

Trinity University and the Associated Colleges of the South
First Report to
The W.M. Keck Foundation of Los Angeles
The Reform of Introductory Science Courses for Non-Science Majors Program
December 31, 2003

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It is with pleasure that Trinity University and the Associated Colleges of the South present the first report on the program activities made possible by a grant awarded on June 12, 2003, by the W. M. Keck Foundation of Los Angeles. This report covers the six-month period ending December 2003.

1. Progress Since the Grant Was Awarded

Trinity University received this three-year grant on behalf of the consorcial entity known as the Associated Colleges of the South (ACS) and engaged ACS as a sub-contractor for purposes of coordination and administration of grant programs and related reports. This agreement includes a schedule for the disbursement of funds from Trinity to ACS to meet programming needs; dates by which ACS will provide Trinity with financial and project reports; and a provision for payment and reporting adjustments, if needed.

In keeping with the organizational structure as presented in the original grant proposal, once news of the grant award was received, a request went to the ACS Council of Deans to name one institutional representative from each campus to a Science Reform Program Committee. This Committee has program and policy oversight of the activities conducted as part of this grant for the “Reform of Introductory Science Courses for the Non-Science Majors.” Fifteen of the sixteen ACS member institutions have named a campus representative to the Program Committee. A list of committee members is attached in Appendix A.

The organizational meeting of the Program Committee for the Reform of Introductory Science courses was held October 11, 2003, in Atlanta, Georgia. Fourteen of the fifteen institutional representatives and two ACS staff members were present. Dr. Ed Roy, Trinity University, chaired the highly productive meeting. The minutes of this meeting are attached in Appendix B.

The Program Committee affirmed Biology, Chemistry, Physics, and Geology as disciplines targeted for this program. Considerable discussion took place about including Mathematics and Computer Science faculty in grant related activities, given the efforts to integrate quantitative skills into science courses. The Program Committee agreed that while our interest in interdisciplinary approaches to the natural sciences will lead naturally to collaborations with faculty in Mathematics and Computer Science, the focus of grant activities remains on faculty in the natural sciences. There also was discussion about including Psychology and Environmental Science faculty in grant activities. Since these two disciplines are included in the natural sciences in a couple of instances, these

faculty are welcomed to participate, especially where there is interest in and opportunities for collaboration.

Three subcommittees, of three persons each, were formed in advance of the organizational meeting:

- a. Course Design and Assessment Workshop
- b. Course Mini-Grants
- c. Mentoring.

In an effort to make the most of the one day organizational meeting and to facilitate the conversations and program decisions that needed to be made during this meeting regarding Year 1 program activities, the subcommittees were charged with the task of reviewing pertinent information in the grant proposal and preparing reports for consideration by the total Program Committee. Decisions made in each of these areas are recorded in the meeting minutes, which are found in Appendix B. Each sub-committee will continue to work on their respective program areas.

a. The Course Design and Assessment Workshop, planned as part of Year One activities, was held January 10, 2004, at Rollins College, Winter Park, Florida. Twenty-three registrations were received, representing fifteen of the sixteen ACS institutions. Bruce Callen, a consultant from Drury University, and Beth Bowser, ACS staff, also participated. A copy of the agenda is found in Appendix C. All presenters were asked to include in their sessions information about how they are assessing their efforts.

The target audience for this workshop was faculty who teach introductory science courses for non-science majors and prospective applicants for the course related mini-grants, with an emphasis on junior faculty at the post-mid-tenure review stage. Other science faculty who have a sincere interest in this area were invited to participate. Four members of the Program Committee and two other ACS faculty members shared with the workshop participants their efforts in redesigning introductory science courses for non-majors. In addition, Bruce Callen, chair of the Physics Department and co-author of the Science and Mathematics Values Inventory (SaM-VI) that we agreed to beta test, was the keynote presenter for the workshop and shared information about the major reform efforts that have been undertaken at Drury, the process of the assessment of the revised courses and of Drury's overall reform effort, and the SaM-VI. In the grant proposal, it was stated that ACS would work with Don Deeds and his colleague, Bruce Callen, at Drury in beta testing the SaM-VI. At the time the grant proposal was written, it was anticipated that ACS faculty would be trained at this first workshop to administer the SaM-VI. Due to a delay in receiving funds for the SaM-VI, it is not ready to be beta tested. However, Dr. Callen will use this workshop to introduce the instrument and lay the ground work for the training that we anticipate will occur at the fall 2004 workshop.

b. Submission and Selection Criteria have been established and published for the mini-grants that will be available for the design, implementation, and review/redesign of courses. The submission/ application deadline is March 15, 2004. Recipients will be announced by May 1, 2004. The complete submission and selection criteria are found in Appendix D.

In Year One, five members of the Program Committee will serve as the Mini-Grant Review/Selection Committee. In Year II, two members of the Year I Review Committee will rotate off, two new members will be named, and three members of the committee from year one will remain to ensure continuity and consistency. The same pattern will be used in Year III.

c. In the original grant proposal, Mentoring was written with a focus on junior faculty, as a means of fostering change in non-majors science instruction. The Program Committee discussed and acknowledged specific challenges that junior faculty, particularly those in the first two-three years of their career, may face if they participate in this program, as well as the potential benefits to be gained by including more seasoned faculty in this aspect of the program. The Program Committee agreed to focus on junior faculty at the post-mid-tenure review stage and selected senior faculty. Since mentoring can (and should) occur within and between ACS members institutions, it was proposed that on-site visitation by “seasoned” ACS natural science faculty to other ACS natural science departments should be fostered and be the principal use of funds allocated for mentoring. A visiting facilitator-discussion leader would be invited to lead a discussion with the target faculty about their ideas on non-majors science curriculum and have a private meeting with individual faculty members during a one-day visit. This format would permit mentoring of the transformation of non-majors science education at each college as well as the mentoring of junior faculty. Furthermore, it was agreed that the discussion with a visiting facilitator-discussion leader should involve all faculty teaching at the introductory level in the Natural Sciences. While the focus will be on non-majors learning and teaching, all faculty teaching at the introductory level should be included because science literacy, fundamental skills, and core science content are issues that apply to all students, both science majors and non-majors.

The Council of Deans will be asked to nominate natural science faculty who have expertise and experience in areas of relevance to our target audience and the goals of the grant (i.e., course development, non-majors learning, assessment, etc.). Faculty nominated/selected to serve as facilitator-discussion leader will agree to be available to sister ACS Natural Science Departments for this activity. Once the Deans submit their recommendations, a list will be compiled, including area(s) of expertise, and distributed to campuses, through the appropriate channels. This list will enable campuses to choose and invite a facilitator-discussion leader who is familiar with issues they want to discuss.

The Program Committee felt that this model of visiting facilitator-discussion leaders would be the most efficient and effective use of the funds allocated for mentoring. Guidelines for requesting funds and reimbursement procedures for these visits are being developed.

In other discussions at the October organization meeting, the committee agreed that dissemination is important and should occur at multiple levels, including ACS publications (*Palladian* and *e-Palladian*), presentations at professional meetings, and articles in professional journals and other higher education publications. They agreed that assessment should be an integral component of every aspect of grant related activities and programs. Why, how, and what to assess should be explored and discussed and changes implemented as a result of these explorations. There was consensus that science reform needs to include an emphasis on computational, data interpretation,

graphic and table interpretation, and problem solving skills. The Program Committee agreed that it was important to consider how ACS member institutions will institutionalize progress fostered by grant activities, how they will be built upon and continued. Furthermore, the Program Committee decided to create a list of relevant publications and post this bibliography on the ACS Science Reform website. This feature would include such titles as:

- *Shaping the Future: New Expectations for Undergraduate Education in Science,*

Mathematics, Engineering, and Technology (1996)

- *From Analysis to Action, Undergraduate Education in Science, Mathematics, Engineering, and Technology* (1996)
- *Revitalizing Undergraduate Science: Why Some Things Work and Most Don't*
- *Academic Excellence: The SourceBook: A Study Of The Roll of Research In The Natural*

Sciences At Undergraduate Institutions (2001)

Templates for acknowledging support from the W.M. Keck Foundation of Los Angeles in printed materials, handouts, overheads, Power Point presentations, and on the related pages of the ACS web site were submitted to and approved by the Foundation. These templates are included in Appendix G.

An ACS Science Reform Website is under construction. Basic information, including a list of campus representatives to the program committee and the submission and selection criteria for the course mini-grants, is available on this site. In time, additional features will be added to include a bibliography of related materials, links to ACS member institutions' science departments, information on workshops and other grant related activities, an archive of assessment tools or modules, and mini-grant reports. The URL for this site is <http://www.colleges.org/sciencereform/index.html>.

An e-mail list was created to facilitate communication among Program Committee members. Along with the use of conference calls, this e-mail list will be utilized to accomplish much of the work needed to be done between annual Program Committee meetings. Additionally, an e-mail list has been created for the science faculty at the 16 ACS member institutions. This will foster communication with and among science faculty and enable pertinent information about grant activities to be disseminated quickly to those most interested in the program.

2. Challenges Encountered

One of the greatest challenges faced in the first six months of the grant was beginning the grant-related activities during the summer when administrators and faculty have limited availability. This meant that it took longer than anticipated to schedule the organizational meeting and to get underway. Because of this delay, we were faced with the possibility of having three major workshops within a nine-month time span: the Course Design and Assessment Workshop, the Information Sharing Workshop (both Year 1 activities), and the Year Two "Course Implementation/ Assessment" workshop that was targeted for fall 2004. This is being addressed by combining the Information and Course Implementation/Assessment Workshop into one event in the Fall of 2004.

Another unexpected challenge surfaced in working with our colleagues at Drury University on the Science and Math Values Inventory (SaM-VI), which they are developing with support from the National Science Foundation. In the original grant proposal (page 10, item 3.c.), we proposed working with colleagues at Drury University to pilot the comprehensive SaM-VI, which included introducing the Inventory to ACS science faculty at the fall 2003 Course Design and Assessment workshop. Participants in this workshop were to adapt the 80 item inventory for use at ACS institutions and be trained to administer it. However, our colleagues at Drury did not receive their funding until late summer 2003. Consequently, they are not ready to introduce the SaM-VI at the January 2004 Course Design and Implementation Workshop. To accommodate this development, the following plan of action has been adopted by mutual agreement:

- Bruce Callen, co-author of the SaM-VI and chair of the Physics Department at Drury University, will be the keynote speaker at the January 2004 Course Design and Assessment Workshop. He will focus on assessment of courses and student learning (in general), introduce the SaM-VI as a specific tool, and talk about collaboration between ACS and Drury on testing the inventory.
- Participants in the Fall 2004 combined Information Sharing and Course Implementation/Assessment workshop will be trained to administer the SaM-VI, with Spring term 2005 as the target date for administration of the survey.
- The results of the SaM-VI inventory that is administered in spring 2005 will be shared and “next steps” determined at the 2005 Course Assessment workshop. The date for the 2005 workshop will be set at a later time.

3. **Progress Anticipated Within Next Six Months**

- Course Design and Assessment Workshop will be held January 10, 2004, at Rollins College.
- The first round of mini-grant recipients will be announced May 1, 2004.
- Guidelines for the mentoring program will be in place and the first round of proposals will be accepted and reviewed.
- Plans will be in place for the combined Information and Course Implementation /Assessment Workshop to be held in the fall of 2004.
- The next Program Committee meeting place and date will be announced. It is anticipated that this meeting will occur in conjunction with the fall 2004 workshop.
- Planning for Year 2 activities will be underway.
- Dissemination will continue to occur via the *Palladian*, *e-Palladian*, the ACS website, and other means.
- Current science (and mathematics) requirements for non-majors at each ACS institution will be inventoried and shared with the Program Committee.

4. **Other Support Solicited/Received Since Grant Inception**

None solicited/received

5. In Hindsight (grant structure)

The proposed grant structure was the result of more than six years of work and pilot programming. The proposal still is viable and the goals can be accomplished by remaining flexible and by being creative. However, with 20/20 hindsight, we now know that one workshop, rather than the two proposed, would have been adequate for Year 1, due to the late start in Year 1 grant activities.

6. Related Activities

Two articles about this new consortial program and the support for it from the W.M. Keck Foundation of Los Angeles have appeared in the ACS publication, *Palladian*. The Fall 2003 issue is included in Appendix E. The Winter 2004 issue is included in Appendix F.

7. Relevant Honors and Awards

Edward C. Roy, Jr., the Gertrude and Walter Pyron Distinguished Professor of Geology, Trinity University, and chair of the ACS Science Reform Program Committee, received The American Geological Institute's (AGI) William B. Heroy Jr. Award for Distinguished Service on Tuesday, November 4, at the annual meeting of the Geological Society of America (GSA), an affiliated member society. See Appendix H for the full press release.