Summary of Regional Meeting held 16 June 2012 at the University of Michigan at Dearborn

Project Title: RCN-UBE: Promoting Concept Driven Teaching Strategies in Biochemistry and Molecular Biology through Concept Assessments
PI: Ellis Bell
Awardee: American Society for Biochemistry and Molecular Biology (ASBMB)
Award Number: 0957205

Meeting Coordinators: Harold B. White (University of Delaware) and Marilee Benore (University of Michigan Dearborn)

University of Michigan, Dearborn Hosts: Marilee Benore and other Dearborn faculty

Site and Time Selection: Detroit is within three hour driving time of a number of colleges and universities in the Midwest ASBMB Undergraduate Affiliate Network region. Prof. Marilee Benore, on the faculty at the University of Michigan at Dearborn, has been very active in ASBMB undergraduate affairs and agreed to host the meeting. The meeting was held on a Saturday during June after the spring semester was complete and during a time when many faculty are free to travel.

Publicity: All ASBMB members in the Midwest region were contacted. In addition, non-ASBMB members who teach at undergraduate schools that have chemistry and biochemistry departments in four states: MI, IN, IL, OH were contacted and invited to attend. The meeting was announced on the ASBMB website.

Demographics of the Registrants: A total of 37 people registered for the meeting. Six of those who registered could not attend for various reasons. The registrants represented 27 different colleges and universities of which 22 were represented at the meeting. The greatest distance travelled was from Chicago and several attendees drove about 3.5 hours to attend. Only 12 of the 37 registrants, other than the organizer and hosts, were ASBMB members and only five schools represented had UAN chapters. This information was gathered prior to the meeting through an on-line survey originally used for the meeting at Moravian College in March.

Other questions on the survey included:

1. What courses do you teach?
2. What topic(s) or concept(s) in Biochemistry and Molecular Biology do you find most difficult to teach or for students to learn? Provide at least one example.
3. Which of the following pedagogical approaches have you used in your teaching? What is your level of comfort, if used?
   a. Lecture
   b. Laboratory Instruction
   c. Undergraduate Research Training
d. Problem-Based Learning (PBL)

e. Process-Oriented Guided Inquiry Learning (POGIL)

f. Peer-Led Team Learning (PLTL)

g. Case Studies

h. Service Learning

i. Portfolios

j. Clickers

4. Which of the following assessment strategies have you used?

   a. Essay Examinations
   b. Standardized Examinations
   c. Concept Inventories
   d. Concept Mapping
   e. Oral Examinations
   f. Group Examinations

5. To what extent do you emphasize the following in your teaching?

   a. Facility with mathematics
   b. Writing clearly
   c. Construction of logical arguments
   d. Interpretation of data
   e. Creating pictorial visual models by hand. (reactions/diagrams/graphs)
   f. One or more molecular modeling programs in class
   g. Molecular modeling in lab
   h. Molecular modeling take-home/out-of-class. (What platforms are you comfortable with?)

6. What do you hope to gain or learn by attending the meeting at Dearborn?

Program: Registration was held from 9:00 – 9:30 AM. Each person received a name badge and a binder containing program information, a flash drive with files of all of the binder materials, and handouts. Included in the binder were the program, a list of registrants, the results of the pre-meeting survey, copies of slides for several presentations, promotional material for the ASBMB and the UAN chapters, as well as the following selected to be relevant to the meeting and of general interest:


In addition, each attendee received a copy of Vision and Change in Undergraduate Biology Education: A Call to Action (AAAS 2011). Picking up on a feature started by Duane Sears at the UCSB ASBMB NSF-RCN meeting, photos of registrants were captured from the Internet and included on the list of registrants. About 80% of the photos were available online. This was a popular addition to the format.

In the week before the meeting, Hal White sent out a message to all registrants. It restated the purpose of the meeting, included the list of registrants, requested volunteers to be note takers at the meeting. This also was a suggestion by Duane Sears and it relieved some of the logistical problems encountered at previous meetings.

The meeting began at 9:30 AM with a welcome and introductions by Marilee Benore. She had every attendee stand and tell who they were, where they were from, what they could contribute to the meeting, what they wanted to learn from the meeting, and one question they had that they would like to have answered. These introductions were not part of our schedule and took until 10:25 AM. However, the activity was quite useful despite the time it took. Hal White then provided an overview of the NSF-RCN grant to ASBMB and its objectives. He followed that with a plenary talk, Classic Research Articles as Classroom Texts for Problem-Based Learning in Undergraduate Biochemistry. It described an Introduction to Biochemistry course he offers to second-semester sophomore biochemistry majors at the University of Delaware. It is conducted entirely in a problem-based learning format using research articles on hemoglobin and sickle cell anemia as problems. The talk ended at 12:15 PM. Because we were behind schedule and the lunches were ready, the planned initial workshop activity was delayed until after lunch.

Box lunches were provided over the noon hour which was used as an opportunity for participants to talk among themselves about their teaching experiences. During that time, Marilee Benore gave a presentation about the ASBMB-UAN program to about 10 faculty and Peter Oelkers led another group to see the teaching and learning center.

The afternoon workshop part of the program, beginning at 1:30 PM, was defined by the grant objectives and the timeline proposed there. Specific workshop goals for 2011-2012 - "Taxonomy of concepts and skills- links to potential revisions of ASBMB recommended curriculum and Active Learning Strategies" - as related to Specific Aim 2 - "Create a taxonomy of these foundational concepts and skills, and link them to topics outlined in the undergraduate curriculum recommendations of ASBMB."

A general outline for the three workshop sessions followed the program developed for the ASBMB NSF-RCN meeting in Moravian College in March.

1. Rewrite the core concepts developed in the first year into sentences.
2. Unpackage learning objectives from core concepts.
3. Identify underlying concepts from chemistry, physics, and math that support these learning objectives.  
The four working core concepts were assigned to groups to discuss with one topic per group and two groups per topic:

1. Energy: Fundamental Nature, Utilization and Flow (Groups 1 & 5)
2. Core Concepts in Biochemistry and Molecular Biology are Based on: (Groups 2 & 6)
   a. Objective Measurement
   b. Quantitative Analysis
   c. Critical Interpretation
3. Macromolecular Structure, Function, Regulation, and Storage (Groups 3 & 7)
4. Transformation and Transfer of Information (Groups 4 & 8)

At the beginning of the workshop session, the registrants participated in an activity designed to create 8 diverse working groups of 4 people each. The groups were then assigned to discuss specific core concepts as noted above. The idea was to have maximum involvement, limited focus for each group, and the opportunity to compare the results from groups working on the same topic. In previous meeting, it proved to be chaotic and time consuming to have each group report out and discuss their summary statements. Consequently, a different approach was taken. The sessions were shortened to 40 minutes. Then the two groups on each topic were brought together to compare and refine their statements and thoughts. Before the next workshop session each group was given a short time to state the major point of their discussions without general comments from the larger group. The recorders in each group captured the discussions and sent them to Hal White after the meeting. He then collected and summarized the sessions in a single report which was distributed as an e-mail attachment during the following week.

The meeting ended at 4:50 PM after a general discussion, during which a wide range of topics were mentioned. Hal white encouraged the attendees to continue their discussions after the meeting and to consider forming a regional group of faculty who would meet on their own. An assessment form was completed by all but one of those who attended the meeting.

The main message that emerged from the evaluations was that the participants appreciated the opportunity to meet for the first time and network with regional, like-minded faculty. There was a lot of interest in active learning pedagogy and also in obtaining assessment instruments such as concept inventories for biochemistry and molecular biology.

**Meeting Coordinator’s Assessment:** I believe that the meeting was very successful in bringing together a sizable group of regional biochemistry and molecular biology educators and promoting discussion on topics related to the grant’s goals. Although some participants did not realize the nature of the meeting and were surprised to be enlisted in the afternoon workshops to be workers on the grant objectives rather than being in an audience listening to others as is often the case at other meetings, that tendency was anticipated from previous workshops and averted for the most part by advance mailings and explicit statements several times during the meeting. That and several modifications to the program were useful. The inclusion of photos on
the registrant list was quite popular and didn’t require much extra work. The decision to identify group recorders helped enormously and alleviated the need for me to take copious notes. And the decision to have groups discussing the same topic spend some time together after each activity rather than involving the whole group proved workable.

The addition of an period for all participants to introduce themselves interfered with the timing of the program, but was an excellent way for people to identify kindred spirits early in the meeting. The negative consequence was the necessity to have all of the workshop sessions after lunch, which was a bit heavy by the end of the day. Although each afternoon activity was shortened by about a third, most groups did not need extra time.

We each have a feeling of unease as we look forward to the third year of our grant, because it represents a transition from gathering information to developing and evaluating appropriate assessment tools for the topics we discussed at the Moravian meeting and elsewhere. This will be a major undertaking and one that few if any of the principals on this grant have expertise. Clearly, people with those talents must be recruited in order for us to keep on schedule.

As with past experience at the Moravian and other venues, there clearly is a large group of biochemistry and molecular biology educators who are not affiliated with the ASBMB and who can contribute to the society’s educational mission. Addressing the interests and engaging this population seems to be an opportunity for the attention of the ASBMB Education and Professional Development Committee.

Separate files associated with this report include:
1. Summary of the preconference survey of registrants
2. Compilation of the responses of the eight working groups to the workshop tasks
3. Transcription of the evaluation forms received from 29 participants (to be forwarded later).

Hal White
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25 June 2012