DLESE Data Services Workshop
Digital Library for Earth System Education
May 14-17, 2006

Evaluation Report
September 15, 2006

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September 15, 2006

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Executive Summary

This report is intended to inform members of the DLESE (Digital Library for Earth System Education) Data Services Team. The main points are listed below.

Schedule

- As has been seen in previous workshops, participants particularly value the meeting as an opportunity for networking and making connections with others in different fields. In keeping with this, they wished for more breakout time in their team groups and more networking time between groups.
- Participants valued the talks, especially the initial Keynote talk, but overall they thought talks were the only aspect over-emphasized in the program.
- Participants generally felt their groups were successful and well facilitated. Several requested clearer direction at the beginning, reporting some confusion between the work on the Data Sheets and the Activity Outline. Groups with experienced leaders appreciated the clear guidance from someone who knew what was going on.
- As in previous years, participants wished for greater education emphasis throughout the workshop. However, there were not many specific suggestions except for more participation by curriculum developers.
- Participants enjoyed the new Tool Time sessions, and many wanted both more preparation (pre-workshop) and more workshop time spent on this area.
- The role breakout was moderately valuable to people attending the workshop.
- The poster session was also moderately appreciated by attendees; having it in a larger facility with refreshments in the same room, and enough time for presenters to mingle, would enhance the experience for many.
- The final report-out is not highly rated, and might perhaps be reformatted in some way. One returning participant liked the new format, but three new participants suggested the all-in-one format would be better.
- A number of participants requested that the workshop be extended to three full days to discourage people from leaving early the last day and to allow more time for breakout groups, tool work, and networking.
- Many respondents reported plans to continue their efforts to bring data and tools into education. Fewer respondents this year spoke only about completing the EET chapter.

Data Use

- Attendees successfully used data for such learning goals as personal exploration and learning, interpreting satellite imagery, and understanding the scientific method among others.
- Satellite imagery data types were the most commonly used data type category, followed by weather/climate and topography data. Image and text/ASCII were the two most commonly used formats.
- NASA, USGS, and NOAA were the main data sources attendees had used.
- All attendees had had to modify data before it was used by end-users, with reducing the file size the most common modification cited. End-users performed graphing, math, and visualization procedures on the data.
- All respondents had been unsuccessful using a dataset in the past. Respondents cited the primary barriers as being unusable formats, problems with required software, file size, and the inability to locate the data that was sought (discoverability).
- Preferred methods of instruction for learning about data use were examples, step-by-step instructions, online tutorials, and one-on-one email assistance.

Workshop Logistics

- Many attendees requested more comprehensive pre-conference orientation, including a list of their teams, their team topics and description of their EET task, the tools to be included in Tool Time, and general information on the EET and DLESE.
- The location, facilities, and organization of the meeting were considered good to very good. Many attendees raved about the facility and food.
- The website, swiki, and printed materials were all considered useful.

Recommendations

Workshop

- Consider extending the workshop to three full days. This would allow for more breakout time, more tool time, and more networking opportunities.
- Increase breakout group time. Try to ensure that a strong, DSW (Data Services Workshop)-experienced facilitator is in each group and be careful to have at least one return participant in each team.
- Have no more than one plenary/talk per day, and keep the length well under an hour.
- Continue Tool Time sessions; however, provide a prepared and equipped computer lab for the work. Include in the pre-workshop information details on the tools to be included and instructions for downloading software and tutorials ahead of time. Have a contact person available for software loading and testing so that the tool time session is ready to go at the time it is held.
- Provide more comprehensive pre-workshop information on the teams and their topics, as well as more detailed information on the work they will be doing in the workshop. If teams have already gotten in touch and are prepped and ready to go, they may not feel the frustration some experienced during the first half of the breakout sessions.
- Inform attendees about the Swiki well in advance and how to use it so they can become familiar with it.
- Consider alternate formats for the final group report-out; the all-together format was suggested.
- Consider skipping the role breakout session or else reformat it; suggestions included breaking out two roles together at a time or having a specific agenda in this session geared towards the chapter development.
- Consider skipping the poster session or revamping it to be a reception in a larger facility with plenty of food and drinks, and non-presentation time for presenter mingling.
- Consider bringing back some of the existing teams year-to-year.
- Be sure DSW staff members attend each group on the final morning to answer questions and give guidance.

Data for Educational Use

- Data providers should consider four primary barriers to educational use of their data—discoverability, software required, file size, and formatting. Common formats (or easy-to-use conversion tools) would enhance the educational uses of data. Ease of subsetting by time or space would also be valuable. Enhancements of the data discovery system that would help users find the data would also be of help.
- To enhance educational use of their products, data providers and tool developers should consider using examples, step-by-step instructions, and online tutorials in their database documentation. Email assistance should also be offered for specialized assistance.

Evaluation

- Modify evaluation instruments to obtain priority data in a manner other than requesting numerical designation by respondents.
- Consider combining Wednesday survey into the final survey, perhaps as the first section.
- Clarify, if possible, the professional role by which participants are being invited to attend the workshop. Many of the attendees wear many hats.

Introduction

This report provides information to DLESE Data Services Workshop organizers to help them understand the degree to which the meeting (as perceived and experienced by participants) met goals and to inform planning for future events. Presented below are a description of the conference; the methods by which the evaluation data were elicited, compiled, and analyzed; a profile of the participants who responded to the surveys; and presentation of responses to survey items. The Appendix includes the evaluation instruments.

The goals of the DLESE Data Services Workshop were

- To bridge the communication gap between technologists and educators about the resources, obstacles, needs and terms used by the other group,
- To establish working relationships between data providers/tool builders and curriculum developers/educators,
- To provide clear, relatively low-barrier pathways to developing educational resources using data (using data portals, EET chapters), and
- To produce guidelines and information for the DLESE community about data use in the classroom (from the technical perspective and from the educational perspective).

To reach these goals, the workshop was organized to include participants representing a range of DLESE community members who are concerned with data use: data representatives, software tool specialists, curriculum developers, educators, and scientific researchers. Participants were chosen for their contributions of data, tools or scientific and educational expertise needed for the development of a series of Earth Exploration Toolbook chapters.

Evaluation Procedures: Data Gathered and Analytical Methods

Data informing this report were collected through a series of five questionnaires, which are uploaded on the Data Services Workshop Swiki (http://swiki.dlese.org/2006-dataservicesworkshop/8). The questionnaires were the following:

- Data Use Questionnaire. Administered on the first day. Nine questions (eight multiple choice with open-ended option, one YES/NO with open-ended explanation requested).
- Daily Questionnaire. Administered three times, at the end of each day. Four questions (two multiple choice, one Likert, one open-ended Monday and Wednesday with two open-ended on Tuesday).
- Final Day Questionnaire. Seventeen questions (one multiple choice, four multiple choice with open-ended option, three open-ended, one Likert, eight mixed Likert/explanation).

Results from each questionnaire are reviewed in this report, with the daily and final questionnaires combined in one section due to their overlapping topics. The results of Likert, multiple choice, and yes/no questions were processed in Excel and are presented in figures. Open-ended questions were categorized and coded for dominant themes and are summarized within the text of each section. Professional roles of respondents were identified for disaggregated display in Excel graphs to show differences between the groups.

One instrument error was noted in the final survey; participants were asked for their opinion about the data search scenario session, which did not appear in the final agenda.

Response rates were sufficient to provide valuable data. The response rates are similar to those at previous Data Services Workshops.

Response rates to the questionnaires are summarized in Figures 1A and 1B.

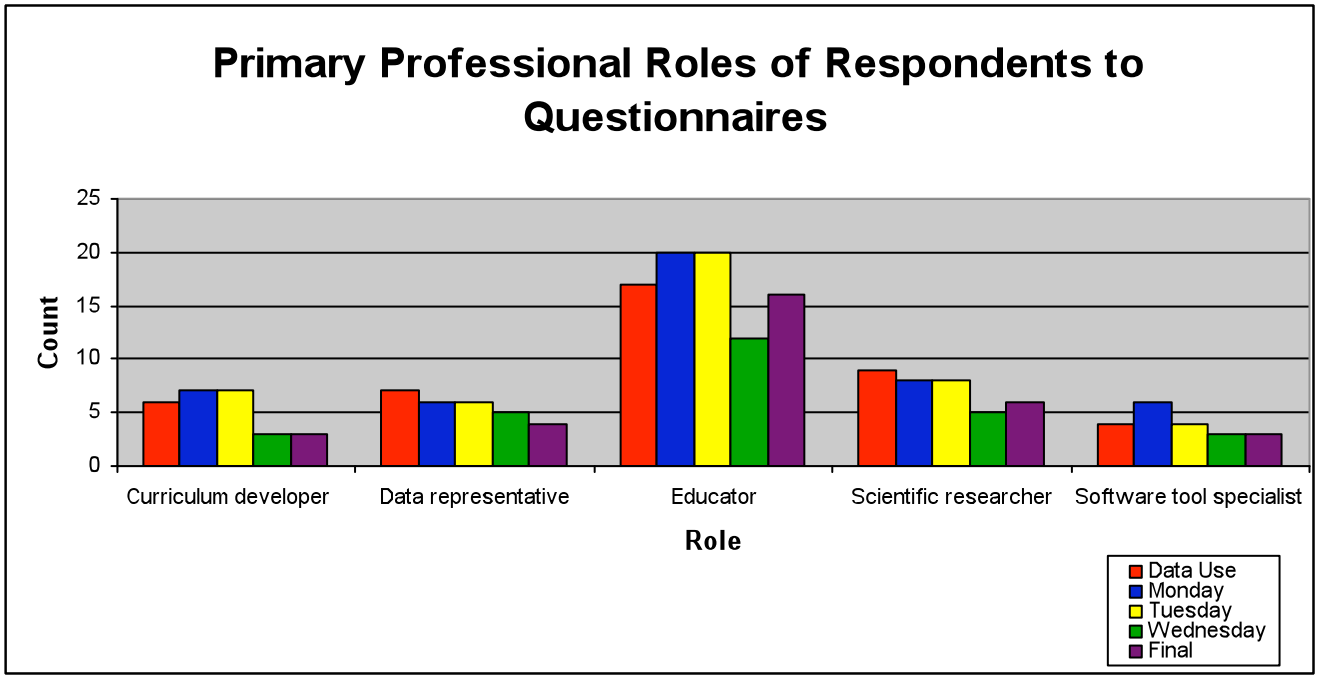

Figure 1A. Number of respondents to each questionnaire, grouped by professional role.

Table 1 reveals the response rates for each questionnaire and each professional role, based on the maximum response rate observed in each role group.

Sixty-eight participants attended the workshop; in addition, there were six staff members who mingled with the attendees.

All questionnaires were well responded to, ranging from 78% to 54%. The highest response rate was to the first daily questionnaire on Monday. The lowest was the final daily questionnaire.

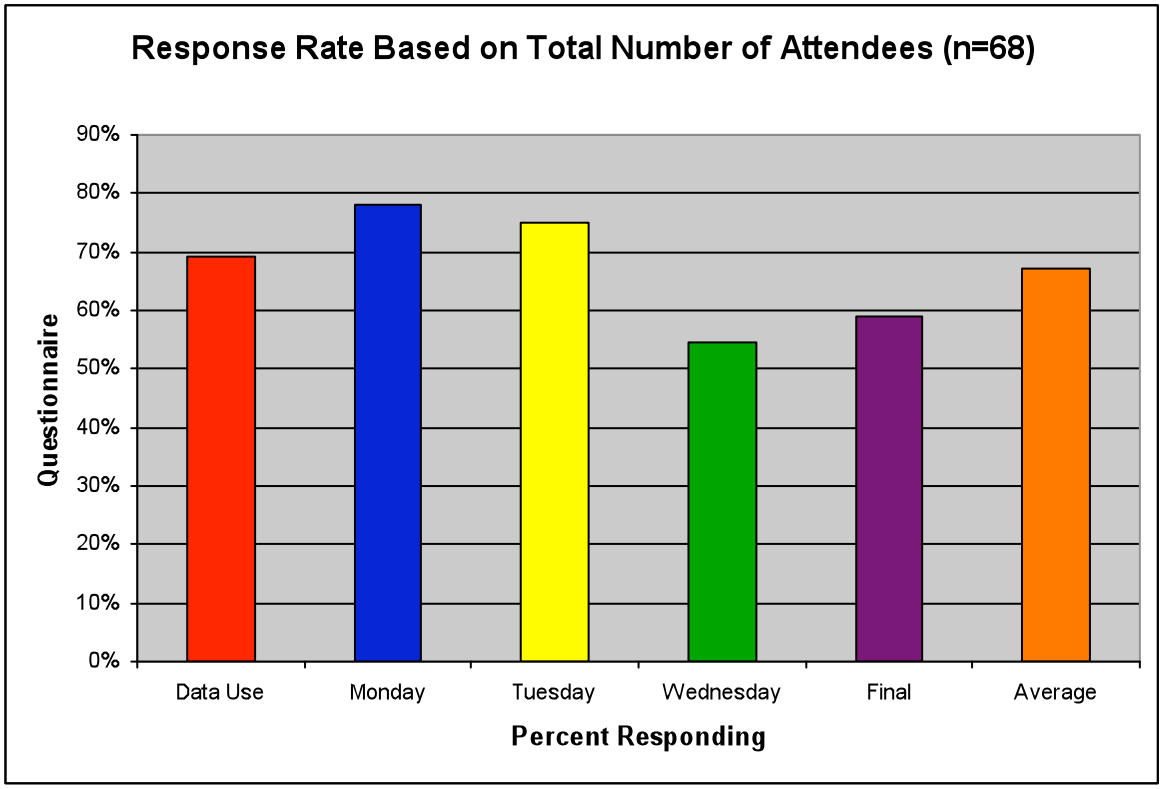

Figure 1B. Percentage of attendees responding to each Questionnaire.

Combine Wednesday and Final Surveys

One of the main reasons for having the daily questionnaires is immediate feedback so that the workshop presenters may correct in issues that emerge in real-time. However, this does not apply to the last daily questionnaire, since by the time this survey is administered, the workshop is over.

The final daily questionnaire also provides the consistent feedback designed to track attendee experience throughout the workshop. With the final questionnaire addressing similar issues, however, these two are a bit redundant. The Wednesday questionnaire addresses Wednesday-only issues, but they are very similar to several questions in the final questionnaire that is administered at the same time.

It **might** be more appropriate to include a couple of Wednesday-only questions in the final survey, thus lessening the impact on the attendee at the end of the workshop. Attendees could be on survey-overload by that time, and might be more apt to answer one longer (final) survey more thoroughly than two.

Professional Roles: Participants Self-Identification was Inconsistent

Respondents identifying themselves as primarily Educators were the largest group for each survey. This is more pronounced than in previous years. Approximately 14 representatives of each of the five professional roles were invited to the workshop. Nowhere near 14 of any of the other four roles were reported on any of the surveys, and over 1/3 of each set of respondents identified themselves as Educators as their primary role. Obviously, more attendees self-identified themselves as educators than did the workshop organizers.

There were between four and nine respondents to each survey who did not answer the role question as requested. Their responses are included in the aggregated response data, but not in the disaggregated analyses. These responses may account for some of the low-reporting in the other roles. However, even assuming that to be the case, it cannot make up for the low totals for Curriculum Developer, Data Representative, and Software tool Specialist.

This discrepancy between self-identification and workshop organizer identification is an issue that should be considered. There may be a way to clarify to attendees the area of expertise for which they are being invited. There may also be a way to request the role information on the surveys in a more precise manner. The role identification issue required a reworking of the disaggregation analyses for this report. This decreased the ability to compare results with previous workshops. It may be that disaggregated analysis is no longer a priority; if so, the issue is not so important.

Table 1. Comparative response rates by role and questionnaire.

	Curriculum developer	Data representative	Educator	Scientific researcher	Software tool specialist	Role not counted	Sum	Percent of total attendees (n=68)
Data Use	6	7	17	9	4	4	47	69%
Monday	7	6	20	8	6	6	53	78%
Tuesday	7	6	20	8	4	6	51	75%
Wednesday	3	5	12	5	3	9	37	54%
Final	3	4	16	6	3	8	40	59%
Average								67%

As displayed in Table 1, the number of responses by each professional role ranged from 3 to 20.

Depending on the question, responses were analyzed both as a whole and as disaggregated groups, split by primary professional role. One problem with disaggregating was that the “primary role” question was not consistently answered. For example, in the final survey 8 of the 40 respondents did not answer the question as instructed; these eight responses were not included in the disaggregated data because it was impossible to ascertain that their primary role fell into one of the five choices.

Due to the large number of self-identified educators who answered each survey, the disaggregated data is given as a percentage of those who identified themselves with a particular role. Open-ended answers to the “Other” option in questionnaires are incorporated into the summary text where they differ from the gist of the multiple-choice questions.

Previous Data Use Survey

There were 48 respondents to the Data Use Questionnaire.

Question 1 asked respondents to select their primary professional role and indicate any additional roles. See Daily and Final Questionnaire section for analysis of the professional role question.

Question 2 asked about learning goals with successful use of data in educational contexts. Respondents selected from eight learning goals and could pick more than one answer (see Figure 2).

Over half the respondents selected *Personal exploration and learning* or *Interpreting satellite imagery*. At least one third of the respondents elected each of the other options.

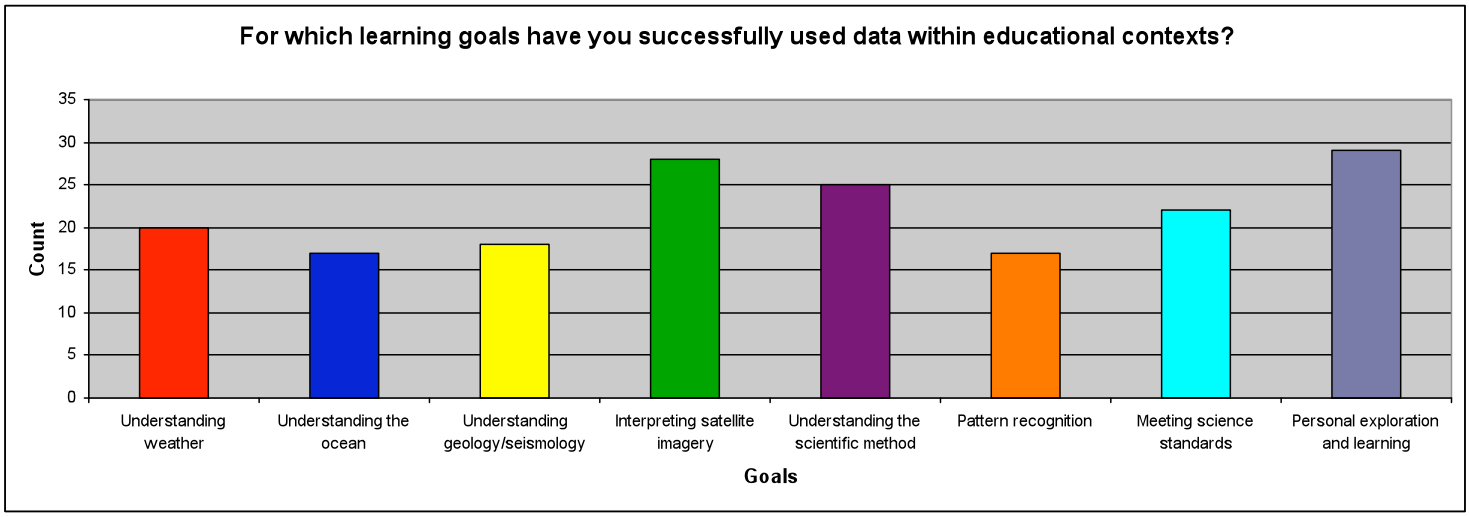

Figure 2. Learning goals for which there has been successful use of data in educational contexts.

Other learning goals participants listed were:

- *Environmental science topics*
- *Understanding water resources*
- *Astronomy educators*
- *Educational website development*
- *Environmental education, air quality, mountain meteorology*
- *Develop curriculum for meeting State Standards*
- *Teacher training*
- *Glacier mass balance (middle schoolers) - interpreting data & photographs*
- *Understanding the impact of climate variability and change on freshwater ice*

In Figure 3, we break out these responses by role in terms of the percentage of each role who answered in a certain way.

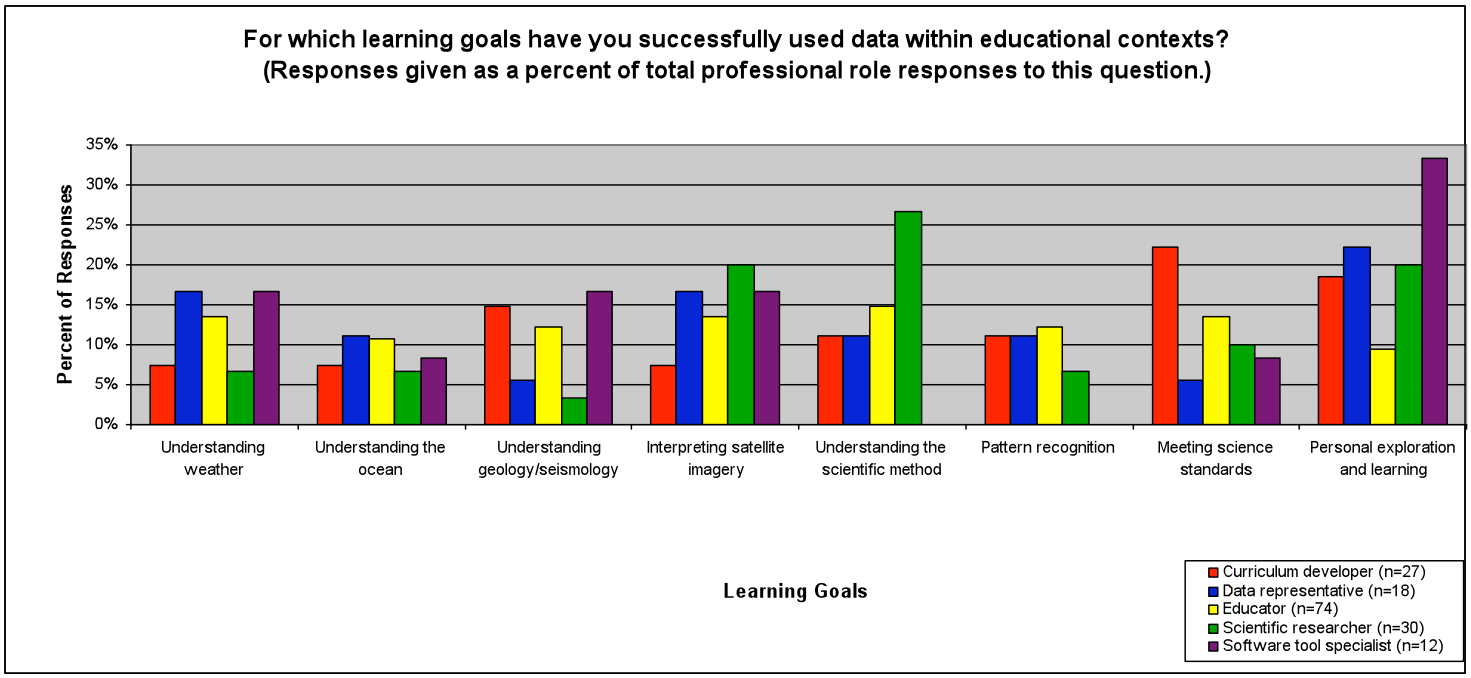

Figure 3. Learning goals for which there has been successful use of data in educational contexts, split by respondents' professional roles.

Curriculum developers most commonly selected *Meeting science standards*, followed by *Personal exploration and learning.* Data representatives most often chose *Personal exploration and learning*, followed by *Interpreting satellite imagery* and *Understanding weather*. Educators selected all eight goals nearly equally, with a slight preference for *Understanding the scientific method*, followed by *Meeting science standards*, *Interpreting satellite imagery*, and *Understanding weather*. Scientific researchers selected *Understanding the scientific method* the most often. Software tool specialists overwhelmingly selected *Personal exploration and learning.*

Question 3 asked what types of data respondents had used successfully; they could pick more than one category. The results are displayed in Figure 4.

Satellite imagery data types were the most commonly selected among the data type categories, followed by weather/climate observations and topography.

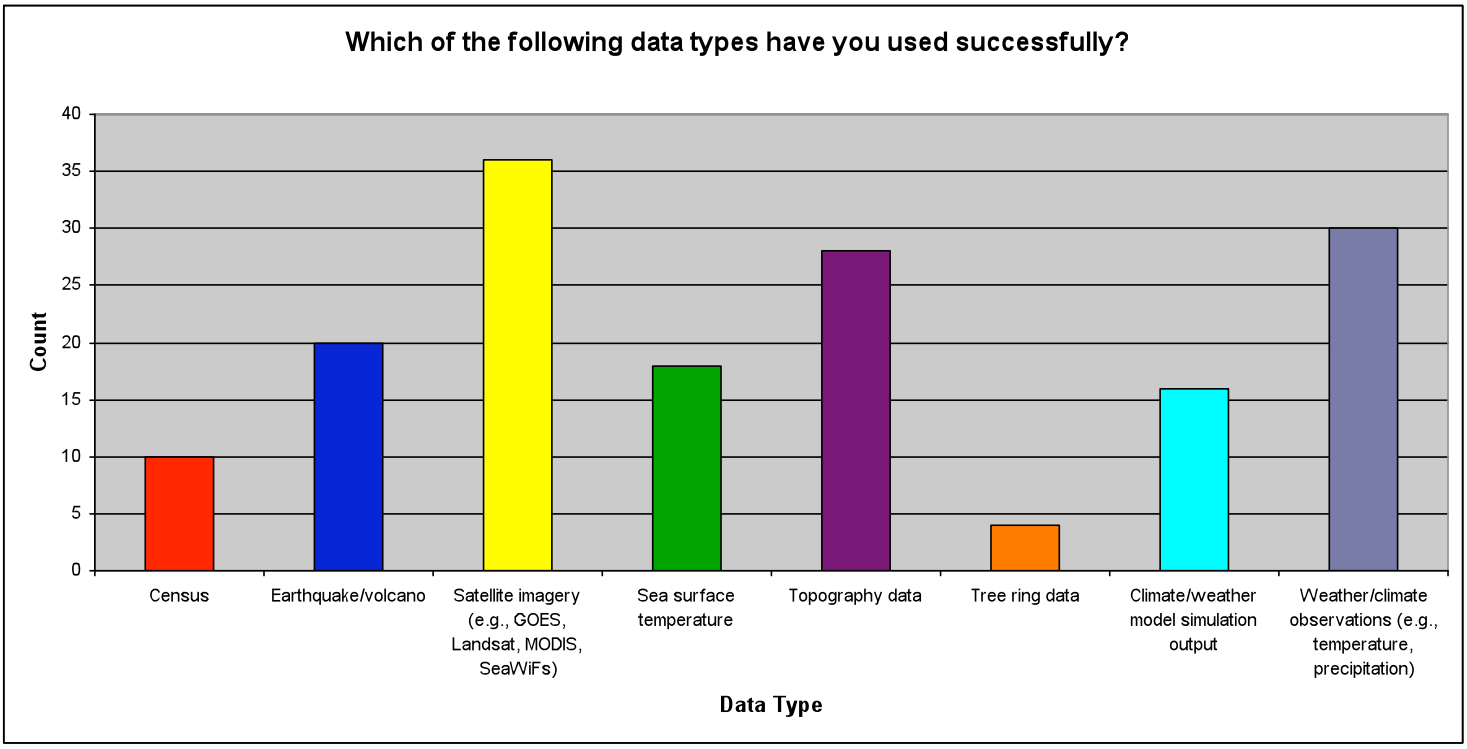

Figure 4. Specific data types which have been used successfully by respondents.

Satellite imagery was mentioned 36 times; *Weather/climate observations*, 30 times; and *Topography data*, 28 times.

Other data types mentioned by respondents included astronomy and space science (6), water resource data (2), and the following:

- *Gravity, Magnetics, Sound Velocity, ocean profiles, gridded/ASCII/binary data files, marine Geophysics data*
- *GIS / GPS*
- *Glacier mass balance monitoring data*
- *Air photos*
- *Chemical degradation*
- *Genetic data- e.g., Genbank, Protein database, x-ray crystallography*
- *E-Commerce Related*
- *Crustal strain; crustal motion (tectonic); model data, e.g., geoid of Earth, Moon, Mars*

Figure 5 shows the usage reported by each role for each type of data.

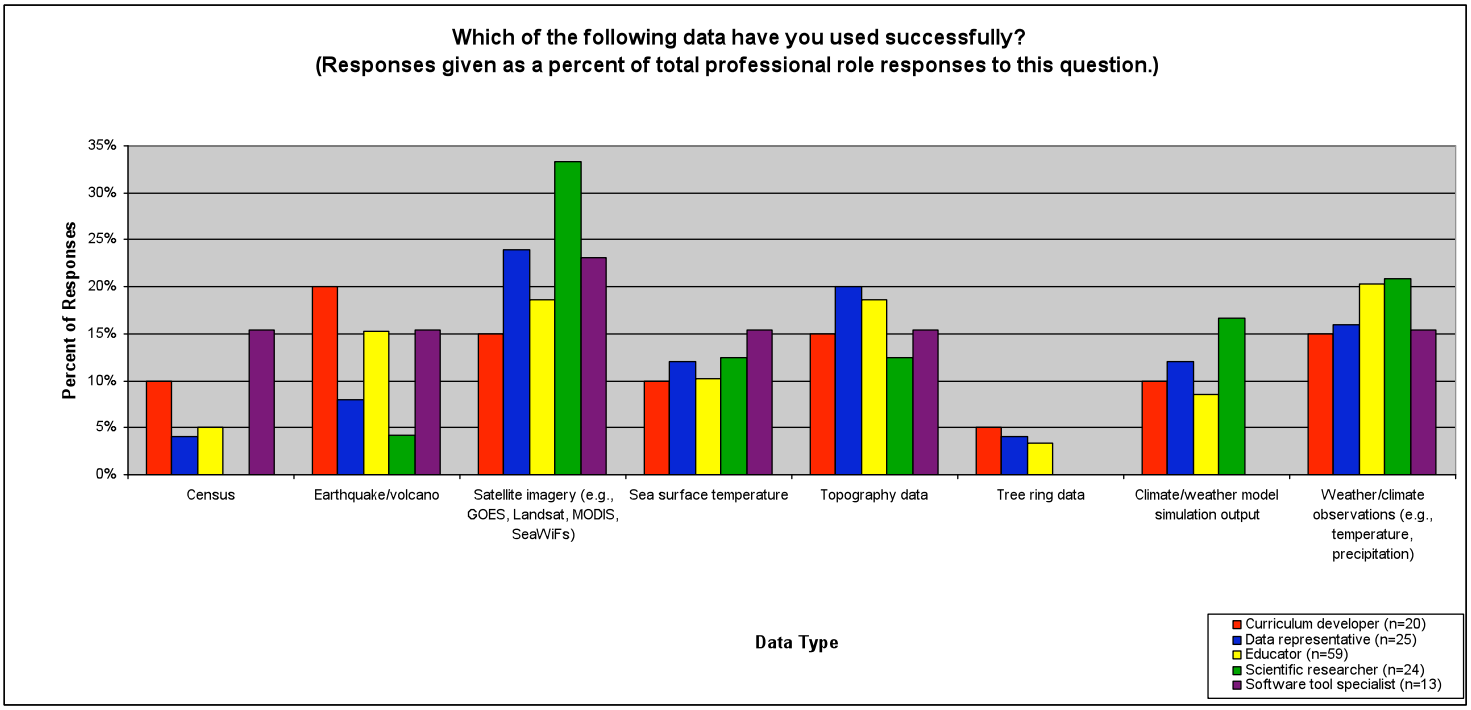

Figure 5. Specific data which have been used successfully, split by respondents' professional roles.

Curriculum developers selected *Earthquake/Volcano* data most often. Data representatives, scientific researchers, and software tool specialists selected *Satellite Imagery* most frequently. Educators picked *Weather/climate observations* most often.

Question 4 asked participants what data formats they had used successfully; they could select as many as they wanted to. Figure 6 shows the responses.

Image and Text/ASCII were the most commonly selected data formats.

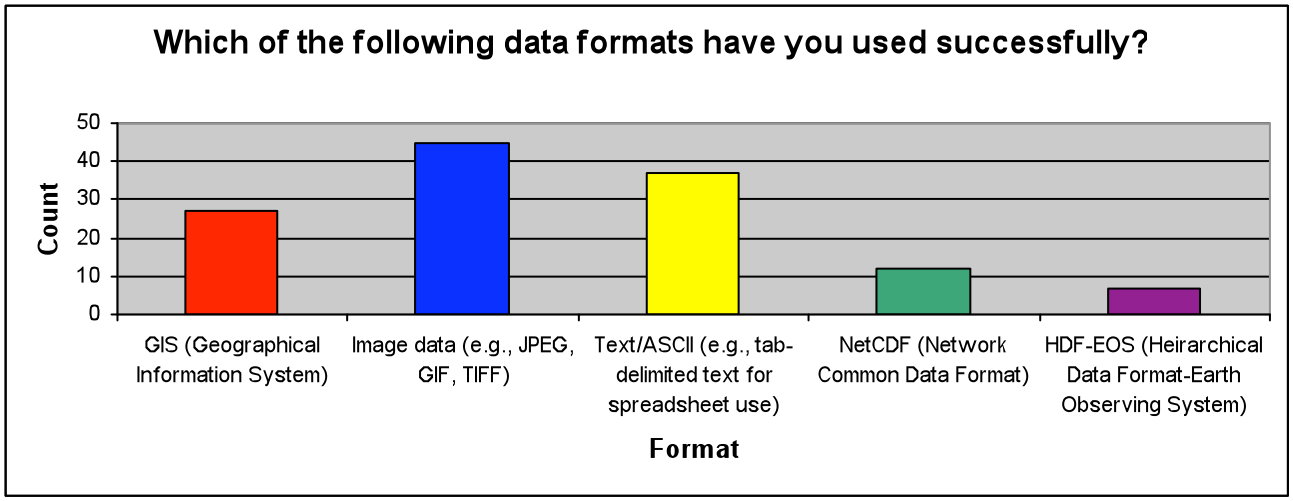

Figure 6. Data formats successfully used.

Image data and Text/ASCII data were the most commonly listed formats. Other formats listed by respondents included the following:

- *DXF*
- *Range of binary and ascii tabular and gridded data.*
- *DEMs; Digital Elevation Model*
- *GEOTIFF*
- *FITS*
- *MCIDAS, other image formats*

Question 5 asked participants what data sources they had used more than once; they could select as many as they wanted to. Figure 7 shows the responses.

NASA, USGS, and NOAA data were the most commonly selected data sources.

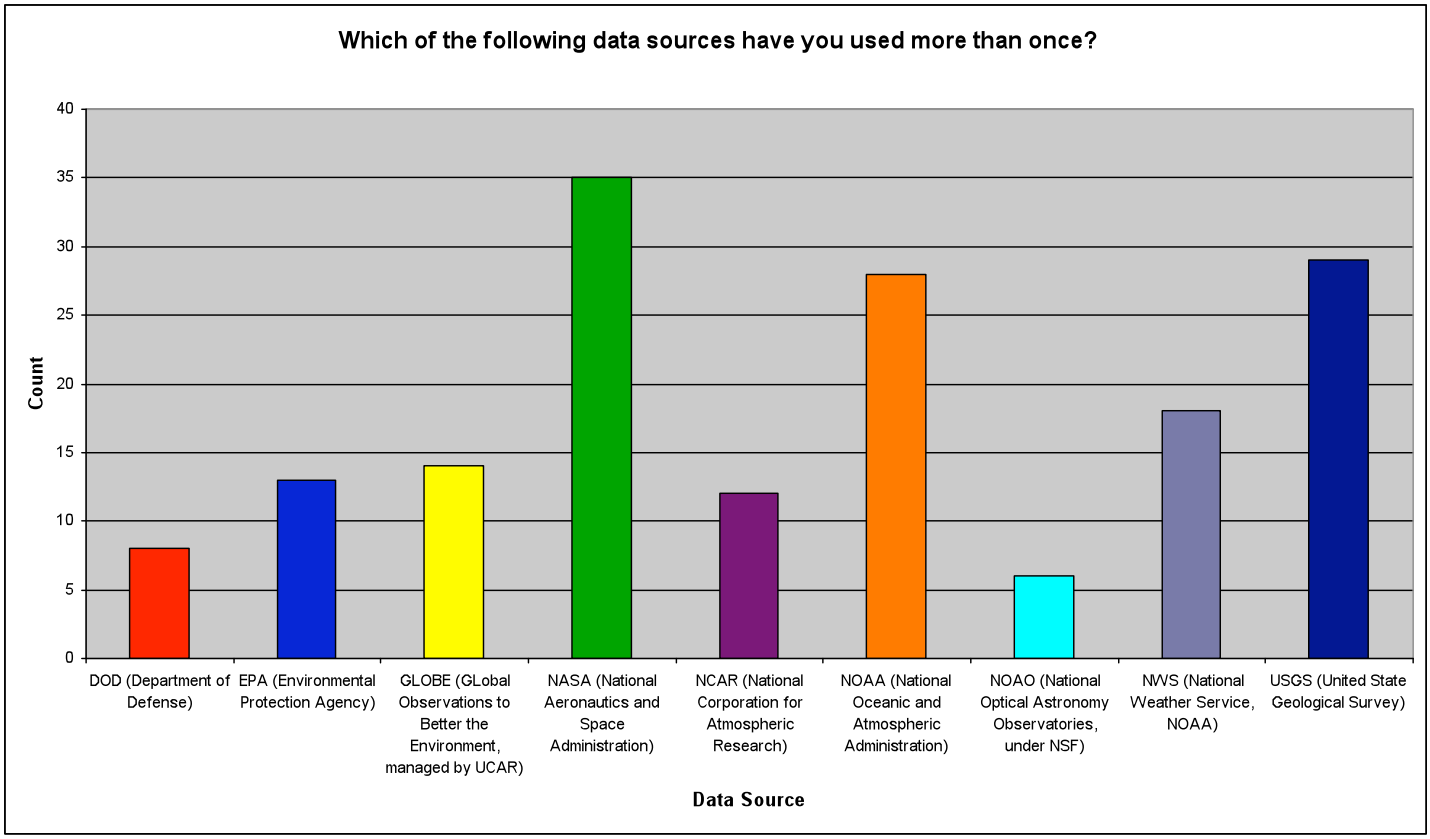

Figure 7. Data sources used more than once.

NASA, USGS, and *NOAA* were the most frequently mentioned sources of data (35, 29, and 28 times, respectively). *NWS*, which is a subset of *NOAA*, was also selected 18 times. Other sources listed were:

- *Earthscope Delorme ArcGIS HIDROSIG*
- *GEBCO underway marine geophysical data*
- *Alaska DNR: Dept.of Natural Resources*
- *NITT NCDB*
- *NPS*
- *ADDE*
- *Skyserver, 2Mass, Hands on Universe, ULA FIRST*
- *Alaska SAR facility, Alaska Dept. of Geophysical & Geological Survey*
- *US Navy*

Figure 8 shows the data source data disaggregated by role.

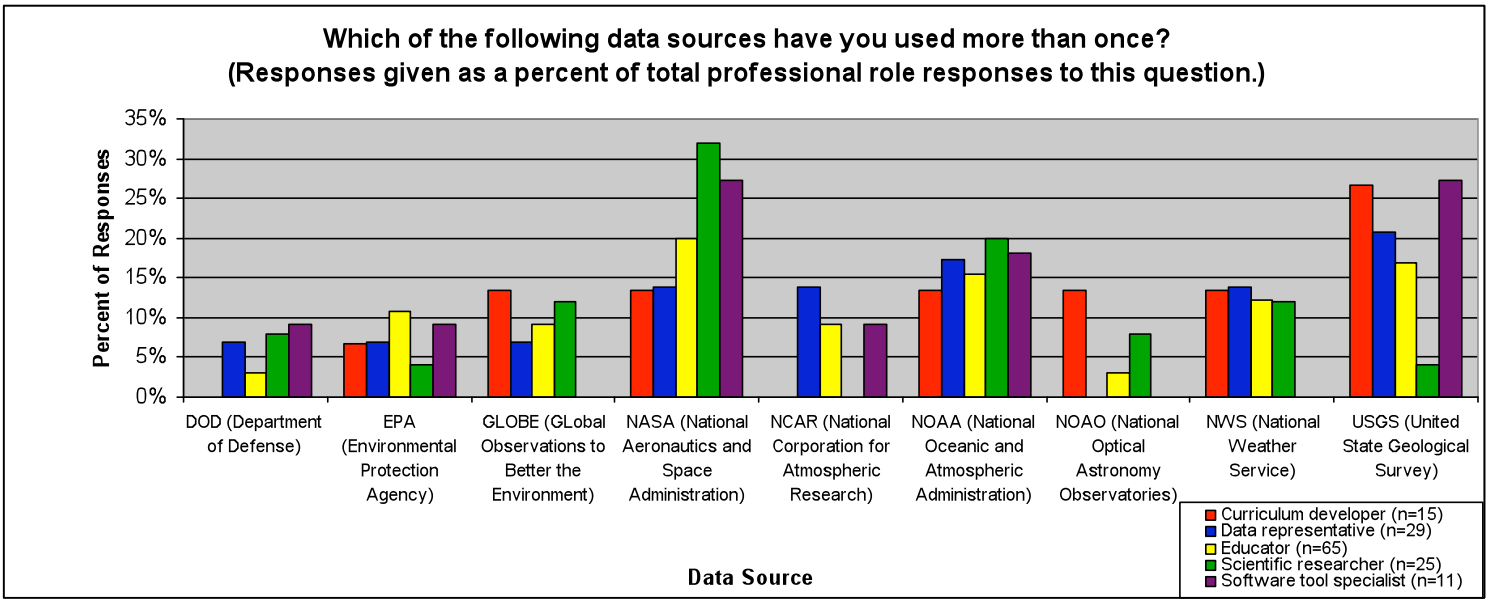

Figure 8. Data sources used more than once, split by respondents' professional roles.

Curriculum developers, data representatives, and software tool specialists most commonly listed *USGS*; in addition, software tool specialists, educators, and science researchers listed *NASA* data as most often used.

Question 6 asked participants if they had found it necessary to modify data sets before they were used by an end-user or learner.

All 39 respondents that they had to modify data sets before providing them to the end-user. Reducing the file size was mentioned frequently, as was the use of Excel in the process.

Thirteen respondents mentioned specific data formats they had started with and had had to either reformat or manipulate the files before use. Seven specifically mentioned that they needed to reduce the size of the data file.

Data formats mentioned included binary, ASCII (txt), HDF, DBF, ARCINFO, CDF, jpg, and DEM. Software used included Photoshop, ArcView, MatLab, IDV, and Excel.

Excel was mentioned by sixteen respondents as being the software they use to reformat the data they use; in addition, four reported taking subsets of the data, and five mentioned changing the units in a dataset before use. An additional five respondents said they had done all three of these things (used Excel, subsetted the data, and changed the units); these were the three examples given in the question itself, however. It is possible that if other examples of data modifications had been suggested, different results might have been obtained.

Question 7 asked what data analysis procedures have end-users or learners performed on data. Figures 9 and 10 provide a summary of the responses.

End-users were most likely expected to use graphing, basic math, and visualization/imaging procedures on data.

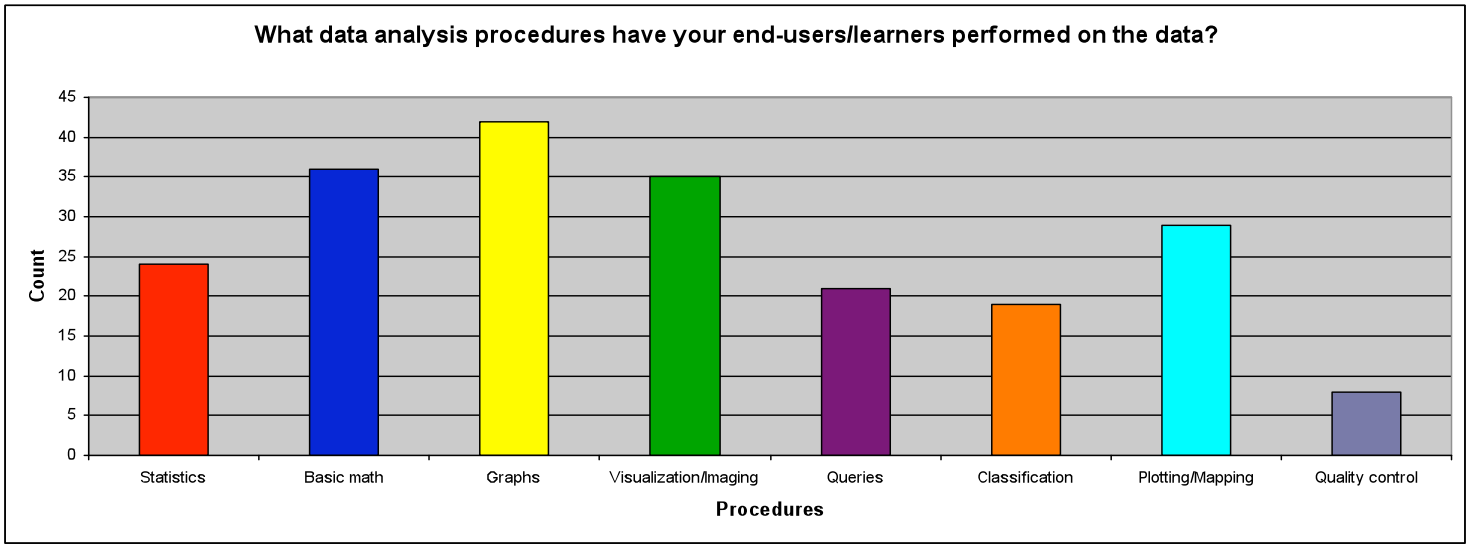

Figure 9. Data analysis procedures performed by end-users or learners.

One respondent noted his students do error analysis on the data. Another listed "feature identification and sizing within imagery."

Figure 10 shows the data disaggregated by role.

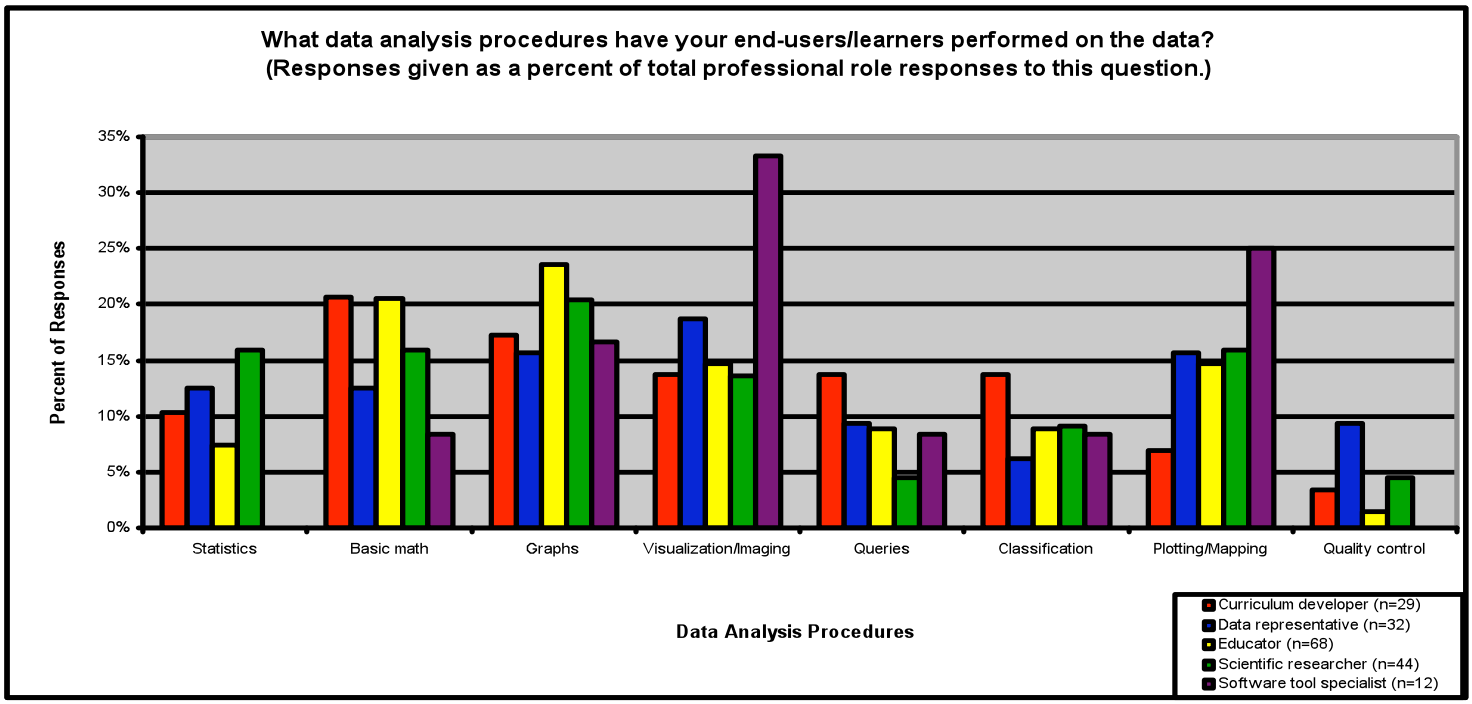

Figure 10. Data analysis procedures performed by end-users or learners, split by respondents' professional role.

Curriculum developers most often chose *Basic math* as the analysis end-users performed on the data; data representatives and software tool specialists both selected *Visualization/imaging* as the most common analyses. Educators and scientific researchers both selected *Graphs*.

Question 8 asked participants if they had made any attempts to obtain and use data sets that were NOT successful and, if so, what barriers they encountered (ranked 1, 2, or 3 in order of priority).

All respondents had been unsuccessful using a data set in the past. Discoverability, dataset size, lack of access to required software, and unusable file format or extension were the most commonly cited barriers to use.

The second half of the question asked participants to specify barriers they had encountered in their unsuccessful data use experiences, ranking them into priority 1, 2, and 3. Figures 11-14 display the barriers that were encountered.

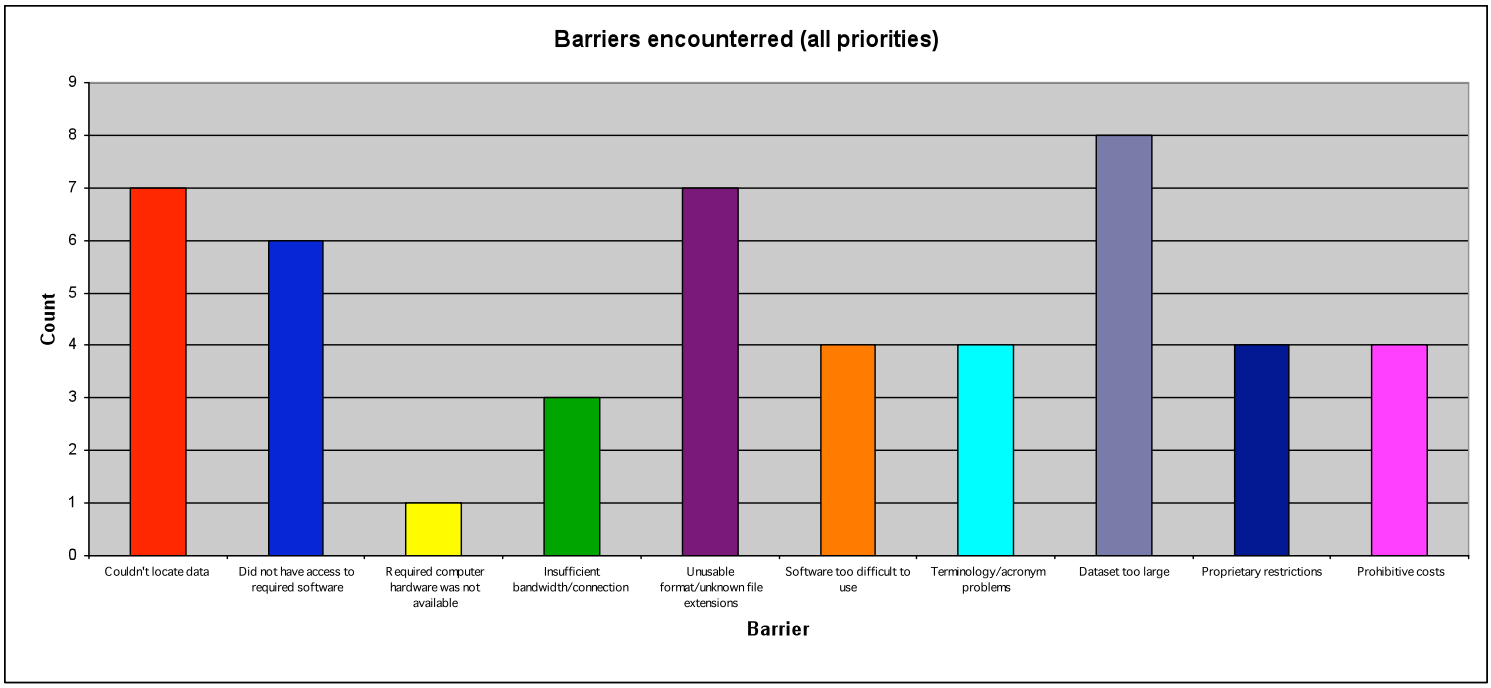

Figure 11. Barriers encountered when participants were unsuccessful in accessing data sets.

Overall, *Dataset too large* was the most commonly mentioned barrier of any priority. Discoverability (*Couldn't locate data*) and *Unusable file format/unknown file extension* were also commonly selected.

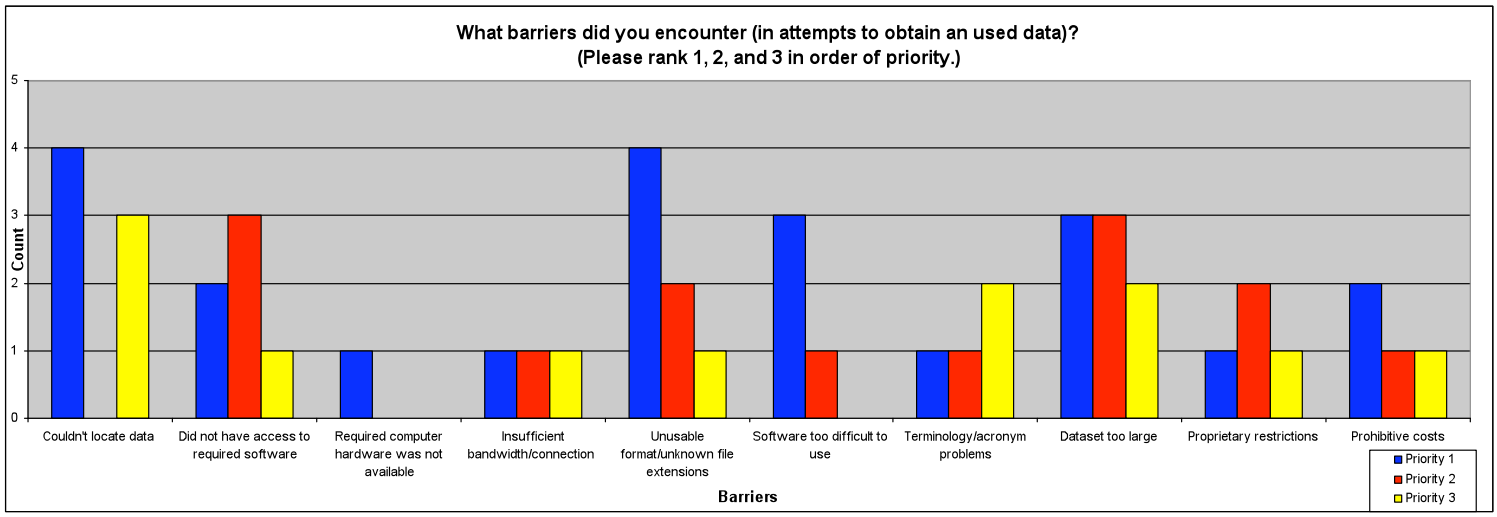

Figure 12. Barriers encountered when participants were unsuccessful in accessing data sets, ranked by priority.

Couldn't locate data and *Unusable file format/unknown file extension* were the most commonly selected top priority barriers listed by respondents. Other barriers listed by participants included the following:

- *Incomplete data set for the data range that I had selected.*
- *The analysis became too complex for High School Students to understand.*
- *The **New to data** for the data was missing.*
- *Broken internet links for data sets is a common occurrence!*
- *Poor documentation*
- *this always applies --> just ran out of time to deal with all the problems*
- *difficult formats / projections HDF and polar projections*
- *didn't want to give e-mail address for data to be mailed to me*

Many respondents did not use the "1, 2, 3" prioritization requested. Instead, they marked each barrier they had encountered. Figures 13 and 14 show **all** barriers that were marked in any way by respondents. This analysis brought *Did not have access to the required software* and *Software too difficult to use* selections to among the most commonly selected, along with the discoverability, file format, and size barriers.

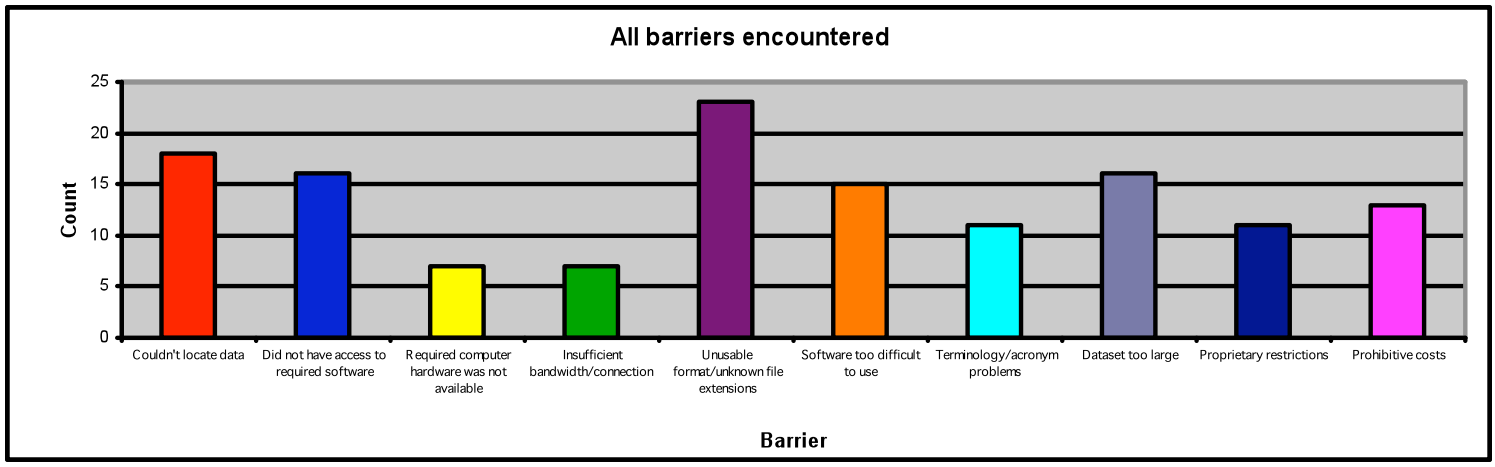

Figure 13. All barriers encountered by respondents, aggregated.

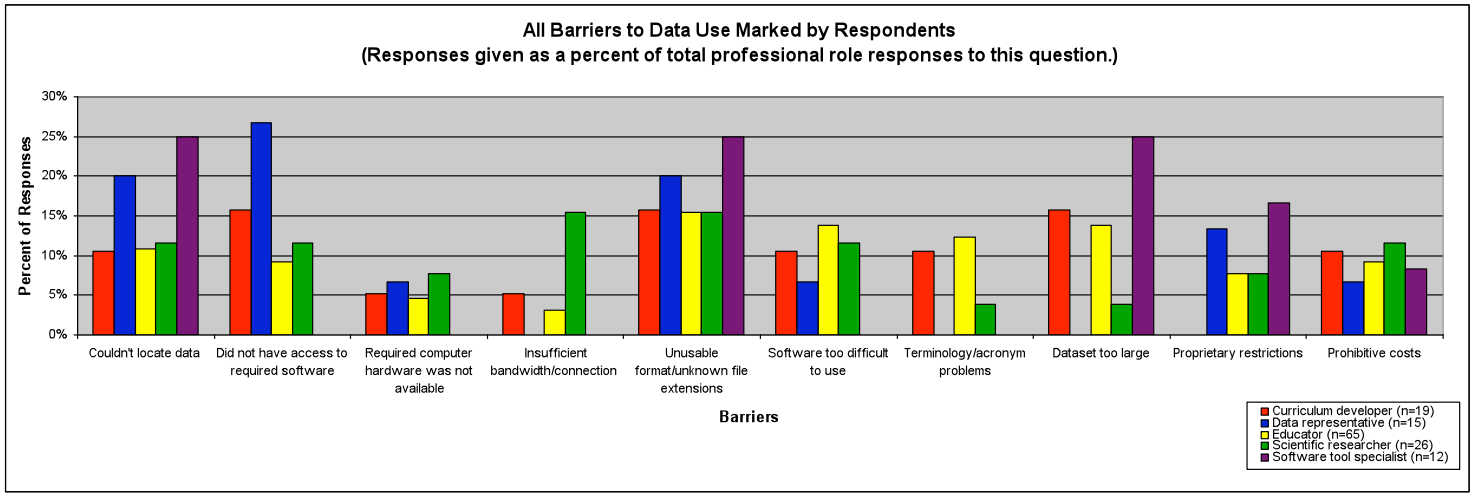

Figure 14. All barriers selected by respondents regarding when they were unsuccessful in accessing data sets, disaggregated by role.

Curriculum developers selected *Did not have access to required software*, *Unusable format/unknown file extension*, and D*ataset too large* equally as their top response. Data representatives selected *Did not have access to required software* the most frequently. Educators most often selected *Unusable format/unknown file extension.* Scientific researchers selected *Insufficient bandwidth/connection* the most often, closely followed by *Unusable format/unknown file extension.* Software tool specialists selected three responses equally: *Couldn't locate data*, *Unusable format/unknown file extension,* and *Dataset too large.*

Question 9 asked participants what types of instruction or support are most helpful to them when using specific data sets. Figure 15 displays the responses.

Overall, examples were the most popular method of instruction selected, followed by step-by-step instructions, online tutorials, and one-on-one email assistance. The similar categories of reference material and FAQ were also selected frequently. **These results were essentially identical to the previous year.**

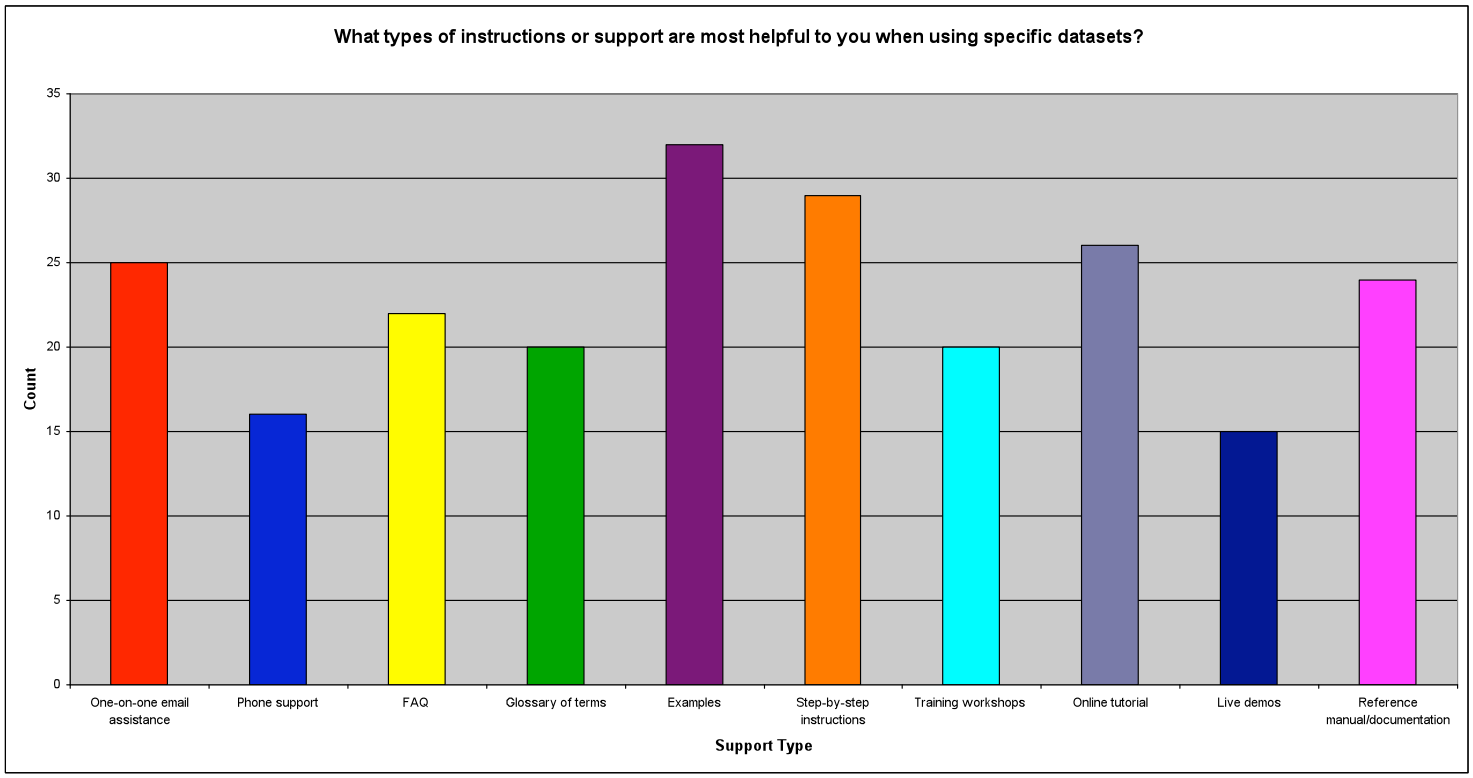

Figure 15. The most helpful types of instruction or support when participants use data sets.

Other types of instruction or support listed by respondents were the following:

- *Workshops*
- *A central place to first find specific data sets then we need all of the above*
- *Coursework- longer time frame than workshops*
- *Modelation. Step by step with the student in his/her Computer Station*
- *Aside from help from the data provider (like above checked items), knowing a science expert familiar with the science behind the data or science extracted from the data*

Figure 16 displays the results split by role.

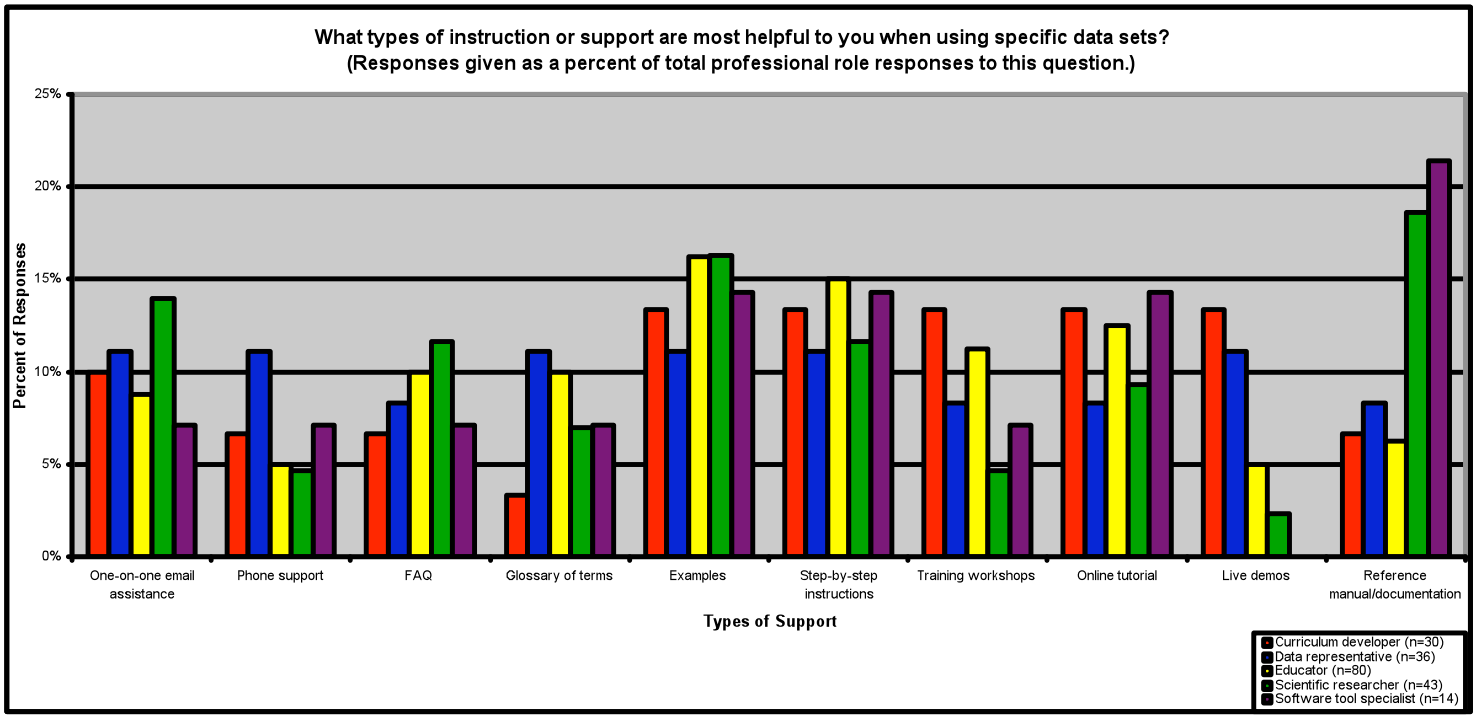

Figure 16. The most helpful types of instruction or support for data use, split by respondents' professional role.

Curriculum developers cited five types of support equally: *Examples, Step-by-step instructions, Training workshops, Online tutorial,* and *Live demos.* Data Representatives were also evenly split; their top selections were *One-on-one email assistance, Phone support, Glossary of terms, Examples, Step-by-step instructions*, and *Live demos.* Educators cited *Examples* the most often, followed by *Step-by-step instructions.* Scientific researchers and Software tool specialists both selected *Reference manual documentation* most frequently.

Daily and Final Surveys

Respondents

Responses to the daily questionnaires and the corresponding questions in the final questionnaire are described together in the first part of this section. Analysis of the remainder of the final questionnaire is at the end of this section.

Monday and Tuesday's daily questionnaires had the most respondents (54 and 52, respectively). There was some drop-off in the response rate on Wednesday (38), probably due to people leaving early and "survey fatigue." There were 48 respondents to the data use questionnaire on the first day and 41 to the final questionnaire on the last day. These two surveys were much longer than the daily questionnaires, and were therefore less likely to be completed (survey fatigue). See Figure 17.

The drop-off seen on the final day was much less pronounced than in previous years. Also, the drop-off was fairly evenly spread among the professional roles.

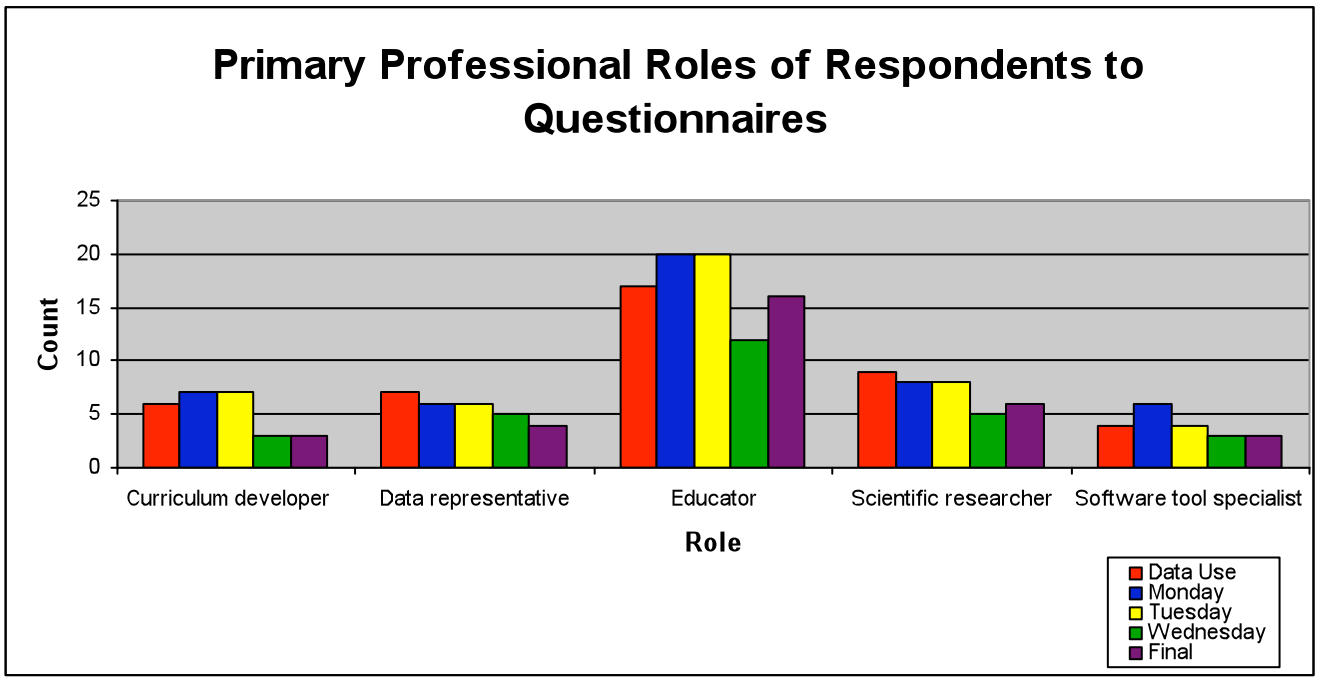

Figure 17. Number of respondents in each professional role to each survey.

As was mentioned earlier, more respondents than expected identified their primary role as Educator. Responses to all other roles were very similar to each other. The responses to the Professional Role question for each survey are included in Figures 18-22.

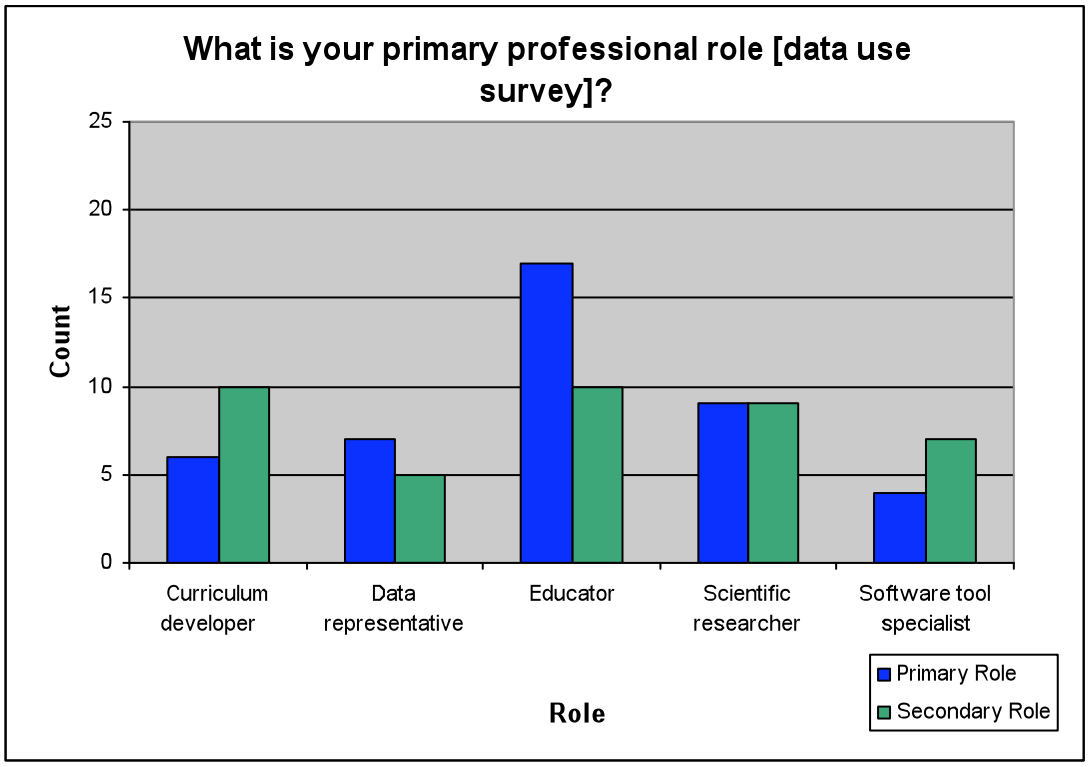

Figure 18. Respondents' primary and secondary roles from data use survey.

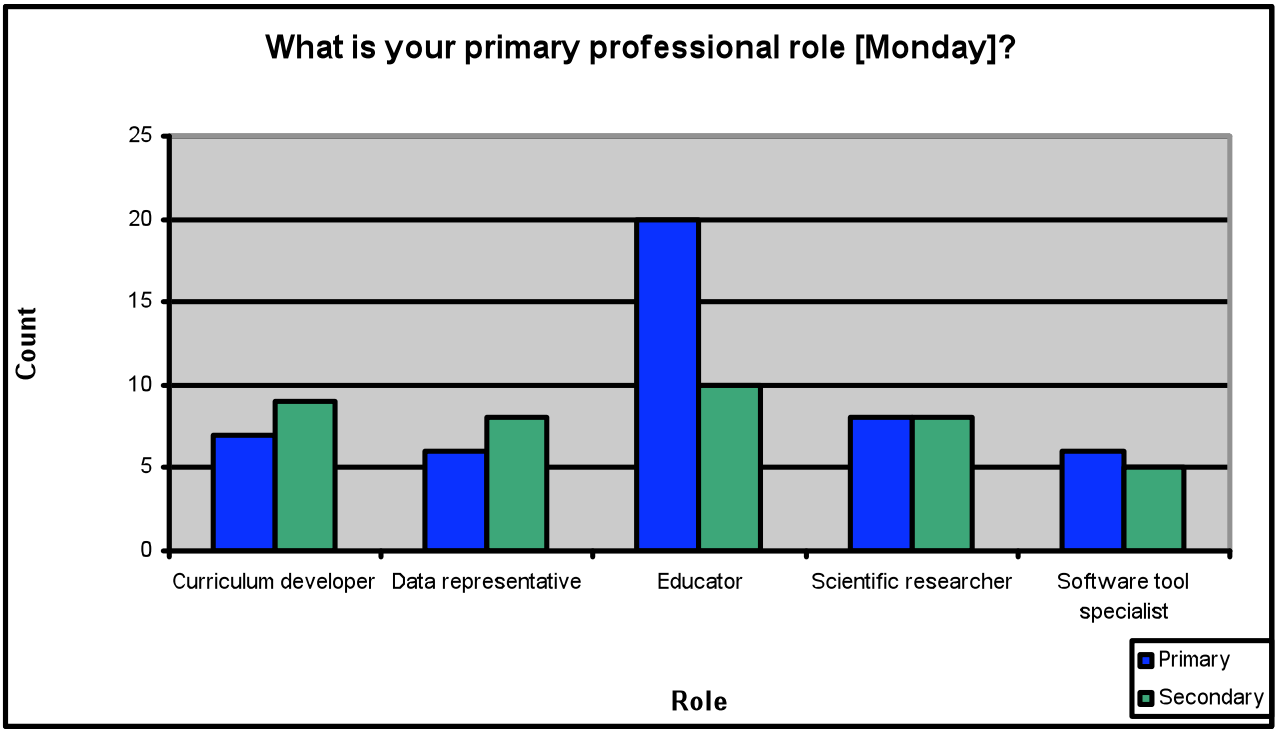

Figure 19. Respondents' primary and secondary roles from Monday survey.

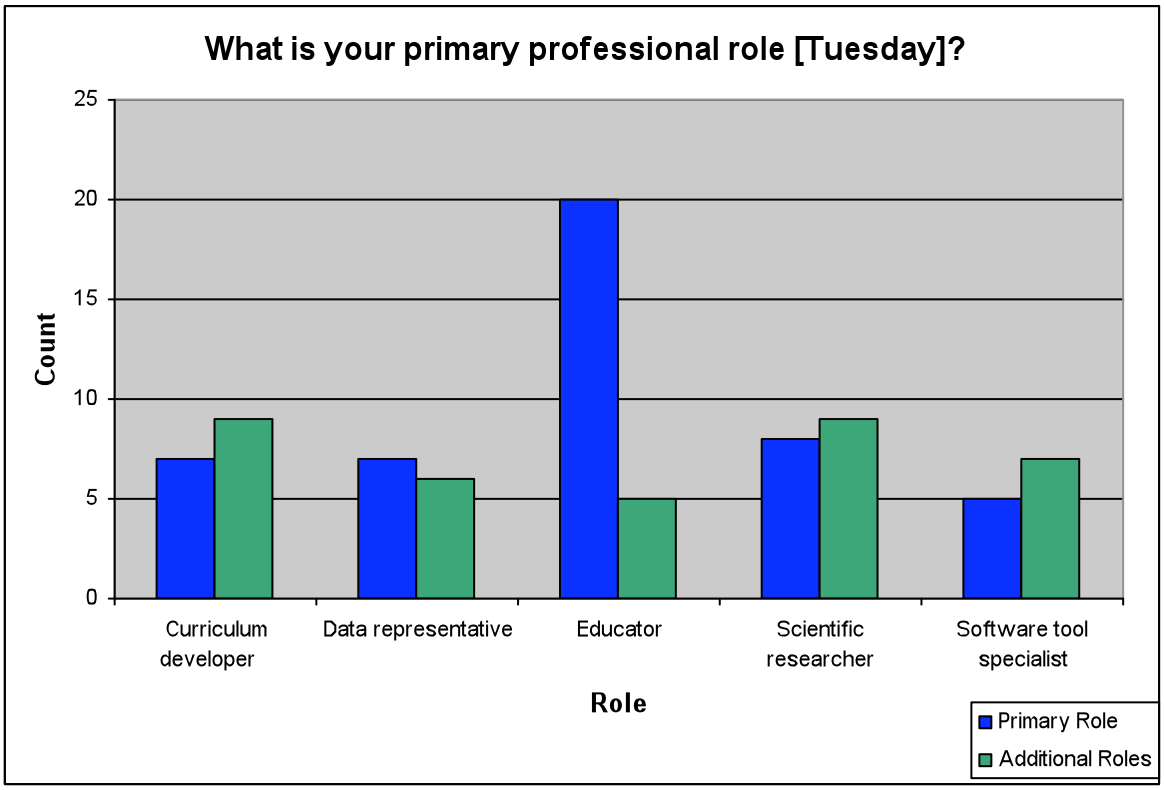

Figure 20. Respondents' primary and secondary roles from Tuesday survey.

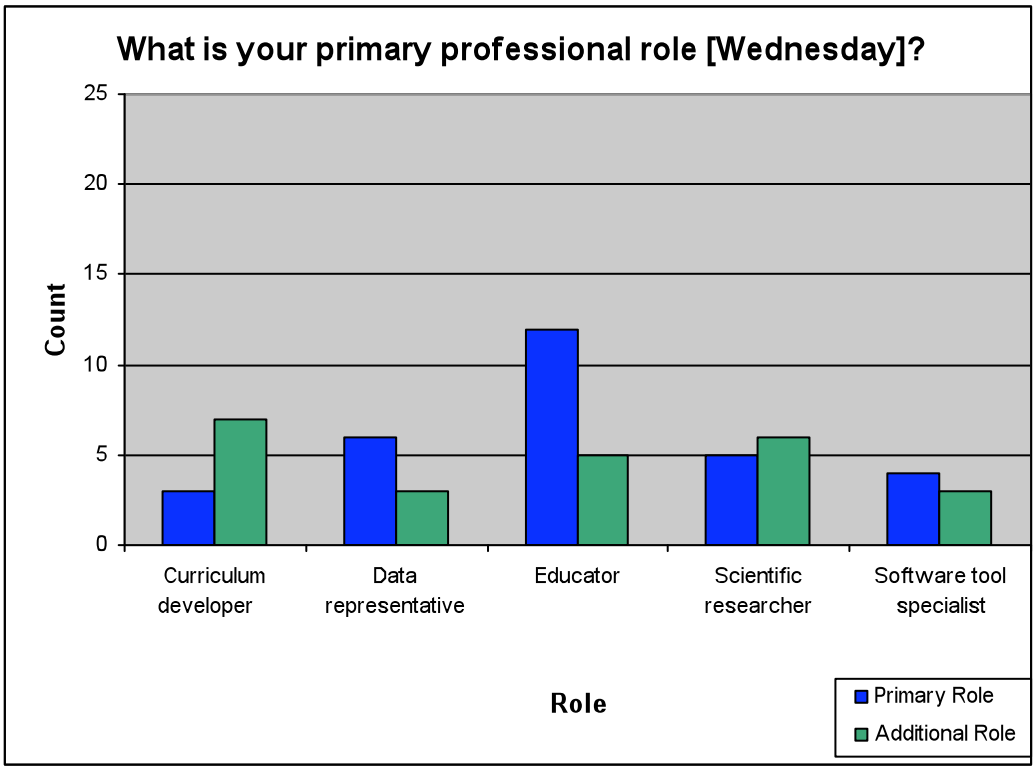

Figure 21. Respondents' primary and secondary roles from Wednesday survey.

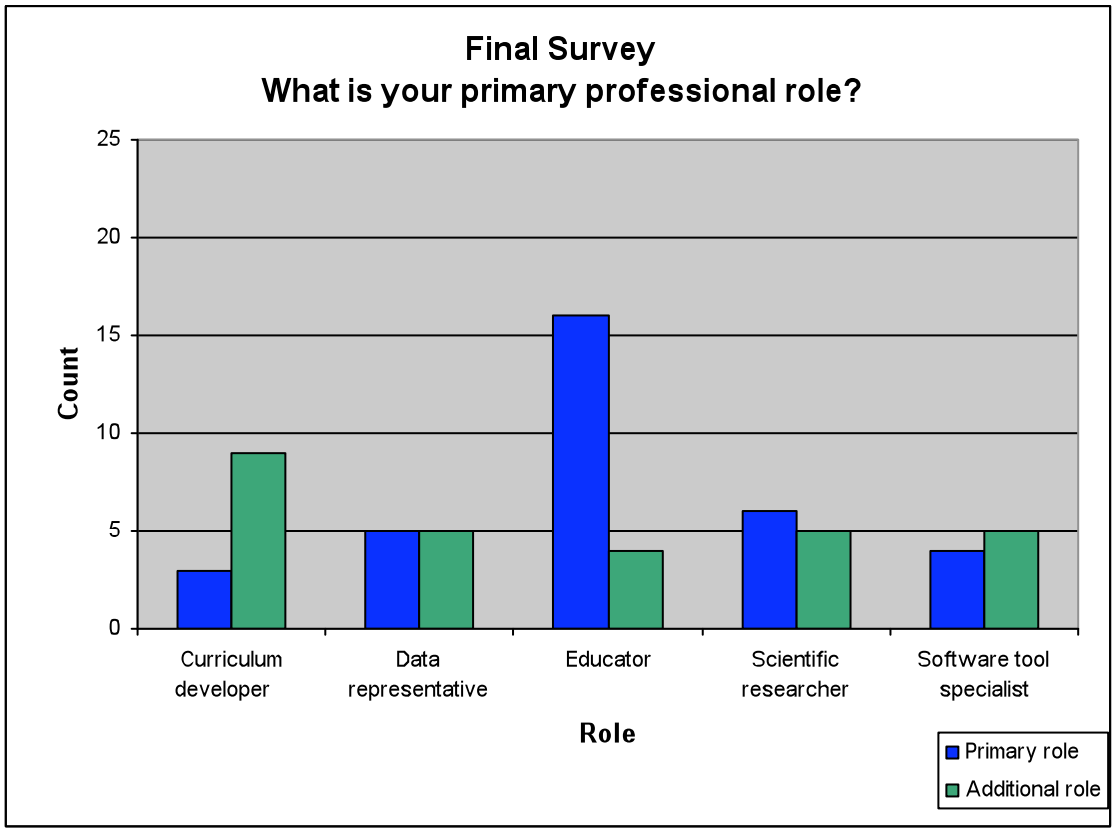

Figure 22. Respondents' primary and secondary roles from final survey.

All work teams were represented by respondents to the final survey except the SAGUARO group (a small, four-member group). Other teams still had at least two members present by the final survey. See Figure 23.

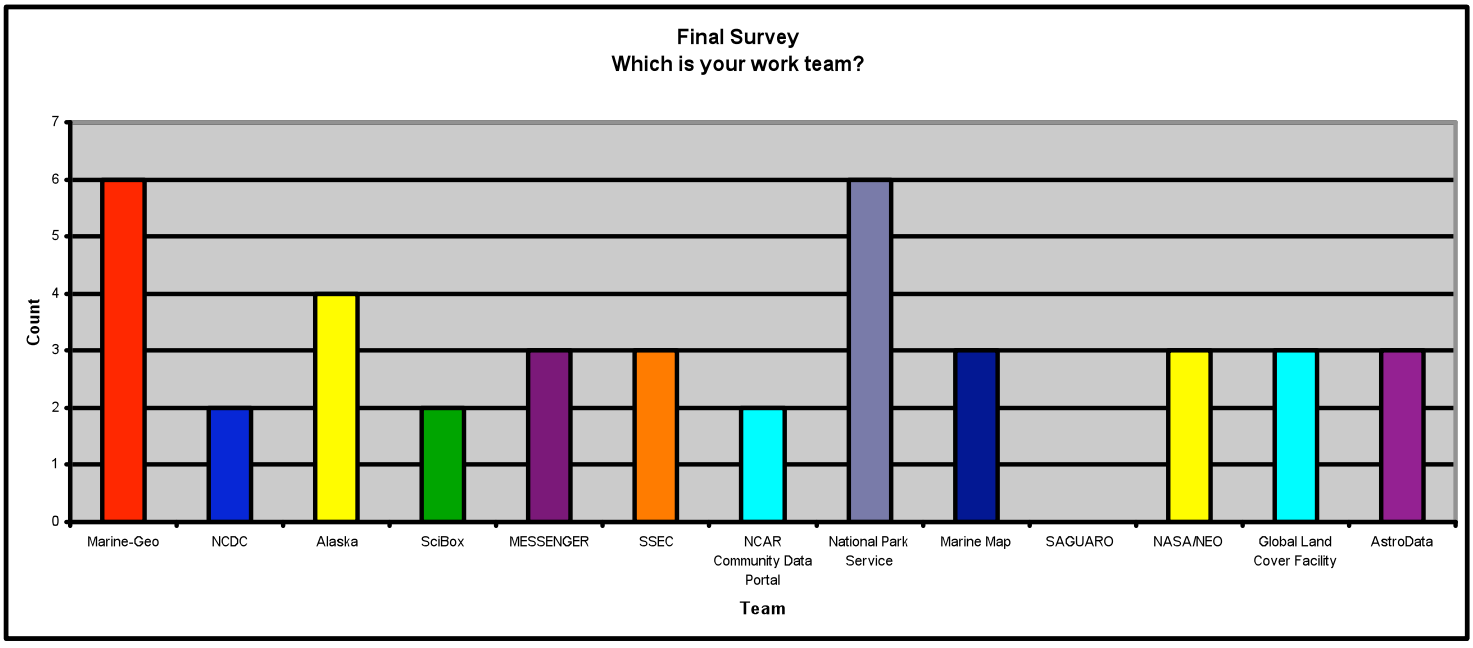

Figure 23 Work teams of respondents.

Most Valuable Aspects of the Workshop

Every day except Monday, the team breakout sessions were considered the most valuable part of the schedule (see Figures 24, 25, and 26). **Monday's keynote talk was the only schedule item ranked more highly than the breakout sessions in the daily surveys. The Tool Time sessions were also highly regarded in both the Monday survey and the final survey.**

The final survey confirmed that, overall, the breakout sessions were the most valuable (see Figure 27). **The second most valuable feature overall was networking with other participants. The Tool Time sessions were also ranked fairly highly in the final survey. This is especially interesting since these sessions were held on the first day of the workshop and this opinion was given on the last day; the Tool Time sessions were remembered three days later by participants as a highlight of the entire workshop.** Disaggregation by role showed these trends to be consistent across the groups, with the exception that curriculum developers did not mention networking as being among the most valuable aspects of the workshop. **As was seen last year, the poster session and final report-outs by teams were not seen as particularly valuable by respondents to the final survey.**

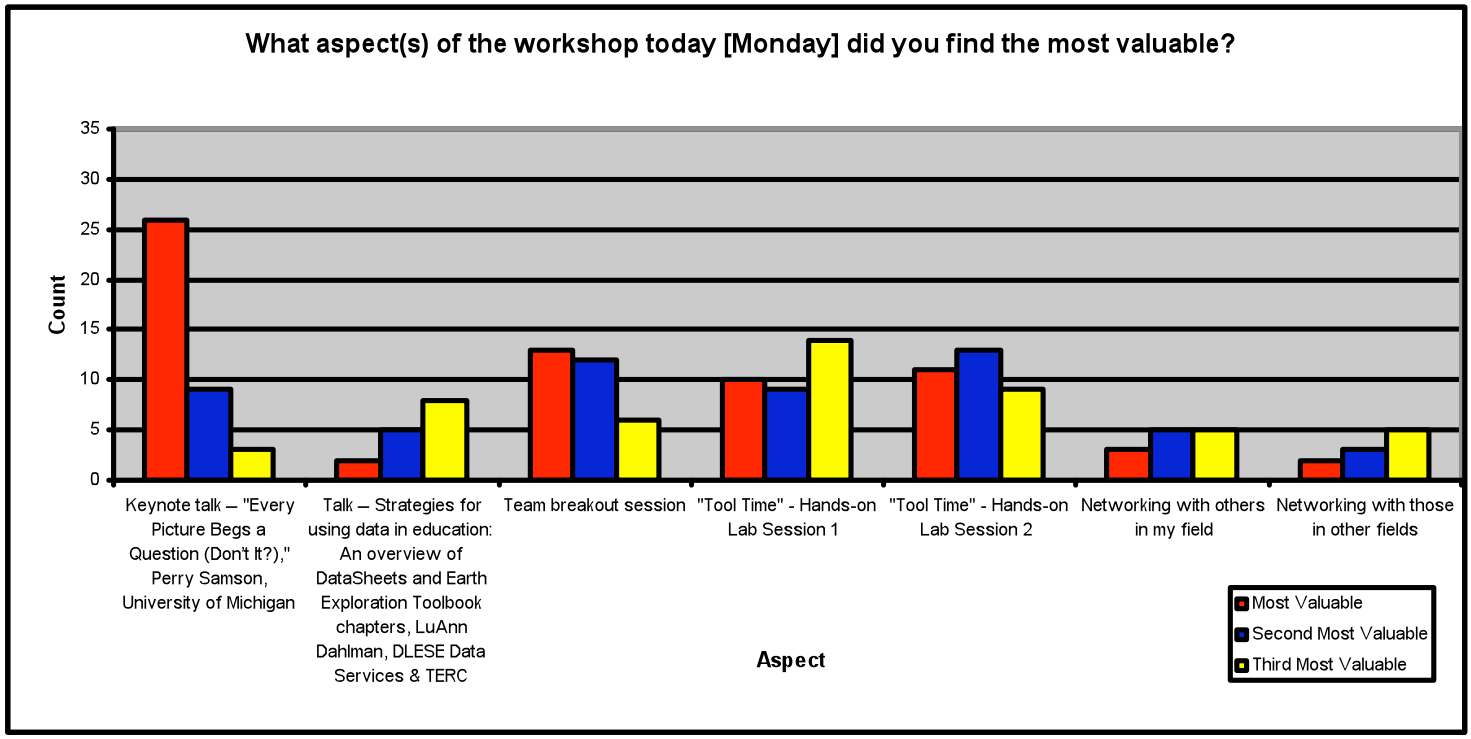

Figure 24. Most valuable aspects of Monday's schedule.

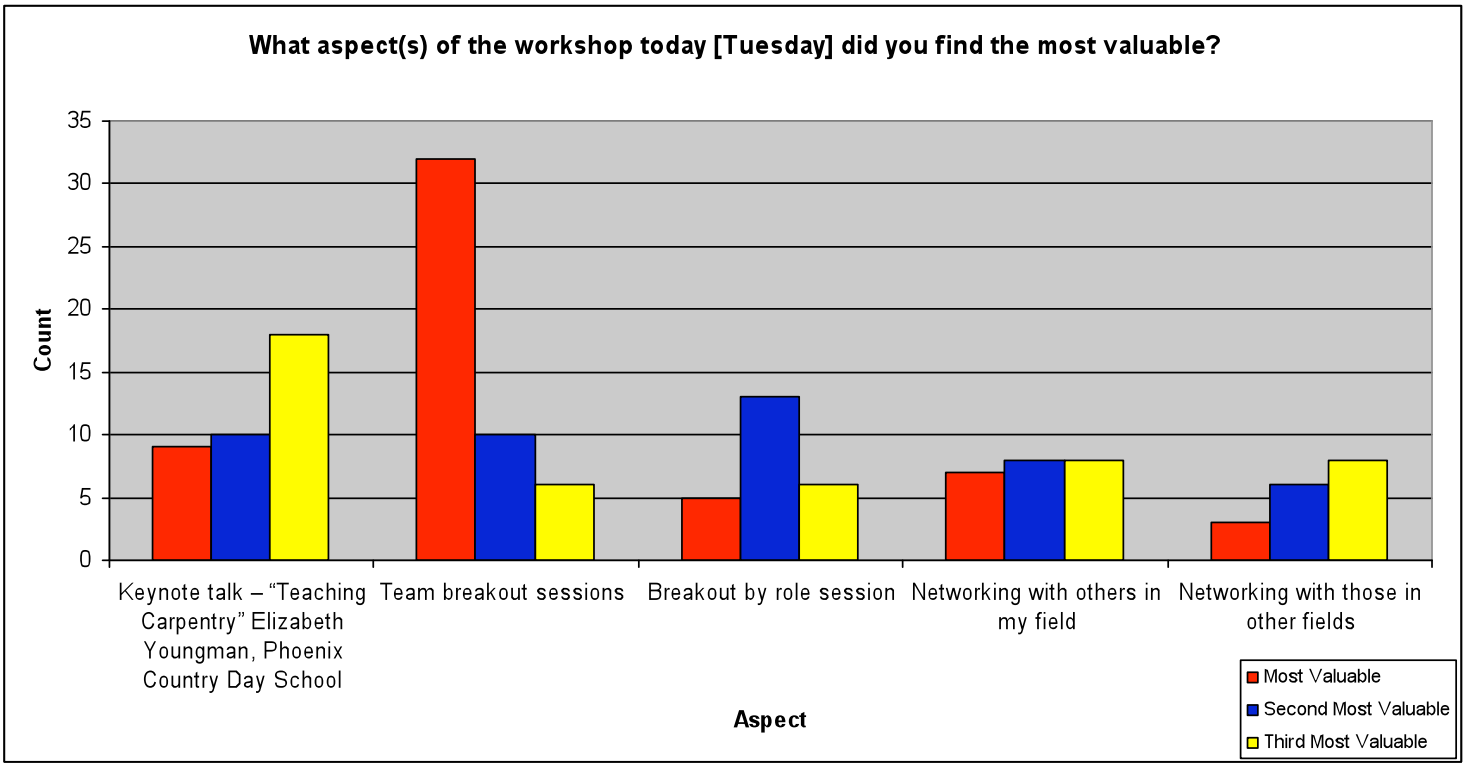

Figure 25. Most valuable aspects of Tuesday's schedule.

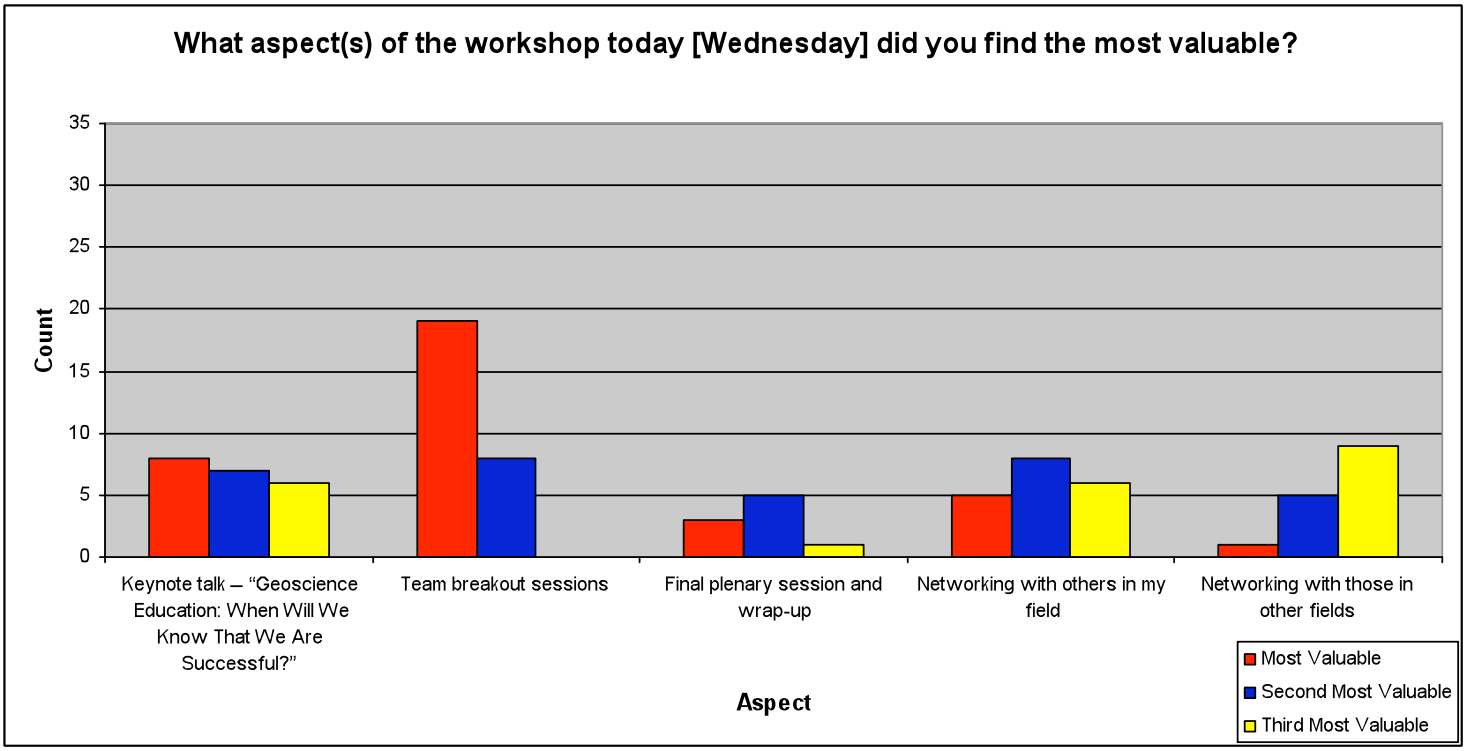

Figure 26. Most valuable aspects of Wednesday's schedule.

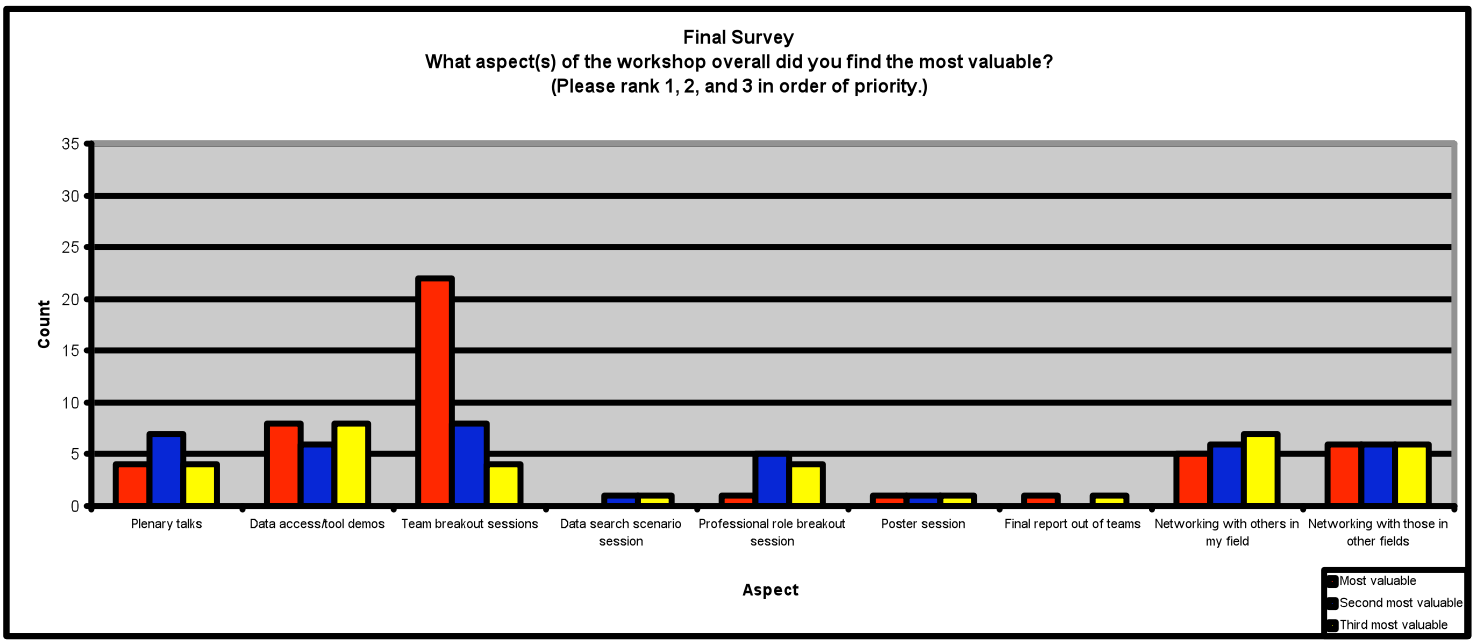

Figure 27. Most valuable aspects of workshop overall.

Balance of the Workshop

Every day and on the final survey, the mix of the workshop was seen as not emphasizing education enough (see Figures 28-35). This is similar to the results from the evaluations of the previous two years, though it appears less pronounced. Although there were still small indicators that too much emphasis was placed on talks, this was also less pronounced than in previous years.

If we look at the results from the previous question, the talk on the first day was quite popular, the second day slightly less so, and the third less again. This may be due to participants being anxious to get to work on their breakout task instead of listening to talks as the workshop gets going. It might also be due to the topics of the talks themselves.

One interesting feature is that, overall, participants thought there was too little emphasis on all aspects of the workshop that were asked about—this may only indicate the workshop was too short to encompass all the areas covered. Participants wanted more of everything (except perhaps talks).

The reaction to the lab session and hands-on learning this year was positive. No respondents thought there was too much emphasis placed on it, and some wanted more. This stands in contrast to last year's surveys that showed too much time had been spent on tool demos; the switch to hands-on labs seems to have been a popular one.

The disaggregated data for the final survey showed general agreement between roles. Data representatives and science researchers were the only ones who indicated there were too many evaluation surveys. This improvement may be due to the fact that one fewer survey was used this year than in years past.

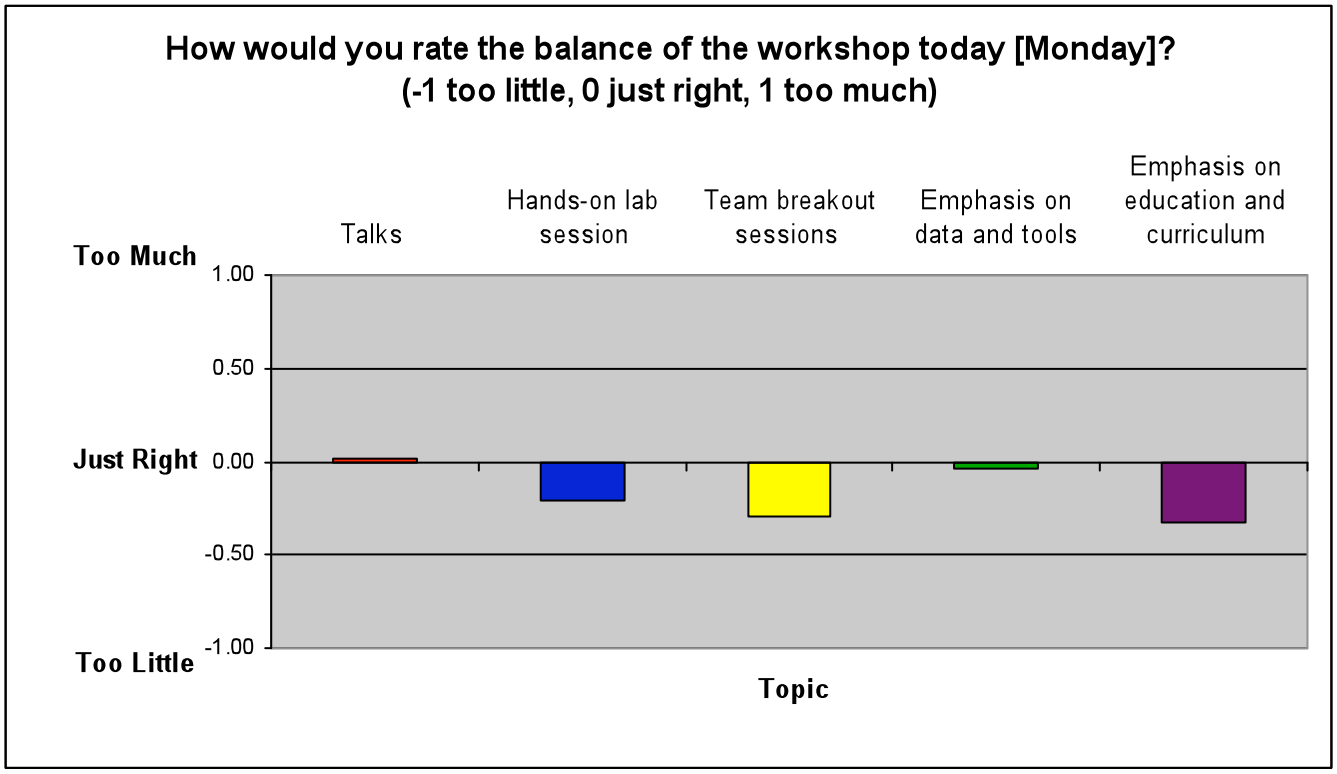

Figure 28. Balance of Monday's session.

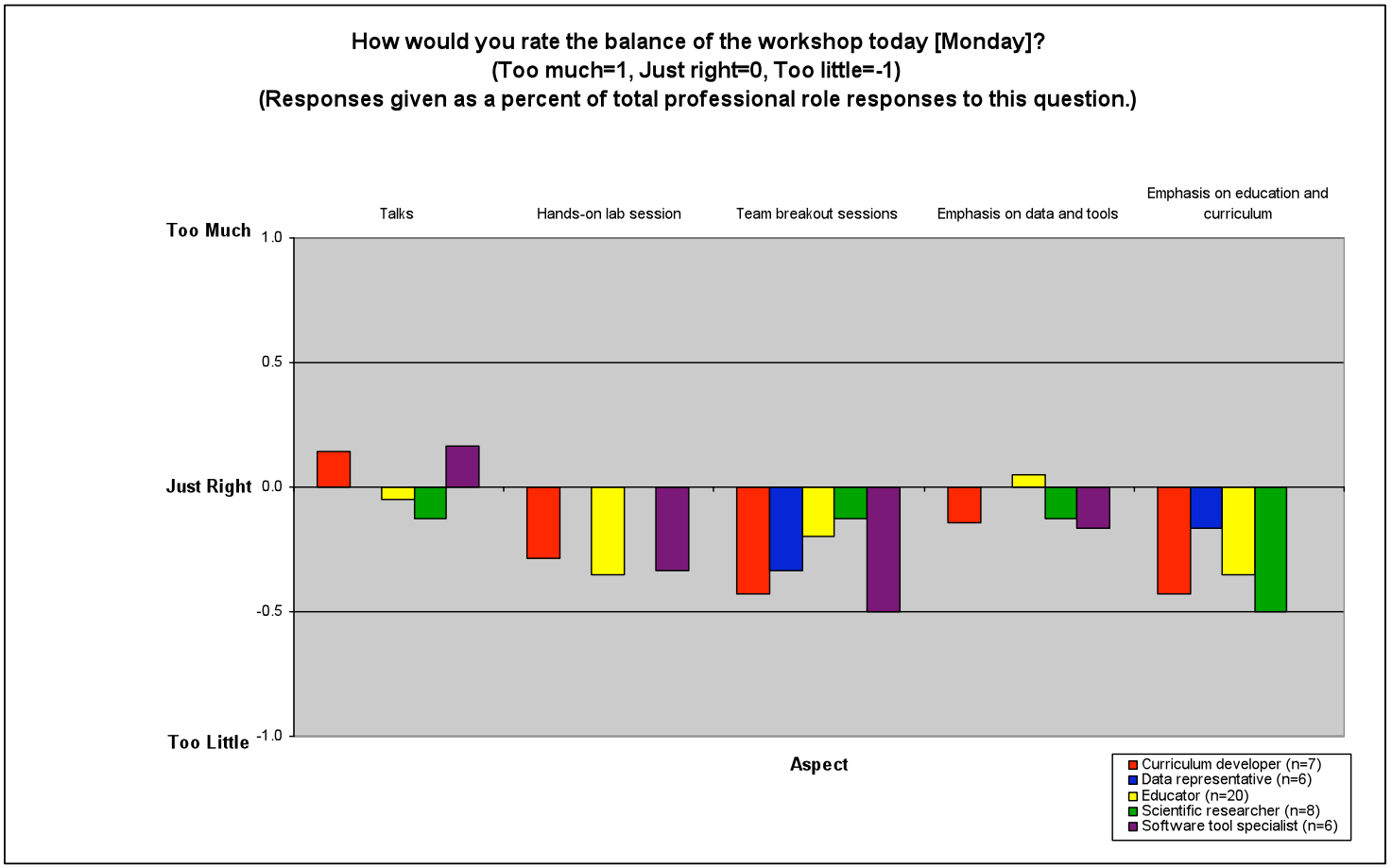

Figure 29. Balance of Monday's session, by role.

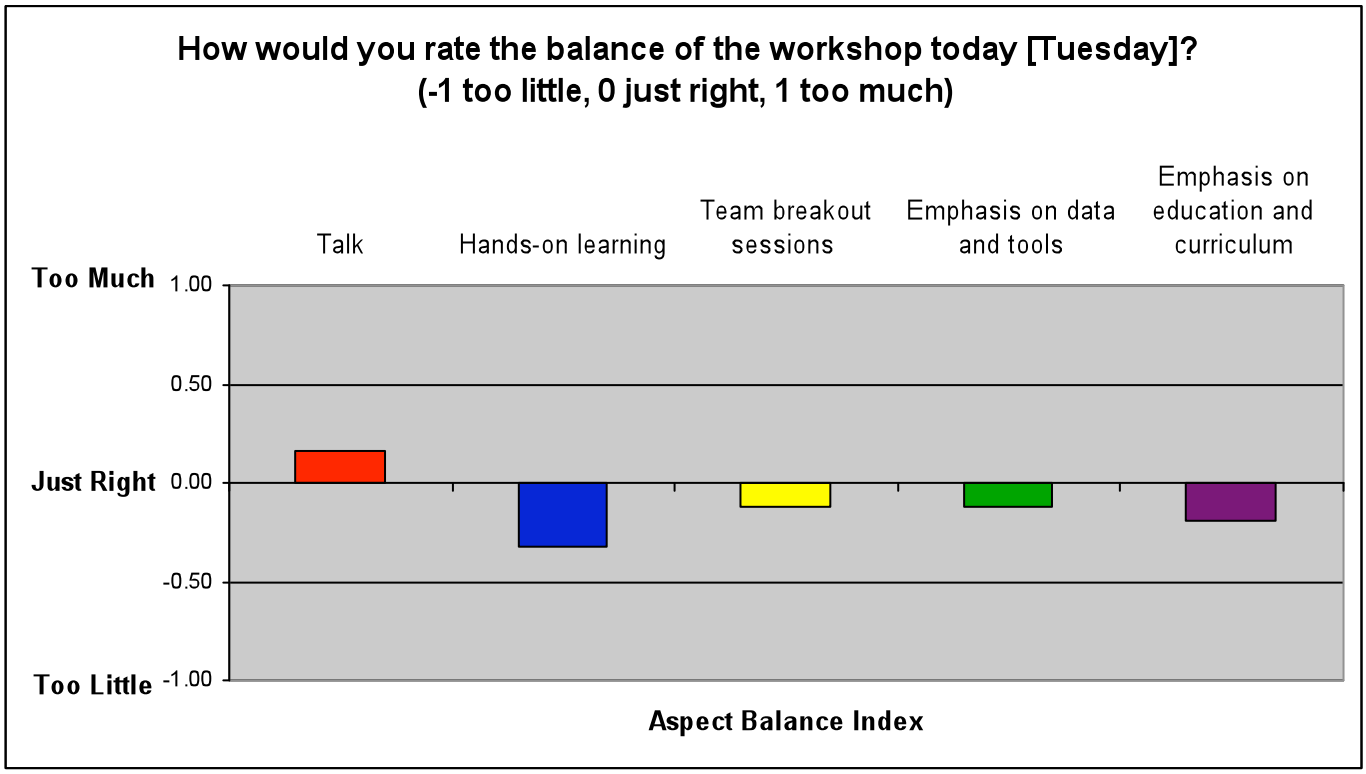

Figure 30. Balance of Tuesday's session.

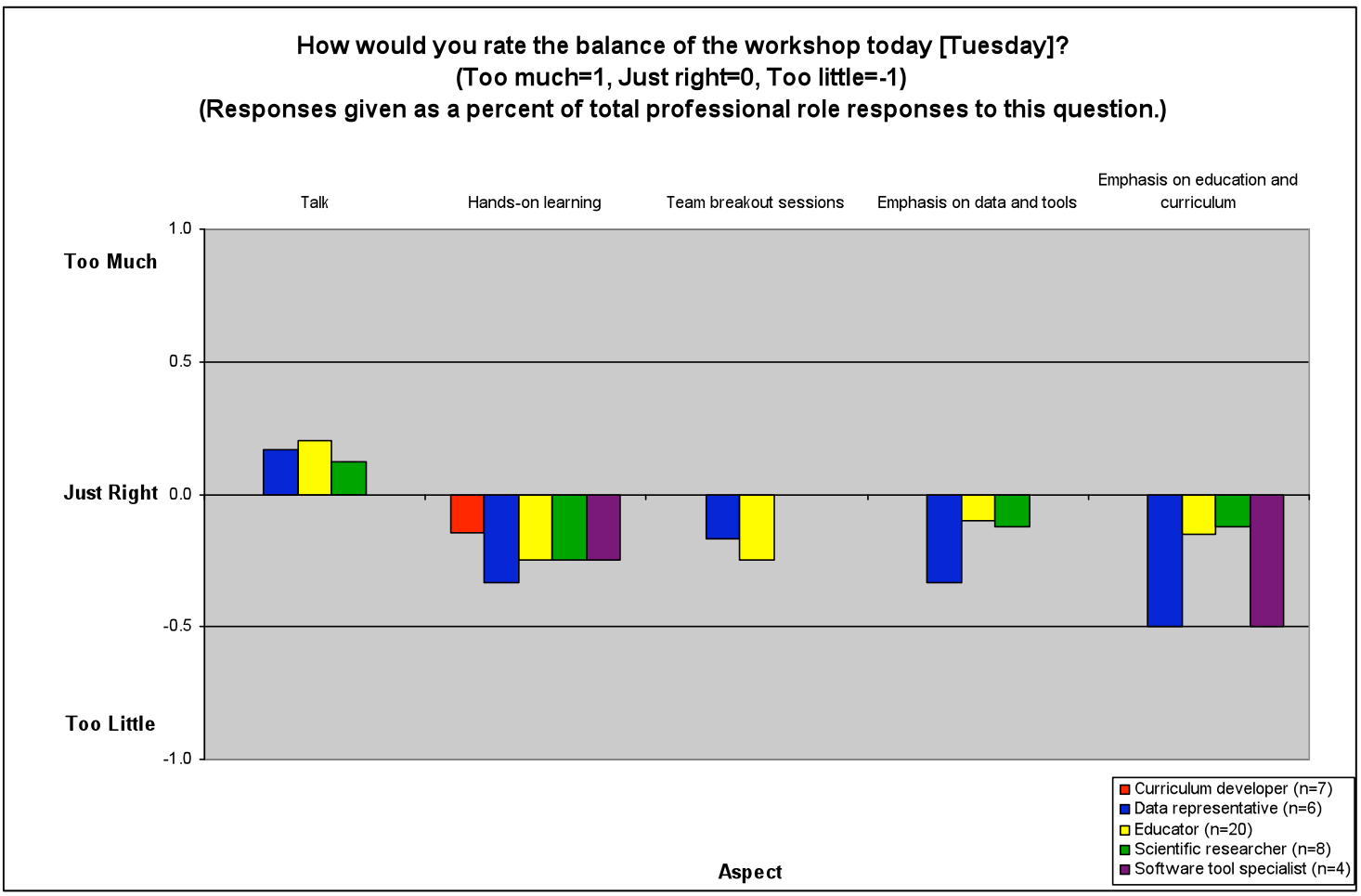

Figure 31. Balance of Tuesday's session, by role.

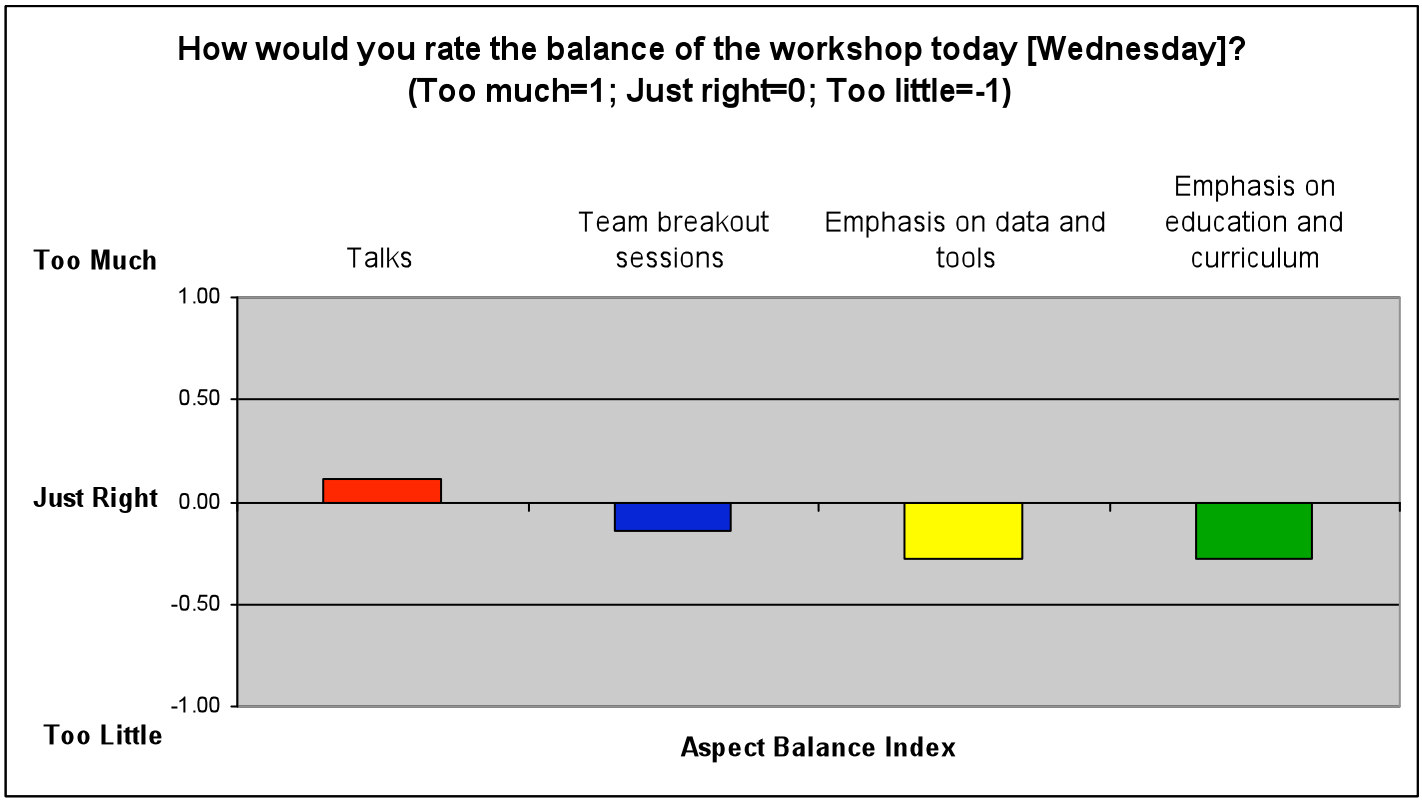

Figure 32. Balance of Wednesday's session.

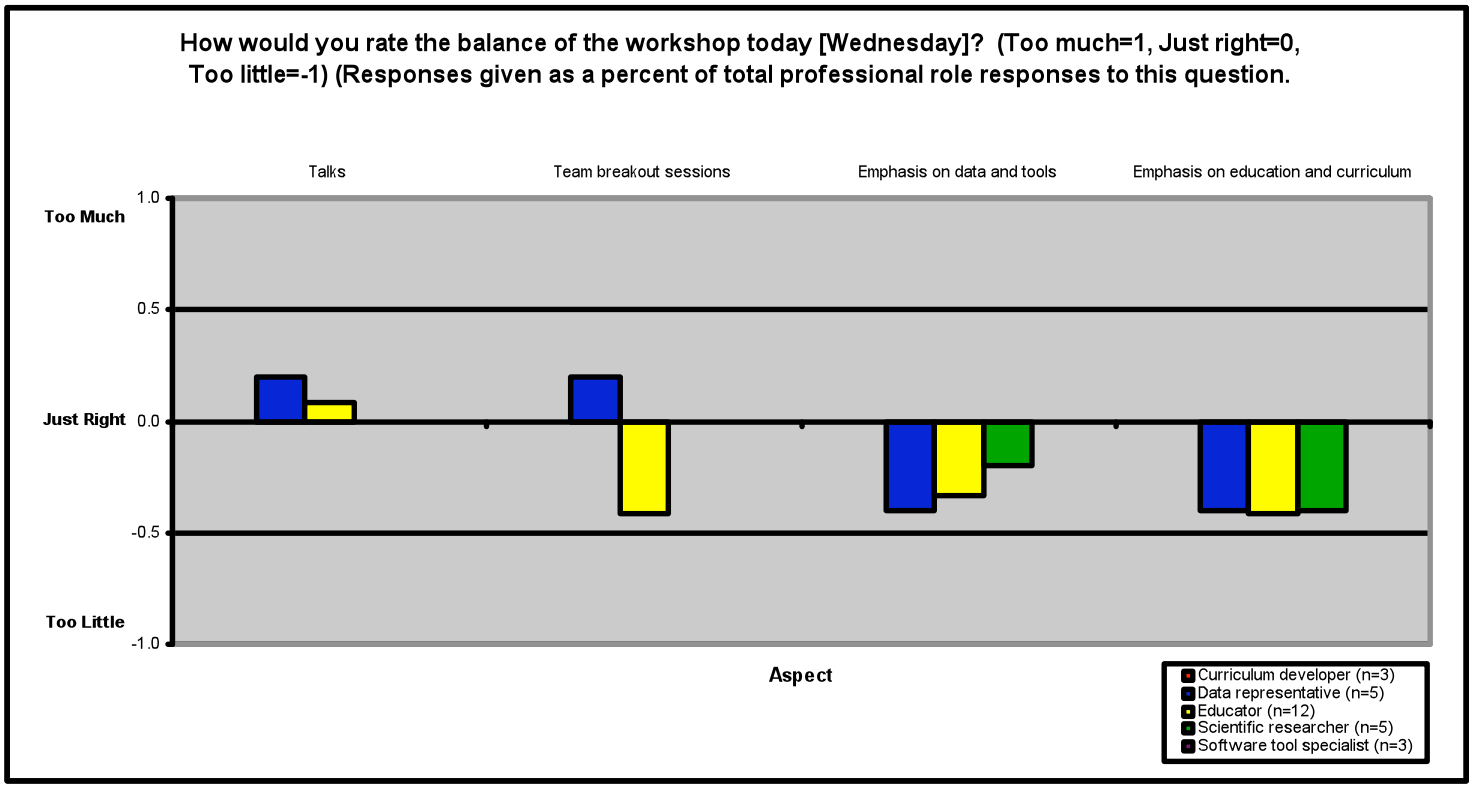

Figure 33. Balance of Wednesday's session, by role.

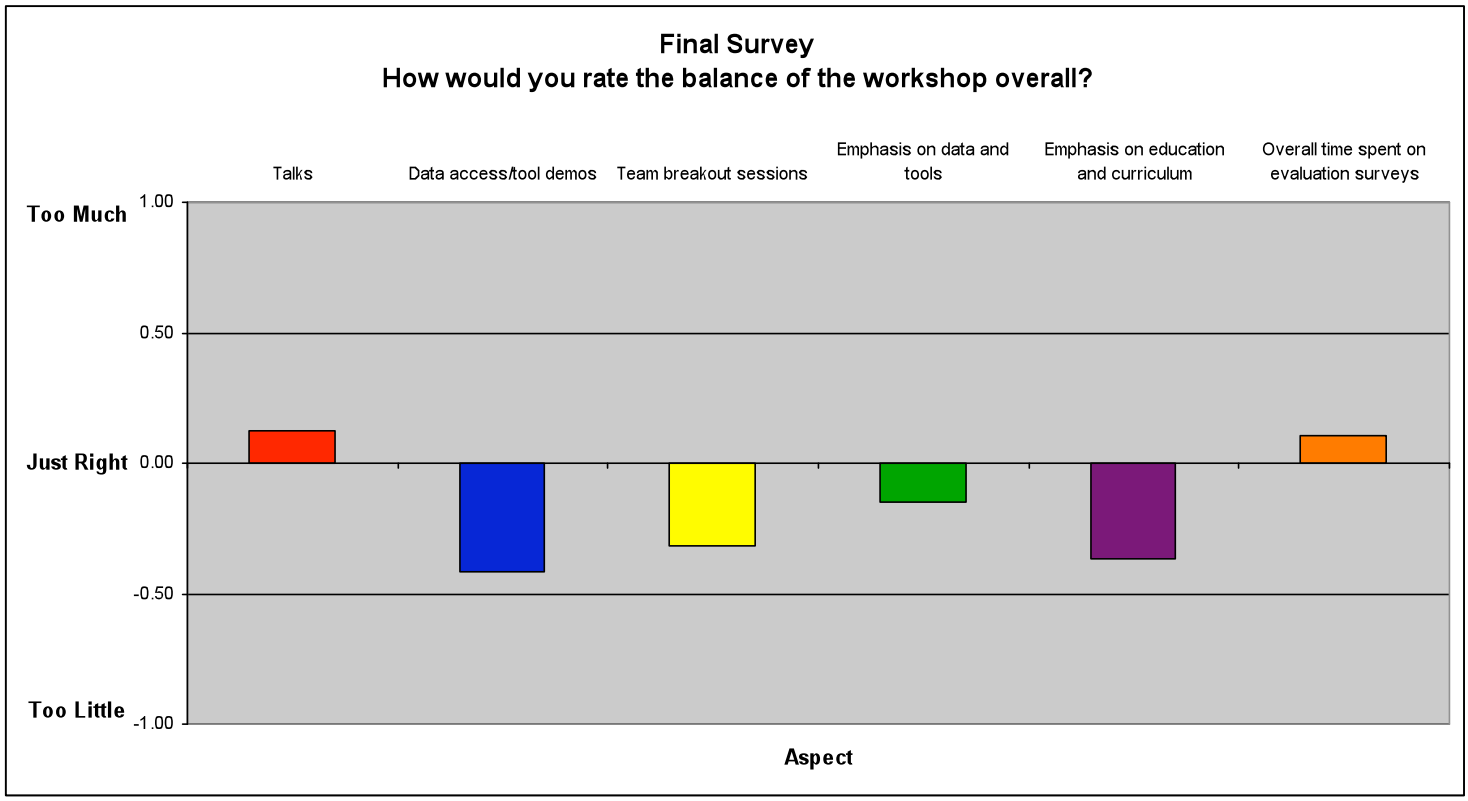

Figure 34. Balance of the workshop overall.

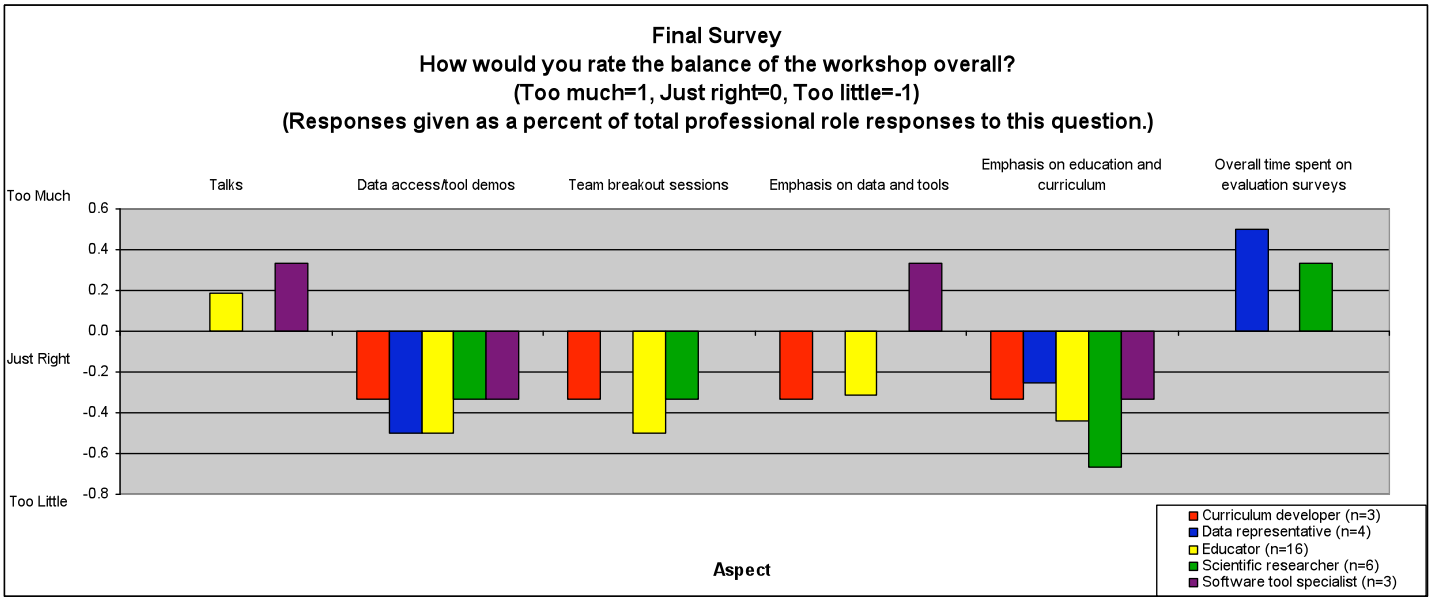

Figure 35. Balance of the workshop overall, by role.

What Should be Changed?

The daily questionnaires asked an open-ended question regarding what should have been changed.

Monday (53 total respondents)

Seven respondents said things would have worked better if the computers for Tool Time had been provided and ready to go. For those using their own computers, they wished they'd had time to load the software before the session; this could have been handled before the workshop as part of the pre-meeting preparation. **Six respondents wanted more time for Tool Time. Nine respondents wanted more breakout time**; they often felt they were just getting started when time ran out. Three expressed concern that they weren't given enough direction to be clear on the breakout team goals and how to achieve them.

Tuesday (51 total respondents)

Nine of the respondents thought the breakout by role session was not useful and the time could be better spent elsewhere. Two others suggested that the role session might be made useful if it were integrated into a full group discussion of primary issues. **Nine other respondents said they wanted more team breakout time; two people again commented they needed more guidance in their team. Three people requested more tool time.**

Wednesday (37 total respondents)

Six people requested extending the workshop to three full days so that fewer people would leave early. Five additional people wanted more team time. As far as format goes, one returning participant preferred this report out format to last year's. Three other people, however, requested an all-together session for the report-outs. One person requested DLESE staff to meet with each group on the last day to answer questions. Another requested just one computer for the PowerPoints.

Question 5 on the final survey asked, "What aspects of the workshop overall would you have changed and how?"

Suggestions for changes to the workshop were fairly consistent. A number of people requested the workshop extend to a fourth day; this would provide more time for networking and breakout group work. They also wanted more pre-conference opportunity to network with others and work with the tools that would be highlighted during the workshop.

Several people requested more time with breakout groups and a number of others wanted more time to network with others not in their group. For example:

> *This is a unique opportunity for me to mix with teachers/educators but I had way too little time to mix with these people. I had to duck out of talks in order to meet with teachers to show them what my group offers.*

Several people requested more time for working with the tools, possibly via a pre-workshop session (online or in person).

As has been requested in previous years, several participants asked for the opportunity to communicate with fellow team members before the workshop to maximize the efficiency of their time together. For example:

> *Maybe a conference call w/all Team Members prior to meeting (w/a DLESE representative) to brainstorm and guide discussion for curriculum development. (1/2 hour!!) This way we can come to workshop a bit more prepared.*

Three people requested changes to the data sheet as follows:

- *Data Sheets should indicate more clearly what is desired of groups.*
- *The data sheet has some redundant sections; was very long.*
- *[Provide] more info about data sheet...beforehand.*

Question 6 of the final survey addressed the effectiveness of the poster session. See Figure 36.

The poster session was moderately effective; a larger facility that would encourage networking would be appreciated.

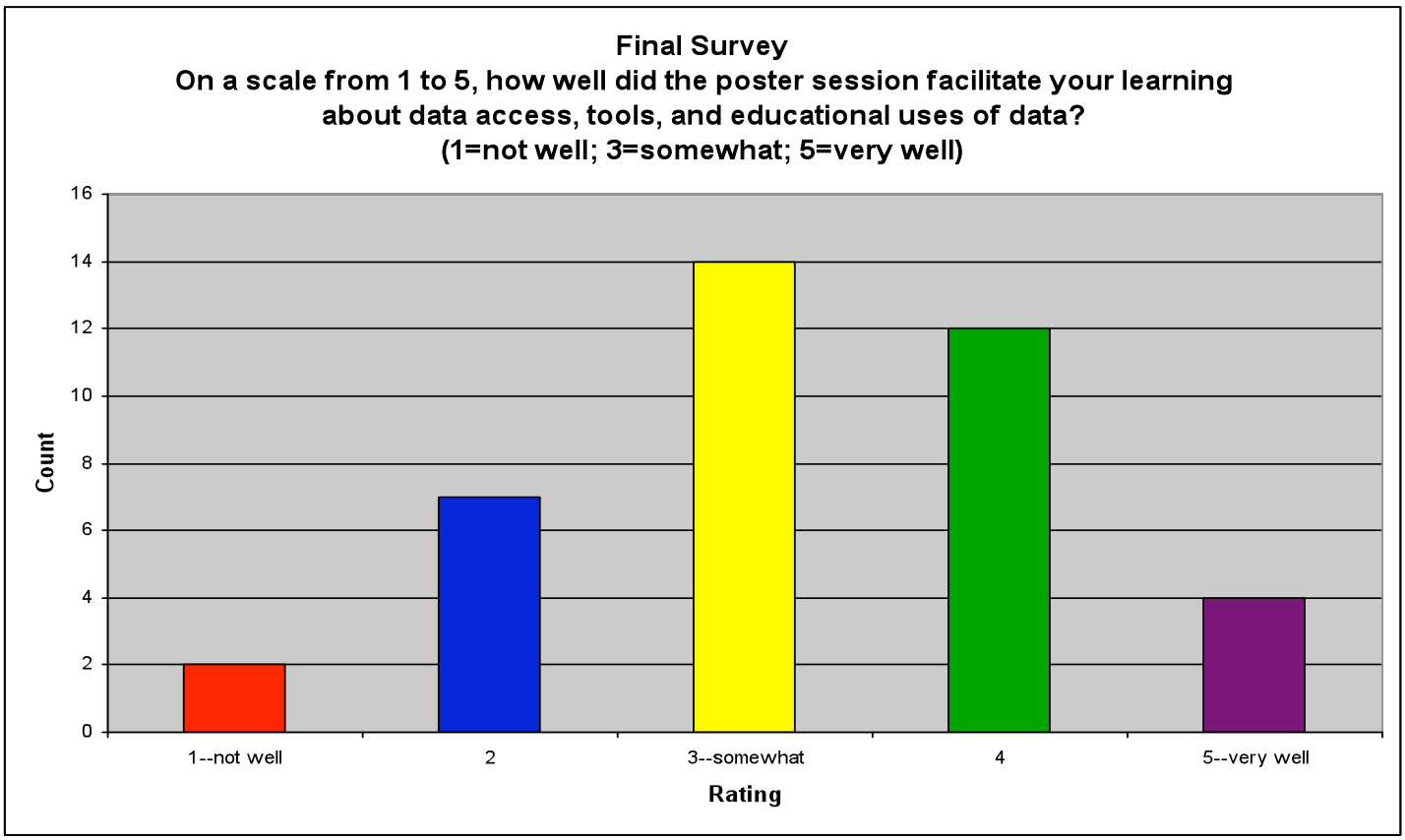

Figure 36. Rating of the poster session.

As shown in Table 2, there was general agreement about the effectiveness of the poster session, though Educators rated it the lowest.

Table 2. Average Rating of Poster Session by Role	
Data representative	3.8
Curriculum Developer	3.7
Scientific researcher	3.4
Software tool specialist	3.3
Educator	2.8

The 14 participant comments on the poster session were varied. Several who commented on the session said the facilities were too small. One suggested that the venue should have had the food and drinks in with the posters as it would have encouraged more mingling in the poster session room. Four specifically said that the opportunity to talk and network was the most valuable thing about the session. Three presenters, as in past years, suggested that they were so busy presenting they didn't have a chance to network or visit the other posters themselves. One appreciative respondent commented as follows:

> *I particularly liked the couple posters by teachers as the were using novel ways to work with simple data. It would be and idea to have more educators present posters on how they are teaching Earth Science.*

Question 7 asked about the breakout team. See Figure 37.

There was almost complete agreement among participants that the teams worked very well together at the workshop. More guidance or preparation to assist them in focusing more quickly might have helped. All roles agreed that the teams worked well. See Table 3.

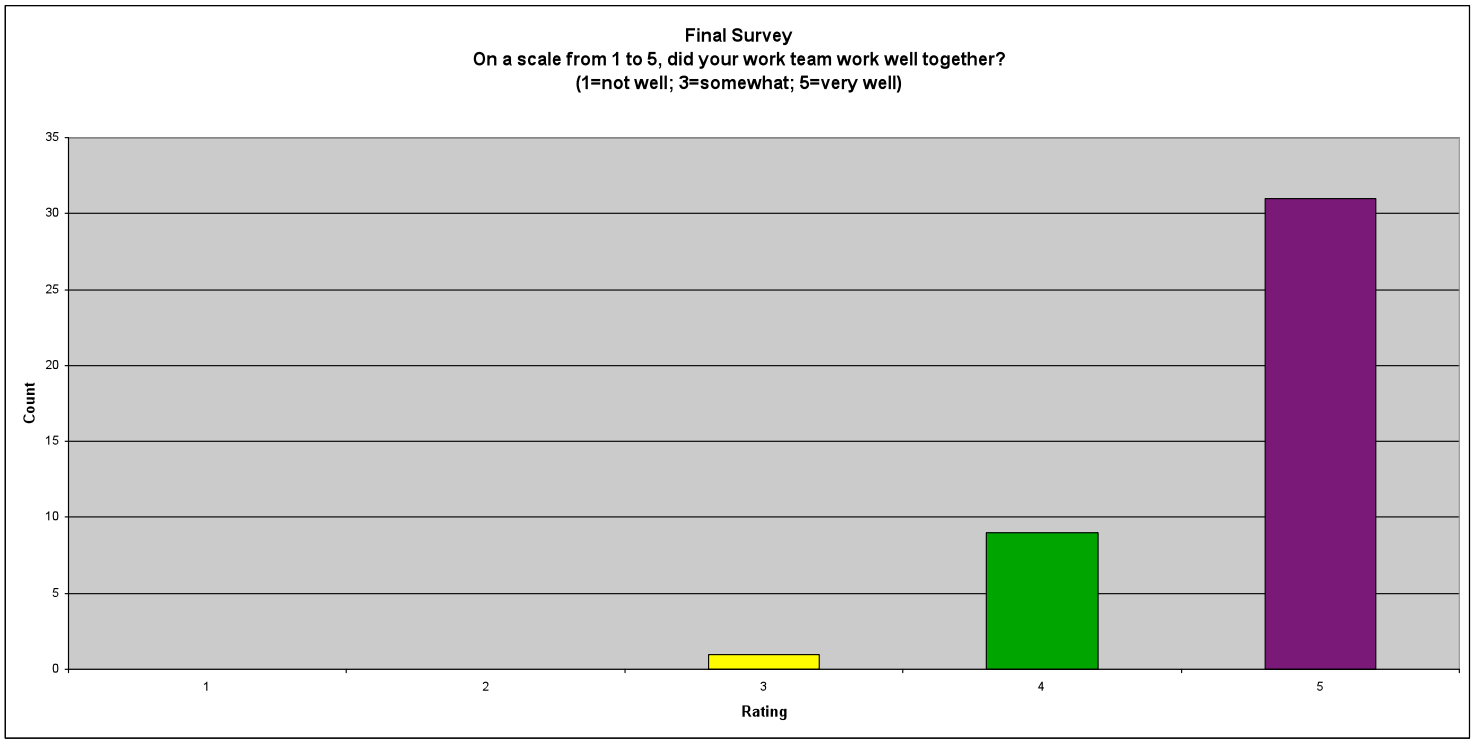

Figure 37. Rating of how well the teams worked together.

Table 3. Average Rating of How Well Teams Worked Together, by Role (1=not well; 3=somewhat; 5=very well)	
Curriculum developer (n=3)	4.3
Data representative (n=4)	4.3
Educator (n=16)	4.8
Scientific researcher (n=6)	4.8
Software tool specialist (n=3)	5.0

Of the 33 comments on how well the team worked together, 19 had positive comments to make about the experience. Six specifically identified their leader as important to the positive experience. Eleven participants mentioned an initial lack of focus, clarity, or other factors that led to a slow start on their project; these were mostly from four particular teams. It seems that having some level of understanding of the project going into the first breakout session enhanced the experience for participants, as did having an effective, directed leader to the group. For example:

- *Our team was great! Our data guy came in already with ideas of what could be done and we ran with it from there.*
- *We had a slow start, too many options to consider. Some people on team had to leave early. Team worked though obstacles well - worked well together.*
- *We already knew one another so it was great.*

Marine-Geo, MESSENGER, NCAR Community Data Portal, Marine Map, and NASA/NEO were the teams that received the most positive comments on how well they worked together. Alaska, National Park Service, Land Cover Facility, and Astro Data seemed to have the most need for additional guidance.

Question 8 of the final survey asked, "What do you plan to do in your work as a result of this workshop that will facilitate the use of data?" **The 40 respondents had lots of ideas, including plans for the EET chapter development project, educational applications, networking, tool development, and data work.**

EET Project

Six respondents said they planned to work with their team to complete their EET chapter. Two specified continued work with the EET in other areas as well.

Education Enhancements to Data and Tools

Seventeen respondents addressed ways in which they would integrate tools, data, and curricular materials for easier use in education.

Other participants specified the data-in-education applications they planned to work on. Several described enhancing existing datasets, materials, or tools with more effective educational information; for example:

- *Figure out how to build software application to enable education easier access to the data and products.*
- *Match data analysis to state standards.*
- *I will work with developers on format issues.*
- *I am currently working on developing strategies to help teach teachers about how to teach with data.*

Education in Action

Eleven respondents described ways in which they would use data and tools in their education work; for example:

- *Form a team at my school and develop cross curriculum modules using data.*
- *Find out more about existing tools and push for [Professional Development] in them!*
- *Use Google Earth!*
- *To allow my students to design graphs and other new programs.*

Funding Opportunities

Two respondents mentioned that they would seek grant funding for further work in the area:

- *Write data sharing and curriculum development into research grants / budgets.*
- *...look into possibilities of getting a grant to develop curriculum activities (in remote sensing GIS) for elementary to high school teachers and students.*

Question 9 asked participants to rank the value of the workshop program and other printed materials distributed at the workshop. Results are summarized in Figure 38.

Printed materials received for the meeting were above average. The average rating was 4.2 on a scale of 1 to 5, which is slightly better than last year.

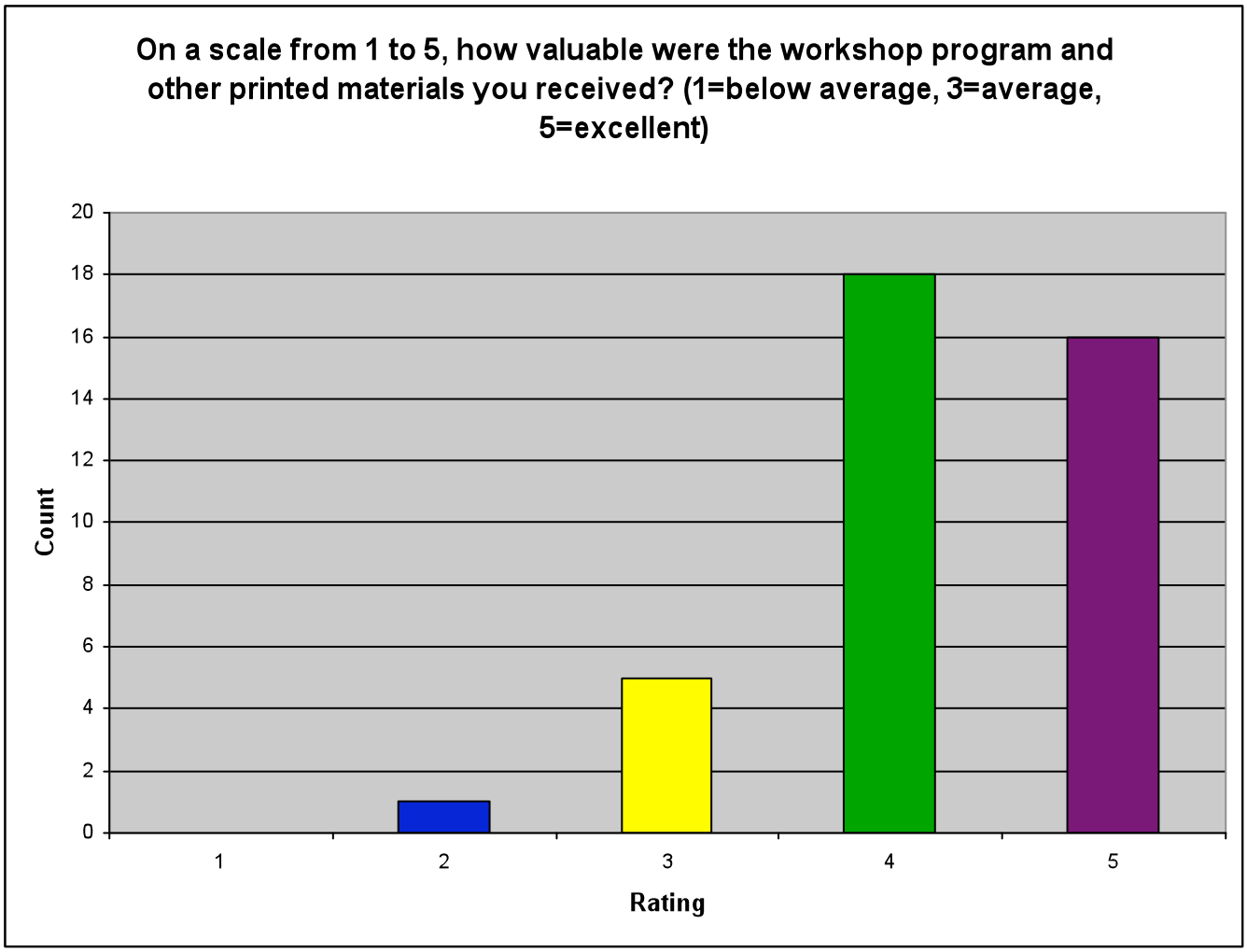

Figure 38. Rating of the printed workshop materials.

The agenda was mentioned as "invaluable" by one respondent and much appreciated by another. Two participants requested hard copies of the Activity Outline. Several participants appreciated that all the information would be available online after the workshop, although some asked that CDs be available to them as well. There were requests for more initial detailed information about what would happen during the workshop as well:

- *Needed more pre-workshop specifics about how it's going to work.*
- *It would have been useful to have the 2 page document for the Professional Role Break out session at the beginning of the workshop.*

One comment on the program schedule was quite appreciative:

> *Timing & distribution of time on various tasks was excellent. I felt busy, challenged and never felt that something had gone on too long.*

Questions 10, 11, 12, and 13 addressed the success of the workshop logistics and websites (see Figure 39).

Online registration was found to be easy to use by almost all respondents. The Swiki and information websites were considered to be quite useful overall. The meeting facilities, housing, and food were ranked well above average overall.

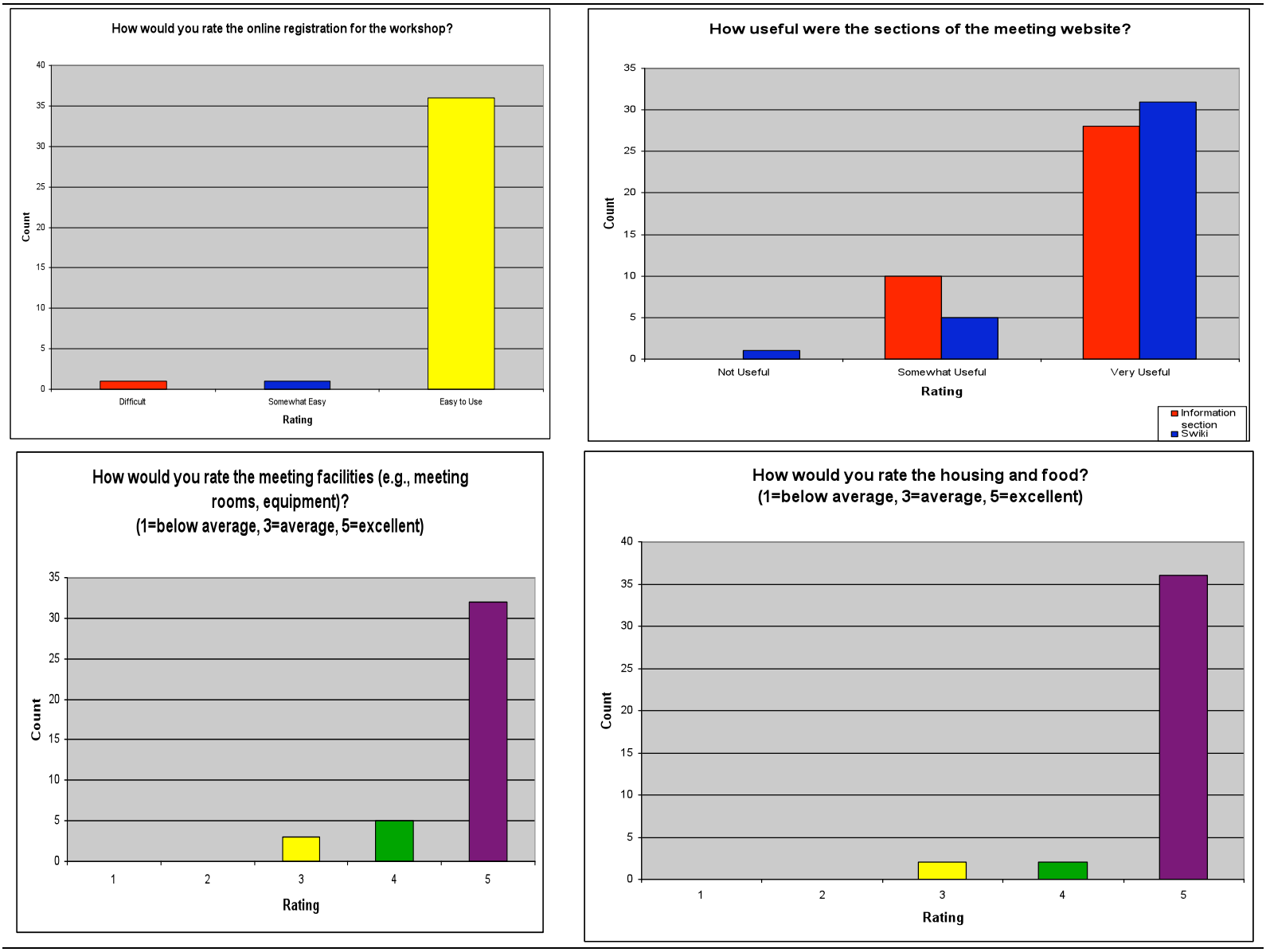

Figure 39. Ratings of online registration, website, facilities, housing, and food.

Meeting registration was ranked very highly by most respondents. A couple of issues were mentioned in the text responses:

- *[It was] annoying when I tried to add my poster abstract--it took me ages to do it.*
- *It kept kicking me off as I tried to register.*
- *Worked pretty well - harder to update registration.*
- *I would have liked to see deadlines. To know when I needed to respond by to know when I would hear back about being accepted.*

The swiki and information pages were well-received. Six people commented on how much they liked using the swiki. One or two participants expressed difficulty navigating from the DLESE home page to the Data Services site; this has been an issue in past workshops as well. One person asked for more details on the information site:

More information could be provided as to what data, tools and applications to bring.

The meeting facilities were appreciated by most respondents. All additional comments were positive except for those that mentioned the spotty wireless coverage at the facility. One respondent expressed a wish that the facility had been closer to town for more choices in the evening.

All comments on the food and housing were very positive except one respondent relating two bad experiences with food service and one request for natural juices. Most opinions were along the lines of this comment:

The best food that I have ever had at a conference/meeting.

Question 14 asked for any additional comments.

Summary comments on the workshop included appreciation for the workshop and some detailed suggestions for improvement.

Appreciation

As in previous Data Services Workshops, participants greatly appreciated the format of the event and the experience itself. Of the 30 open-ended comments, 14 included praise, as follows:

- *I loved it! Great concept!*
- *I hope this workshop continues in the future. DLESE products seem like they are / will be very useful for educators; thanks for having me.*
- *Excellent DLESE Workshop.*
- *Great job, I learned a lot! Made a few connections. Learned about Google earth (yay!)*
- *fantastic, I had a great time and learned a lot*
- *This was and excellent workshop I really enjoyed it.*
- *The workshop was a very positive experience and communication seemed to flow freely!*
- *Great workshop -it's wonderful to have a place to bring together scientists and educators to specifically produce something.*
- *Wonderful experience.*
- *This was fantastic - the mingling of professionals from different roles was the best experience of this kind that I have ever had 2. Give me more "data in the classroom" experiences!*
- *I'm taking home ideas from the educators that will help me in my day to day work to design more effective user interface*
- *Fun!*
- *Great!*
- *Excellent*

Suggested changes to future workshops

A number of participants suggested modifications to the workshop for future years. **Five suggested adding more time to the workshop so that there would be more group time; two specifically requested three full days of meetings and people leaving the fourth day. Six again requested more preparation options before the workshop begins**, as follows:

- *Allow groups to meet "virtually" before they meet physically.*
- *It would have been nice to already have the data determined as a place to start from.*
- *It also would have been useful to have some communication with people who had never been to a DLESE workshop to allow [new people] better prepare what we brought.*
- *It was hard to get loose from school, more preliminary information about what I was doing here would have been helpful.*
- *Some pre-preparation would have been good with the team--maybe a conference call for each team? [And for] tool time--an online tutorial for the tools would be great.*
- *We should all look at the data ahead of time so we'd be more familiar.*

Other suggested various modifications to improve future Data Services Workshops:

- *Having a way to project and show the data to other team members would have been helpful.*
- *Continue to include higher education faculty & instructors. Make an effort to have the focus on using data in education across K-16.*
- *Integrate the curriculum developer in the teams.*
- *I would like you make video taping of the [presentations] where all the conclusion are submitted and provide laptops for participants (not everybody has a laptop).*
- *Glasses instead of plastic cups @ break tables perhaps this is not and option @ the resort thanks for the constant supply of coffee and drinks outside the meeting rooms.*
- *Filling out the data sheet template took two days and the activity outline was sidelined. I think over the two days you can do one or the other, but both was a stretch. There was some confusion of what goes with the data sheet*

and what in the activity outline. I understand that it is great to get as many people as possible to attend the DLESE DSWs and try and have new people at each workshop, but if everyone is new every time, it creates some confusion because noone in breakout team knows exactly what to expect. We benefited from having someone more familiar with the process in our team from having attended the workshop before and perhaps it would be useful to have one person in each team if possible that has been here before.

- *Data downloading tool courses for "non" teachers and education classes for science and researchers*
- *Could contact people about it sooner and get the word out about it more.*
- *[A] key issue [is that there is] too much data--info-overload. [We} need [to] focus on [the] most useful datasets for education.*

Other related suggestions and ideas

Four respondents suggested related issues that could be addressed:

- *Let's put together a curriculum development workshop... Perhaps state by state targeting (or regional targeting) as focus for the bigger meeting. I would love to help with this or initiate it as appropriate and next time I'll drive if you need someone to do so :)*
- *I would like you have a Spanish version of DLESE.*
- *For classroom teachers:*
    a. *DLESE should provide a principal to encourage the participation of teacher and how the outcomes could be used to foster science education in the classroom and as PD for departmental staff.*
    b. *Prepare a Press release so participants can share with community and school district.*
- *Future workshops - now that our team has become comfortable and works well - consider bringing same team back to develop new modules.*

Appendix—Survey Instruments

DLESE Data Services Workshop 2006
Data Use Questionnaire

We are interested in attendees' perspectives on the use of data in education, We hope to improve our understanding of the ways in which data are being used and the ways in which data use may be made easier. This information may be used to help define future projects that focus on bringing data into the classroom. Thank you for your help.

1. What is your primary professional role? (Please mark your primary role with a "1" and check any others that apply.)

_____Curriculum developer
_____Data representative
_____Educator
_____Scientific researcher
_____Software tool specialist
_____Other; please describe _____

2. For which learning goals have you successfully used data *within educational contexts*? (Check all that apply.)

____Understanding weather
____Understanding the ocean
____Understanding geology/seismology
____Interpreting satellite imagery
____Understanding the scientific method
____Pattern recognition
____Meeting science standards
____Personal exploration and learning
____Other; please describe_____

_____

_____

_____

3. Which of the following data have you used successfully? (Check all that apply.)

____Census
____Earthquake/volcano
____Satellite imagery (e.g., GOES, Landsat, MODIS, SeaWiFs)
____Sea surface temperature
____Topography data
____Tree ring data
____Climate/weather model simulation output
____Weather/climate observations (e.g., temperature, precipitation)
____Other; please list _____

_____

4. Which of the following data formats have you used successfully? (Check all that apply.)

____GIS (Geographic Information System)
____Image data (e.g., JPEG, GIF, TIFF)
____Text/ASCII (e.g., tab-delimited text for spreadsheet use)
____NetCDF (Network Common Data Format)
____HDF-EOS (Hierarchical Data Format-Earth Observing System)
_____Other; please list _____

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5. Which of the following data sources have you used more than once? (Check all that apply.)

____DOD (Department of Defense)
____EPA (Environmental Protection Agency)
____GLOBE (GLobal Observations to Better the Environment)
____NASA (National Aeronautics and Space Administration)
____NCAR (National Corporation for Atmospheric Research)
____NOAA (National Oceanic and Atmospheric Administration)
____NOAO (National Optical Astronomy Observatories)
____NWS (National Weather Service)
____USGS (United State Geological Survey)
____Other; please list _____

_____

_____

6. Have you found it necessary to modify data sets before they were used by an end-user/learner (e.g., selected subset, imported into Excel)?

____ Yes _____No

If yes, please describe the original state of the data (e.g., format, file size, region, etc.):

_____

_____

_____

How did you modify the data (e.g., imported into Excel, selected time period, changed units, etc.)?

_____

_____

_____

7. **What data analysis procedures have your end-users/learners performed on the data? (Check all that apply.)**

____Statistics
____Basic math
____Graphs
____Visualization/Imaging
____Queries
____Classification
____Plotting/Mapping
____Quality control
____Other; please describe _____

_____

_____

8. Have you made any attempts to obtain and use data sets that were NOT successful?

____ Yes _____No

If yes, what barriers did you encounter? (Please rank 1, 2, and 3 in order of priority.)

____Couldn't locate data
____Did not have access to required software
____Required computer hardware was not available
____Insufficient bandwidth/connection
____Unusable format/unknown file extensions
____Software too difficult to use
____Terminology/acronym problems
____Dataset too large
____Proprietary restrictions
____Prohibitive costs
____Other; please describe
_____

_____

_____

_____

9. What types of instruction or support are most helpful to you when using specific data sets? (Check all that apply.)

____One-on-one email assistance
____Phone support
____FAQ
____Glossary of terms
____Examples
____Step-by-step instructions
____Training workshops
____Online tutorial
____Live demos
____Reference manual/documentation
____Other; please describe _____

_____

_____

Thank you for your feedback. Please return this form to a workshop staff person or to the drop-box at the registration table.

DLESE Data Services Workshop 2006
Monday Feedback Questionnaire

1. What is your primary professional role? (Please mark your primary role with a "1" and check any others that apply.)

_____Curriculum developer
_____Data representative
_____Educator
_____Scientific researcher
_____Software tool specialist
_____Other; please describe _____

2. What aspect(s) of the workshop today did you find the most valuable? (Please select three and rank them 1, 2, and 3 in order of priority.)

_____Keynote talk – "Every Picture Begs a Question (Don't It?)," Perry Samson, University of Michigan
_____Talk – Strategies for using data in education: An overview of DataSheets and Earth Exploration Toolbook chapters, LuAnn Dahlman, DLESE Data Services & TERC
_____Team breakout session
_____"Tool Time" - Hands-on Lab Session 1
Please indicate tool session you attended_____
_____"Tool Time" - Hands-on Lab Session 2
Please indicate tool session you attended_____
_____Networking with others in my field
_____Networking with those in other fields
_____Other; please describe _____

3. How would you rate the balance of the workshop today? (check one column)

	Too much	Just right	Too little
Talks			
Hands-on lab session			
Team breakout sessions			
Emphasis on data and tools			
Emphasis on education and curriculum			

4. What aspects of today's session would you have changed and how?

_____

Thank you for your feedback. Please return this form to a workshop staff person or to the drop-box at the registration table.

DLESE Data Services Workshop 2006
Tuesday Feedback Questionnaire

1. What is your primary professional role? (Please mark your primary role with a "1" and check any others that apply.)

_____Curriculum developer
_____Data representative
_____Educator
_____Scientific researcher
_____Software tool specialist
_____Other; please describe _____

2. What aspect(s) of the workshop today did you find the most valuable? (Please select three and rank them 1, 2, and 3 in order of priority.)

_____Keynote talk – "Teaching Carpentry" Elizabeth Youngman, Phoenix Country Day School
_____Team breakout sessions
_____Breakout by role session
_____Networking with others in my field
_____Networking with those in other fields
_____Other; please describe _____

3. How would you rate the balance of the workshop today?

	Too much	Just right	Too little
Talk			
Hands-on learning			
Team breakout sessions			
Emphasis on data and tools			
Emphasis on education and curriculum			

4. What aspects of today's sessions would you have changed and how?

_____

_____

_____

5. Of the posters you visited at yesterday's poster session, which are most interesting or useful to you and why?

_____

_____

Thank you for your feedback. Please return this form to a workshop staff person or to the drop-box at the registration table.

DLESE Data Services Workshop 2006
Wednesday Feedback Questionnaire

1. What is your primary professional role? (Please mark your primary role with a "1" and check any others that apply.)

_____Curriculum developer
_____Data representative
_____Educator
_____Scientific researcher
_____Software tool specialist
_____Other; please describe _____

2. What aspect(s) of the workshop today did you find the most valuable? (Please select three and rank them 1, 2, and 3 in order of priority.)

_____Keynote talk – "Geoscience Education: When Will We Know That We Are Successful?"
Frank Hall, National Research Council
_____Team breakout sessions
_____Final plenary session and wrap-up
_____Networking with others in my field
_____Networking with those in other fields
_____Other; please describe _____

3. How would you rate the balance of the workshop today?

	Too much	Just right	Too little
Talks			
Team breakout sessions			
Emphasis on data and tools			
Emphasis on education and curriculum			

4. What aspects of today's session would you have changed and how?

_____

_____

_____

_____

Thank you for your feedback. Please return this form to a workshop staff person or to the drop-box at the registration table.

DLESE Data Services Workshop 2006
Final Day Questionnaire

Please answer the following questions for us so that we can determine what we did well and what we can improve. Any identifying information will be kept confidential.

WORKSHOP CONTENT

1. Which is your work team?

_____Marine-Geo
_____Alaska
_____MESSENGER
_____SSEC
_____National Park Service
_____SAGUARO
_____Global Land Cover Facility
_____Not on a team
_____NCDC
_____SciBox
_____POET
_____NCAR Community Data Portal
_____Marine Map
_____NASA/NEO
_____AstroData

2. What is your primary professional role? (Please mark your primary role with a "1" and check any others that apply.)

_____Curriculum developer
_____Data representative
_____Educator
_____Scientific researcher
_____Software tool specialist
_____Other; please describe _____

3. What aspect(s) of the workshop overall did you find the most valuable? (Please rank 1, 2, and 3 in order of priority.)

_____Plenary talks
_____Data access/tool demos
_____Team breakout sessions
_____Data search scenario session
_____Professional role breakout session
_____Poster session
_____Final report out of teams
_____Networking with others in my field
_____Networking with those in other fields
_____Other; please describe _____

4. How would you rate the balance of the workshop overall?

	Too much	Just right	Too little
Talks			
Data access/tool demos			
Team breakout sessions			
Emphasis on data and tools			
Emphasis on education and curriculum			
Overall time spent on evaluation surveys			

5. What aspects of the workshop overall would you have changed and how?

_____

_____

_____

_____

6. On a scale from 1 to 5, how well did the poster session facilitate your learning about data access, tools, and educational uses of data? (Please check the appropriate box.)

Not well--1	2	Somewhat--3	4	Very well--5

Additional comments:

_____

_____

7. On a scale from 1 to 5, did your work team work well together? (Please check the appropriate box.)

Not well--1	2	Somewhat--3	4	Very well--5

Please comment on what did and didn't work in your team:

_____

_____

_____

8. What do you plan to do in your work as a result of this workshop that will facilitate the use of data?

_____

_____

_____

9. On a scale from 1 to 5, how valuable were the workshop program and other printed materials you received? (Please check the appropriate box.)

Below average--1	2	Average--3	4	Excellent--5

Additional comments on workshop program and other printed materials:

_____

_____

WORKSHOP LOGISTICS

10. How would you rate the online registration for the workshop? (Please check the appropriate box.)

Difficult	Somewhat easy	Easy to Use

Additional comments:

_____

_____

11. How useful were the sections of the meeting website? (Please check the appropriate box.)

	Not useful	Somewhat useful	Very useful
Information section			
Swiki			

Additional comments:

_____

_____

12. How would you rate the meeting facilities (e.g., meeting rooms, equipment)? (Please check the appropriate box.)

Below average--1	2	Average--3	4	Excellent--5

Additional comments:

_____

_____

13. How would you rate the housing and food? (Please check the appropriate box.)

Below average--1	2	Average--3	4	Excellent--5

Additional comments on housing and food:

_____

_____

GENERAL IMPRESSIONS OF WORKSHOP

14. Please use the space below to add any other comments you have, suggestions for improvements at future workshops, or any other ideas you would like to share with us.

_____

_____

_____

_____

15. Have you attended previous Data Services Workshops?

____No
____Yes Please explain how your experience at the Workshop(s) in previous years has affected your work:

_____

_____

16. Which of the following other DLESE events have you attended?

____DLESE Annual Meeting
____Ambassadors Workshop
____Other (please describe) _____

17. If we may contact you further about your experience, please provide your contact information here:

_____

_____

Please complete and turn in this form to a workshop staff person or to the drop-box at the registration table during your final day. Your feedback and comments will help to shape future DLESE data workshops. Thank you!
--DLESE Data Services Team