

# HPC Educators Group LittleFe Buildout Workshop Project

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Report on the SC12 LittleFe Buildout Workshop Survey

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## Introduction

The LittleFe group received support from NSF to host Buildout sessions as part of the HPC Educators Program at the 2012 Super Computing conference (SC12) and SC13. Buildout sessions are one-day activities where teams, each with faculty members from colleges and universities across the United States, spend the morning assembling their LittleFe and installing the Bootable Cluster CD (BCCD) BCCD Linux distribution. During the afternoon the teams learn about using LittleFe as an HPC/parallel/distributed computing educational tool and discuss how to develop curriculum modules for the LittleFe/BCCD platform. The NSF grant also provides a modest amount of support to evaluate the success of the LittleFe Buildout sessions.

The project evaluation has two overall goals: (i) to assess the quality of the LittleFe/BCCD platform as a tool for teaching and learning parallel/distributed computing and computational science; and (ii) to understand how we can improve the platform and make it more available and accessible to a broader audience. Given the time and budget constraints of the project, the main tool used to address these goals is an online survey, which will target faculty who participated in the SC12 LittleFe Buildout and who took the units they assembled back to their home institution to use in teaching. A post-workshop survey will also be developed that addresses the modules created by the participants subsequent to the workshop and the courses that participants redesigned to use LittleFe and the instructional modules. This survey will be given to SC11 participants as well as those from SC12. In addition, we will conduct interviews with a subset of faculty to gather more in-depth anecdotal information on their experiences using the LittleFe/BCCD platform in their classrooms. Finally, all participants will be invited to share documents that illustrate how LittleFe/BCCD has changed their teaching experiences and their students' learning of and interest in parallel/distributed computation and computational science (e.g., teacher blogs, or suitably anonymized student projects and test results).

This brief report summarizes the results from the survey of LittleFe Buildout workshop participants at SC12. We first discuss the development of the survey and the methodology through which it was deployed. The next section summarizes both the quantitative and qualitative results and offers some brief conclusions. The final section discusses next steps in the project evaluation. The Appendices contain the survey instrument itself and along with tables of qualitative survey data.

## Methods

The SC12 LittleFe Buildout workshop [1, 2] was a full-day workshop held on November 12 2012, as part of the SC12 convention in Salt Lake City [3]. Students and faculty began applying for positions in the workshop in July 2012; all applications were due by August 12. 44 participants registered for the event, including instructional staff. All student and faculty participants were offered support to attend the workshop through a grant provided by NSF. In addition, all workshop participants were entitled to keep the LittleFe portable unit that they assembled during the workshop. In the first workshop session the participants built their LittleFe/BCCD Bootable Cluster CD platform. In the second session they reviewed examples and demonstrations of how LittleFe could be used to teach and learn key ideas in parallel and distributed computation.

## **Creating the SC12 LittleFe Buildout Workshop Survey**

The LittleFe group leadership planned to develop and deploy two related surveys to gather information about the SC12 LittleFe workshop. The first asked participants about their workshop experiences. The second survey will gather information on the usage of LittleFe in curricula and classroom teaching. The first survey was deployed within a month of the November workshop; the second will be deployed several months later.

Prior to the SC12 workshop the LittleFe group leaders met with the project evaluator to discuss the survey structure and shortly after the workshop was conducted, the survey was completed. The survey comprised 25 multiple-choice and free-text response questions divided into 4 sections, which addressed demographics and background information, experiences assembling LittleFe/BCCD, experiences using LittleFe/BCCD and suggestions for improving LittleFe/BCCD training and outreach strategies. The survey questions were beta-tested and refined to ensure participants could easily complete the survey within 30 minutes. (See Appendix I for a complete list of all survey questions pages).

## **Deploying the SC12 LittleFe Buildout Workshop**

The survey was implemented using a web-based survey tool provided by the National Computational Science Institute (NCSI). On November 28, approximately two weeks after the workshop, an email was sent to all participants asking them to complete the survey online. Reminders were sent to all participants who had not yet responded on November 30; a third reminder was sent on December 12; and a final reminder was sent out December 19. On Feb 7 the evaluator, along with the LittleFe group leaders, agreed to close the survey data collection and begin the analysis of results.

## **Results**

Of the 44 workshop participants 37 finished the online survey (35 were complete; two response sets were partial). This represents an almost 85% completion rate, which is high for most online surveys. Survey data was downloaded from the NCSI site to an Excel spreadsheet and all quantitative descriptive data analysis was done using Excel tools. Qualitative data from the free-text short-answer questions were analyzed manually. The participant data include those from faculty and students (41) as well as from workshop instructors (3); no attempt in the analysis was made to distinguish results from these two groups.

## **Background and Demographics**

Table 1 through Table 5 summarize the demographic characteristics of workshop participants. A relatively small percentage of the participants were female (6/37 or 16%), although this was still higher than the overall percentage of women who are computer science professionals. By the same token, under-represented minorities are not well-represented in computer science or computational science, but the relatively high percentage of non-white participants in the workshop (18/37 or 49%) indicates the workshop attracted a diverse set of participants.

Gender	
Female	Male
6	31

Table 1. Gender of LittleFe Buildout Participants

Ethnicity				
Asian	Black	Hispanic	White	Several
8	7	2	19	1

Table 2. Ethnicity of LittleFe Buildout Participants

Table 3 shows that most of the workshop participants were faculty at 4-year colleges, although pre-college instructors, faculty from Ph.D.-granting institutions and university students were also well represented. Others were either staff at universities or employees of non-profits. Of the 30 participants who identified themselves as faculty or instructors, Table 4 indicates almost half of them (12/30) were relatively young computer scientists. But the distribution was skewed: nearly as many participants had 16 or more years of teaching experience as had 5 or fewer. Nevertheless, with the exception of a few instructors Table 5 shows that most of the participants were participating in an SC/HPC education program for the first time. Many of the participants, therefore, appeared to be interested in LittleFe and in parallel and distributed computation, but had relatively little past hands-on experience with the technology or how to teach key ideas in this emerging field.

Institution Type					
Precollege	2-year	4-year	Ph.D.	Student	Other
1	1	17	6	7	5

Table 3. Institution Type of LittleFe Buildout Participants

Years Teaching				
0-5	6-10	11-15	16-20	> 20
12	5	2	4	7

Table 4. Years Teaching of LittleFe Buildout Participants

Number of SC/HPC Education Programs Attended						
0	1	2	3	4	5	6+
23	6	4	1	0	1	2

Table 5. Number of SC Education Programs by LittleFe Buildout Participants

### Experiences Learning and Assembling LittleFe/BCCD

Table 6 summarizes the opinions of workshop participants about building the LittleFe/BCCD unit. Overall, they clearly had positive experiences, with relatively small inter-participant variance (standard deviation) in ratings. The scores for the Buildout leaders were exceptionally high (4.71 mean rating, with 80% of respondents strongly agreeing that the leaders were very helpful). Participants also felt that the assembly instructions were good (mean ratings

for organization and content were 3.63 and 3.34, respectively). These ratings, however, were slightly lower than the leader ratings and may have reflected some problems that the participants encountered with the assembly kit (see Table 7). The participants had a number of constructive suggestions for improving the instructions and the assembly process, as discussed below in the analysis of the qualitative short-answer responses.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A	N	Mean	St. Dev
The organization of the assembly instructions was good	8	17	1	7	2	2	35	3.63	1.21
The content of the assembly instructions was clear	3	16	7	8	1	2	35	3.34	1.03
The Buildout leaders were helpful or useful	27	4	3	0	0	3	34	4.71	0.63
We were able to complete the build in time	19	12	0	2	0	4	33	4.45	0.79

Table 6. Experiences Assembling LittleFe

Note: Standard Likert scoring is used: *Strongly Agree* = 5; *Strongly Disagree* = 1.

	Missing Parts	Damaged Parts	Mislabeled Parts	No Problems	Other	N
Were there problems with your LittleFe assembly kit?	4	2	0	20	11	37

Table 7. Problems with the LittleFe kit and assembly

### Short-Answer Responses

Free-text responses to the short-answer questions were analyzed manually mainly because it was it feasible: the dataset of free-text responses was relatively small and could be analyzed by a single researcher in less than 20 hours. For larger-scale text datasets, automated tools (e.g., text-mining applications) would not only be more effective but cheaper. For each short-answer question, all responses by participants were reviewed and the main themes or suggestions were summarized. The summaries are listed and discussed below; a full compilation of all responses to short-answer questions can be found in Appendix II.

Responses to the first question (A) were consistent with quantitative ratings given to the organization of the assembly instructions; the main constructive suggestions for improvements are given in the adjacent text box. Overall, participants felt that the instructions were clear but some key steps could have been outlined in more detail, schematic diagrams and

<p><b>A. What could be done to improve the organization of the assembling instructions?</b></p> <ul style="list-style-type: none"> <li>- ensure the instructions were all for the same versions of LittleFe</li> <li>- use Ikea-like schematic diagrams in preference to pictures</li> <li>- take more care outlining the assembly sequence of critical parts</li> <li>- improve layout and formatting of sections</li> <li>- order steps more clearly</li> </ul>
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better formatting could have simplified the organization and small parts should have been easier to find and related to the step-by-step assembly process.

Responses to the question on content (B) were very similar to the replies about the organization of the instructions. If anything they were more uniform. For example "picture" was mentioned in 11 responses; "photo" in 2; "diagram" in 4. Overall, participants wanted clarity on key assembly steps and felt labeling pieces systematically would help.

Participants had very positive experiences with the workshop leaders and assistants and voiced few complaints about them or their presentations (C). Most comments here, in fact, were technical ("more assembled units"). A few of the participants felt that some of the leaders had more experience than others.

Only 12 of 37, or less than one-third of the participants, voiced any complaints about the LittleFe kit (D). The most common concerns were about a relative scarcity of tools and (again) about problems with the content and organization of the instructions.

**B. What could be done to improve the content of the assembly instructions?**

- reduce the narrative and increase the use of pictures and graphics
- emphasize the order of steps in certain areas, and don't omit steps
- instructions need to be updated to reflect kit changes
- pictures and labels for small parts such as screws would be useful
- label small parts like bolts more carefully

**C. What could be done to improve the helpfulness/usefulness of the Buildout leaders?**

- ensure all leaders have extensive experience in building and troubleshooting LittleFe and BCCD
- provide more assembled units to use as models
- check that all teams are following steps in the right order
- provide a backup BCCD on a flash drive for participants

**D. Were there problems with the quality of your LittleFe assembly kit? If so, what?**

- Provide additional tools (eg., screwdrivers) for the teams
- Check parts in advance, since a few holes and screws did not work; one board was defective
- Improve the instructions

## Experiences Using LittleFe/BCCD

Following the assembly of the LittleFe units, participants spent the rest of the workshop learning about the possible uses of their units through presentations of examples and demonstrations. Table 8 summarizes participants' impressions of this section of the day. As with the assembly, participants were generally very positive and uniform about their experiences; barely 10% (4/31) felt mildly that the demonstrations and examples were not useful. Understanding the potential value of LittleFe in their courses was not the only benefit that most participants gained from the workshop. A very high percentage of respondents (26/33, or roughly 80%) also felt they would continue to stay in touch with workshop participants and others in the growing community of HPC educators. Not one participant thought that they would be unlikely to continue networking.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A	N	Mean	St. Dev
The event examples and demonstrations of High Performance Computing (HPC), Parallel Programming, and Computational/Data Enabled Science and Engineering were interesting and useful	17	7	3	4	0	6	31	4.19	1.08
I met others with whom I plan to continue networking after the LittleFe/BCCD Buildout event is over	19	7	7	0	0	4	33	4.37	0.82

Table 8. Experiences using LittleFe/BCCD

### Short Answer Responses

The free-text short-answers to survey questions about experiences using LittleFe shed light on the reasons some of the participants might not have found the examples and demonstrations useful, and more importantly, they offer constructive suggestions for improvements.

The main concern about the examples and demonstrations was not that they were poor, but simply that participants felt they had too little time to work with them (E). This was primarily because the first session of the workshop, where the LittleFe units were assembled, took much longer than expected. Many of the suggestions for improving the presentation of examples (F), in fact, focused on how to streamline the assembly process. When asked about improvements and changes to this session beyond the workshop examples (G), some participants were still concerned about available time, but many also offered some very constructive suggestions, which seems to signal their overall high interest in innovative approaches to education in high-performance, parallel and distributed computing education.

Among other things, participants suggested that it would be useful not only to engage with demonstrations that the instructors had prepared, but also to see examples from previous Buildout workshops. They also wanted information on usage and implementation. That is, they didn't just want to study modules in a workshop setting but wanted to know how instructors and participants in other workshops used them in classroom practice.

**E. What could be done to improve the usefulness of examples and demonstrations?**

- provide more time to get to the examples and curriculum; the assembly took too long (this was mentioned by most of the participants)
- provide more examples, demos and uses (this is related to the previous points)

**F. What could be done to improve the quality of the Buildout leader's presentations of examples and demonstrations?**

- the main problem with leader presentations of examples was a lack of time
- reduce the building time (e.g., partially pre-assemble units) so that more time can be devoted to leaders discussing examples and demonstrations and increasing usage

**G. What other kinds of examples or demonstrations could be presented?**

- provide time to use the modules
- provide curriculum and usage examples from previous Buildout workshops (to show cases from the past)
- offer advice on how to use the unit in class, class projects (from beginner to advanced)

More broadly, they had suggestions about the importance of using different methods to disseminate knowledge about LittleFe (H). And they advocated ways to grow the community of educators in the area of parallel and distributed education. Ideas included connecting the Buildout workshops with other SC conference sessions, related panel discussions and programming contests. Websites and social networking sites were suggested as natural methods of sharing libraries of modules developed by workshop participants over the years, and supporting the discussions of effective teaching practice using these new technologies.

**H. In addition to demonstrations and examples, what different ways of showing teaching uses of LittleFe/BCCD could be considered?**

- connect LittleFe usage to other related SC sessions or an additional follow-on session to the Buildout; panels and moderated discussions were suggested
- present case studies of LittleFe usage in actual courses at various institutions, from past participants
- set up a persistent and interactive site (e.g., wiki) or social networking site to organize modules, uses, lessons learned and general participant commentary
- support student programming contests with LittleFe
- provide videos or slide shows that show successful demonstrations and examples, which participants can access outside the workshop, possibly a YouTube channel (see above re: persistent sites)

Participants' responses to the final questions on the survey (I, J), reiterated some of their suggestions about the processes of conducting the workshops and ideas for new methods of building the knowledge base and the community.

**I. What additional comments do you have on the LittleFe/BCCD Buildout or how to improve it?**

- plan for and allocate more time for examples and use of LittleFe/BCCD as well as building it
- expand access to curriculum materials (not just examples and demos) in the workshop or in support material
- improve written building instructions and supplement workshop activities with persistent (online) documentation and support materials
- ensure helpers and instructors are well trained (they generally were regarded as competent but anything that could speed up the building process was regarded as important)

**J. What additional comments do you have on ways other than workshops to train faculty, instructors and students on the use of LittleFe/BCCD in teaching?**

- consider related workshops on topics such as Linux and other software for LittleFe
- support peer-reviewed publication and sharing of LittleFe modules
- convene a LittleFe users conference or online version of the workshop or a related course

## Conclusions and Recommendations

The LittleFe/BCCD Buildout workshop at SC12 was generally regarded by participants as very successful, although they suggested a number of ways it could be improved for future conferences. As funding permits, LittleFe group leaders should also seriously consider implementing some of the ideas beyond the workshops that the participants discussed. The participants' comments indicated they were not aware of the listservs, the NCSI repository site, or the Facebook page that the LittleFe group already provides for these purposes. They should be informed of these, although developing a next-generation of social networking and repository



services should not be expensive and could improve LittleFe/BCCD dissemination and communication.

The analysis of the Buildout workshop results is useful, but the key outcomes of this project are to develop new modules that use LittleFe/BCCD and to use them in courses at the colleges of workshop participants. This will be the topic of the next data collection activity. Critical to the success of this effort will be to ensure that participants adhere to the agreement they made on their acceptance to the workshop [2]: (i) use the LittleFe/BCCD unit in their classes, (ii) develop and publish at least one module for the LittleFe/BCCD platform, which will be curated by LittleFe; (iii) submit two brief reports 6 months and 12 months after receiving the LittleFe unit detailing the classes in which the modules have been used; and (iv) provide the materials for the curriculum modules that have been developed. If we are able to get this data we will be able to make a case to our project funders that their investments in LittleFe/BCCD have yielded strong returns.

## References

- [1] LittleFe Buildout. <http://sc12.supercomputing.org/content/littlefe-buildout>
- [2] LittleFe 2012 Buildout Event. <http://littlefe.net/buildout>
- [3] Super Computing 2012 (SC12) Conference. <http://sc12.supercomputing.org/>

## Appendix I: SC12 LittleFe Buildout Survey Questions

The following pages show all questions from the SC12 LittleFe Buildout survey as they appeared to participants.

NATIONAL COMPUTATIONAL SCIENCE INSTITUTE

Jump To:

### LittleFe Buildout Event Survey

Shodor > NCSI > 2012 Workshops > LittleFe Buildout Event > Surveys > LittleFe Buildout Event Survey

The main goal of the first set of evaluation questions will be to understand what you thought of the event: whether it met your expectations or not, what you learned, and what you may have wanted to do or learn but did not. We would like you to complete this survey within a week or two of the workshop.

#### I. Background information

**Which LittleFe Buildout event did you attend?** \*

2012 Salt Lake City - SC12 HPC Educators Program

**What is your gender?**

Select...

**What is your ethnicity?**

Select...

**Where do you teach?** \*

Other

**If 'other', please explain:**

**If you are a teacher or faculty member, how long have you been teaching?**

Select...

**Have you ever attended an SC Education Program/HPC Educators Program before?** \*

Select...

**If yes, which ones?**

Prior to 2005     2007     2010

2005     2008     2011

2006     2009

[Select All](#) - [Select None](#)

## II. Experiences Learning and Assembling LittleFe/BCCD

Please rate the following statements on your experiences assembling your LittleFe/BCCD unit at the event.

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	NA
<b>The organization of the assembly instructions was good.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *
<b>The content of the assembly instructions was clear.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *
<b>The Buildout leaders were helpful and/or useful.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *
<b>We were able to complete the build in the allotted time.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *

[Select None](#)

**What could be done to improve the organization of the assembly instructions?** \*

**What could be done to improve the content of the assembly instructions?** \*

**What could be done to improve the helpfulness/usefulness of the Buildout leaders?** \*

**Were there problems with the quality of your LittleFe assembly kit?** \*

*Please check all that all apply.*

- Missing Parts
- Damaged Parts
- Mislabeled Parts
- No problems with the assembly kit
- Other

[Select All](#) - [Select None](#)

**If 'other', please explain:**

### III. Experiences using LittleFe/BCCD

Please rate the following statements on your learning to use your LittleFe/BCCD unit at the event.

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	NA
<b>The event examples and demonstrations of High Performance Computing (HPC), Parallel Programming, and Computational/Data Enabled Science and Engineering were interesting and useful.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *
<b>I met others with whom I plan to continue networking after the LittleFe/BCCD buildout event is over.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> *

[Select None](#)

**What could be done to improve the usefulness of the examples and demonstrations?** \*

**What could be done to improve the quality of the Buildout leader's presentations of examples and demonstrations?** \*

**What other kinds of examples or demonstrations could be presented?** \*

**In addition to demonstrations and examples, what different ways of showing teaching uses of LittleFe/BCCD could be considered?** \*

### IV. Suggestions for improvements to LittleFe/BCCD training and outreach strategies

**What additional comments do you have on the LittleFe/BCCD Buildout or how to improve it?** \*

**What additional comments do you have on ways other than workshops to train faculty, instructors and students on the use of LittleFe/BCCD in teaching?** \*

## Appendix II: Participant Responses to Short-Answer Questions

Following are complete records of all participant responses to short-answer questions in the order in which the questions appeared. Section headings of the questions are included. The responses are shown in association with the related numerical rating from the same participant to give a broad sense of the consistency across quantitative scoring and qualitative comments.

### II. Experiences Learning and Assembling LittleFe/BCCD

**What could be done to improve the organization of the assembling instructions?**

Org Rating	Organization improvement comments
1	<i>Redo entirely, check while building. Include Photos. There were no instructions for the software build. Helpers were great. Good instructions could be done by one person in a few hours. Great instructions by 3 folks in 4 hours (each). No good reason that instructions were so worthless. Don't get me wrong, great team, great project, loved it.</i>
1	<i>Look at Ikea instructions for motivation.</i>
2	<i>Video and the finished sample were much easier to follow than paper instruction.</i>
2	<i>The video, the printed instructions, and the pre-built example were all helpful, but they would have been more helpful if they were all for the same version of the LittleFe. There were minor differences between all three resources. When we switched from the printed instructions to the video instructions, we missed at least one step in the assembly process because of these differences. The printed instructions and video individually, were careful and methodical. But when we tried to combine them we ran into trouble. Fortunately, the workshop organizers and support personnel were very helpful and pulled us through!</i>
2	<i>More photos might be useful. Without the assembled unit to inspect visually, the instructions would not have cut it. If there is an assembly video, let people know about it before they are ready to walk in the door for the buildout. Pre-buildout communication was marginal.</i>
2	<i>Overall it was thorough instruction. But I have a few comments on it. Diagrams will be more helpful than actual photos, e.g., Lego and IKEA assembly manuals. Components in the photos of the assembly instructions are not scaled, so it's kind of confusing to find the right nuts and bolts. Also it would be helpful if the assembly sequence of critical parts are more clearly visible. We had to unbolt the master motherboard to attach the WiFi card. It was kind of annoying. It could be avoided if it was emphasized in the instruction.</i>
2	<i>The organization was fine. It would have been nice if they were more in sync with the online video.</i>
2	<i>The written instructions were not useful. To improve, provide a diagram like the one provided with the assembly kits of bicycles, or furniture (<a href="http://www.sheldonbrown.com/retroraleighs/catalogs/1977-drawings/images/22-track-bike.jpg">http://www.sheldonbrown.com/retroraleighs/catalogs/1977-drawings/images/22-track-bike.jpg</a>)</i>
2	<i>I thought the organization was clear.</i>
3	<i>We just barely got done before the allotted time, I think if the instructions were more clear then everyone would be able to finish in time. To make the instructions more clear I think that main points of buildout should be bolded and in order and below the main points there should be further explanation of what is to happen.</i>
4	<i>No comments.</i>
4	<i>a few key steps were not clear in the instructions. these were relayed at the buildout.</i>
4	<i>itemize the screws</i>
4	<i>organization fine</i>

Org Rating	Organization improvement comments
4	<i>Maybe create a slideshow to make it easier to follow.</i>
4	<i>I think having a color version of the assembly instructions would have helped along with my suggestion below about having pictures. Additionally, perhaps a local copy of the online instructions available for viewing in the case of a bad network connection (as was the case at SC12). Probably the biggest improvement would to be have complete documentation of the entire process. The print-outs covered most of the hardware assembly, but the software setup required help from the Build leaders since there were no written instructions.</i>
4	<i>Put in the assembly instructions the software configuration steps as well.</i>
4	<i>There were a couple of places where the ordering of the operations did not coincide with the ordering on the instructions.</i>
4	<i>The instructions were ordered well.</i>
4	<i>More figures to go along with the written instructions would have been helpful, however having the assembled unit available during the buildout was far more useful than a two dimensional picture may have been.</i>
4	<i>Make it more of a numbered, step-by-step set of directions.</i>
4	<i>N/A</i>
4	<i>Use of bullet points</i>
4	<i>Organization was pretty good. It looked like the printed instructions came from an HTML source and when printed this had some problems like section headers at the bottom of a page with the section content on the next page. Perhaps a little better printed layout would be helpful.</i>
4	<i>The organization was fine.</i>
4	<i>N/a</i>
4	<i>Having pictures with outlines of the parts to help uniquely identify them. Have instructions be pictorial like Lego assembly instructions.</i>
5	<i>Organize it more in section and subsections. The video was for a different model, and as the wireless internet was iffy during the sessions, several of us could not watch it.</i>
5	<i>N/A</i>
5	
5	<i>Not much...(no instructional detail could have prevented us from experiencing a false Fire Alarm!-- hence slowing us down). It was quite helpful to have the pre-built LittleFe to look at--for certain points of the assembly.</i>
5	<i>Provide a detailed assembly instructions</i>
5	<i>Use the same model for both inspection and assembly.</i>
5	<i>Have the youtube video more easily acceptable for contest participants.</i>
5	<i>Giving things to check at the end of each major section might be good - this would prevent people from going too far with an improper setup</i>
NA	<i>N/A</i>
NA	<i>labels on screw bags</i>

## What could be done to improve the content of the assembly instructions?

Content Rating	Content improvement comments
1	<i>Please do not make us build the case - I build computers routinely for myself and for friends. A case is just a case - there is no value in building it.</i>
2	<i>Redo entirely, check while building. Include Photos. There were no instructions for the software build. Helpers were great. Good instructions could be done by one person in a few hours. Great instructions by 3 folks in 4 hours (each).</i>
2	<i>Only needed to supplement sample and video. Stress the important order of certain assembly steps.</i>
2	<i>The printed instructions would be clearer if they included more photographs. Better quality reproductions of the instructions would also help, making the photos easier to interpret.</i>
2	<i>The content may be improved by reducing the words in it. For me, I felt like it's somewhat wordy for the Buildout situation. Although it was not a contest of how fast one can build a LittleFe, we were still under the time pressure to finish building it in a couple of hours. And the atmosphere was like 'Let's build it faster than others!' :) So considering the unexpected psychological factor, I hoped that the instructions would be shorter and have more intuitive diagrams like my son's Lego instructions. :)</i>
2	<i>Lots of pictures.</i>
2	<i>The written instructions were not useful. To improve, provide a diagram like the one provided with the assembly kits of bicycles, or furniture (<a href="http://www.sheldonbrown.com/retroraleighs/catalogs/1977-drawings/images/22-track-bike.jpg">http://www.sheldonbrown.com/retroraleighs/catalogs/1977-drawings/images/22-track-bike.jpg</a>)</i>
2	<i>The most helpful tool was a constructed LittleFe that could be used as a model. The instructions were not complete or detailed enough. Multiple times we ran across situations where steps were not mentioned in the instructions. The software instructions were the ones that need the most work. They were very incomplete.</i>
2	<i>More pictures, more Lego/IKEA-like. Say more in fewer words.</i>
3	<i>1.The instructions need to be updated when changes are made to the kit. For example, there was no indication that the one board without a fan should be used for the head node. Time was wasted. 2. Don't use details such as the 'white' cable clip, when the new kits contain 'black' cable clips. There were other examples but I can't recall them right now.</i>
3	<i>Have diagrams with clear part numbers and concise instructions.</i>
3	<i>I think more pictures would have improved the assembly instructions. The printed out instructions were incomplete and without a stable network connection, we could not view the wiki page. We mostly relied on looking at the completed model and trying to replicate that setup. Pictures of each component and how it is assemble would be extremely useful.</i>
3	<i>My team spent a lot of time figuring out which screws to use; a picture of each kind of screw would have been helpful. Also, we had to look at the example unit to figure out how components were oriented. I expect that people without a finished unit would have had much more difficulty. If the instructions had accompanying pictures for each step, they would have been much clearer; there was too much text, and too few pictures. I really like the style of the instructions on ifixit.com, for example.</i>
3	<i>- Provide 'drawn-to-size' profile drawings of the screws, nuts, and washers. This would be very helpful during the unpacking and contents checking stage. I'm thinking of 'outline' drawings that I could hold a screw next to make sure I've got the right</i>
3	<i>Explain just a little clearer</i>
3	<i>Give a as detailed as possible instructions</i>
4	<i>I think that it would be good to provide the assembly instructions in color printouts as it was hard to distinguish the details of some of the photos.</i>
4	<i>I think by having the content in bullet form would make things easier to read</i>



Content Rating	Content improvement comments
4	<i>pictures of screws...</i>
4	<i>several directions referred to parts by color or some other feature that were not in line with the actual devices in use. we corrected these with the organizers as we went, so there may be nothing left to fix.</i>
4	<i>pictures and perhaps show a video of various steps before turning everyone loose</i>
4	<i>It is very good already.</i>
4	<i>Make sure the assembly instructions reflect the LittleFe model being assembled.</i>
4	<i>Be sure to indicate that the head node does not have a fan on it!!!!</i>
4	<i>Highlighted sections in the assembly instructions would have been helpful in keeping the workflow going. For example, Section One. 'Assemble the Frame', Section Two 'Assemble the Mainboards', etc.</i>
4	<i>Make the assembly instruction more clear and to the point. Also point out places that is easily mistaken.</i>
4	<i>clear cut instructions</i>
4	<i>Once the unit was built, the student helpers told us how to configure the BIOS, etc. I didn't see these steps explained in the printed material. This would have been nice so I could follow along and understand the steps.</i>
4	<i>Assembly video content was good. Redo written instructions using the Lego style organization.</i>
4	<i>The instructions were not clear in places. More diagrams/fotos with labels would definitely help. As a newbie at this, some of the terms were not known to me. A glossary might help with that.</i>
4	<i>Adding pictures of the parts to be used for each block of instructions.</i>
4	<i>N/A</i>
4	<i>Giving more visual examples of what parts look like would help, in particular showing the areas where parts connect. Having scale in the pictures would help too</i>
5	
5	<i>Perhaps some extra pictures for the steps of mounting the processors could help (esp. if NO pre-built LittleFe was available). The main question we faced was how to assess the left-side/right-side of the metal plates onto which the processors are mounted--the question being which face of the plate should facing us. Likely this was all clarified well in the instructions...(but I found that a few seconds of looking at the pre-built unit saved me from a careful read at that point!)</i>
5	<i>Make sure that the video is accessible during the assembly process.</i>
NA	<i>N/A</i>
NA	<i>more pictures on the written instructions</i>

**What could be done to improve the helpfulness/usefulness of the Buildout leaders?**

Leader Rating	Leader improvement comments
3	<i>Some of the leaders were misleading - they should be trained and should be able to build these things on their own before they are asked to advise us.</i>
3	<i>The student helpers did everything that you could expect student helpers to do. The leaders did not seem organized.</i>
3	<i>More familiarity with the design/BCCD/curriculum.</i>
4	<i>They were pretty helpful. Maybe, to improve their troubleshooting skills, train them with faulty LittleFe's.</i>
4	<i>The leaders were cordial and helpful. Make sure that an adequate number of leaders know what to do regarding the software installation. Things seemed a little disorganized regarding the software.</i>
4	<i>The buildout leaders were very helpful and I can't think of anything they could improve on, so kudos to them.</i>
4	<i>Maybe have one or two more assembled units available to serve as reference models. It got a little crowded sometimes around the one unit.</i>
5	<i>They were great folks, very knowledgeable and helpful - nothing to improve!</i>
5	<i>Lock step demonstration with a camera, and have all teams follow steps</i>
5	<i>Nothing! The Buildout leaders and staff were extremely helpful and encouraging!</i>
5	<i>The leaders were extremely helpful! Please keep up the good work!</i>
5	<i>The buildout leaders were great.</i>
5	<i>The leaders are very helpful. Some of them would do better with more detailed knowledge of assembly.</i>
5	<i>They were very helpful.</i>
5	<i>I thought the leaders did a great job, especially considering the number of teams they were helping. We got helpful answers every time we asked a question. Also: It would be REALLY HELPFUL if each LittleFe came with a USB flash drive with BCCD installed. We were given one to install from but these were taken back. I would feel a lot better about having a copy of the actual OS I installed. I can get BCCD of the web but it appears to be an older version (and neither the 'latest' or 'testing' versions seem to match the version we were given at the buildout).</i>
5	<i>They were very helpful</i>
5	<i>A couple of more assembled LittleFes for references</i>
5	<i>I thought the helpers were great I don't have much to say for them</i>
5	<i>they were great.</i>
5	<i>they were great, though it was unclear who to ask for specific problems -- some were clearly more aware of hardware issues, while a different subset were able to help with software</i>
5	<i>no suggestions</i>
5	<i>They are awesome!</i>
5	<i>Leaders were great!!!!!!</i>
5	<i>Having the assembled LittleFe out on the table where we could all go and look was a great idea!!!!</i>
5	<i>The Buildout leaders were more than helpful.</i>
5	<i>N/A</i>
5	<i>Nothing. They were fine.</i>
5	<i>In general, they are practically perfect in every way.</i>

Leader Rating	Leader improvement comments
5	<i>Most were great. However, we checked several times during the process with them to make sure that we were doing it correctly, and we assured we did. As it turned out, we build ours in mirror image, and in the end had to undo a lot of work. That is why we could not finish in the allotted time. Otherwise we would have finished in plenty of time.</i>
5	<i>N/A</i>
5	<i>N/A</i>
5	<i>All of them should be familiar with the hardware and software</i>
5	
5	<i>Nothing really.</i>
5	<i>The leaders were very helpful</i>
NA	<i>I think that it would help if all members of the Buildout leaders team had experience in building the LittleFe units themselves.</i>
NA	<i>N/A</i>
NA	<i>give all buildout leaders personal screw drivers haha</i>

**Were there problems with the quality of your LittleFe assembly kit? If so, what?**

Instructions	
Rating	Other Problems with instructions
1	Very bad instructions; assembly video is not clear either; URL kept changing; Instructor, did not assemble -- but some groups had missing or unprepared (e.g. needed to be filed) parts.
2	
2	Not a problem with the LittleFe assembly kit, but hoped that there was more screw drivers and tools.
2	
2	unlabeled parts
2	
2	
2	No tool to tighten the think nuts that hold red switch bottoms, so one of them was lost in transit. Should have taken some spare preplacement parts.
3	
3	I recall some minor problems such as the holes for power switch being too small and needing widening and some other minor faults that were quickly resolved.
3	We had one screw of the wrong size
3	
3	One screw was replaced with a different length screw (but the threading was the same, so it didn't matter too much).
3	
3	
4	
4	
4	I was part of the leaders team, so I had no kit of my own to assemble.
4	
4	As it turned out, one of boards was faulty and had to be replaced.
4	
4	
4	Some LED mounting holes were too small, but they were easily enlarged with a file
4	
4	
4	
4	
4	
4	
4	
4	
4	
4	
5	

5	Only one more screw-driver type wrench could have saved abit of time for us--instead of the crescent wrench.
5	
NA	
NA	

### III. Experiences Using LittleFe/BCCD

#### What could be done to improve the usefulness of the examples and demonstrations?

Examples Rating	Examples improvement comments
2	<i>Make sure we get to the curriculum section with enough time to cover it well.</i>
2	<i>Unfortunately we didn't really get to these. We had some time to run a few examples, but there was no 'organized' presentation about using the LittleFe or the software included with BCCD.</i>
2	<i>It took the entire day to assemble the LittleFe. Very little time was spent on examples and demonstrations. Perhaps another morning or evening session is in order to get this done.</i>
2	<i>The whole day should be devoted to the buildout.</i>
3	<i>Not yet ready to answer this</i>
3	<i>We didn't really have an opportunity to go over the examples at the buildout, though our team did poke around with the examples on our own time.</i>
3	<i>The assembly took too long leaving no time for the examples and demonstrations. The instructions in the README files need updating...</i>
4	<i>Because of time, we did not have a chance to look at many of the examples and demonstrations. We were trying to solve software installation problems.</i>
4	<i>Dedicate more time in the buildout to discuss the examples. In our session, not even 10 minutes were dedicated to that.</i>
4	<i>Another example or two would have required another session - which would have been worth it. Some guidance on creating our own problems in a follow-on session.</i>
4	<i>More time for the buildout would help. We didn't get to fully test the software after getting the hardware assembled.</i>
4	<i>No comments.</i>
4	<i>My partner and I managed to run a few demonstrations, with the help of the leaders, but there wasn't centralized instruction. We wouldn't have been able to run the demonstrations if we hadn't had the prior experience that we did, since there weren't step-by-step directions.</i>
4	<i>Provide a short tutorial on the examples and demos, and on BCCD in general.</i>
5	<i>Need to have a session dedicated to getting started with the littleFE software load. As it worked out there was almost no introduction to the software so we are now exploring on our own.</i>
5	<i>Show the general steps to convert typical codes to GPU codes.</i>
5	<i>They don't need any improvements.</i>
5	<i>A few more examples</i>
5	<i>None</i>
5	<i>For the example on the power points, I think it would be useful if we all could pull up the power point on our computer to reference what the speakers are talking about.</i>
5	<i>document the algorithms presented? I was unfamiliar with GalaxSee, for example, and was unsure what was so computationally expensive as to require a parallel implementation.</i>
5	<i>I would have liked to have a two hour session devoted to using the LittleFe unit (for example, introducing the unit in a class setting). Time may have been built into the event day, however, my team took a little longer assembling the unit, thus did not have as much time to explore in the company of the Buildout leaders as I would have liked.</i>
5	<i>N/A</i>
5	<i>Examples were fine however, more demonstrations are needed.</i>

Examples	
Rating	Examples improvement comments
5	<i>Get curricular models from past grantees integrated into BCCD.</i>
5	<i>Make sure the wireless works. My laptop was not able to hang on to connections for more than a few minutes at the time once the conference was in full swing. The first 2 days, I had no such problems.</i>
5	<i>N/A</i>
5	<i>N/A</i>
5	<i>Having a demo LittleFe at the front where buildout instructors can demonstrate assembly techniques might be useful</i>
5	
5	<i>Well...again the fire-alarm took some time and we just barely got through the steps for BIOS and liberation. So we did not get to experiment with the pre-loaded BCCD programs, as intended.</i>
NA	<i>To my knowledge, there weren't any examples of using the LittleFe. Adding these would have been useful.</i>
NA	<i>For this, I hoped to have more thorough instructions explaining what the examples do.</i>
NA	<i>Didn't see any due to time constraints.</i>
NA	<i>We need to have more examples and demonstrations. I think that adding more structure to the event by helping all participants complete the build in enough time to do some hands-on, leaders team led exercises with the newly assembled LittleFes would be helpful.</i>
NA	<i>N/A</i>
NA	<i>they are fine</i>

**What could be done to improve the quality of the Buildout leader's presentations of examples and demonstrations?**

Examples Rating	Leader presentation of examples comments
2	<i>More time where there is no focus on the assembly of the LittleFe.</i>
2	<i>Not sure, since they only happened informally one-on-one with groups that had finished their builds.</i>
2	<i>Buildout leaders' presentations were very good.</i>
2	<i>Perhaps planning ahead of time what we want to say and when we want to say it.</i>
3	<i>Again, we didn't really have an opportunity to go over the examples.</i>
3	<i>Maybe preassemble some parts to leave time for examples and demonstrations.</i>
3	<i>There were no demonstrations!</i>
4	<i>More time.</i>
4	<i>This part was good.</i>
4	<i>There should have been a 'follow-along' example, and handouts showing the syntax of commands.</i>
4	<i>??</i>
4	<i>I realize that the priority was for the participants to have a working machine when the session was ended. Since different groups work at different speeds, it is difficult to have organized presentations (especially with fire alarms :) ) at the end. I am not sure what a good solution would be. One possibility would be to reduce that amount of construction (have frame already built, etc.) to leave more time for some hands-on involving the examples. Even though there is value in building LittleFe, there is more value in using LittleFe.</i>
4	<i>No comments.</i>
4	<i>If the video and buildout instructions were provided prior to the event. Or if participants were made aware that they were available prior to the buildout, participants could familiarize themselves with the instructions before attempting the assembly. Make a bigger deal of the assembled example to look at. This helped a lot, and we didn't start looking at it until we were frustrated with the written documentation.</i>
5	<i>there was no presentation of examples or demonstration.</i>
5	<i>N/A</i>
5	<i>Nothing. He was fine.</i>
5	<i>Need more time for software examples and demonstrations.</i>
5	<i>hands-on with the build out machines.</i>
5	<i>Nothing.</i>
5	<i>The quality was nice, I just needed another example</i>
5	<i>The Buildout leaders' presentations were quite informative.</i>
5	<i>Adjust pacing so all desired topics are covered evenly.</i>
5	<i>Improve the instructions with diagrams and a glossary (with pictures would be great)</i>
5	<i>N/A</i>
5	<i>N/A</i>
5	<i>We didn't really have any presentations, but we should definitely fix that. Even demonstrating speedup and communication overhead with GalaxSee could be useful</i>
5	
5	<i>Perhaps an extra morning session for using Galaxsee, NAMD, Life or other examples and pedagogical demonstrations.</i>
5	<i>A detailed discussion on curriculum module based on LittleFe. A website with more information</i>



Examples	
Rating	Leader presentation of examples comments
5	<i>I thought this presentation was good</i>
NA	<i>To my knowledge, there weren't any examples of using the LittleFe. Adding these would have been useful.</i>
NA	<i>Didn't see any due to time constraints.</i>
NA	<i>I don't remember if I was in during the demonstration or presentation. But the student leaders were very helpful for me to find out what to do next after building the LittleFe.</i>
NA	<i>I was part of the leader team so I will say that we should work harder to get the hands-on demonstrations into the event.</i>
NA	<i>N/A</i>
NA	<i>they are fine</i>

**What other kinds of examples or demonstrations could be presented?**

Examples	
Rating	Other kinds of examples and demonstrations comments
2	<i>The demos on the LittleFe are very good, so I think if the leaders had additional time to present these it would be great.</i>
2	<i>I'd love to have had instructed time on using modules and other techniques that those familiar with BCCD could share.</i>
2	<i>Teaching uses were not covered because we ran out of time.</i>
2	<i>More curriculum, especially from the buildout classes of '11 and '12.</i>
3	<i>I think general coverage of what's in the BCCD and what each example demonstrates would be useful.</i>
3	<i>...</i>
3	<i>There were no demonstrations!</i>
4	<i>I think that right now the set of examples/demonstrations is broad and useful.</i>
4	<i>Not sure.</i>
4	<i>I thought the preinstalled examples were great, but they should have been better presented.</i>
4	<i>?</i>
4	<i>More attention could be given to the source code (HPC part) of the examples.</i>
4	<i>No comments.</i>
4	<i>You could walk everyone through assembly of one of the cards maybe using a document camera and projector.</i>
5	<i>see above (there was no presentation of examples)</i>
5	<i>N/A</i>
5	<i>The parts of the build.</i>
5	<i>Need to make clear what kind of instructional modules are expected.</i>
5	<i>games or something that will attract student interest.</i>
5	<i>No suggestions.</i>
5	<i>n/a</i>
5	<i>Examples that would be useful include - advice on how to introduce the unit into a class setting, - introductory, intermediate, and advanced programming assignments, and - classroom to research projects.</i>
5	<i>A walk through of submitted curricular models.</i>
5	<i>Maybe add a Unix session for beginners or those who need refreshers.</i>
5	<i>N/A</i>
5	<i>N/A</i>
5	<i>Having a dead motherboard to pass around could be useful to teach hardware architecture</i>
5	
5	<i>None at this point--I'll keep reflecting on this question as we proceed with our use of LittleFe.</i>
5	<i>Slides on example curriculum module</i>
5	<i>If there were objects that could be reference in examples that the speakers could show I think that could be helpful for the visual learners</i>
NA	<i>To my knowledge, there weren't any examples of using the LittleFe. Adding these would have been useful.</i>
NA	<i>N/A.</i>

Examples	
Rating	Other kinds of examples and demonstrations comments
NA	<i>The Hello World example seems to work. The Galaxee was cool as it helps to see what's going on if I add more nodes for the calculation.</i>
NA	<i>Perhaps how to install software libraries</i>
NA	<i>N/A</i>
NA	<i>they are fine</i>

**In addition to demonstrations and examples, what different ways of showing teaching uses of LittleFe/BCCD could be considered?**

Examples Rating	Ways of teaching other than examples and demonstrations comments
2	<i>Later in the week during SC12 there was an excellent session on 'how to teach ...' that focused on uses of various technologies including the LittleFe. Perhaps a the workshop should try to make sure that everyone knows about the availability of this second session.</i>
2	<i>In addition to my previous comment, a time to talk with one another (panel? moderated discussion?) about how the LittleFe are being or could be used would be really helpful.</i>
2	<i>Teaching uses were not covered because we ran out of time.</i>
2	<i>Case studies of successes at various institutions, possibly with pictures/video.</i>
3	<i>It would have been great to have seen people talk about examples of using the LittleFe/BCCD in actual courses so that we would have an opportunity to emulate those experiences.</i>
3	<i>I like the format Shodor interactivates uses. A web page with an activity, learner instructions and teacher instructions.</i>
3	<i>There were no demonstrations!</i>
4	<i>We will think about this as we study the examples and demonstrations available.</i>
4	<i>Another example or two would have required another session - which would have been worth it. Some guidance on creating our own problems in a follow-on session.</i>
4	<i>A better explanation of the setup of the software environment would have been excellent. It all sort of just starts working, but I'd like to know more of the details of how to set up and configure clusters.</i>
4	<i>?</i>
4	<i>some 'lessons learned' by some people who have used LittleFe in a class</i>
4	<i>No comments.</i>
4	<i>Could there be a uses Wiki?</i>
5	<i>i would love a use case for providing students with LittleFE access. how can we get students using the machine for assignments?</i>
5	<i>N/A</i>
5	<i>Simulations</i>
5	<i>N/A</i>
5	<i>Computer architecture aspects and comparing to GPU alternatives: FPGA, DSP, microcontroller, ... You could have a slide show running on the projection screen while the participants are building their LittleFe's. During the Buildout, there were often 15-30 second lulls while one participant was waiting for his or her partner to complete a task. A slide show of examples, demonstrations, and photos of LittleFe's in use would be nice to see in snippets. It would also give those of us who were slow in building our systems a chance to see some of the demonstrations before leaving the Buildout.</i>
5	<i>With the instruction set, pictures could be handy</i>
5	<i>Production of data (while somewhat of a demonstration) would be a good way of showing students the power of LittleFe/BCCD.</i>
5	<i>More user make videos of classroom use posted to LittleFe Youtube channel.</i>
5	<i>I'm still thinking about that.</i>
5	<i>Adding nodes to a LittleFe by booting BCCD on participants' laptops.</i>
5	<i>YouTube video link to a quality LittleFe build sent to the emails of all participants would be great.</i>
5	<i>A programming contest around LittleFe (like the student cluster competition) might be useful and</i>

Examples	
Rating	Ways of teaching other than examples and demonstrations comments
	<i>fun</i>
5	
5	<i>Perhaps complete video footage of steps--especially if others start building their units on their own-- after only acquiring the framing and the parts ordered on their own.</i>
5	<i>A website that contains different currclum modules</i>
5	<i>have participation involved in the demonstrations</i>
NA	<i>In addition to adding some demonstrations of the computational capabilities of LittleFe, maybe include some discussions of the existing lesson plans, etc. that have been developed for it.</i>
NA	<i>Actual pre-recorded in-situ video lectures. Live internet event.</i>
NA	<i>Creating accounts on the LittleFe. Changing network setup.</i>
NA	<i>I'm not sure.</i>
NA	<i>N/A</i>
NA	<i>they are fine</i>

## IV. Suggestions for improvements to LittleFe/BCCD training and outreach strategies

What additional comments do you have on the LittleFe/BCCD Buildout or how to improve it?

Overall Rating	Buildout improvement comments
0	N/A
0	<i>a non local (internetless) copy of the buildout video should be available and playing in the background on repeat.</i>
2.2	<i>I think that helping others assemble their LittleFes was extremely helpful in solidifying my own knowledge of the process, so I would encourage the participants who finish their assembly early to mentor and assist other teams. I think this would really help build the community.</i>
3.2	<i>Improving the instructions and how things are labeled seemed to be the biggest take-away from this year about how to make things better.</i>
3.4	<i>Will need more time to answer this.</i>
3.8	<i>The Buildout event was really a great experience for me. Thanks!!</i>
4	<i>Excellent activity! I only wish we had more LittleFes to turn the buildout into a class exercise.</i>
4	<i>Nothing additional.</i>
4	<i>The buildout session was great. In the future, I suggest planning a separate required event where the use of LittleFe is explained. This could include both demonstrations and ideas for use in the classroom.</i>
4.2	<i>It was fun and a positive experience with a few wrinkles.</i>
4.2	<i>making sure that the parts that we have all fit together, the filling for the LED lights to fit was annoying. Either that or make sure the tools are there that we can use.</i>
4.4	<i>Perhaps the schedule should be flipped: provide an overview of the LittleFe/BCCD and the demonstrations and curriculum models and then build the machine. This way builders now know what they are striving towards and the ideas that we can take home and utilize is communicated without having to worrying about running out of time.</i>
4.4	<i>...</i>
4.4	<i>I would emphasize more the 'using' rather than the 'building'.</i>
4.4	<i>More pictures on the instructions. More time to assemble and use the provided software.</i>
4.4	<i>All in all, great experience. It should be made clear that someone on the team needs hardware experience.</i>
4.6	<i>Make time for the presentations. Unfortunately this will be hard to do. Ideally this would be a two day event -- perhaps using similar time but spread out over two nonconsecutive blocks of time. That way those who needed more time to finish building could have it and there would be dedicated time for orienting the users to the software and packages. How about a 1pm - 4pm build out followed by a 10:30am-12:00pm instruction section the next day. Basically I'm trying to think of a way that the instruction time for the whole group is not sacrificed for extended build time.</i>
4.6	<i>None</i>
4.8	<i>Some additional time to focus on demos and examples.</i>
4.8	<i>It was a lot of fun, and I'm glad we had the opportunity to build the units ourselves; it wouldn't have been as good an experience if the units had been pre-built.</i>
4.8	<i>No comments.</i>
4.8	<i>Excellent! Thanks for all your initiative and contribution!</i>
4.8	<i>It was a great experience! I learned a lot and got to bring back with me a tool that I will feature in my teaching.</i>

5	<i>Have more tools on hand</i>
5.2	<i>none</i>
5.2	<i>N/A</i>
5.2	<i>No</i>
5.4	<i>The buildout should cover the entire day.</i>
5.4	<i>I don't have any other comments.</i>
5.4	<i>Brilliantly useful way to encourage new LittleFe owners to buy-in to understanding their machines.</i>
5.6	<i>Please continue to do what you are doing to impact undergraduate teaching and education.</i>
5.6	<i>Make sure that all the helpers either are sure about what they say, or know that they do not and get the right answer. Also, the plates were off a little bit, and we all had to share 1 file, so that took awhile. It might also help to tell participants to bring their own tool kits, specifying the tools that would be needed.</i>
5.6	<i>N/A</i>
5.6	<i>We need to have some way of introducing the building of curriculum modules during the Buildout</i>
5.8	<i>N/A</i>
5.8	<i>None. (see below)</i>
6	

**What additional comments do you have on ways other than workshops to train faculty, instructors and students on the use of LittleFe/BCCD in teaching?**

Overall Rating	Other than workshop comments
0	<i>I never got a response that I was accepted. The rest of my team participated and I got there by the end, when everything was done. Therefore I can't really participate of this survey.</i>
0	<i>none</i>
2.2	<i>I think better documentation would be good.</i>
3.2	<i>Online tutorials and instructions (videos, etc.), testimonials from LittleFe/BCCD users, improve the wiki, social media.</i>
3.4	<i>Will need more time to answer this.</i>
3.8	<i>None.</i>
4	<i>Instructional videos about the modules, in the style of coursera / udacity.</i>
4	<i>Nothing to add.</i>
4	<i>Online materials: sample curricula, videos and/or webinars showing lectures, etc.</i>
4.2	<i>N/A</i>
4.2	<i>I think that a workshop for using linux on LittleFe would be good.</i>
4.4	<i>As I mentioned above, I think having people talk about actual experiences using the LittleFe would be valuable.</i>
4.4	<i>...</i>
4.4	<i>Hands-on training is always the best but webinars created by people who have used LittleFe would be very helpful. Also, instead of just some example, the pedagogy involving the examples who would helpful.</i>
4.4	<i>We should just cram a website full of the different things people are using the LittleFe and BCCD to do in classes and student research projects.</i>
4.4	<i>None.</i>
4.6	<i>I know that there is a BCCD developers group. Is there a LittleFe/BCCD users group? if not, making one would be really helpful. If there is, making sure everyone who receives a LittleFe is part of it would be great.</i>
4.6	<i>A informative website</i>
4.8	<i>There need to be peer-reviewed opportunities for the publication/sharing of modules, such as are available at SC and SIGCSE.</i>
4.8	<i>There should be step-by-step directions online for running the examples. Also, it would be great if there were a LittleFe accessible over the internet, with accounts people could sign up for. I think there are similar setups for the Raspberry Pi.</i>
4.8	<i>No comments.</i>
4.8	<i>YouTube videos.</i>
4.8	<i>Encourage Buildout participants to give presentations at professional conferences in their disciplines.</i>
5	<i>?</i>
5.2	<i>none</i>
5.2	<i>N/A</i>
5.2	<i>N/a</i>
5.4	<i>No additional comments at this time. Will do a seminar on the uses of LittleFe at two or more conferences next year. Will poll the audience and share feedback.</i>
5.4	<i>None</i>



Overall Rating	Other than workshop comments
5.4	<i>Conference call of owners. LittleFe User's conference</i>
5.6	<i>Webinars and YouTube videos seem to be effective teaching/communication tools and they allow users to revisit the material at their own pace.</i>
5.6	<i>I think it would be helpfull to have a workshop on how to build a curriculum model for LittleFe, from top to bottom, a small one we could all do together, and then also get help on whatever module we were working.</i>
5.6	<i>N/A</i>
5.6	<i>Could we do an online course (or set of them)?</i>
5.8	<i>Videos demonstrating BCCD's uses. (hands-on and practical videos showing BCCD's use in action)</i>
5.8	<i>Perhaps for cases where there was not enough time for a complete 'buildout': Video demonstrations of the step-by-step processes of construction, BIOS, system settings, and especially the use of the pre-installed software.</i>
6	<i>More time</i>