of the rest were invited by a colleague.**

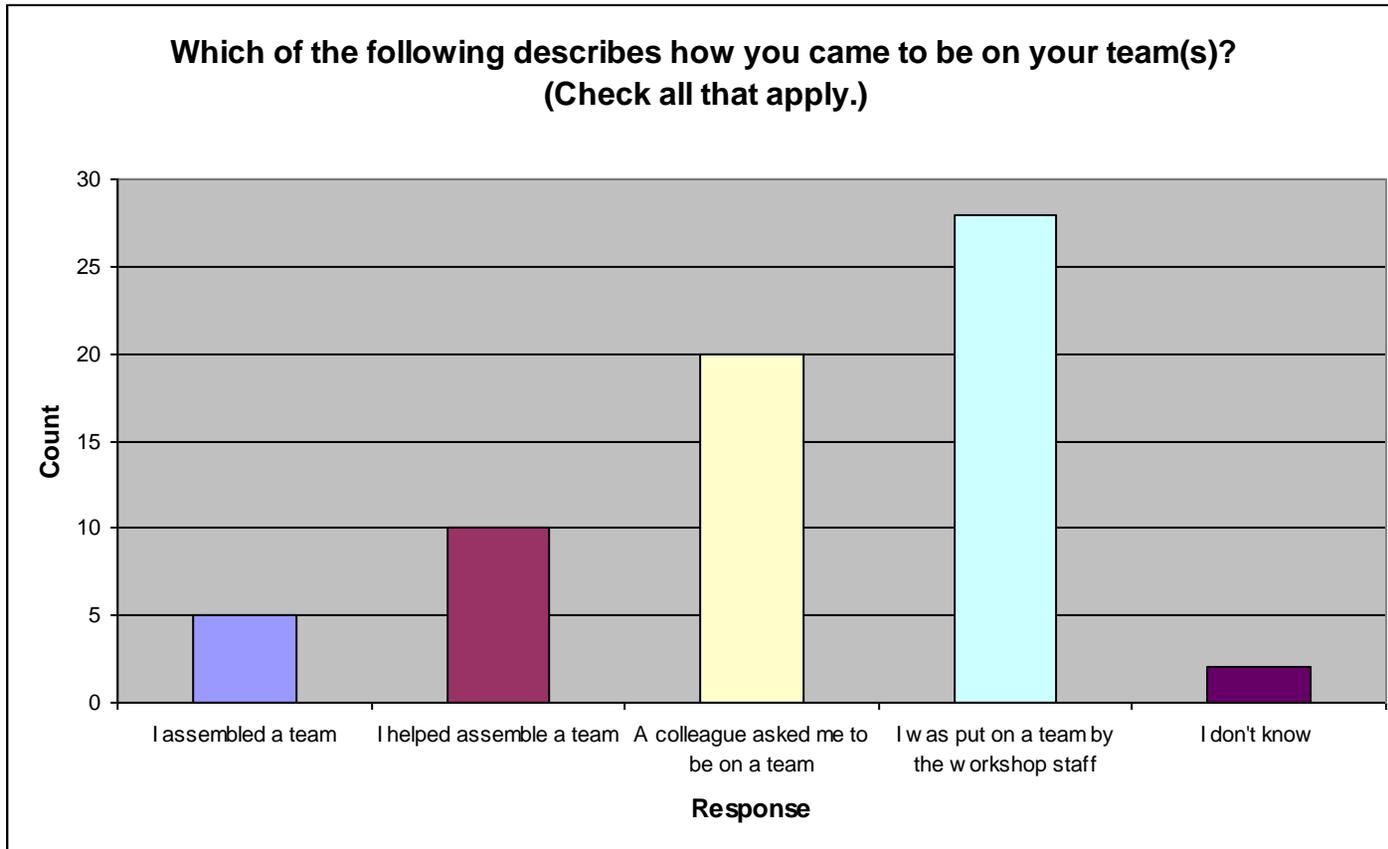


Figure 2. How respondents came to be on a team.

The open-ended response was as follows:

- *I was a presenter at the 2004, 2005 workshops and then placed on a team*

The next question was **What aspects of the workshop (including pre- and post-workshop activities did you feel were the MOST useful? (Check all that apply.)** Responses are shown in Figure 3. **Team breakout time was the most useful.**

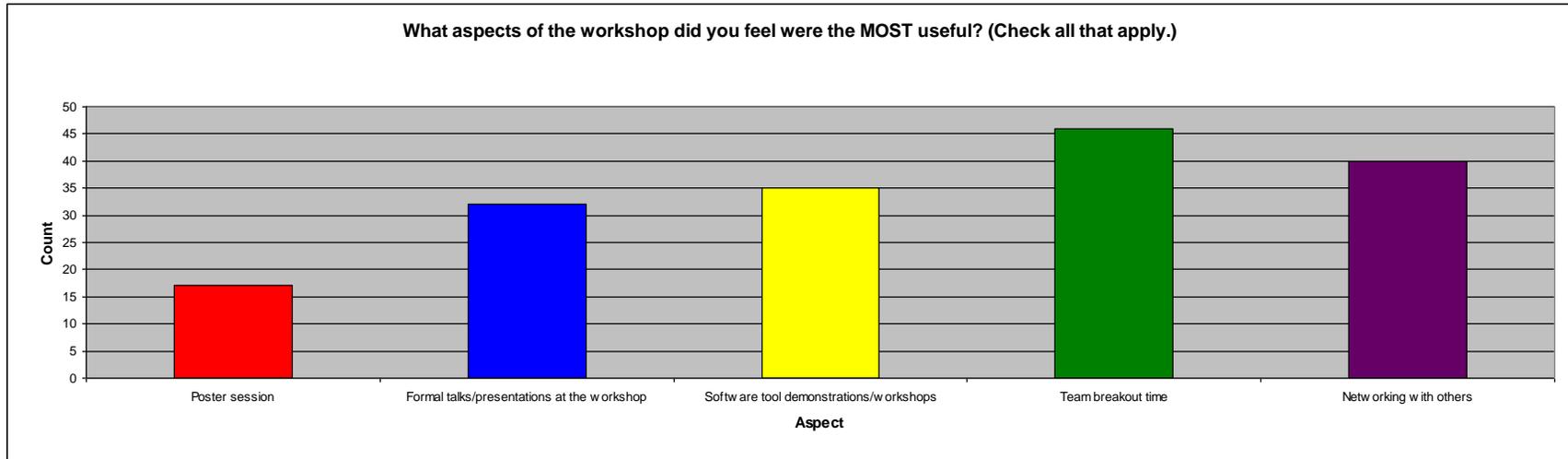


Figure 3. Most useful aspects of the workshop.

Open-ended responses were as follows:

- *All of the above were most useful, although the team breakout time was most important way of ensuring the EET chapter was completed since the skeleton of the work was established before the end of the workshop.*
- *For me, completing a Data Sheet will be very useful this time around*
- *Speaking with working scientists to learn how what they measure translates into online data (for example, I learned how the NASA AURA actually measures NOx and was able to understand not only how to access the data, but also what the limitations of the data are, etc.)*
- *team breakouts have been very beneficial and I have found over the years very productive on the whole...*

The next question was **What aspects of the workshop (including pre- and post-workshop activities did you feel were the LEAST useful? (Check all that apply.)** Responses are shown in Figure 4. **The poster session was most commonly selected.**

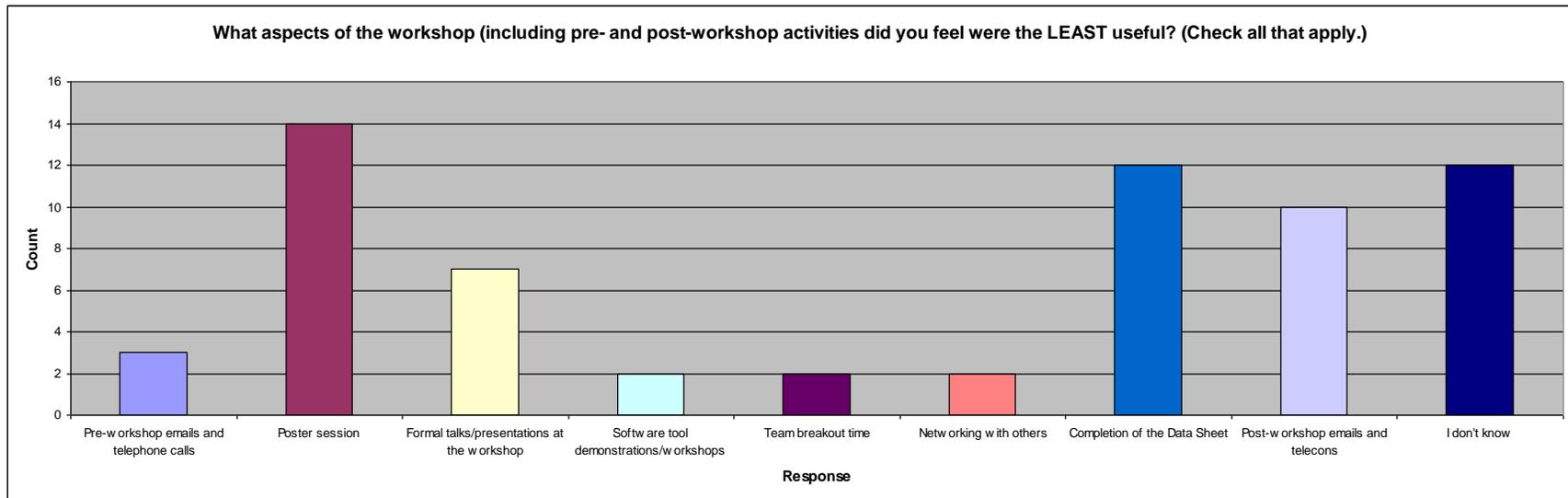


Figure 4. Least useful aspects of the workshop.

Open-ended responses were as follows:

- *I don't even remember what the Data Sheet was.*
- *In the last workshop I attended, the three slide final summary seemed restrictive in the suggested content of each slide. Brief is good when there are many groups to report back, but there must be a better way that allows a more "creative" pitch for the ideas coming out of the small groups.*
- *I was not involved in pre and post workshop activities.*
- *I thought the workshop was well organized and that each activity had some value.*
- *I would like to see the post workshop comm's be strengthened..perhaps even in a formal way.*
- *the data sheet always seems to be a stumbling block for many teams. Too much detail needed for the chapter needs unless you have someone on the team that is very familiar with the data*

The next question was **Did you attend more than one workshop?** Responses are shown in Figure 5. **Responses were split about half and half.**

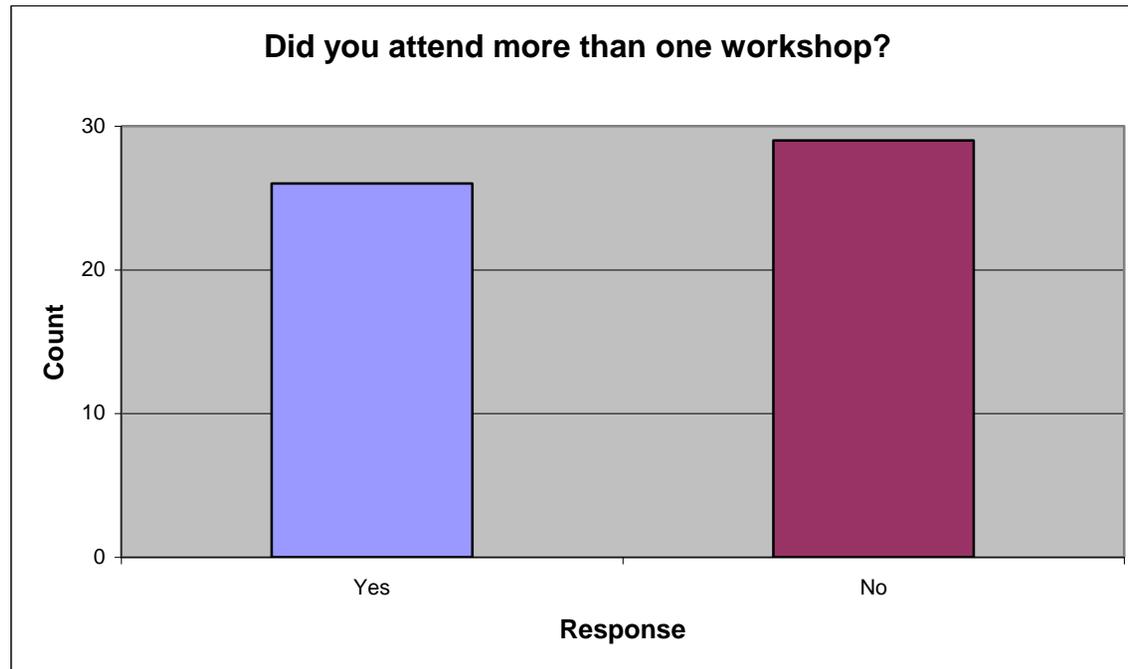


Figure 5. Those attending more than one workshop.

Open-ended comments were as follows:

- *Wish I had known about them earlier - I would have attended more than one!*
- *I would have liked to.*
- *Wish I could have but there wasn't enough lead time to secure the time off, or the workshops were position during the week which require travel days on top of the workshop days. Cross-over into a weekend would have helped this issue.*

- *yes, I have been extremely fortunate to attend all the workshops and feel very privileged to have done so. I have really enjoyed being part of this effort over the years and working with such quality people. The Iron-Man award last year is close to my heart*

**Those who replied “Yes” to the above question were offered the following four open-ended questions.**

The first of these questions was **What motivated you to participate in multiple workshops?** Responses were as follows:

- *I enjoy them, and like collaborating to develop a useful science activity using data and software. (M C)*
- *It was fun and rewarding. As a teacher I came away with increased knowledge and understanding of science that I could then apply in my teaching. I also liked having new materials to use in my classes as the result of developing chapters. I also really appreciated meeting other passionate and excited people. (T M P C)*
- *I was asked to participate in one to form a team and the other I was asked to be on someone's team. (B T)*
- *I had completed an EET chapter by the time of the second workshop and presented it to teachers, and had ideas I thought could be put into that structure. Similarly for the 4th workshop. I felt the excitement teachers had that they could find online "real" data in a suggested approach to an Earth science topic or investigation. The value of the first workshop experience. Networking, learning more about ways the tool(s) could be integrated into geoscience classrooms and developing valuable classroom resources that would make a difference for teachers and students who used them. (N B M)*
- *The opportunity to network with others. (P C)*
- *Quality of products and chance to get things done, not able to find time for otherwise. Assembly multifaceted team (M C)*
- *I had such a positive experience from my first workshop (Portland) that I was very motivated to participate in the workshop in Colorado Springs. I felt that I could build on what I had learned in my first workshop and make a greater contribution in the second. (P C)*
- *The opportunity to be introduced to modern data tools and to meet others in similar and complementary fields. (M P)*
- *I was asked by a colleague to be part of a specific team for the 2nd workshop. (B T)*
- *I had a really good experience with the first workshop but lost contact with the team (I was put on a team at the last minute) so didn't know how the exercise turned out. The second time around, I wanted to make sure we put together a useful activity. (M C)*
- *Was asked to. (N B)*

- *Invited. (N B)*
- *I was very much interested to see how the process of the teams in general changed over the course of the three workshops I attended. I think, in some ways, that the maturation of the approach and participation in the process was even more interesting than some of the end results. (T M P)*
- *Desire to create data-based resources for teachers and students and the opportunity to network with others. (N T M P)*
- *I was asked by a colleague to participate in the 2nd one near Boston. (T)*
- *I was asked to be a presenter and the types of data that I have worked with expanded with each workshop so it was useful to get multiple perspectives. (N B)*
- *I found the format and work to be very interesting and exciting. I put a team together for the second workshop to work on a specific project. (N T)*
- *Presenting software tools (IDV) (N B)*
- *enjoyed the experience of working with others to piece together learning projects and to network. (N T)*
- *I really like the group of people involved in the workshop. Unidata realizes the benefit of seeing the challenges educators have in representing/analyzing/visualizing data in the classroom, so we can attempt to make the process as easy and useful as possible for the community at large with our supported applications.(B T P C)*
- *as a curriculum developer who has focused on data and visualization tools, I have tended to span data, tools and education and found these workshops to be extremely informative to many aspects of my work. I also have really enjoyed the networking and work with such a variety of people across many disciplines (N B T M P C)*
- *The goal of the work seems important--helping make the use data and technology more accessible to teachers and students. (N B T M)*
- *Thoroughly enjoyed the entire process in the first one I attended, used some of the ideas I picked up there in my classes. And the, having been through one already, I felt both enthusiastic and prepared to participate again. (T M P C)*
- *The first team invited me to join and the second team I formed myself because I wanted to complete a lesson. (M C)*

The next question was **The workshops and the pre- and post- workshop activities evolved over the course of the six years of the program. What changes did you notice that improved the workshop experience?**

Responses were as follows:

- *I felt the groups were more committed to putting together a product during and after the workshop in the later workshops. My second workshop suffered from an uncertain data product, so it was never completed. The third became an EET chapter, but we had learned to be able to modify some of the decisions made in the workshop to be able to accomplish this, and it was a much stronger and broader lesson in the end. (N B M)*
- *I certainly think the pre-workshop teleconferences enabled our groups to be more productive at the actual workshops. (M C)*
- *The pre workshop calls were helpful for getting everyone going. I think that having the data sheet underway before the meeting made the scientists focus on useful time spent at the workshop. I also think the post workshop commitment was important. I succeeded in developing 2 of 4 chapters that I began. I attribute one failed chapter to a team that did not hang in there and contribute after the meeting was over. In that case they did not even return emails that I sent. The other chapter died in process because we couldn't settle on a software. These things could have been worked out before the meeting. It helps having experienced people on the team to guide the process. (T M P C)*
- *I did not notice any changes between the two. (B T)*
- *Organization of the pre-workshop activities for the teams I worked with improved. This resulted in more efficient work being done face-to-face at the workshop. (P C)*
- *The post-workshop emails and telecons (P C)*
- *Pre workshop preparation of team (M C)*
- *I only participated in the last two, but I noticed an increase in the number of team breakout sessions in the second (Colorado Springs), so that tasks were broken down into smaller and more manageable chunks of time. Maybe it was just the team I was on, but we seemed to be more productive in the second workshop compared to the first. (P C)*
- *Changing the location kept the experience fresh. Keeping up with new tools and data every year helped to keep it relevant as well. (M P)*
- *With two back-to-back workshops in the middle, I didn't notice significant changes. (B T)*

- *The pre-workshop prep for my team seemed to work better the second time around, but we had more time to think about things. I think the Colorado Springs workshop struck a good balance between team time and whole group time. (M C)*
- *No comment. (N B)*
- *Trying to remember the specifics... There was a move away from inviting elementary educators (I believe) and that was a good step as their needs were very much different, and more basic, than many of the other participants were able to address. I think another thing that really helped some of the groups over the course of the years was the continuous involvement of the same people and that helped jump-start the group activities each year. Groups that were comprised entirely of people who were new to the process really had to spend a lot of time getting up to speed, whereas veteran groups really hit the ground running. (T M P)*
- *Less highly technical sessions in the later years were better. Motivational speakers in the latter workshops were also helpful. (N T M P)*
- *That was a few years ago now. As I recall, I felt that I had a better idea of what was needed/wanted for the 2nd workshop. (N M)*
- *I can not provide any input on this as I was not involved in these activities. (N B)*
- *The data sheets were improved in workshop #2. (N T)*
- *had not been invited to the past few workshops. cannot fairly answer this question. (N T)*
- *Poster session! Non-overlapping tool times. Dynamic speakers. (B T P C)*
- *the two that I feel are most significant have been the pre-workshop conference calls to get everyone on the same page and anticipating what they will experience at the workshop and the increase in team time at the actual workshop. (N B T M P C)*
- *There was more time with the team. (N B T M)*
- *Can't really think of any..... (T M P C)*
- *There were more pre-and post telecons which helped get the group on the same page and to help them understand the expectations. (M C)*

The next question was **The workshops and the pre- and post- workshop activities evolved during the course of the six years of the program. What changes should NOT have been made?**

Responses were as follows:

- *The last workshop I attended had less participation at the poster sessions, and I think the 2007 workshop had a much more successful poster session. Seemed to be better attended and presented at. (M C)*
- *I would have liked a chance to present our progress to all teams at the end of the workshop, and to see what other teams were working on. (M C)*
- *the place I have struggled most has been the post workshop communication. As a developer of multiple chapters, I sometimes have been frustrated by the lack of engagement or time some team members have been willing to provide after the workshop. Some felt their responsibilities were over when they left the workshop. As a facilitator I did learn to communicate this expectation to my team which did help in later workshops and chapter development. (N B T M P C)*

The next question was **How did your prior workshop experience help you in the later workshops?**

Responses were as follows:

- *Could bring insight to the process for new participants. Helped me better understand what the ultimate product should look like, and so I had more to offer in the later workshop. (M C)*
- *I am assuming you mean by being a veteran of one workshop I knew that the pace needed to be fast and focused since the time runs out very quickly on the face to face. (T M P C)*
- *I knew what to expect. (B T)*
- *it allowed us confidence to change aspects of our "lesson" or "presentation" after the workshop, and it helped us to try out some of the ideas with teachers after going back "home" before assembling them into a written framework. (N B M)*
- *It gave me a better sense of the timeline the team needed to stick to in order to get the chapter finished and what really needed to be accomplished face-to-face. (P C)*
- *I attended two workshops. The prior workshop experience gave me an idea of what to expect and enable me to readily tune in to the later workshop. (P C)*
- *Being ready to really focus when all in same room (M C)*
- *I had a much better idea of what was important/not important in terms of details, use of my expertise, and the time involved in accomplishing particular tasks/goals. (P C)*
- *I knew what to expect as far as the flow of the workshop experience and the outcomes. (M P)*
- *I knew more of the participants, and knew generally how to prepare newcomers for the experience. (B T)*
- *I knew what to expect and what was useful to have done by the time the workshop started. (M C)*
- *Knew what to expect in the group work (N B)*
- *As I mentioned, experience in the process and expectations helped us accomplish more each year -- we knew what to do as soon as we assembled the first day. (T M P)*
- *I understood better what was wanted. (N M)*
- *I had a better awareness of what the workshop organizers expectations for workshop outputs.(N B)*
- *I had a project in mind that was appropriate for the workshop.(N T)*
- *more clearly understanding the context and mission of the groups and activities assigned. (N T)*
- *A priori knowledge of the process and what to expect, hence the desire to keep the pre-workshop telecons in place. Also having some previous exposure to some of the tools was quite helpful. (B T P C)*

- *much...as described previously. I also was able to explain the workshop structure and overarching goals to my team members better each year I was involved. (N B T M P C)*
- *I became better at knowing what kind of information I'd need to complete the chapter and was better prepared to make input to the group. (N B T M)*
- *I "knew the drill", understood roles better. (T M P C)*
- *I was the team leader and my prior experience allowed me to direct the team effectively and to ensure that we were working toward the goals. (M C)*

The next question was **Did your team(s) complete an EET chapter?** Responses are shown in Figure 6.

**The most common response was that they weren't sure whether their team was working towards chapter completion, though over 20 respondents confirmed that their chapter was completed.**

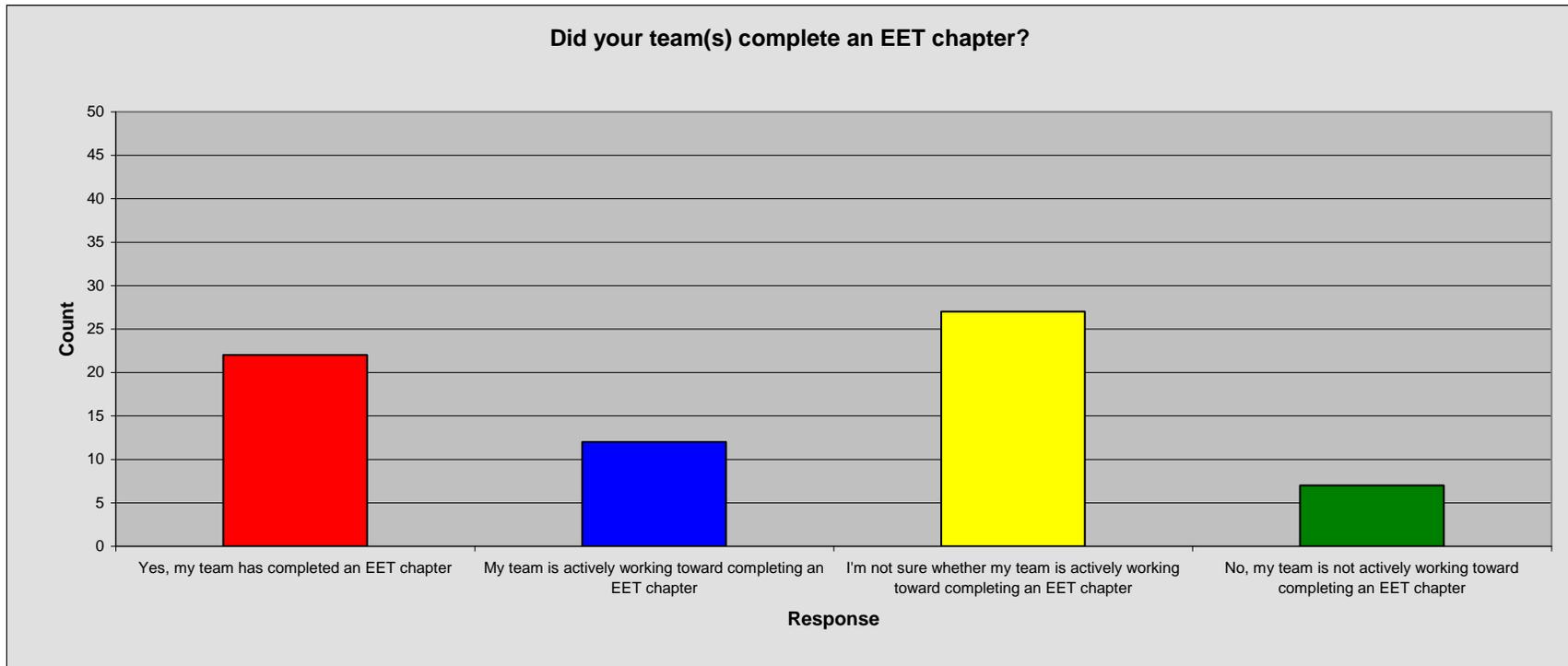


Figure 6. Whether the respondents' team completed their chapter.

Open-ended comments were as follows:

- *I think one was done but I'm not sure (B)*
- *See earlier comment about successful chapters. (T M P C)*

- *The first session created a chapter, but not with my guidance in the end. The second chapter had a dubious data set, but an exciting idea. The third workshop resulted in a chapter - 2 years later. (N B M)*
- *My second team did. My first team has yet to complete their chapter. (P C)*
- *We had every intention to complete a chapter, but once we left the workshop, we got caught up in our other responsibilities and did not further work on the chapter. (T)*
- *I completed my section at the workshop and have not heard too much since (T)*
- *I think we've completed our chapter, but I'd like to see a bit more communication from the other end so our chapter could get on-line more quickly. Overall the process is a good one and was very helpful - just need to push all the way through the finish line. (C)*
- *This is very frustrating for me as I felt like we were 90% done at the end of the workshop but the curriculum developer seems to have dropped the ball. (P)*
- *This has been the part that disappoints me. I don't believe a chapter was completed. I asked several times what I needed to do to complete one. But it did not happen. I understood we were waiting for feedback from those in charge of EET for the first one I attended. I understand that the lead of the 2nd group has some things to do. (N M)*
- *I completed an EET chapter with other TERC team members independent of the teams I was on in the 2004 and -05 workshops (N B)*
- *did not see the final drafts nor copy of the chapter. (N T)*
- *I ~think all 4 apply, depending upon which workshop we discuss. There have been many levels of success over the past 4 attended workshops. (B T P C)*
- *I think there was a year or two that the chapter wasn't completed. these were years I was team member but not a lead (N B T M P C)*
- *But not for every workshop. There were a couple of times when it was impossible for the team to narrow down the science or the technology or the data to the point where it was possible to move forward with the development of a chapter. In the context of very limited funds available to complete an EET chapter, I had to focus my attention on projects that were expecting me to and paying me to spend a significant amount of time on the work. (N B T M)*
- *but they're not live yet (T M P C)*

The next question was **What would have helped to complete the chapter or made the work more efficient?**

Responses were as follows:

- *more time (B)*
- *More time at the workshop to work on the chapter. Once we had left the workshop, it was difficult to find time to work on it. (M)*
- *Better pre-workshop focus; more work done ahead of time defining exactly what the goal of our chapter would be. We went in thinking one thing, but realized while talking about it that our idea could not work with the tool we wanted to use; we changed our goal to something do-able but that back-and-forth caused a considerable loss of steam. (P)*
- *Not much would have helped, always comes down to the time needed by the curriculum developer (and they usually have other things going on; e.g., teaching, research, etc.). Overall, I think the chapter collaboration and work went well. (M C)*
- *A few scheduled follow up meetings to keep everyone's interest. Maybe paying more people to contribute. There were a few moments where as the curriculum developer I got some messages from others on the team that they were not being paid so they were not willing to continue contributing. At times the teams felt a little large and some people checked out and started looking at email etc... that really slowed the process down. Also anyone presenting a workshop or keynote talk is pretty distracted too... just figure that in when making the teams. Spread the less committed or over worked around amongst the teams. (T M P C)*
- *The tool was really clunky for uploading the materials. It took a LOT of time and was frustrating. (B T)*
- *Our team needed to have planning discussions before the conference, but we were last minute additions. (M)*
- *More free time from normal job responsibilities (C)*
- *Filling in a WIKI proved problematic - we erased each other's work in simultaneous editing. I think having material we agree on as an outline on a website was a good idea as a work space, though. But life takes over after you go back to your job, so getting as much done in the 3 days in written material is best. (N B M)*
- *Re the unfinished chapter .... having more than one person assigned as the curriculum writer after the workshop. If there had been an additional person working on it, chances would be higher that it would have been completed. (P C)*

- *A goal-oriented team leader and a reliable curriculum developer. (P C)*
- *More time at the workshop. (T)*
- *In reference to the Colorado Springs workshop, everything was pretty efficient except for the AccessData web site, which had...issues, depending on which web browser and operating system one was using. In my first workshop, our team never completed its EET exercise. The team was way too large, for one thing, which created some efficiency issues. But the main problem was that not enough work had been done up front regarding the suitability of the data for creating an exercise. Ultimately, we had the framework for a good EET chapter, but there were too many problems with the data to implement it. (P C)*
- *A little bit more time during the workshop to work together on the chapter. (C)*
- *Beginning much earlier (before the workshop) and using the workshop to finalize the chapter might have been beneficial. (M P)*
- *We were a little unclear about our educational and scientific goal for the chapter. I am not sure if this was because of a difference of opinion or misunderstandings. The out-of-the-group arbitrator should have helped but didn't. (B)*
- *1st workshop: I think the team needed a more dedicated leader. 2nd workshop: My understanding is that our goal was not to produce an EET chapter, but to come up with an activity that might have been selected for further development, and if our activity had been selected, an EET chapter probably would have been part of the final development. (B T)*
- *see previous comment....and, I think we could've have used a bit more post-meeting connection to our full team. A couple members sort of dropped out after the meeting. Those that were left did a wonderful job though of getting the chapter done. (C)*
- *I'm not sure. (N)*
- *The only obstacle at this point is just that the team is really busy and geographically distributed. (M C)*
- *Another day + successful completion of a proposal to get the idea funded. (T)*
- *Our chapter went smoothly. (N)*
- *I don't know. I saw little postworkshop communication. (P)*
- *A leader in the group who was willing to carry the work of the chapter after the workshop (N B)*
- *larger team: there were just two of us (P)*

- *I think it definitely helps to have funded one person from each team to complete the work. Relying solely on volunteering just isn't going to get it done. Of the three years I was there, I think the only EET chapter than made any progress was the one that had a funded educator to continue the work. (T M P)*
- *Specific deadlines, telecon capabilities (N)*
- *The EET organizing team was very helpful but additional support from them would have been even better. (B)*
- *A different curriculum developer (I think) (P)*
- *As a follow-on to my last response, it is not clear what needs to be done to complete the effort. It would be good to get at least a formal list of the things that needed to be done to consider a chapter complete. I was not the lead for either workshop; the lead may have gotten the list. I know that those people were very busy and are not involved in other projects so they may have just run out of resources to get to completion. (N M)*
- *A primer (reminder) on the philosophy/concept for each section of the chapter. (N B)*
- *immediate post-activity communications. (N T)*
- *It was hard to continue to work on it after we left the workshop because we all live in different parts of the country and have many competing responsibilities for our time. I guess a follow up meeting would help--but finding time to do that is difficult. (C)*
- *...writing it up :) Data and concepts were fully fleshed out at all 4 workshops, it is the final push for completion that seems to fail. Better, or perhaps scheduled, post workshop comm's could help bring more chapters to a successful end. (B T P C)*
- *Hmmm.... not sure. I remember the wiki being VERY useful, but I think I have a vague recollection that the data sheet was either redundant or didn't quite move us forward efficiently toward completing the chapter. (M)*
- *A clearer sense of what our team was attempting to accomplish and a timeline for completing it. With the exception of one team member, I totally lost track of the team after the workshop was over. (P)*
- *having a better case study to wrap the chapter around. I don't think this is my particular strength so I need others on my team that can provide that aspect of the chapter (N B T M P C)*
- *Having the science and technology people arrive at the workshop with a better sense of what an EET chapter is, and what is feasible to tackle in an ETT chapter that may need to be completed in no more than two or three class periods. (N B T M)*
- *More instructions, with specific deadlines and guidance from the organizers (T)*

- *Knowing the outcome. We left with one person doing the rest of the work and I never knew what happened. (M)*
- *I found the SERC cms daunting...Well, maybe not daunting, but I had a hard time fitting our work to the cms (T M P C)*
- *Once the team left, communication has dropped to nil. It is difficult to find time after the conference, so maybe having a follow up meeting would be helpful. (M C)*

The next question was **Did you contribute to the completion of the Datasheet after the workshop?** Responses are shown in Figure 7. **Responses were equal among the choices.**

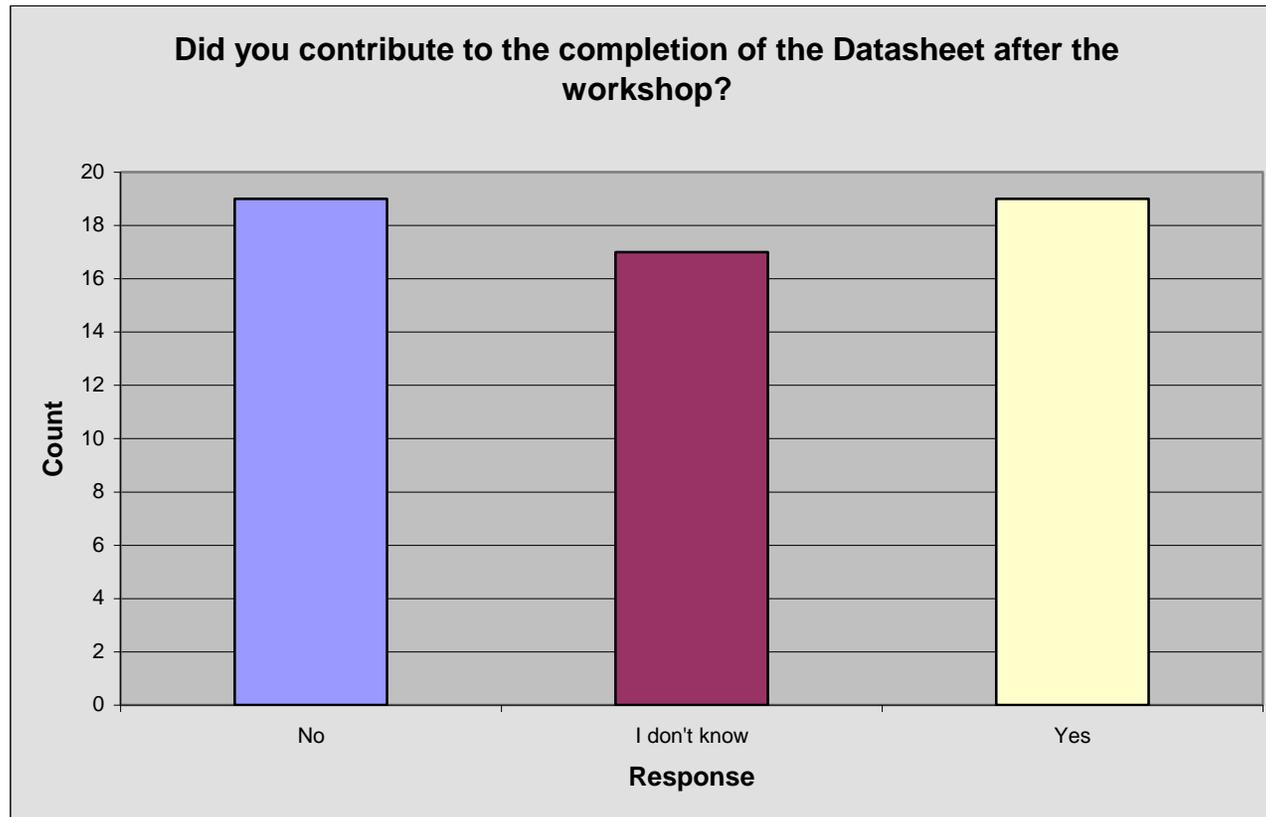


Figure 7. Contribution to the Datasheet after the workshop.

Those who replied “Yes” explained as follows:

- *I helped with the development of the Aerosol Optical Thickness data sheet. (Curriculum Developer, M)*
- *Looked it over, provided feedback and suggested revisions. (Curriculum Developer, M C)*
- *yes, i reviewed it and added educational materials. (Curriculum Developer, T M P C)*

- *Provided additional data; proofed and edited several versions of DRAFTs (Data Specialist, C)*
- *I filled in data sheets for at least two of the workshops - and even a data sheet for something I thought might be an EET chapter, but did not. Still, the data is useful in a library for others to discover. (Data Specialist, N B M)*
- *Completed agreed upon sections after the workshop, communicated on edits via email and participated in a follow-up phone conference to complete the document. (Educator, P C)*
- *Use in Teaching and Learning, Educational Resources (web sites). (Educator, P C)*
- *I reviewed one other person's part (Scientist, T—note there were not data sheets at Tucson)*
- *I contributed scientific material and background info on the data for the data sheet (Scientist, M)*
- *I provided the technical/programming support for the group. (Tool Specialist, B—note there were not data sheets at Breckenridge)*
- *Minimally - I provided content and editing but our team leader did all the real heavy lifting with the data sheets (Tool Specialist, C)*
- *I made reviews of it. I do not recall exactly. The team exchange a lot of material in the first few months have the workshop that was near Boston. (T)*
- *information regarding Science Standards. (NT)*
- *all aspects from data description, tool use and educational use. (N B T M P C)*
- *We did it, but I don't remember what it was (T)*

The next question was **Did you contribute to the completion of the EET Chapter after the workshop?** Responses are shown in Figure 8. **Most respondents had done so.**

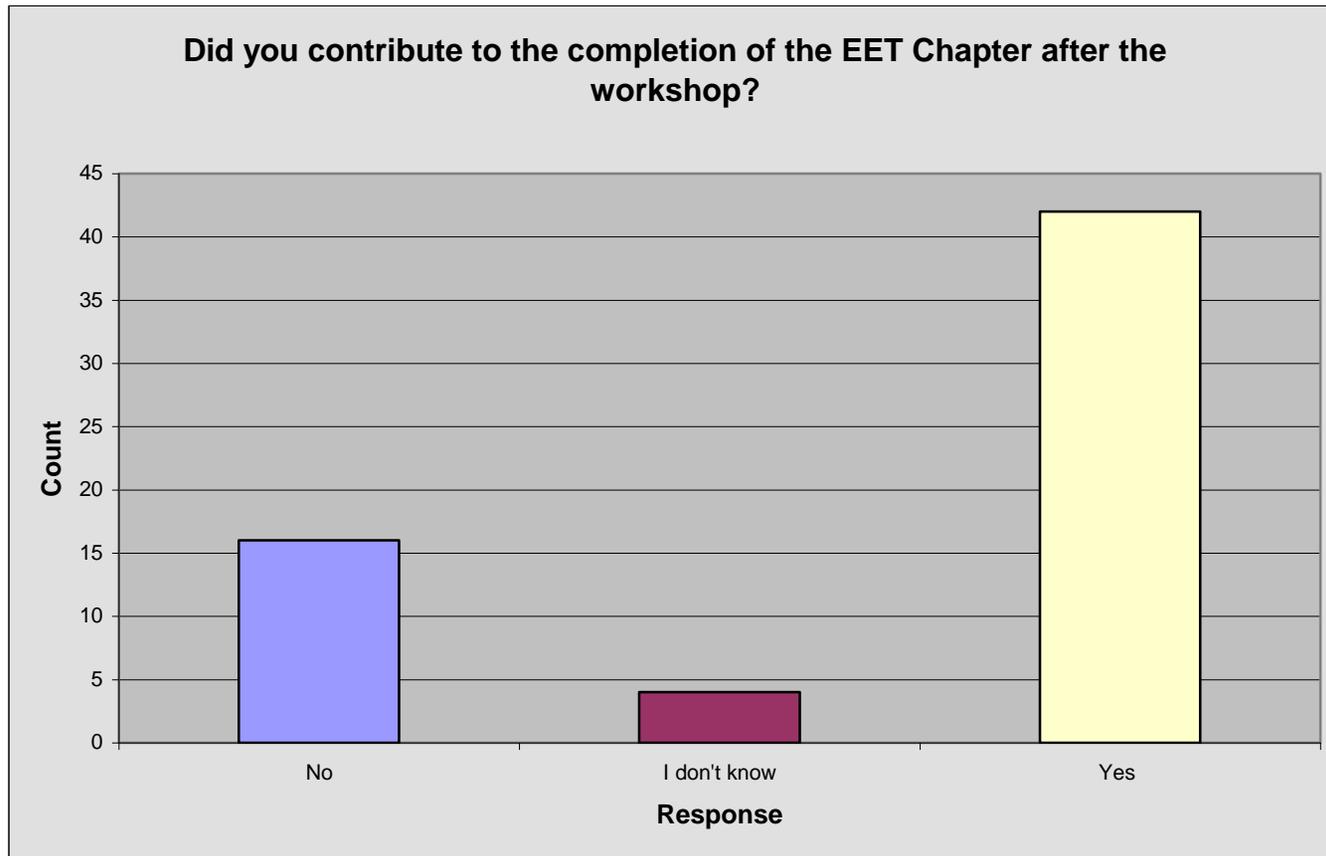


Figure 8. Work on EET Chapter after the workshop.

Those who answered "Yes" explained as follows:

- *I participated in a number of conference calls (thru October 2007) and helped with the development Part 1 of the chapter and the Going Further page. (Curriculum Developer, M)*

- Narratives (Curriculum Developer, P)
- I was a curriculum developer. (Curriculum Developer, M C)
- I wrote the chapter. (Curriculum Developer, T M P C)
- Reviewed the unit (Curriculum Developer, B T)
- Still working on it but have made edits and comments to a DRAFT (Data Specialist, C)
- I wrote WORD docs of all aspects of the Carbon in Forests chapter, and tried out some of the materials on teacher groups before committing them to the chapter. I input material to an incomplete chapter that bogged down due to a dataset that seemed to have bad values and was too coarse to allow any investigations at a city level. (Data Specialist, N B M)
- Revised drafts. (Data Specialist, N)
- I read through the entire EET chapter for smooth flow and did some editing (i.e. identified and corrected some grammatical errors) as requested by our curriculum developer. (Educator, P C)
- reviewed (Educator, M C)
- Some of the background Information/References and Pre-requisite Knowledge, some of the Teaching Strategy, a significant part of one section/module of the exercise, national educational standards (particularly National Geography Standards), "Going Further" suggestions, parts of step-by-step instructions. (Educator, P C)
- I reviewed it and edited it (Scientist, C)
- I reviewed one other part (Scientist, T)
- I provided data, scientific interpretation, and read through the chapter to make sure everything was scientifically accurate. I also tested the chapter. (Scientist, M)
- I built an application that viewed the data sets I was provided. (Tool Specialist, B)
- content, software, editing (Tool Specialist, C)
- Provided software and data. Provided feedback. (Tool Specialist, M C)
- Just some simple review of the copy. (Tool Specialist, T M P)
- I worked with another person and provided the educational support of the chapter, and the extra set of eyes to ensure the step-by-step worked correctly. (Educator, N)
- in progress; editing text, uploading images, downloading data and writing instructions for use with tool (Curriculum Developer, N T M P)
- some editing (Data Specialist, B)
- I sent several follow-up e-mails to our curriculum developer to try to get things wrapped up. (Unknown, P)

- *I did work on it after the workshop but I don't believe it was ever called completed. (Tool Specialist, N M)*
- *Primary writer of the content and steps. (Unknown, N B)*
- *I lead the writing effort. (Educator, N T)*
- *I helped revise and edit the chapter--it's an ongoing process right now. (Educator, C)*
- *e-mail exchanges and phone calls to clarify data and storyline (Data Specialist, B T P C)*
- *I only remember commenting on the progress of the chapter after the workshop. However, I then wrote an additional chapter on my own after the workshop. (Educator, M)*
- *all aspects from tool/data description to full chapter development (Curriculum Developer, N B T M P C)*
- *As the curriculum developer, I authored the chapter. (Curriculum Developer, N B T M)*
- *Both Hurricane Highway and Larson B were my projects, and both required work after the workshop....writing instructions, curriculum (Curriculum Developer, T M P C)*
- *I am the curriculum person. . . so working on the chapter is on me. (Curriculum Developer, M C)*

The next question was **Did your participation in the workshop impact your teaching?** Responses are shown in Figure 9. **For those who teach, most reported an impact.**



Figure 9. Workshop on participants' teaching.

Those who answered "Yes" to the above question explained as follows:

- *Yes. I have tried to utilize the software I learned about at the workshops. Courses I teach do not readily utilize the types of activities/software learned about. (Curriculum Developer)*
- *see earlier comments. I was a great experience, one every master teacher should have. I don't think it is for the shy or timid, or unmotivated teacher. For me, and the other teachers still questing knowledge and understanding, these workshops were far superior to any other professional development opportunities I*

had in my later career. Having the chance to interact with scientists in a variety of fields gave me so much confidence in my presentations with my students. (Curriculum Developer)

- But I teach teachers primarily, although I have visited classrooms and seen material in use as well. I think the classroom visit is tremendously helpful, even if the teacher has been "taught" the material through a workshop or EET chapter. Maybe it is just having two people delivering the content - one who already has a relationship with the students and one who is more the author of the "lesson". (Data Specialist)
- I learned about new tools that I would not otherwise have learned about. This allowed me to bring in new data sets. The biggest impact has been the increase in the use of data and the quantitative nature of curricular activities that have resulted directly from the workshops or contacts with people I met there. (Thank you!) (Educator)
- My participation in the workshop motivated me to promote the use of on-line data in my teaching. (Educator)
- more applications of technology in teaching (Educator)
- Yes, I tried to write and incorporate more data-intensive activities in my classes. (Educator)
- It has made me more aware of the need to establish learning outcomes and teaching objectives in the development of exercises and assessments for the courses I teach. It has also made me more aware of the sources of data available out there for educational purposes, such that I am seeking them out and incorporating them into my own courses. (Educator)
- I show my students the site and have them use it (Scientist)
- I don't think it changed what I do but it did reaffirm that the use of data in class is a worthy goal. (Tool Specialist)
- Science must be taught as a combination of content and practices, and students must go away from the course knowing how we know processes and systems work. The workshop provided me with additional tools to use in my repertoire of science practices. The greater number of tools I use, the more confidence I have in learning & applying additional tools. (Educator)
- When I provide technical 'how-to' tutorials, I provide an example of where we're going and then snapshots of the how-to steps. (Unknown)
- better use of data sets for students' use in the science classrooms. (Educator)
- I learned so much about available online data at the workshop, and now my GIS students regularly access these online data sets. Also, meeting with NASA scientists gave me a more thorough understanding of what the AURA satellite measures and the limitations of these measurements; I am able

to pass on this information to both my GIS students and to my IB Chemistry students when we study air pollution as a part of their environmental chemistry unit. I also have a better appreciation for the number and type of tools that are out there, which also becomes part of what I teach in GIS. I know that all of our Geoscience teachers make regular use of the DLESE website. Having the EET site up is very helpful when I present at professional development sessions (NSTA, Science Approach workshops, District-level science workshops, etc.) because I can simply refer teachers to a website they can access from anywhere, instead of having to provide my own printed or electronic copies of some of the activities I like to suggest to teachers of Geoscience, GIS, Environmental Science, etc. I've been to a LOT of workshops over the past 11 years that I have been teaching, and I must say that the AccessData and the Earthworks workshops were the most valuable that I have ever attended. The value of science teachers being able to work with scientists is immeasurable (priceless). :-)

- (Educator)
- The tools demonstrations were particularly valuable in giving me some additional tools to use with my students. (Educator)
- although I am not a day-to-day classroom teacher, I have introduced and done workshops on various tools and sometimes data. I also have used some of the delivery techniques I have observed in tooltime presentations (Curriculum Developer)
- I'm not a teacher, but it helped me in future teacher professional development work. (Curriculum Developer)
- I learned how hard it is to do this, and so I scaled back many of my efforts to use science data in the classroom. I want to do this, but it is too hard. (Data Specialist)
- I'd been using data to drive my lessons in the past, but exposure to new data and analysis tools led to their incorporation into my day to day classrooms. (Curriculum Developer)
- I use the data sources and tools in the teacher professional development workshops I present for my job. (Curriculum Developer)

The next question was ***Have you used EET chapters in your teaching (either the one you created or others)? (Check all that apply.)*** Responses are shown in Figure 10. **Quite a few respondents had used EET chapters in some way for teaching.**

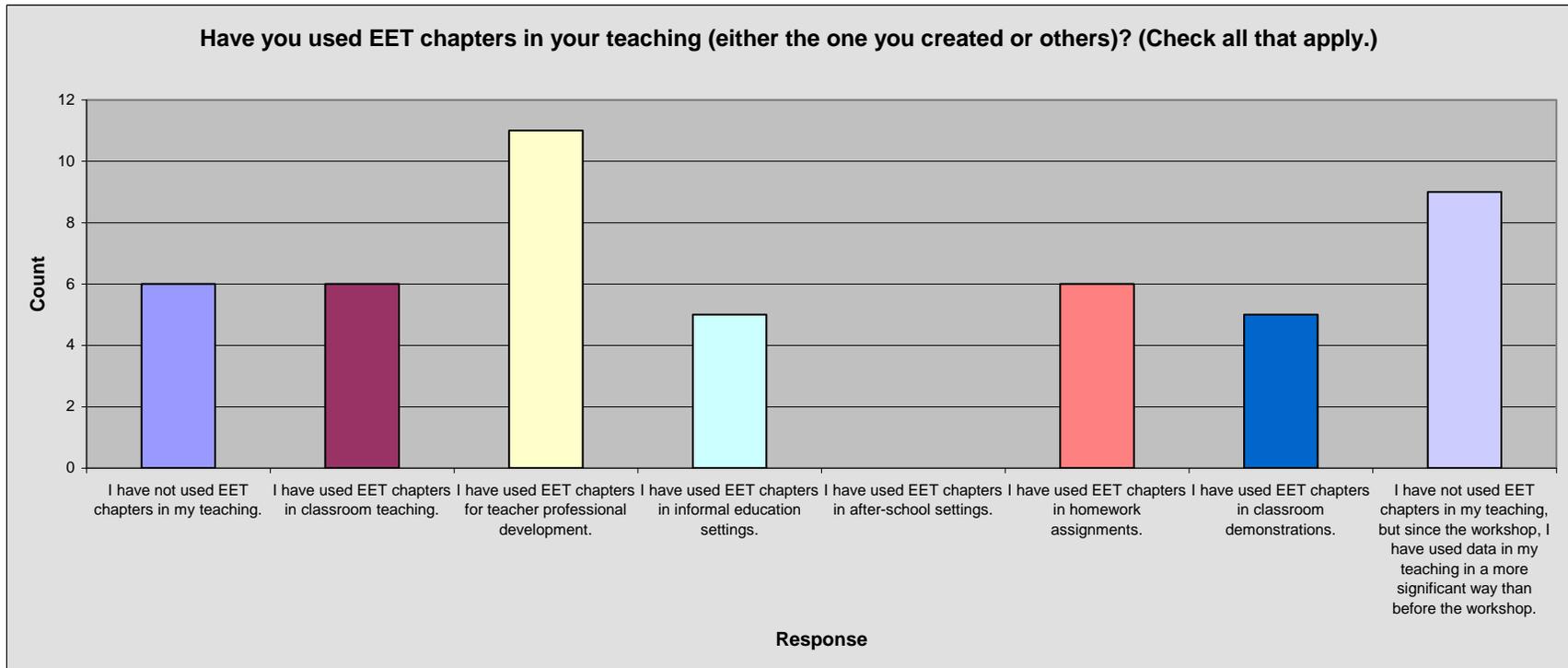


Figure 10. Use of EET Chapters by respondents.

Those who replied they had “used EET chapters in other ways” explained as follows:

- *As part of an extended problem based learning experience focusing on climate change in school. (Educator)*
- *I have referred colleagues to the EET and encouraged them to use them where appropriate. (Educator)*

- *I've applied a few of the tools to new datasets, and have shared the tools with people doing research. (Educator)*
- *usually ones I have developed (Curriculum Developer)*

**Those who had used EET chapters were asked, Which EET chapters have you used in your teaching? Answers were as follows:**

- *Exploring air pollution (NASA Aura) chapter; Detecting El nino; Exploring seafloor topography. (Curriculum Developer)*
- *Wither Sea Ice Detecting El Nino Is Greenland Melting Annotating change in Satellite Images Analyzing the Ozone Hole When is dinner served I used these chapters in AP Environmental science (Curriculum Developer)*
- *Using GLOBE Data to Study the Earth System Exploring Seafloor Topography Is Greenland Melting? Exploring Air Quality in Aura NO2 data Annotating Change in Satellite Images Investigating the Precipitation-Streamflow Relationship Exploring Characteristics of Wetlands Predicting the Spring Phytoplankton Bloom in the Gulf of Maine Visualizing Carbon Pathways Exploring Regional Differences in Climate Change Understanding Carbon Storage in Forests Creating Custom Map Images of Earth and Other Worlds (Data Specialist)*
- *Is Greenland melting? Whither Arctic Sea Ice (Educator)*
- *Using GLOBE Data to Study the Earth System Exploring Air Quality in Aura NO2 data Analyzing Plate Motion Using EarthScope GPS Data Investigating the Precipitation-Streamflow Relationship Measuring Distance and Area in Satellite Images When is Dinner Served? Predicting the Spring Phytoplankton Bloom in the Gulf of Maine Visualizing Carbon Pathways Exploring Regional Differences in Climate Change Evidence for Plate Tectonics Creating Custom Map Images of Earth and Other Worlds Whither Arctic Sea Ice Analyzing Populations with Maps (Educator)*
- *Analyzing Plate Motion Using EarthScope GPS Data , Creating Custom Map Images of Earth and Other Worlds (Unknown)*
- *Exploring Air Quality in Aura NO2 Data Mapping Local Data in a GIS The two above are the only ones I've use in my own classroom, but I've recommended the site as a whole to a lot of teachers at workshops. (Educator)*

- *Evidence for Plate Tectonics, El Nino SST, water availability, NCAR Climate Change (Curriculum Developer)*
- *Annotating Change in Satellite Images Using GLOBE Data to Study the Earth System Investigating Earthquakes Measuring Distance and Area in Satellite Images Exploring and Animating GOES Images (Curriculum Developer)*
- *Hurricane Highway Air Quality NEO Ice tool for analysis(Curriculum Developer)*
- *GLOBE data and the two chapters that I worked on that are not live yet (NASA NEO and GLOBE Surface Temp).(Curriculum Developer)*

The next question was **What was your primary role at the workshop(s) you attended? (Choose only one)**  
Responses are shown in Figure 11.

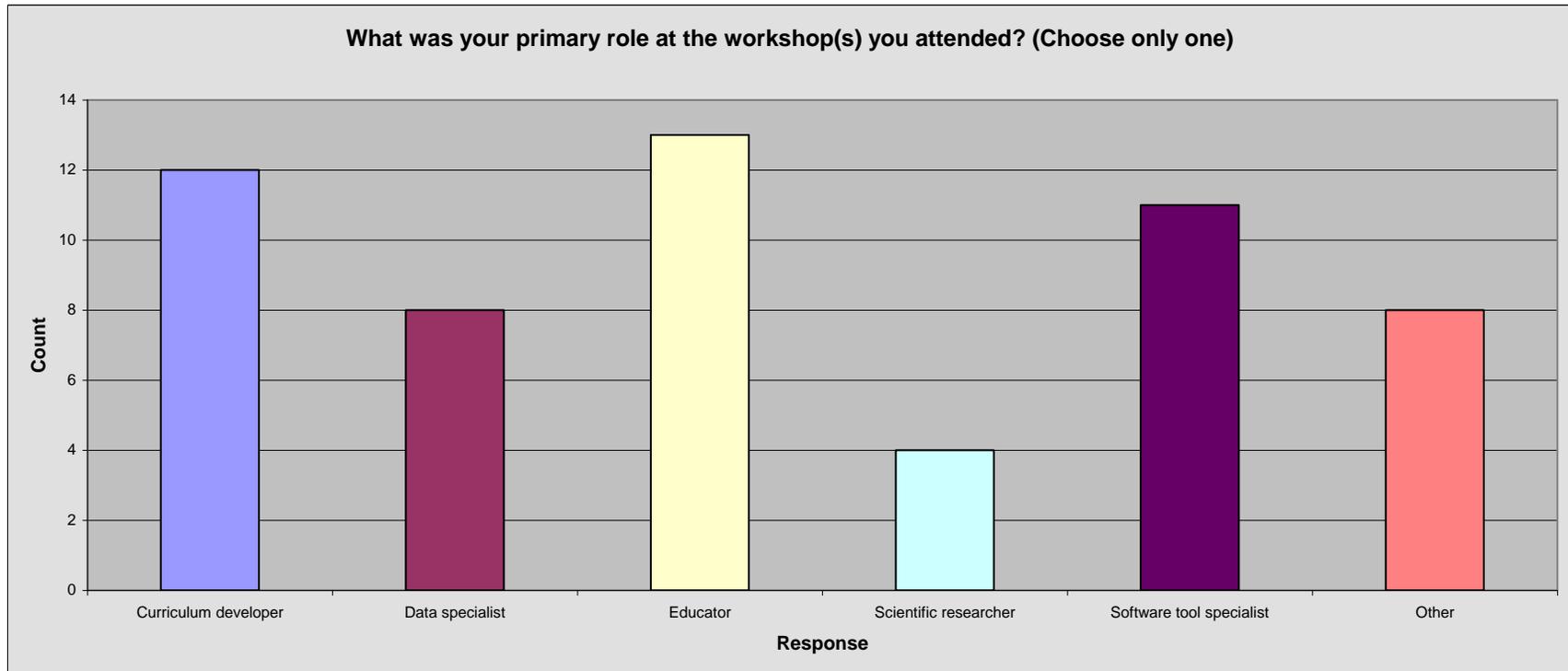


Figure 11. Primary role at workshop.

Only Curriculum Developers received the following series of questions:

The next question was **Were you responsible for the completion of an EET chapter?** Responses are shown in Figure 12. **Most respondents said they were.**

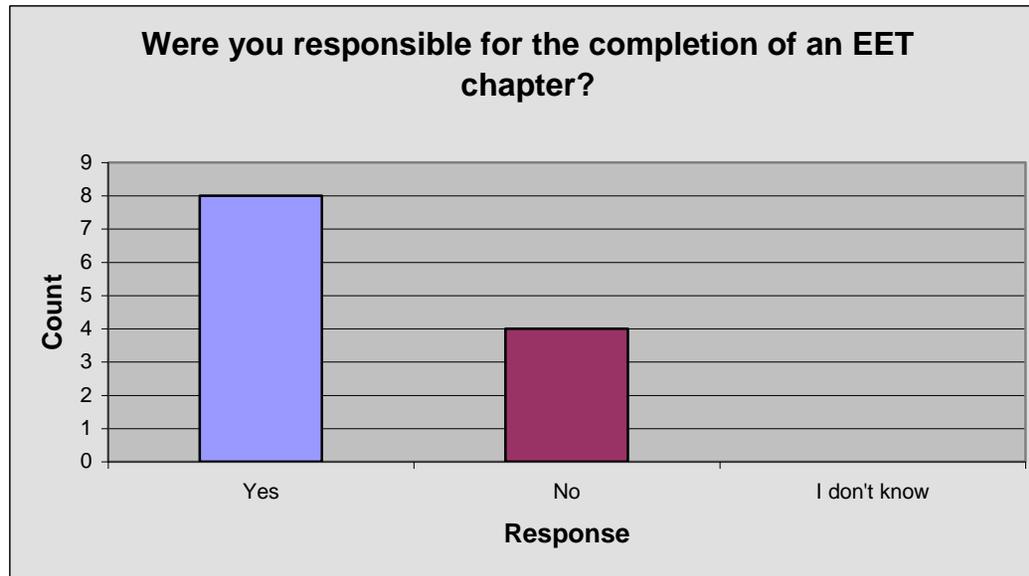


Figure 12. Whether curriculum developers were responsible for EET chapter.

The eight "Yes" responses were from (C), (P), (2-T M P C), (T), (M), and (2-M C) workshops. The "No" responses were from (B), (2-M), and (B T).

The next question was ***What is the status of the chapter you were responsible for?*** Responses are shown in Figure 13. **Most respondents said the chapter was or would be completed.**

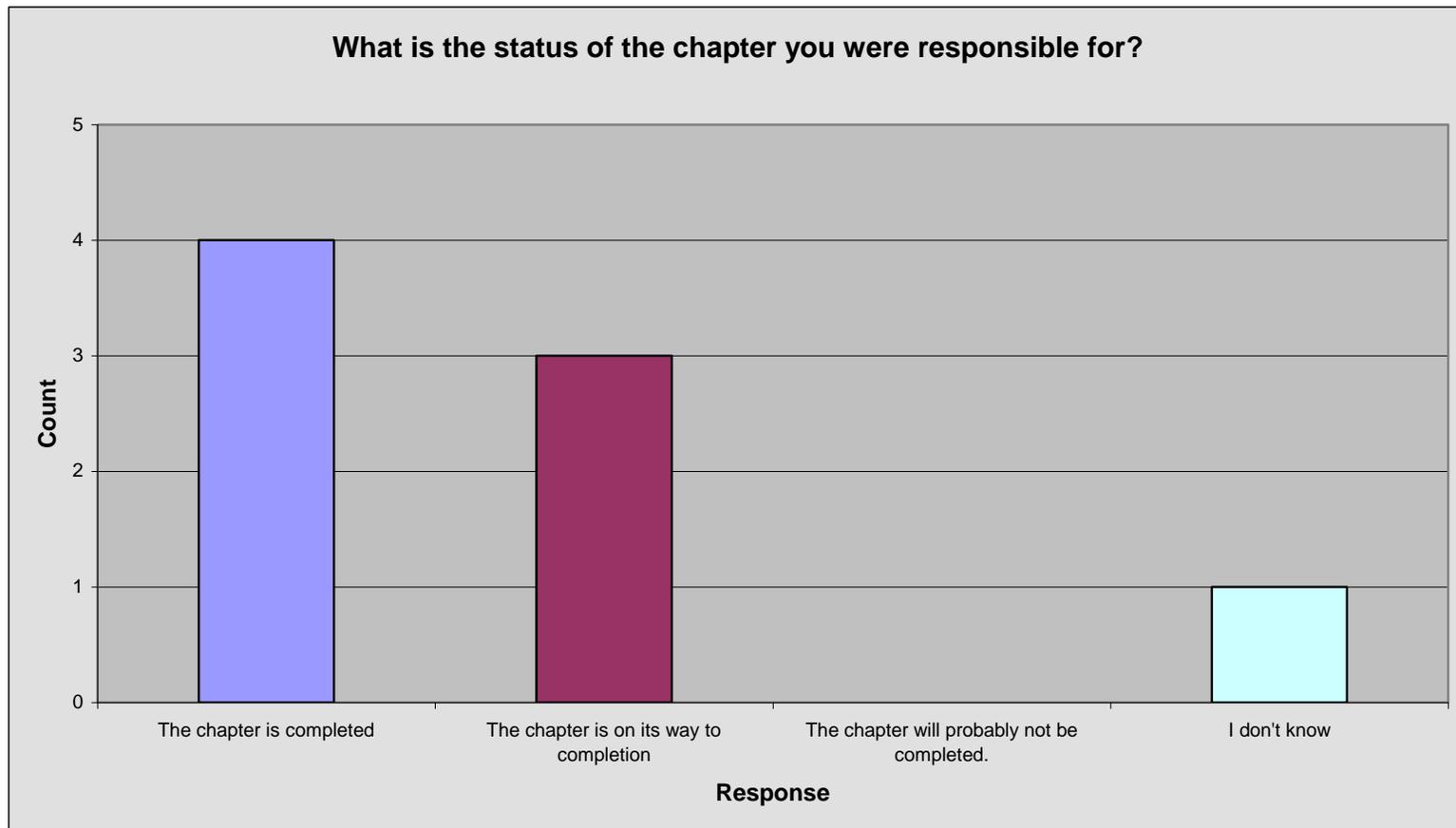


Figure 13. Chapter status.

Four "Other" comments were as follows:

- *One chapter, from previous workshop, is complete. Currently working on another chapter from most recent workshop. (M C)*

- 2006- Tucson - did not complete, software issues (I was not the curriculum developer there, I did contribute as the educator) 2007 - completed - Whither Sea Ice 2008- Portland did not complete, data and people issues - 2009 - completed – EdGCM (T M P C)
- One is completed; one is mostly completed but needs a little more work; two will probably not be completed. (N B T M)
- but not live (T M P C)

The next Curriculum Developer question was **How long did it take after the workshop for the chapter to be completed?** Four responses were received:

- *Sea Ice - 3 months edGCM - 6 months (T M P C)*
- *I usually always had a hard time getting started mostly because of job changes soon after the workshop or because summers tended to be busy with PD workshops. I found the best thing to do was to dedicate large blocks of time over a short time period to finish a chapter. I did not like to spread them out (N B T M P C)*
- *several months of part-time work (N B T M)*
- *Hurricane Highway was completed within days. Larsen B - actually had to change focus..waiting to see if the TERC gang approves... (T M P C)*

The next Curriculum Developer question was **When do you anticipate the chapter will be completed? One response was received:**

- *1/1/2010 (M C)*
- *Before Spring 2010 (M C)*

The next section gives the answers to the open-ended questions branched in the survey by primary role.

## **Curriculum Developer**

### **How has your participation in the workshop(s) impacted the curriculum materials you have developed or how you develop them?**

- *It was helpful to work in a team of people from different disciplines. I learned more about the topic we worked on, which has been useful to me over the years. (B)*
- *It helped make me aware of other data resources that are available online, in addition to the resources I was already using. (M)*
- *I do not develop curriculum materials. (P)*
- *Well, I have more knowledge about Google Earth, My World, GeoMappApp, and other tools, and how to utilize DLESE or other forms of data. I strive to bring in more technology into all of my classes, regardless the content. (M C)*
- *Yes, it would have been impossible without the workshop. The face to face struggling with the ideas and software is irreplaceable. (T M P C)*
- *It did not have any impact. I had lots of experience in this area of developing data-rich curriculum materials already. (B T)*
- *no impact. The daily duties of my job have a far greater impact on my curriculum development skills than a brief workshop once a year. (N T M P)*
- *mostly thoroughness and learning how to structure the learning so that the user would not get lost or confused.(N B T M P C)*
- *I participated in developing the EET program prior to the start of the workshops, and it was that initial work that helped me understand the challenges of teaching new technologies to users who would be learning without the help of a course instructor or another who could answer questions.*
- *It gave me insight into the process of creating a unit. (N B T M)*
- *It's given me more experience in tailoring instruction to incorporate data and data analysis tools, and to develop curriculum around data. (M)*
- *I feel more comfortable using data sources and now use the tools more often in the professional development.(M C)*

**How has your participation in the workshop(s) impacted the way you have interacted with the scientific and technical community?**

- *I better understand the needs of teachers trying to use new curriculum materials in the classroom (B)*
- *No noticeable change. (M)*
- *Not at all. (P)*
- *I have made several connections with other educators and scientists. (M C)*
- *No change. (B T)*
- *no impact. Again, the daily duties of my job have had a far greater impact than these short workshops. The workshops were valuable. However, they represent only a very small slice of time when compared to all the other activities I engage in. There is no doubt a cumulative effect, when viewed across all my work. However, the impact of these particular workshops are not significant when compared with time spent on other activities. (N T M P)*
- *I found this to be one of the best aspects of the workshops. I enjoyed interacting with scientist and translating their work/knowledge/data to a chapter. I enjoyed the scientific learning I went through to create a chapter. Being exposed to new tools and datasets has been useful in my curr development efforts (N B T M P C)*
- *I have a better understanding of what they have to offer to educators, and have come to appreciate their willingness to help with these efforts. (N B T M)*
- *I had a more positive impression of the community and their dedication to education. (M)*
- *I know communicate and collaborate with people that I would never have met otherwise. It's enriched my professional life tremendously, and improved my teaching as well. (T M P C)*
- *I can now contact the scientists and tools directly to get answers or to solve problems where before I didn't have those contacts. (M C)*

**What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the scientific and technical community?**

- *working with the team on the project (B)*
- *The poster session was helpful to me because it allowed me to interact with different people than those I already knew, and those on my team. (M)*
- *Software demonstrations, dinners, and after-hours socializing. (P)*
- *lectures, workshops. The things that took place at the actual workshop. (T M P C)*
- *I had good relationships and connections to do this kind of work before becoming involved in the workshops. No change really happened. (B T)*
- *not applicable. I interact with the scientific and technical community on a regular basis already. (N T M P)*
- *just spending time with them talking and getting to understand their perspectives on their own discipline and how they viewed education and outreach efforts (N B T M P C)*
- *Just getting to know people from these communities and interacting with them in a common effort; knowing they were participating because they had an interest in outreach. I otherwise have few opportunities to work with these people. (N B T M)*
- *Networking and general conversation (M)*
- *Informal time at meals and breaks, emails pre and post. I found learning of their work quite interesting, and knowing what they were doing and incorporating pieces of that into my classes made my classes more relevant and interesting to my students. (T M P C)*
- *The team break out time. (M C)*

## Data Specialists

**How has your participation in the workshop(s) impacted how you think about and put in practice providing data to educators and students (e.g., data products, formats, metadata, searchability, interfaces)?**

- *More emphasis on web services as a method of delivering data, rather than static web pages or SQL queries. Allows us to focus on managing out data, but makes it available to a wide variety of client interfaces. (M)*
- *Something I do quite often at a variety of scales and venues, no impact (C)*
- *Access has to be simple, downloads minimal size and there should be a way to quickly verify that you have the data you want before you download. (N B M)*
- *unfortunately, it hasn't had much impact (I'm busy enough with my regular work that it's hard to fit in a new project) (P)*
- *We have used the team format from the workshop to develop other modules. (B)*
- *Yes, very much so. It has changed how we document our software, how we implement middleware (THREDDS, RAMADDA) and what meta-data schemas to adopt and support, what formats to use and make available for data transfer, storage, and visualization. How to aid in discovery (data mining) as well as discovery based learning. (B T P C)*
- *I am strongly in favor of providing data to educators and students, but I have not found an effective way to do it. (T)*

**How has your participation in the workshop(s) impacted the way you have interacted with the educational community?**

- *No impact (C)*
- *I like to visit the classroom if it is possible, and be accessible to teachers for one on one questions though email. (N B M)*
- *not applicable (I'm only minimally involved with education) (P)*
- *I have additional contacts in the community. (B)*
- *Yes, we are now more aware of the needs of the educational community, and can better address those needs. (B T P C)*
- *I have interacted at the same rate and in the same ways before and after the workshop. (T)*

**What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?**

- *Team work sessions, I had the data, how to make it teachable (C)*
- *email and the development environment of the EET chapters to allow us all to see the chapters progress (N B M)*
- *networking at the workshop (B)*
- *Hands on data usage (wrangling) in an educational context..so the team break outs are great for seeing how people react/interact with data use and data discovery (B T P C)*
- *Meeting educators at the workshop was the single most helpful thing. (T)*

## Educators

### **How has your participation in the workshop(s) impacted your teaching of science and your use of scientific data in the classroom?**

- *After implementing the first few activities related to EET chapters it was apparent that students were highly engaged in the problems addressed by the activities. Reflection statements submitted by students and classroom discussions indicated a new level of interest in the content and development of valuable new skills working with the tools. As a result, the tools were used in PD opportunities with other geoscience faculty in the three school district. Now GIS, Google Earth and Image J are all integral tools used throughout the year in the geoscience curriculum. (P C)*
- *I introduced some laboratory activities that enabled students to work directly with on-line data. (P C)*
- *more use of data in teaching and lab activities (M C)*
- *I have tried to use more scientific data. (T)*
- *It has definitely compelled me to more frequently utilize data and data analysis, particularly towards the goals of incorporating inquiry-based learning and critical thinking into my courses as ways of improving student learning. (P C)*
- *Yes, tremendously. See previous questions (N)*
- *It has impacted my work in faculty development since I can now point faculty in that direction. (N T)*
- *adds to deeper understanding of concepts in Earth Systems Science courses with application of the data, and its connection to the real-world. (N T)*
- *I am trying to find more and better ways to use data in the resources I am developing for climate change ed. (C)*
- *I mentioned some of the impacts earlier in this survey, but in general I am able to access data that I was not even aware of before the workshop. In my GIS class, this allows my student to create their own projects instead of being stuck with the limited "canned data-sets" that come with available curriculum. It's always more relevant when you can access current/recent data sets. Since I write curriculum (for Science Approach, PASCO, etc.), this has also given me more ideas about data sets that could be accessed by teachers anywhere. (M)*
- *The geospatial and geophysical data tools that I learned about have been particularly valuable for creating geoscience visualizations for my students.(P)*

**How has your participation in the workshop(s) impacted the way you have interacted with the scientific and technical community?**

- *There is no question that the workshops have allowed me to network with a group of educators, researchers and tech experts that I would otherwise not have met. As a result, students experience a more data driven instructional method.(P C)*
- *no (M C)*
- *It has not. (T)*
- *I already had a strong connection in that regard due to my background, but I'm just more aware of the role that the scientific and technical communities can play in education...and how many of these people WANT to participate in education and find educational uses for their data. (P C)*
- *Yes, it has. I have a better understanding of the current practices of science, and therefore have more confidence when asking questions about topics I'm interested in but need clarification (N)*
- *I have become much more engaged with the technical community. (N T)*
- *establish partnerships. (N T)*
- *I met a scientist I did not know before and we are staying in touch and sharing ideas and resources. (C)*
- *The workshop obviously gave me the chance to work with scientists that I would otherwise have no contact with. What I learned from them is so much more valuable than anything I could have read in a textbook. Having additional contacts also makes it easier to know where to start when the need to contact someone in the scientific or technical community arises.(M)*
- *It has given me additional contacts with people in both the geoscience ed and geoscience research communities. This has been invaluable for generating new projects.(P)*

**What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the scientific and technical community?**

- *Poster sessions, tool time, general session presentations and meal times (and evenings too). (P C)*
- *Poster session (P C)*
- *no impact (M C)*
- *I already interact with them. I teach at a college, and although I am classified as an educator, I identify more with college instructors than most K-12 teachers. (T)*
- *Pre-workshop phone calls, and the team breakout sessions. Having a clear framework allowed us all to contribute our particular expertise, and yet still learn from one another. (P C)*
- *The breakout sessions were a great way to meet and spend time with those in the scientific and technical community. By interacting with them I learned more about the processes of science and the way they think like either scientists or techies. (N)*
- *The breakout groups and talks. (N T)*
- *direct working group activity sessions and social networking after work assignment hours. (N T)*
- *I found the pre-workshop phone calls very helpful in getting us all on the same page before starting our work together. I think it gave us a head start to be able to dive right into the work. We established rapport and a working plan before arriving at the workshop. (C)*
- *The general sessions/presentations and the small-group time working on the EET chapter (as well as informal networking over lunch) helped me to better understand that scientists want to make their data available, but they're not always sure how we want to access it --- the time for articulation was important. (M)*
- *Despite my lapse in staying in contact with my team, this model of educator / scientific / technical collaboration proved to be a fascinating project. (P)*

## Scientists

**How has your participation in the workshop(s) impacted how you interact with educators and how you think about and put in practice providing scientific information to educators and students (e.g., scientific information, data products, formats, metadata, searchability)?**

- *I shared all the information I gathered during the workshop with my colleagues in the university where I work. I also shared with my students the URLs for different chapters created during the workshop. (C)*
- *It was very good for me to understand curriculum standards and that these need to be addressed - you can't just put out an activity that uses data. (M)*

**How has your participation in the workshop(s) impacted the way you have interacted with the educational community?**

- *It helped my perspective, and I'm sure it influences my teaching, access to information, information sharing, and interactions with my colleagues. (C)*
- *It has not, I am very active within the educational community (T)*
- *It has made me more aware of what educators need from data providers and scientists. (M)*

**What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?**

- *the working sessions (the teamwork). (C)*
- *The workshop itself (T)*
- *Interacting with educators, developing the EET chapter. (M)*

**How has your participation in the workshop impacted how you conduct your research?**

- *I think more about the way I present my results, and try to do it in a better, more useful way. (C)*
- *I am more aware of all aspects of research (T)*

- *Not on my research directly, but in related aspects, such as communicating the research to the public. I try to keep in mind how the research may be received by the education community and the impact it may have. (M)*

**How has your participation in the workshop impacted how you report your research to others?**

- *It helps present my results in a better, more useful way. (C)*
- *I can relate the impact of the research on education to other researchers and encourage them to keep these issues in mind. (M)*

## Tool Specialists

**How has your participation in the workshop(s) impacted how you think about and put in practice providing your software tool to educators and students (e.g., interfaces, documentation, instructions, FAQs)?**

- *The workshop opened my eyes to many tools and data sets that I hadn't been exposed to. I also learned new ways to use tools that I did know about (such as Unidata's IDV, and NOAA's data mapping tool). (M P)*
- *I found it very enlightening to get input from the teachers about how the tool should or shouldn't work for the students. I think this should be an integral part of any educational software product design. (B)*
- *Well, it's important to think outside the box as much as possible, get usage scenarios from as many different types of users as possible, see how various users use the tools, and collect metrics (if possible). (B T)*
- *As a software developer AND research scientist I've struggled with creating curriculum materials to go with my software for teachers. The workshop provides a real working venue where I could be with a curriculum development specialist - it was an invaluable experience! (C)*
- *I developed a (clearer?) sense that our community's data-in-education effort tends to place insufficient emphasis on learning outcomes. That is, I would like to see clearer definitions of what students should know (about acquiring and using data) and more emphasis on discerning whether or not they know it. I think this shift in emphasis would counter the tendency for at least some data-in-education efforts to be motivated by hopes that a given data set will find educational applications, underpinned by assumptions that important learning will be a natural consequence. (N)*
- *It has made me more conscious of how the tool may be used in educational settings. It has also forced me to improve my documentation. (M C)*
- *I have developed a tool, <http://www.lecturetools.com/>, that allows me to challenge students in large lecture halls using data, imagery and questions to encourage active learning. (T)*
- *We have applied lessons learned at the workshop in the design of our tools. Still, there are major issues preventing active data use where this is not required by standards. (N)*
- *It really helped with regards to how I approach the flow of a tool and the applicability of it to a particular audience. Even at the workshops there was a broad range of experience and ability in the educators and those interactions emphasized to me the need to really focus on a specific audience because even*

*within the "interested educators" demographic there are sub-groups that need to be differentiated.  
(TMP)*

- *I received feedback on a tool that I have helped develop ... MultiSpec. I was able to implement some of the suggestions that I received. (N M)*
- *Hasn't really (N B)*

**How has your participation in the workshop(s) impacted the way you have interacted with the educational community?**

- *I guess I understand more the importance of simplicity and fun when science data and technology are used in a classroom setting. (M P)*
- *Unfortunately not. We haven't incorporated teacher input into our educational products. (B)*
- *No, with the collapse of DLESE my budding interaction with the educational community came to an abrupt halt. (B T)*
- *It hasn't really yet - but I hope the availability of the EET chapter will help me better integrate my software and science into the classroom. (C)*
- *I'm not sure. (N)*
- *It has made me more aware of what is needed to effectively use data and tools in educational activities. (M C)*
- *I would say that I am more engaged with certain members of the community in ways that I wouldn't have been had I not attended the workshop. (TMP)*
- *I don't believe that has changed me much. I try to help those that bring questions or problems to me about remote sensing or about MultiSpec. (N M)*
- *Hasn't really (N B)*

**What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?**

- *The face to face interaction with educators and listening to comments in presentations/meetings/poster sessions. (M P)*
- *The design phase of the chapter was the most useful for me. (B)*
- *I think it was mainly the physical meeting and face-to-face exchanges with educators at the workshop. (I don't get any of that in my current job.) (B T)*
- *teaming up with a curriculum development specialist (C)*
- *I'm not sure. (N)*
- *Most of it was just watching how the scientists and the curriculum developer interacted to see what motivated each group and what each group valued. The curriculum developer wanted to ensure the material was simple enough that students could understand. The scientists wanted to ensure the simplification of the concepts don't change the actual science. (M C)*
- *All the conversations we have with teachers help us to understand the limitations of what they can use in the classroom. (N)*
- *The networking opportunities, poster sessions, and the interaction within the groups were extremely useful in engaging the educators. The poster sessions were useful because it provided a specific framework for a discussion, even though the tool might not apply to all users. (TMP)*
- *I got the most out of the workshops themselves. I was able to work with people that I had not worked with before (in particular K-12 teachers). (T)*

### **How did your participation in the workshop impact how you use your analysis tool?**

- *My usage hasn't changed a whole lot but when communicating with others I make more of an effort to simplify the tool or experience. (M P)*
- *How \_I\_ use it? No impact. (B T)*
- *made me focus on creating some uses of our software that could be accomplish in a much shorter time in the classroom. (C)*
- *I'm not actually a tool \_user\_ in any significant way. (N)*
- *It didn't impact how I use the tool. (M C)*
- *Not really. (T)*
- *Probably no change in how to use the analysis tool, but there was impact in what changes to make in the analysis tool (MultiSpec). (T)*

### **How did your participation in the workshop impact how you have developed your analysis tool further?**

- *Again, simplifying the tool and making it more user friendly for educators and students. (M P)*
- *It instilled the desire to get educators involved in the development process. (B)*
- *trying to see things the ways other users tend to see them (B T)*
- *Don't have funding for further development at the moment, but if we do get some I will improve the ability of the software to be used in shorter classroom sessions. (C)*
- *I'm not sure that it has affected my approach to tool building, per se. (N)*
- *It has encouraged me to focus more on usability and documentation rather than breadth of functionality. (M C)*
- *Perhaps. We are now designing a tool for allowing students to use Google Maps and Google Earth to explore problems in large classrooms. (T)*
- *The participation did help me focus on doing things to make the analysis tool (MultiSpec) easier to use. This was after the first workshop in particular. (T)*
- *Added some easier configuration and a few new features (T)*

**If your participation in the workshop impacted you in ways that were not addressed by this survey, please describe in the box below.**

- *The workshops were great, and I feel fortunate to have been a part of them! Basically, just awareness. By participating in the workshops, I was introduced to software tools, data, and applications. My overall total awareness of initiatives with technology and data have been enhanced. (Curriculum Developer, M C)*
- *It allowed meeting others who were interested in this approach to Earth Sciences and had discussions beyond our specific group meetings. (Data Specialist, N B M)*
- *My level of confidence working with the tools I learned about through the workshops has increased as has my interest in learning about other tools and databases to teach the geosciences in a more data driven and quantitative format. (Educator, P C)*
- *My participation and exposure has made me realize how much of a need there is for this type of work. Educators need tools like the ones developed for the EET and don't have time to develop them on their own. Scientists and technical people have a desire to have what they know via their data applied in educational settings, and so having these team efforts used to create resources for educators provides a significant service. (Educator, P C)*
- *I value very much the opportunity to work in multi-disciplinary teams like this workshop format made possible. Scientists, software developers, educators, curriculum and data specialists too rarely get to work closely on a project. I only wish I could work in an environment all the time like this! But, since that's not an option I would very much appreciate more opportunities like the AccessData workshop presented. (Tool Specialist, C)*
- *The workshop format has also become a model for other workshop efforts in which we have participated or organized. (Tool Specialist, N)*
- *N/A Although I would enjoy participating again if it is possible! (Educator, N)*
- *I value the professional relationships that were either initiated or strengthened at the workshop. (Unknown, P)*
- *These workshops provide additional reasons (through collected data) for the need for good data interfaces, contextualization of data and their interfaces, and for tutorials. Plus there are many common issues that many of us face but often don't have a community where these issues can be discussed; these workshops provide such a venue for creating and maintaining these connections. (Unknown, N B)*

- covered. (Educator, N T)
- It was an amazing workshop with a lasting impact, but I believe I've highlighted the major benefits already. Thanks! (Educator, M)
- I have become a better educator because of these workshops. I have learned multiple methods to introduce technology and data to teachers and students. I have gained new perspectives and an appreciation of working with a range of disciplines and expertise through these workshops. I enjoy the team work these workshops have modeled for me. (Curriculum Developer, N B T M P C)
- The networking and interaction with the wide range of professionals in my field has been invaluable! (Curriculum Developer, M C)

The next question was ***In addition to your primary professional role at the workshop(s), what other areas of expertise do you have? (Check all that apply.)*** Responses are shown in Figure 14. **There was a range of additional expertise, with educator being the most common.**

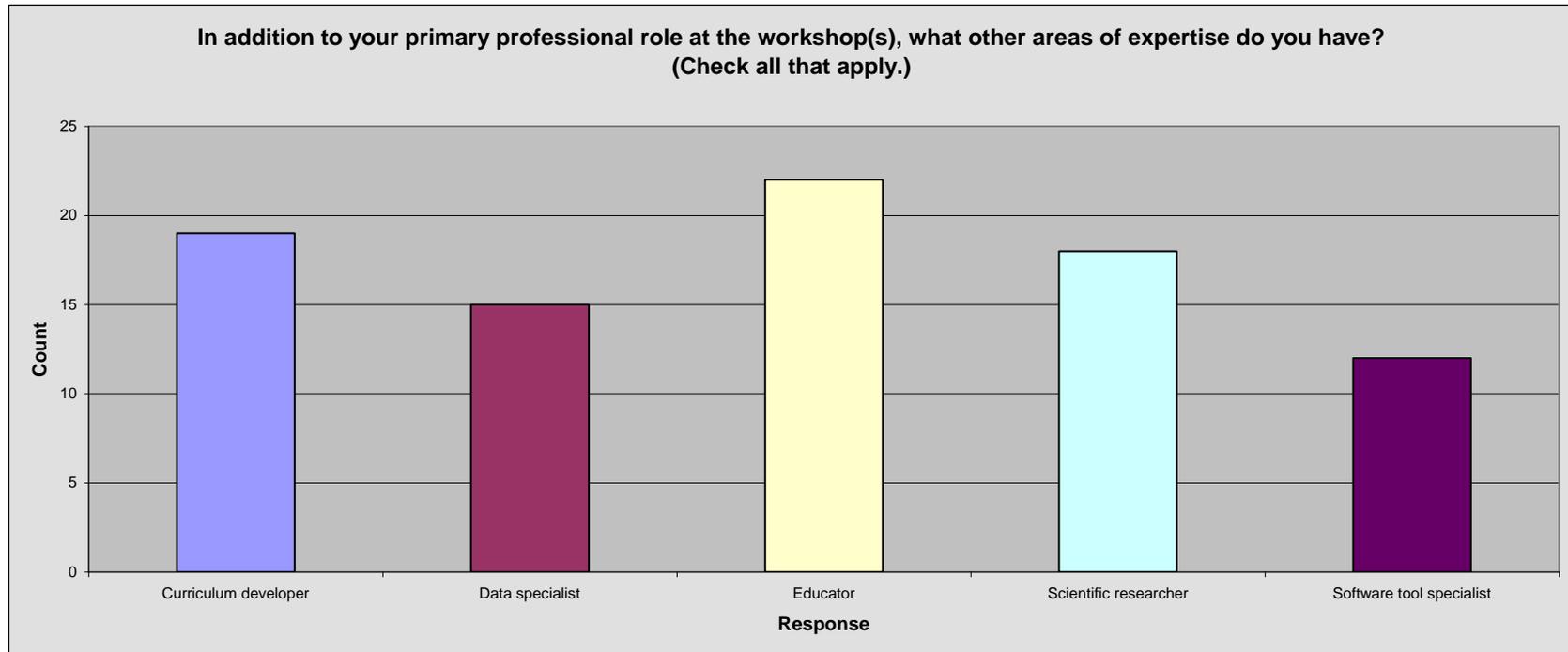


Figure 14. Other areas of expertise.

Under the “Other” category, the following responses were given:

- *graphic artist*
- *web developer, tech support*
- *Scientific editing*
- *Geoinformatics*

- *Data visualization & web design*
- *Educational Researcher*
- *Outreach*
- *administration of school and professional development*
- *Geoscience education researcher*
- *professional development provider*

## Appendix—Evaluation Instrument

### AccessData & Data Services Workshops Retrospective

Welcome to the survey! We're asking all past participants of DLESE Data Services and AccessData Workshops to complete this brief survey. Your responses will help us get a comprehensive understanding of what aspects of the workshops have been effective and how access to Earth science data could still be improved. Thank you for sharing your candid opinions with us.

Best wishes from the Workshop Team.

**\* Which workshop(s) did you attend? (Check all that apply.)**

- 2004-New Hampshire
- 2005-Breckenridge
- 2006-Tucson
- 2007-Marlborough
- 2008 Portland
- 2009 Colorado Springs
- I'm not sure which ones I attended, but I attended the following number of workshops:

**\* Which of the following describes how you came to be on your team(s)? (Check all that apply.)**

- I assembled a team
- I helped assemble a team
- A colleague asked me to be on a team
- I was put on a team by the workshop staff
- I don't know
- Other (please specify)

## AccessData & Data Services Workshops Retrospective

**\* What aspects of the workshop (including pre- and post-workshop activities did you feel were the MOST useful? (Check all that apply.)**

- Pre-workshop emails and telephone calls
- Poster session
- Formal talks/presentations at the workshop
- Software tool demonstrations/workshops
- Team breakout time
- Networking with others
- Completion of the Data Sheet
- Post-workshop emails and telecons
- I don't know
- Other (please specify)

**\* What aspects of the workshop (including pre- and post-workshop activities did you feel were the LEAST useful? (Check all that apply.)**

- Pre-workshop emails and telephone calls
- Poster session
- Formal talks/presentations at the workshop
- Software tool demonstrations/workshops
- Team breakout time
- Networking with others
- Completion of the Data Sheet
- Post-workshop emails and telecons
- I don't know
- Other (please specify)

## AccessData & Data Services Workshops Retrospective

\* Did you attend more than one workshop?

Yes

No

Comments:

What motivated you to participate in multiple workshops?

The workshops and the pre- and post- workshop activities evolved over the course of the six years of the program. What changes did you notice that improved the workshop experience?

The workshops and the pre- and post- workshop activities evolved during the course of the six years of the program. What changes should NOT have been made?

## AccessData & Data Services Workshops Retrospective

How did your prior workshop experience help you in the later workshops?

**\* Did your team(s) complete an EET chapter?**

- Yes, my team has completed an EET chapter
- My team is actively working toward completing an EET chapter
- I'm not sure whether my team is actively working toward completing an EET chapter
- No, my team is not actively working toward completing an EET chapter

Comments:

What would have helped to complete the chapter or made the work more efficient?

**\* Did you contribute to the completion of the Datasheet after the workshop?**

- No
- I don't know
- Yes (Please describe what you contributed below.)

## AccessData & Data Services Workshops Retrospective

**\* Did you contribute to the completion of the EET Chapter after the workshop?**

- No
- I don't know
- Yes (Please describe what you contributed below.)

**\* Did your participation in the workshop impact your teaching?**

- I do not teach.
- No, it has not impacted my teaching.
- Yes it has impacted my teaching. (Please describe these impacts below.)

**\* Have you used EET chapters in your teaching (either the one you created or others)?  
(Check all that apply.)**

- I have not used EET chapters in my teaching.
- I have not used EET chapters in my teaching, but since the workshop, I have used data in my teaching in a more significant way than before the workshop.
- I have used EET chapters in classroom teaching.
- I have used EET chapters for teacher professional development.
- I have used EET chapters in informal education settings.
- I have used EET chapters in after-school settings.
- I have used EET chapters in homework assignments.
- I have used EET chapters in classroom demonstrations.
- I have used EET chapters in other ways. (Please explain below.)

## AccessData & Data Services Workshops Retrospective

Which EET chapters have you used in your teaching? (Please describe or list them below.)

\* What was your primary role at the workshop(s) you attended? (Choose only one)

- Curriculum developer
- Data specialist
- Educator
- Scientific researcher
- Software tool specialist
- Other

\* Were you responsible for the completion of an EET chapter?

- Yes
- No
- I don't know

\* What is the status of the chapter you were responsible for?

- The chapter is completed
- The chapter is on its way to completion
- The chapter will probably not be completed.
- I don't know

Other (please specify)

How long did it take after the workshop for the chapter to be completed?

## AccessData & Data Services Workshops Retrospective

When do you anticipate the chapter will be completed?

Why is it unlikely the chapter will be completed?

How has your participation in the workshop(s) impacted the curriculum materials you have developed or how you develop them?

How has your participation in the workshop(s) impacted the way you have interacted with the scientific and technical community?

What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the scientific and technical community?

How has your participation in the workshop(s) impacted how you think about and put in practice providing data to educators and students (e.g., data products, formats, metadata, searchability, interfaces)?

## AccessData & Data Services Workshops Retrospective

How has your participation in the workshop(s) impacted the way you have interacted with the educational community?

What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?

How has your participation in the workshop(s) impacted your teaching of science and your use of scientific data in the classroom?

How has your participation in the workshop(s) impacted the way you have interacted with the scientific and technical community?

What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the scientific and technical community?

## AccessData & Data Services Workshops Retrospective

How has your participation in the workshop(s) impacted how you interact with educators and how you think about and put in practice providing scientific information to educators and students (e.g., scientific information, data products, formats, metadata, searchability)?

How has your participation in the workshop(s) impacted the way you have interacted with the educational community?

What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?

How has your participation in the workshop impacted how you conduct your research?

How has your participation in the workshop impacted how you report your research to others?

## AccessData & Data Services Workshops Retrospective

How has your participation in the workshop(s) impacted how you think about and put in practice providing your software tool to educators and students (e.g., interfaces, documentation, instructions, FAQs)?

How has your participation in the workshop(s) impacted the way you have interacted with the educational community?

What aspects of the workshop (including pre- and post-workshop activities) did you feel were the most helpful in increasing your ability to interact with the educational community?

How did your participation in the workshop impact how you use your analysis tool?

How did your participation in the workshop impact how you have developed your analysis tool further?

## AccessData & Data Services Workshops Retrospective

**\* In addition to your primary professional role at the workshop(s), what other areas of expertise do you have? (Check all that apply.)**

- Curriculum developer
- Data specialist
- Educator
- Scientific researcher
- Software tool specialist
- None
- Other (please specify)

**If your participation in the workshop impacted you in ways that were not addressed by this survey, please describe in the box below.**

**\* Would you be willing to participate in a brief telephone interview regarding your opinions about the workshop(s)?**

- Yes
- No
- Other (please specify)

Please enter your name and email address in the boxes below. These will be used only for participation confirmation.

**Name**

**Email address**

## AccessData & Data Services Workshops Retrospective

\* If we do a capstone, wrap-up two-day meeting in February 2010 to further explore the impact of the DataServices and AccessData Workshops, would you be interested in attending?

Yes

No

Other (please specify)