

## EVALUATION METHODS

The evaluation initiative associated with the CWCS Program has evolved as the activities of the Center have grown in scope. Early evaluations were, by necessity, short-term in nature. However, the Program now has a sufficiently long history, and a considerable number of past-participants who have used content from the workshops in their teaching, that we have more recently engaged in longer term evaluations of the Center's activities. Over the last grant period we developed prototype evaluation materials and methods which will serve us well over the course of the proposed activities: (i) to assess the effectiveness of the workshop series, (ii) to further focus the Center on the development of a community of learning, and (iii) to focus participants on ways to enhance their own instruction. Throughout the evaluation program there are numerous times that a participant can identify hindrances to successful implementation of new curriculum content and pedagogy. Careful and timely review of this data will allow us to provide individualized assistance, most commonly in the form of establishing mentoring partnerships with other members of the learning community.

In addition to providing an assessment of the participants' satisfaction with the workshops and the impact on their own professional development, *the evaluation program is also designed to elucidate changes in their students' learning and perception of chemistry and science, and institutional growth.* The evaluation process is conducted entirely online via the CWCS website. The data is submitted directly from pull-down menus, buttons and fields on the webpage into a database which provides for great flexibility in terms of sorting, binning and statistical analysis. While the Director and Co-directors work with the independent evaluators to establish how to best address the evaluation of the goals of the program, all data is collected independently of the presenters and management team.

Much of the data provided in the online reports were gathered from (i) application forms, (ii) end of workshop evaluations, and (iii) long-term evaluation forms completed 1-3 years after participation in a workshop. These data were collected primarily by Dr. Rebecca Owen and Dr. Jesusa S. Josue working under the direction of Professor Emelita Breyer.

The evaluation program has evolved to provide for collection of data and perspectives through a variety of online forms that are designed specifically for each workshop depending on the instructor's goals for the workshop. For example, workshops that cater to the development or enhancement of freshman and sophomore level classes will have different goals, and impact a larger number of students (SMET majors and non-majors), than specialized workshops which will impact fewer students (most often Chemistry majors in upper level undergraduate courses). Other workshops provide an integration of different disciplines to provide perspectives and laboratory skills in contemporary areas of science.

- In an extension of an initiative from previous Molecular Genetics workshops, all applications will include a *Participant's Expectation Form*. The data collected from this form provides the workshop instructors with a perspective on the background, experience and training of the participants, and allows for some tailoring of the workshop materials. It also serves to focus the applicant on what they hope to learn from participation, and will be used to provide baseline data for comparisons of knowledge before and after the workshop to determine the efficacy of the program in reaching the goals of both the instructors and the participants.
- At the conclusion of the workshop, the participants complete a detailed *End-of-Workshop Evaluation Form*. This form consists of a detailed critique of the instruction, topical content, and facilities. This data is provided to the CWCS directors who then provide a synopsis to the instructors. It provides the program directors with valuable insight into the general level of

satisfaction expressed by the participants, and specific areas that might best be addressed by direct consultation between the CWCS directors and the workshop presenters. Presenters will be expected to address any substantial criticism with the Director in the design of any future workshops.

- Given the rising number of participants over the lifetime of the program (approximately 150 new participants per year), future plans are to evaluate the medium-term impact (1-3 years) of the program by two related initiatives:
  - All participants in workshops over the previous 3 years (i.e., approximately 450 participants) will be contacted by email to complete a short *Implementation Assessment Survey* regarding their use of materials to date, interactions with other participants, and future plans. While this particular activity is expected to result in a lower response rate than other methods, this survey, together with a bulletin of highlighted activities of other participants, maintains a level of interest in the program and allows participants to communicate their successes and challenges, to which we can respond.
  - One-third of participants from each workshop will complete a more detailed *Temporal Development Evaluation* in each of the three years after attending a workshop; each participant will only complete ONE of these forms over the course of three years. This will provide us with a quantitative assessment of how materials and methods are beginning to be incorporated into the teaching activities of the participants. Participants will be offered a \$20 gift certificate to insure a high rate of participation in this particular phase of the evaluation program so that we can track the incorporation of workshop materials in a statistically-valid fashion. The evaluation team will phone participants who do not complete the on-line survey in response to an email. While this is the most time-consuming aspect of the evaluation process we have succeeded in attaining high response rates to similar surveys in the past. A selection of participants who have identified that they have made use of the materials in Years 1-3 will be invited to take part in a *Student Impact Evaluation* (see below).
- Whereas long-term evaluations in the past have focused on participants of workshops 1-3 years earlier, future longitudinal assessment will be made via a *Cumulative (Long-term) Evaluation Form* will be distributed five years after attendance and consists of a detailed analysis of how participants have used content from the workshop in their classes. At this stage it includes analysis of materials that they have developed beyond those provided at the workshop, and conversely, determination of materials that they initially adopted (as indicated perhaps in the temporal development survey) but subsequently discontinued. A *randomly chosen* selection of participants will be invited to take part in a *Student Impact Evaluation* (see below) in conjunction with the Cumulative Evaluation. Participants will be offered a \$30 gift certificate to insure a high rate of participation, with phone contact to prompt responses.
- In 2004-5 we developed instruments to determine the effect of the workshop series on student learning. Evaluation surveys were developed by CWCS in collaboration with participants for distribution to their students in classes that made use of workshop materials. For the *Student Impact Evaluation* the participant identifies the content and activities that they use in their courses that are derived from taking part in the program. They work with the evaluation team to design a simple-to-administer course-specific instrument to collect critiques from their students in a current or upcoming class. This is often administered in conjunction with the home institution's course critique, and focuses on a variety of potential areas of enhancement depending on the goals and level of the course. These may include questions related to how the topics relate to other material in the class, how these topics effect learning, recognition of the

relevance of the topics to science in society, interest in careers in science, etc. This evaluation method will be deployed in two situations in future:

- Once it has been established (from the *Temporal Development Evaluation*) that a participant is using a substantial amount of content from a workshop in their instructional capacity. This is, of course, a biased analysis in that it only addresses those participants who have made extensive use of the workshop materials. However, this information can then be used by the Directors, Instructors and Participants in refining community-building activities.
- A randomly chosen selection of participants (25%) will be invited to complete the student survey to provide a perspective on the impact of the program in a manner that is unbiased by the sole selection of those participants who have made extensive use of workshop materials.

The online evaluation tools and automated database compilation allow for the collection and review of data collected from the variety of evaluation instruments described above. Based on the evaluation plan described above we expect to collect approximately 2,000 individual evaluation instruments. Reviews prepared by evaluation team will be presented to the directors for further discussion and distribution to workshop presenters and the Advisory Committee. They will be included in periodic reports to NSF.

Proposed Evaluation Instruments (annual basis)			
<i>Instrument</i>	# surveys		<i>expected return</i>
	<i>to distribute</i>	<i>%</i>	
<i>Participant's Expectation</i> (all applicants)	200	100%	200
<i>End-of-Workshop Evaluation</i> (all participants)	150	90%	135
<i>Event/Activity Evaluations</i>			
Virtual reunion	135	90%	122
- i.e., 90% of previous year participants			
Symposium (all attendees)	100	50%	50
<i>Temporal Development Evaluation</i>	150	80%	120
- i.e., 1/3 of participants from previous 3 years			
<i>Implementation Survey</i>	300	20%	60
- i.e., remaining 2/3 from previous 3 years			
<i>Cumulative (Long-term) Evaluation (5year)</i>	150	80%	120
<i>Student Impact Evaluation</i>			
- 25% of Implementation Survey respondents, i.e., 15 participants @ 40 students	600	80%	480
- randomly-chosen 25% of cumulative evaluation respondents @ 40 students	1430	50%	715
<b>Total (annual)</b>	<b>3215</b>		<b>2002</b>