

Evaluation Report for SC 2007

Prepared by
Gypsy Abbott
Lisa Bievenue
Kathy Harrington

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Executive Summary Supercomputing 2007

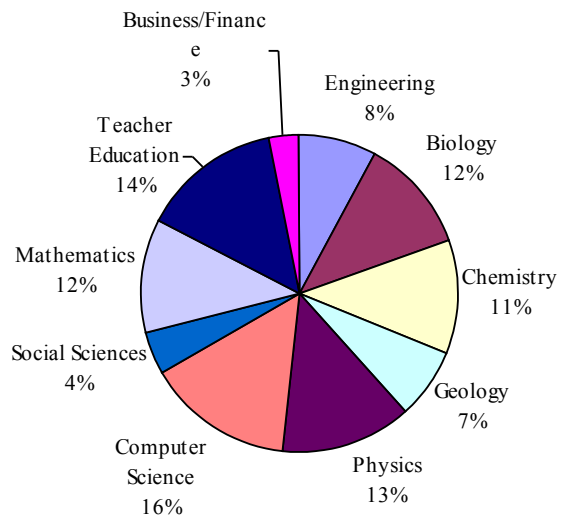
The evaluation of the annual conference for Supercomputing 2007 was conducted using a pre-post evaluation design. Data collected were both quantitative and qualitative, thus a mixed methods design was used. Data sources were: 1) pre-conference survey, 2) post-conference survey, and 3) a focus group with K-12 teachers.

Analyses of the quantitative data included using both descriptive statistics and parametric statistics. The Statistical Package for the Social Sciences (SPSS) was used in these analyses. The qualitative data were analyzed using content analysis procedures as described by Patton (2002). The data were examined for emerging themes as described in this report.

1. Sample for Program Evaluation

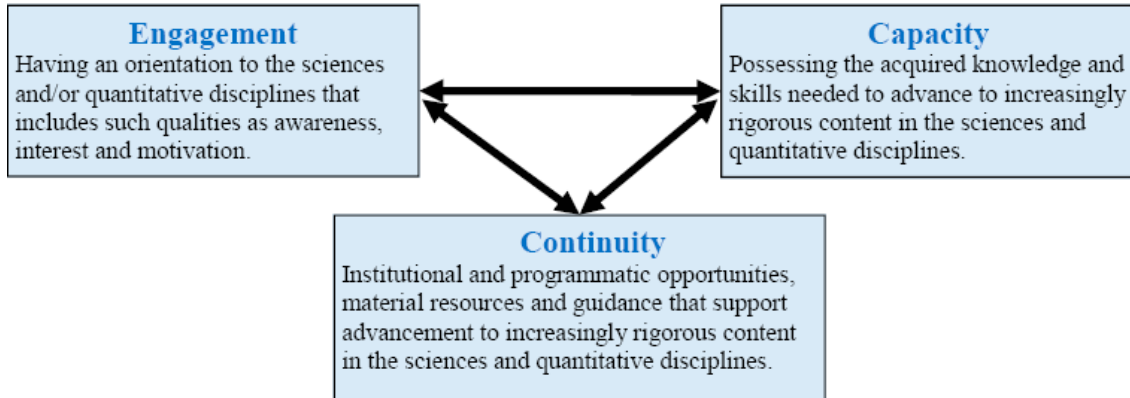
Of those attending the Supercomputing 2007 annual conference, there were a total of 102 individuals who completed surveys. Of these, 67 completed both pre- and post-conference surveys while 8 completed only pre-conference and 27 completed only post-conference surveys. Those participants who completed the pre-conference survey provided demographic information. These respondents were equally divided with respect to gender (males = 38, females= 37) while the majority were Caucasian (64%).

Participants came from diverse areas of expertise as noted in the chart to the right. Participants also came from diverse institutions: 35% from 4-year institutions, 25% from K-12 systems, and 9% from 2-year colleges. As indicated below, 52% of the respondents held a graduate degree. In terms of years of teaching experience, 34% of respondents had been teaching ten years or less and 40% of respondents had been teaching more than ten years. Ages of respondents were almost equally split with approximately half being younger than 40 years of age while the other half were 40 or older.



2. Evaluation Framework

The theoretical framework for this evaluation is the Trilogy model (Jolly, Campbell, & Perlman, 2004). Items in the pre- and post-surveys are tied directly to this model.



In the following text and charts, survey items and concepts will be identified as they relate to this model.

3. Reasons for attending SC07 and Expectations of the Conference

The top 3 **reasons for attending SC07** annual conference were: a) to learn to use modeling and visualization tools in instruction, b) the opportunity to meet and network with other instructors who use these tools, and c) provide knowledge and leverage for making changes in home institution/department/college. The opportunity to network was the highest priority. Participants' expectations for attending the conference were to:

- 1) advance their knowledge of computational science,
- 2) learn to use tools (software and web-based),
- 3) learn about discipline-specific models, and
- 4) learn to display outcomes of data analyses using visualization tools.

Data indicated that all of these expectations were either met or exceeded. (*Engagement*)

4. Post-Conference Outcomes Described by Participants

Participants were asked to indicate **the extent to which they had learned enough to be able to use ideas/activities in their courses/classrooms**. Eighty nine percent (89%) indicated that they felt confident that they had learned enough to use High Performance Computing (HPC) in their classrooms. These findings are related to the *Engagement and Capacity* components of the evaluation framework.

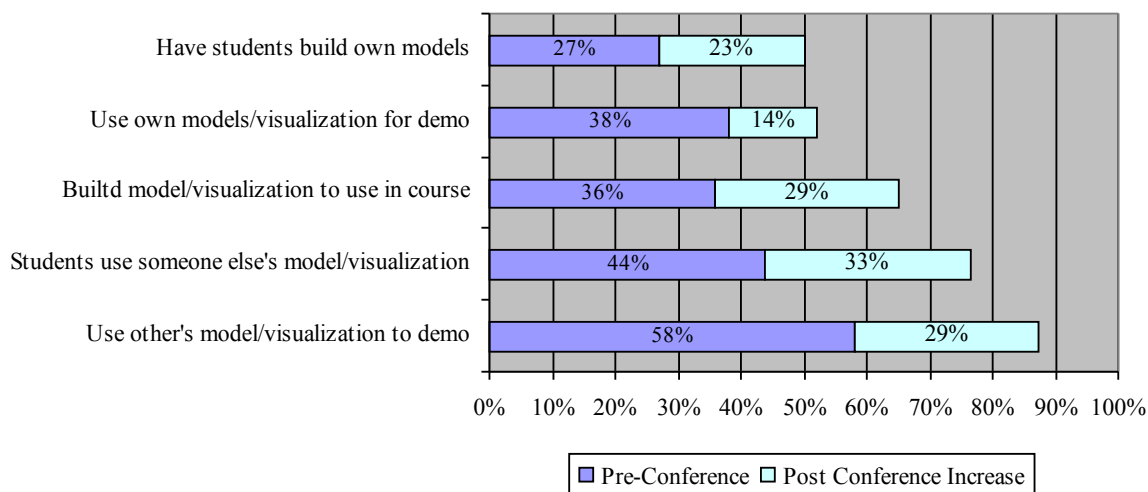
Participants were also asked to provide examples of **activities that can be used to make connections** between their discipline and at least one additional content area, with 89% of respondents describing potential inter-disciplinary connections (*Engagement*).

Participants were asked to assess **the extent to which they plan to change their methods of teaching in their classrooms/courses**. Approximately 84% of respondents indicated that they either somewhat agreed or strongly agreed that they will be changing their methods as a direct result of their participation in SC07 (*Engagement*).

5. Changes from Pre-conference to Post-conference

There was an impressive increase the number of participants who indicated that they will **use modeling and visualization in their teaching** after the conference, compared to those who used it before the conference. The chart below provides a visualization of these increases (*Engagement*).

Pre- and Post- conference use of computational science



A pre- and post-conference **analysis of technology skills** indicated that the greatest gains were noticed in use of numerical methods for research (17.8% gain), modeling (11.6% gain), electronic collaboration tools (10.1% gain), scientific visualization (19.7% gain), HPC resources in education (24.4% gain), and grid computing (23.7% gain). Clearly, the participants have increased their skills in important ways (*Capacity*).

After the SC07 Education program, nearly three times as many people plan to **provide information to others through professional activities** than prior to the conference. Examples include giving a talk on computational science education, developing a computational science program for faculty, and submitting a computational science education grant proposal. More than twice as many participants plan to teach in a workshop or seminar or give a talk about computational science education at professional meetings after the conference (*Capacity*).

All but two participants indicated that they expect to face **obstacles in implementing HPC in their home institution**. Numerous obstacles were described; emerging themes regarding these obstacles were: 1) external constraints, such as issues related to policy in a school district, and financial resources; 2) time for using HPC in the curriculum; 3) access to

appropriate technology; 4) their own level of expertise; and, 5) their students' level of expertise (*barriers to Engagement, Capacity and Continuity*).

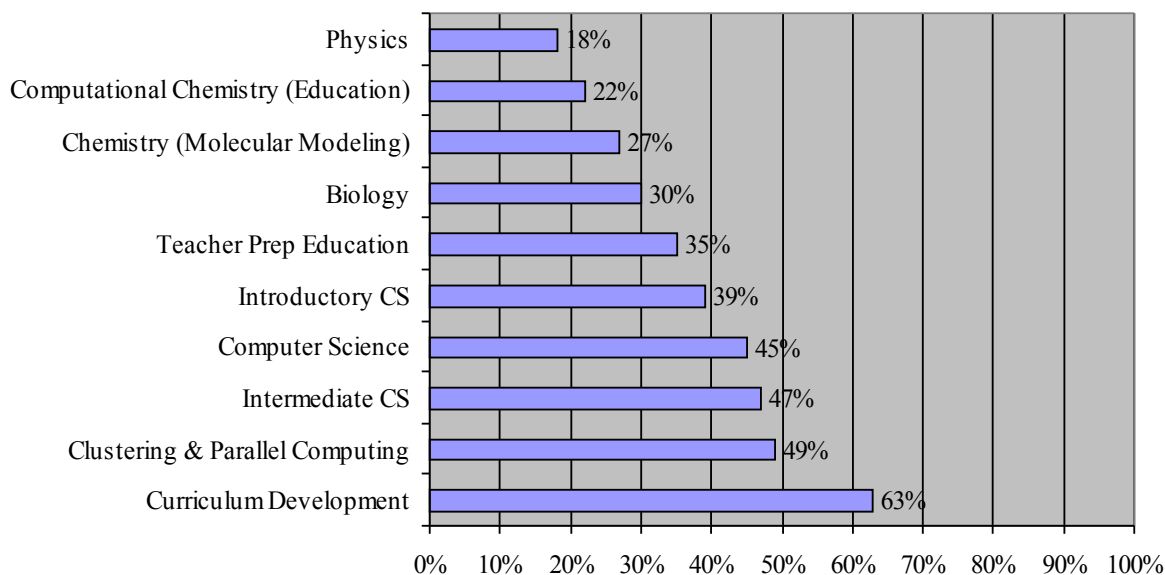
There was no significant difference between the pre- and post-conference scores for **expectations for learning** at the conference ($p=0.792$) although scale means for post-conference were slightly lower than pre-conference means. (26.39 vs. 26.50. Further, there were no differences in "expectations for learning" scores between those completing tests at both time points and those completing it at only pre- or post-conference (*Engagement*)

Self-efficacy or **confidence regarding using computational science** in their work and teaching, were measured as self-efficacy is related to *Capacity* in the evaluation framework. Trilogy model. Comparing the scores from the 67 participants who had complete self-efficacy scores for both time points showed a ~7% change from pre- to post-conference. This change was significant in a positive direction ($p=0.002$) with a pre-test scale score mean of: 57.16 and post-survey mean of 63.07. Participants reported moderate confidence in their ability to use computation science prior to the conference; still, the conference improved participant's confidence in their ability to use computational science at their home institution. Self-efficacy reflects behavioral capacity (knowledge and skills) so an increase in behavioral capacity likely is responsible for the increase in self-efficacy.

6. Plans for Follow-up Workshops

Overall, there was high interest in attending follow-up workshops on a variety of topics. The most popular need was Curriculum Development, followed by various levels of computational science and computing (*Capacity*). This chart presents the percentage of respondents ($n=82-89$ due to some missing data) who indicated interest in further workshops when they completed this section. (See next page)

Type of Future Workshop of Interest



7. Role of Participants in SC07 Team and at Home Institutions

Four categories represent the response of participants with respect to their roles for next year. These include:

- serving as the information person and motivator for both my team and district,
- providing professional development for colleagues,
- provide leadership/mentor, and
- facilitation and implementation.

8. Recommendations for Future Conferences

The following recommendations came from participants on the post-conference survey and are grouped by theme and headed by a summary phrase:

Specific needs – content and resources:

- “More content specific info (even more applicable to K-12 teachers); provide more K-12 teacher workshops and forum’s.
- "Could there be small "snapshots" of simple activities to use in the classroom? ...

”More “downtime:”

- “Days are very long. a lot to learn in a short amount of time; I would allow for a bit of downtime. We got on the bus at 6:30 am and many nights didn't return until 9:00pm. Half a day off would be nice.”

Match presenters to audience needs:

- “Some presenters should slow the pace of presentations. Some were hard to follow workshops run by educators who have had extensive teaching experience.”
- “Presenters are absolutely critical in the design and implementation of the tool but were not (by their own admission) necessarily experienced technology educators/presenters. It would be useful to provide the presenter advance information on their audience; some workshop instructors assumed that we had more knowledge than we did.”
- Workshop facilitators need to be aware of the audience and their curricular needs.”

Offer Levels of Sessions – Beginner to Advanced:

- “Separate participants based on their level of computer proficiency Offer two sections in parallel - one at intro and the other at advanced level; the talks and subject matter went well beyond my reach yet alone those of a high school student.”
- “Offer a basics for people who are unfamiliar with the computer terminology; almost like a crash course.”
- “Many times because I was new to the "community" I have no clue what was being discussed. Some of the sessions presumed a knowledge base that I do not have.
- “Perhaps a slower pace in some of the presentations would have helped neophytes.”

More time, handouts or tutors for software applications:

- “Either longer time to learn the software applications or more people to help when I get stuck.”
- “Handouts that explicitly take users through the software and lessons would be very helpful.”

Hotels within walking distance of conference:

- “The transportation was at time frustrating. Having a hotel within walking distance of the convention session is much more helpful than having to wait for buses.”

Repeat all of the "tool instruction" workshops at least once during the conference, perhaps in evening sessions.

- “These workshops are invaluable for K-12 teachers, and should take precedence over everything else for this target group.”

Web-based support for post-conference access (*Continuity*):

- “I would like to see a support network to help us use what we learned when we get home.”

In the focus group conducted on Tuesday of the conference, K-12 teachers indicated that they most definitely want to “stay connected.” Their suggestions include either list serves or communicating via a social networking tool such as Facebook. In the opinion of the Program Evaluator, this is an opportunity that should be thoroughly explored. This speaks to creation of a virtual community to keep these networks that were formed during the SC2007 meeting intact.