

THE VIEW FROM THE CHED CHAIR

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Abstract The Division of Chemical Education (CHED) is one of the 33 technical divisions within the ACS. Its mission is to serve and enhance the interests and efforts of all who are involved in the teaching and learning of chemistry at every level. Its goal is to provide a common ground for teachers and students of chemistry to examine chemical education in its broadest sense through its committee and governance structure, website, *Newsletter*, programs at national and regional ACS meetings, the ACS Examinations Institute, the Biennial Conference on Chemical Education, and the premier journal in its field, the *Journal of Chemical Education*. This paper will reflect on the perceived strengths and weaknesses of CHED, and its future promise. It will discuss the following issues and attempt to provoke response and discussion: the seemingly popular opinion that CHED, its programs, and its members get no (or very little) respect within ACS; the static nature of the number and the resulting "graying" of its membership over the years; the unique and attractive resources that CHED has to offer its members and potential members; the responsibilities of the membership to reach out to its non-member colleagues and enlighten them about new directions in chemical education research and practice.

Introduction

The Division of Chemical Education (CHED) is one of the 33 technical divisions within the ACS. Although there are divisions that represent the traditional silos of chemistry as well as more focused segments and inter- and multidisciplinary areas, CHED is unique in that it encompasses *all* of chemistry and *all* of the educational levels at which chemistry is (or might be) taught. Our uniqueness is further demonstrated by the fact that CHED is the only ACS technical division that publishes its own journal (*Journal of Chemical Education*), which is premier in its field worldwide; all the other ACS journals are published by the mother society and are not responsible, editorially or financially, to any division. CHED also owns and operates the ACS Examinations Institute, the mission of which includes every aspect of educational assessment in chemistry. CHED produces extensive and well-recognized programming at ACS national meetings, collaborates with the organizers of ACS regional meetings to enhance chemical education programming, and operates the Biennial Conferences on Chemical Education, which attract as many as 1,500 high school, college, and university teachers. With a membership of over 5,000 and a well-endowed treasury, CHED is professionally rich and is recognized as a major division within ACS.

One of the questions that always arises from CHED members and nonmembers is about the Division's ownership of the *Journal*, and why its citation has not appeared (until very recently) on the publications page of the ACS website.⁽¹⁾ For the answer, it is necessary to review some history; the most recent examinations of the early years of CHED and the *Journal* are given in papers by Bohning⁽²⁾ and Benfey.⁽³⁾ After the first 30 years of the ACS, during which little concern was given to matters of education, a Section of Chemical Education was created in 1908, which quickly became defunct before the beginning of the First World War. After the war, occasional papers related to course content were presented at ACS meetings within the programs of technical divisions, but were clearly out of place there and in the ACS technical journals. This was noted by Neil Gordon (later the creator of the Gordon Research Conferences), a young physical chemistry professor in his first year at the University of Maryland, who imposed upon ACS governance to resuscitate the Section of Chemical Education, and then, a couple of years later, to establish a probationary Division. By 1923, Gordon had brought in more than 1,000 members (keep in mind that the ACS membership was only 15,000 at that time), and the probationary status was removed. Thus was born the Division of Chemical Education. In 1924, Gordon, perceiving the need for a chemistry education journal, approached Charles

Lathrop Parsons, the ACS Secretary for financial support. The story is told that Parsons informed Gordon that the ACS could offer no financial support but he did give his reluctant blessings, betting Gordon a lavish dinner that he would not be able to find 300 subscribers. By the fall of the year, the *Journal* had 1,300 subscribers; seven year later there were more than 9,000 subscribers. "Parsons had lost his bet and Gordon enjoyed his dinner."⁽³⁾ The *Journal* has been published by CHED ever since.

Now, 81 years after its founding, CHED is a mature organization. It publishes a *Newsletter* three times a year, communicates via its website,⁽⁴⁾ and has a well developed governance and committee structure, in addition to all its activities mentioned above. Despite its clear success, rumblings can often be heard among members of CHED that it, its programs, and its members get no (or very little) respect within ACS. The view from this CHED Chair is that these rumblings have no merit. It should be pointed out that the 2005 ACS President, Bill Carroll, made chemical education, especially at the secondary level, one of the initiatives of his administration. In fact, John Clevenger (2004 CHED Chair), John Moore (*Journal* Editor), and I worked with Bill last year to develop the *Chemistry Teacher Connection* program that offers affiliate membership in CHED and access to *CLIC* (*JCE* High School ChemEd Learning Information Center), an online-only *Journal* site for high school teachers, for only \$40/year.⁽⁵⁾ The 2006 ACS President, Ann Nalley of Cameron University, has been a very active faculty advisor of her department's successful Student Affiliates chapter. CHED was one of the winners of a ChemLuminary Award for "innovation and outstanding service to its members" at the recent ACS national meeting in Washington, DC, and often has the largest number of papers of any division in the meetings due to the inclusion of the undergraduate research posters in our programs.

Strengths and Weaknesses

Clearly, the greatest strength of the Division is its members and the way they generate new initiatives and bring them to fruition by their creativity, resourcefulness, and dogged stubbornness. The roster of CHED committees covers the chemical education waterfront: chemistry education research, college chemistry consultants, two-year colleges, computers in chemical education, high school chemistry, international activities, Project ChemLab, regional meetings, website. In addition, the Program Committee puts together the CHED program at ACS national meetings, and the Personnel and Nominations Committee makes the committee assignments and establishes the slate of officers for our annual elections. The Division advises the management of the Passer Portfolio, and has a Recognition Committee to honor long-time members of CHED for their volunteer activities. Papers from the Biennial Conference Committee, the Membership and New Members Committees, and the Long-Range Planning Committee are part of this online conference.

Our Division, led by its members, has taken an active role on many issues of importance to chemical education and the ACS. Professional development activities for local high school teachers are part of the CHED program at every national ACS meeting, and our representatives at the regional meetings serve to facilitate the organization of those activities there as well. Our Outreach Office provides materials for display about the Division, the *Journal*, and the Exams Institute at ACS regional meetings and, increasingly, at meetings of local sections, outside organizations, and international societies in order to encourage the improvement of chemical education. Members of the Division are at the forefront of research into the theoretical and practical aspects of the nature of teaching and learning, and have been outspoken in their support of the continued recognition of chemical education research as a valid scholarly activity within the education system.⁽⁶⁾ Because of its concern that college and university faculty that are not engaged in chemical education research do not truly understand or appreciate the nature of that research at the time of promotion and tenure decisions, the Division has established a task force to provide a series of guidelines for all concerned that, hopefully, will "level the playing field."

An ongoing project that demonstrates the depth of commitment and generosity of the Division and its members is the establishment of an endowment to support in perpetuity awards to recognize high school chemistry teachers within the ten ACS regions. With a total goal of \$300,000 of which CHED will match the first \$100,000 contributed, the endowment has raised more than \$60,000 in less than one year from individuals, local sections, and Student Affiliate groups in amounts ranging from \$10 to \$10,000. In what better way can we say "thank you" collectively to our high school chemistry teachers who inspired us to become chemists and educators?

Whatever our ample strengths, we do have weaknesses as an ACS technical division. Our membership,

while diverse, is not truly representative in terms of numbers and range of chemical education practitioners at high schools, two- and four-year colleges, and universities across the nation. Our membership has increased only 3-4% over the past ten years(7) despite the increase in the overall number of chemical educators in the nation as a result of the growth in the population of college-bound students and the increase in the number of students studying some aspect of chemistry. Despite the range and magnitude of our programs and the opportunities CHED provides for person-to-person networking, our membership numbers have been rather stable and, it might be said, our members have been "graying." It is clearly not a matter of feeding them and they will come. [For comparison, the biological chemistry and physical chemistry divisions have experienced growth during the same period of more than 50%; some divisions, specifically, AGRO, TECH, RUBB, and PROF, have decreased in membership by as much as 30%.](6)

As a member of the faculty, now emeritus, of the chemistry department at a research university, it is not lost on me that my colleagues at home and at other research universities simply do not consider CHED as an option when selecting membership in ACS technical divisions; a very small percentage of them are members of our Division. In contrast, my guess is that many of the members of CHED, because of their broad interests in things chemical, are also members of other technical divisions; for example, I am a member of PHYS and INOR, and was a member of ENVR during an earlier period of my career. I recently asked a friend of mine from a prestigious research university who is an ACS award winner in a field of chemistry if he considers himself to be involved in chemistry education, if he is a member of CHED, and if not, why not. He answered the first part of the question in the affirmative; certainly, the teaching of chemistry at the undergraduate and graduate level, including the mentoring of research students, postdocs, and visiting scholars, represented involvement in chemistry education. However, no, he is not a member of CHED, and questioned whether the Division, which he perceives as populated by "soft scientists," could provide him with anything that would prove to be useful in his teaching. He asked, "What has all the research in chemical education uncovered that was not already known? How do we know that the application of the research findings will make things better? Will it be worth all the time and effort that must be expended to make changes?" Maybe it is true that we don't get no respect, at least from that component of the chemistry community.(8)

We can decry my friend's attitude as Neanderthal or worse, and wish a pox on him, but, of course, that will not change his mind. It is clear that we must develop a strategy to disseminate the evidence of the efficacy of the new approaches to the teaching and learning of chemistry to a wider audience, especially at the research universities. Does anyone have any ideas about how to do that?

And, while we're at it, we need to explore what should be done to attract new members into the Division, and, having done so, encourage them to become active members who will be our new leaders. Let us ask the question of what will those who pay \$20 to become full (if they are ACS members) or affiliate members (if they are not) get for their money. Professional institutional identification, which might be going out of favor in the 21st Century? Good friends and networked colleagues, which, with the communication methods we enjoy may not be perceived as necessary any longer? Programs at national and regional meetings, which one does not need to be a member of the Division to enjoy? What incentives can we provide to potential members? Since we publish our own world-class journal, can we design a membership and subscription package that is cost-effective similar to the one we have developed to attract high school teachers? Does anyone have any ideas about that?

Preaching to the Converted

Over the past decade and more, I have attended many conferences, meetings, and presentations on chemistry education in this country and abroad, including in 2005 trips to Saskatoon (Canada), Oxford (England), Beijing (China), and Jena (Germany). Perhaps it's just advancing old age and the onset of senility, but I cannot but help having feelings of déjà vu all over again at many times, including when I was giving a talk. In fact, others at many of these meetings, regardless of the enthusiasm of the presentations and the novelty of the results, have expressed to me that it seems that all we ever do is preach to the already converted choir. Except for the Gordon Research Conferences this past summer in chemistry education research and practice, and visualization in science education, which did explore new issues with speakers and attendees outside the "chemistry education" mainstream, very few of the sessions at our own very well-developed programs at ACS national meetings and the chemical education sessions at regional meetings attract many listeners from other divisions and chemical interests. Perhaps it is because, sometimes, the CHED programs, because of their size and complexity, are located at venues far from the

convention centers and the sites of the other divisions. Perhaps it is because we cannot compete with the other churches, synagogues, mosques, and temples of chemistry for congregants. We are left to preach to our own choir of converts who have seen the chemical education light.

In the future, the competition might become even more intense if the ACS reconfigures the divisional structure and the programs at national and regional meetings to reflect its new multidisciplinary initiatives. Check out the report on the "The Future Of Chemistry and Multidisciplinarity" from the ACS Board-Presidential Task Force on Multidisciplinarity.⁽⁹⁾ To be forewarned is to be forearmed.

I would like to appeal to each member of CHED to become a personal ambassador in the cause of enhancing the teaching and learning of chemistry at his/her own institution. Perhaps the concept of an "ambassador" is too diplomatic for what needs to be done; perhaps the word "missionary"⁽¹⁰⁾ would be more appropriate. Although I do not personally come from a religious tradition of missionary activity, the *auto de fe* of the Spanish Inquisition not being my favorite historical precedent, I do believe that there are a number of actions we can take on our home turf that might persuade others to join our cause. I offer the following plan to our more than 5,000 members and others who are listening:

- Learn about the new pedagogies for the teaching and learning of chemistry with an open mind, and apply those with fervor that best suit your courses, department, and institution.
- Enthusiastically and never-endingly (*i.e.*, nag, nag, nag) tell your colleagues what you are doing differently and the results you are getting.
- If the number of departmental chemistry majors or course enrollments increase on your watch, take full credit for the changes and tell the world.
- If your department holds faculty research lunches or other "brown bag" meetings on a regular basis, request (nay, demand) that faculty teaching lunches be scheduled similarly so that educational activities can be discussed with the same approbation. Offer to organize them, and do not hesitate to bring up contentious issues.
- If your department holds research colloquia with invited speakers, request (nay, demand) that at least once a semester (or academic year) a distinguished chemical educator be invited to spend the day talking to the faculty and students, and presenting a talk. Offer to host such visits, and do not hesitate to invite someone who will rattle your colleagues' chains.
- When your department invites a faculty prospect for a job interview, if s/he is not already required to demonstrate at least a modicum of understanding about education by teaching a class or presenting a pedagogical seminar about the courses s/he will teach in addition to the usual research seminar, request (nay, demand) that this be done. Forty minutes listening to what a candidate thinks about the educational mission of your department and institution before an offer is made will pay dividends later.
- If your department does not have a formal mentoring process for newly-hired faculty, request (nay, demand) that this be established. Offer to be the "teaching" mentor of the new colleague, to sit in on his/her classes and provide constructive criticism, and guide him/her through the minefields on his/her march toward promotion and tenure. And sign up a new member of CHED along the way.

Be fruitful and multiply (but don't get bogged down with significant figures)!

Notes and References

1. <<http://pubs.acs.org/about.html>>.
2. Bohning, James J. *J. Chem.Educ.* **2003**, *80*, 642-650.
3. Benfey, Theodor J. *J. Chem.Educ.* **2003**, *80*, 651-657.
4. <<http://www.divched.org/>>.
5. <<http://jce.divched.org/HS/aboutclie.html>>.
6. Through the efforts of Tom Greenbowe (Iowa State University), the ACS Board of Directors approved at the Washington, DC, meeting the establishment of an Award for Achievement in Research for the Teaching and Learning of Chemistry.
7. Report by Denise Creech (Director, ACS Membership Division), at Summit on the Effects of a Multidisciplinary Marketplace on the American Chemical Society and its Scientific and Professional Member

Divisions, October 1, 2004.

8. My response: "What would it take to convince you otherwise?" His rejoinder: "Evidence to the contrary."
 9. <http://membership.acs.org/m/multidiscipline/acs_mdtf_report3.pdf>.
 10. The Encarta World English Dictionary in my Microsoft Word application defines "missionary" as "somebody who tries to persuade others to accept or join something such as a belief, cause, or movement." I think that's right on!
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