

**Project MECESUP UCH0403 –  
Curricular Renovation of Civil Engineering in the University of Chile and the  
Pontifical Catholic University of Chile**

**Visitor Report --**

Doris R. Brodeur, Ph.D., Massachusetts Institute of Technology (U.S.A.)

**Dates of Visit:** 13 – 18 November 2005

**Background**

MECESUP, a program of the Ministry of Education, has provided funding for two prominent institutions in Chile, the Universidad de Chile and the Pontificia Universidad Católica de Chile, to collaborate to improve engineering education at the two universities and to make materials from the project available to all universities in Chile. Improvement in engineering education involves a broad scope of activities that include:

- Analysis of the length of engineering programs in Chile in comparison to international standards,
- Curriculum renewal, and
- Increasing application of new teaching methodologies.

To provide a more extensive knowledge base for the ambitious undertaking, the project team will invite experts in engineering education from across the world.

Dr. Jeffrey Froyd, of Texas A&M University, and Dr. Doris R. Brodeur, of the Massachusetts Institute of Technology, were invited to consult and give workshops concurrently during the week of 13 to 18 November 2005. (Dr. Froyd has submitted a separate Visitor Report.)

**Schedule of Activities**

**Monday, 14 November**

Dr. Froyd offered workshops on Monday, 14 November. His report gives details of the workshops from his perspective.

**Tuesday, 15 November**

In the morning, I presented an overview of CDIO, an international collaboration of more than fifteen engineering universities in eight countries, focused on the reform of engineering education. (Information about the CDIO Initiative can be found at <http://www.cdio.org>.) In the afternoon, I presented workshops on curriculum design, and course development. PowerPoint presentations for all sessions are available at the web site for the School of Engineering at the University of Chile. See <http://escuela.ing.uchile.cl/uch0403/taller2005/material/>.

The workshops were held at la Universidad de Chile. Workshops on both days invited participation and interaction, and generated numerous questions from the audience. About 60 engineering educators and other interested participants, representing more than 20 universities and organizations from all of Chile, took part in one or more sessions.

Evaluations, submitted by participants at the end of the workshops were positive, and suggested that participants would be exploring one or more of the workshop topics in greater depth.

### **Wednesday, 16 November**

Both Dr. Froyd and I met with the project team at la Pontificia Universidad Católica de Chile, where we received a more complete report on the scope of the project and its three major components..

### **Thursday, 17 November**

I presented a workshop on program evaluation at a meeting of the sub-committee on curriculum renewal. Later, both Dr. Froyd and and I met with the project team at the Universidad de Chile.

### **Friday, 18 November**

Dr. Froyd presented a workshop on learning strategies at a meeting of the sub-committee on teaching methodologies. The meeting was held at la Pontificia Universidad Católica de Chile. About twenty faculty members attended the two-hour workshop. Afterward, Dr. Froyd and I were invited to lunch with the deans of the two engineering schools and key members of the project team from both universities. We were asked to share our impressions of the project and the week's activities with the assembled group.

### **Impressions**

The following statements are a summary of impressions I shared at Friday's lunch meeting:

1. The proposed project addresses three goals that are critically important to the reform of engineering education in Chile: degree structure and professional titles; curriculum re-design focused on learning outcomes; and, improvement of teaching and learning methodologies.
2. The proposed project is the stimulus for an important collaboration of two engineering schools at Chile's prominent research universities. While past collaborations have focused on engineering research, the two universities now have the opportunity to become leaders of educational reform and models of teaching and learning improvement in all of South America, and beyond the continent. This project can serve as a reference model of engineering education that can be used by many other universities. As such, the project collaboration has the potential to contribute in a significant way to other international collaborations focused on engineering education reform.
3. If we consider five stages to commitment – awareness, interest, participation, commitment, passion – I would say that the constituents at both universities are at the *high interest* stage. Workshops have increased the awareness of a broad spectrum of educators in Chile. Questions and comments at the workshops and during the meetings indicate a desire to find alternatives and move ahead toward project goals. Members of the three sub-committees range from those who are *participating* to those who are definitely *committed* to the success of this project.

4. The project team made good use of the visiting consultants. We were asked to give multiple workshops, and invited to participate in meetings of all the sub-committees over the course of the week. At both universities, people were eager to listen, and receptive to perspectives that may have differed from their own. Many expressed the desire for continued professional contact through email and web pages. (For my part, I returned to MIT with renewed enthusiasm, generated by the energy of project participants.)

### **Recommendations**

Based on my interactions with project team members and workshop participants, I make the following recommendations:

1. Continue to explore alternative models of engineering reform, curriculum design, and program evaluation. Get consensus of the entire project team on the adoption of specific approaches before implementing data collection strategies or introducing new teaching methodologies.
2. Establish connections with industrial partners who are willing to support educational reform initiatives.
3. Re-examine the scope of the project, in light of the two-year commitment of funding from the Ministry of Education. Two possible approaches might be to use the two years in *planning* reform across the entire school of engineering in both universities; or, to start with one or two programs in each engineering school, and plan and *implement* pilot projects of curriculum renewal and teaching improvement. (I believe you will make better progress if you have “something to show” as a model at the end of the two years.) The experiences of other international groups might provide examples and support in this approach.
4. Look for resources to supplement those provided by the Ministry of Education. Initiating change is not cost-free. Consider re-allocating new and existing resources to support early adopters of planned changes, as well as project team members.
5. In the curriculum re-design process, develop plans that are aligned with requirements of accreditation groups, but not constrained by them.
6. Consider the questions raised by workshop participants in planning curriculum re-design and course development. (See attached).