

## **It's Time to Re-think Engineering Education Conferences**

**Russel C. Jones**  
**World Expertise LLC**

**Bethany S. Oberst**  
**James Madison University**

**Thomas J. Siller**  
**Colorado State University**

### **Abstract**

The annual meeting of SEFI (The European Society for Engineering Education), held in Copenhagen, Denmark, on September 12 – 14, 2001, provided a model for what engineering education conferences should be in the future. If engineering education is truly a global enterprise, then we, as professionals, must make these meetings truly international. This can be accomplished by enabling a wide range of colleagues from around the world to participate and to take an active role in disseminating useful information about the processes of teaching and learning in the engineering environment. Two barriers to such democratized participation were attacked in this event: the barrier of culture ignorance, which means that engineers from one part of the world do not always have sufficient understanding of the issues affecting their colleagues elsewhere, and the barrier of cost, which prevents many engineering educators from developing parts of the world from attending in person even the most important international events. The SEFI Copenhagen meeting was the core around which were built 1) a pre-conference, 2) an electronic conference, and 3) a post-conference. Each of these components was designed to enhance the experience of traditional attendees, to attract attendees from other countries and educational traditions, and to extend the benefits of the conference to those unable to attend in person. This paper explains each of the three components and proposes a model for use by future engineering education gatherings.

### **The European Society for Engineering Education (SEFI)**

SEFI (Société européenne pour la formation des ingénieurs) is the major engineering education organization of Europe with membership composed of individuals, educational institutions, industries and related organizations. Since its founding in 1973 SEFI has pursued its mission “to contribute to the development and improvement of engineering education in the economic, social and cultural framework of Europe.” SEFI promotes the

exchange of ideas about best practices through its quarterly publication, *The European Journal of Engineering Education*. It organizes its activities around nine working groups and four committees. SEFI is directed by an elected president and an elected board of 26. Headquarters are in Brussels, where a full-time Secretary General directs operations. For more information see <http://www.ntb.ch/SEFI/>.

### **The 2001 SEFI annual meeting**

The annual meeting of the European Society for Engineering Education (SEFI) was held in Copenhagen, Denmark from 12 to 14 September 2001, under the sponsorship of the Technical University of Denmark and the Engineering College of Copenhagen. The theme of the meeting was “New engineering competencies: changing the paradigm.” Major plenary sessions covered the following topics:

- The changing society
- New engineering competencies
- Changing the paradigm

See [www.sefi2001.dk](http://www.sefi2001.dk) for details of the program.

As early as spring, 1999, discussions were underway between the conference organizers and other organization leaders to determine SEFI’s interest in using the conference as a centerpiece for three important activities that would take advantage of the intellectual stimulation of the central meeting and enhance international participation outside of the European community. Ultimately, three components were approved as add-ons to the central conference design: a pre-conference, an electronic conference, and a post-conference.

### **The pre-conference workshop**

World Expertise LLC of Falls Church, VA USA organized a pre-conference workshop designed to introduce US engineering educators to issues and opportunities in European engineering education, while increasing the participation of US educators in the SEFI annual meeting. US participants were engineering faculty and administrators who want to bring greater familiarity with international issues to their teaching and service responsibilities at their home institutions.

The short, concentrated workshop took place in the day and a half preceding the SEFI conference – on Monday evening, 10 September and all day Tuesday, 11 September 2001. Participants attended presentations and discussions providing a comprehensive overview of current trends and issues in European engineering education. Particular attention was paid to explaining the relevance of these topics to US higher education at both the undergraduate and graduate levels. In addition, selected sessions of the SEFI conference were coordinated with the workshop in order to draw the US educators into dialogue with colleagues on broader themes on international engineering education.

The preconference program was as follows:

Monday evening: Evening reception  
Overview of the workshop  
Introduction of speakers  
Dinner  
Keynote presentation by the 2001 President of SEFI, Torbjorn Hedberg of Lulea University of Technology, Sweden, on the status of European engineering education

Tuesday: Presentations:  
Curriculum developments – Ingemar Ingemarsson, Linkoping University, Sweden  
Continuing education – Patricio Montesinos, Universidad Politecnica de Valencia, Spain  
Accreditation/quality assurance – Giuiano Augusti, Universita de Roma, Italy  
Mobility of engineering students and of engineers – Hans Peter Jensen, Technical University of Denmark, Denmark; and Gaston Wolf, Swiss Technical Association, Switzerland  
Industry perspectives – Kruno Hernaut, Siemens AG, Germany  
Lunch talk: European Union/Commission  
End of day: SEFI annual meeting introduction; SEFI opening reception

Wednesday through Friday

Participation in regular SEFI program

The predicted outcomes of this workshop included:

Greater participation in SEFI annual meetings by US engineering educators

Increased transatlantic dialogue

Infusion of international issues into curriculum at participants' home institutions

Increased collaborative teaching, research, and service activities between US and European engineering educators

## **The electronic conference**

Gearold Johnson, Academic Vice President of the National Technological University and Russel C. Jones, managing partner in World Expertise LLC, designed an electronic conference that took the form of a global poster session using the Internet and the World Wide Web. The intent was to simulate electronically a traditional session in which presenters gave summaries of papers describing and analyzing projects in engineering education, and engaged in dialogue with members in attendance at the session. The hope was that such educators would use provided web locations to share 'best practices' with their peers globally, and in the process of reviewing other such submissions would continue their own professional development.

Announcements about the electronic conference began to circulate in the late spring before the conference. Submissions were posted as they were received. At the actual SEFI meeting the papers were summarized and the results presented as part of an experts' panel. The entire session was videotaped and these results are being made available globally using the same technologies as the worldwide poster session.

The rationale behind this electronic conference is that engineering educators throughout the world need continued stimulation from colleagues in order to stay abreast of new developments in their field, and thus to stay relevant and up to date in their teaching. Active faculty members with adequate resources often accomplish this collegial interaction through participation in international conferences on engineering education, sponsored periodically by organizations such as UNESCO (United Nations Education, Science, and Cultural Organization), WFEO (World Federation of Engineering Organizations), SEFI, and ASEE (American Society for Engineering Education), etc.

Unfortunately, engineering educators teaching in developing countries often do not have the resources to participate in such conferences. Travel expenses, conference registration fees, and on-site expenses are typically beyond their means. This often leads to a steady decline in their effectiveness as faculty members, as they fall increasingly behind new developments in engineering education.

Based on National Technological University's experience, sufficient electronic communication technologies exist, at least in capital cities throughout the developing world, to allow participation in an electronic conference, so that engineering educators there are able to participate readily. In target developing countries (e.g. in Africa, Latin America, Asia, Central and Eastern Europe) the availability of Internet accessibility was assessed and determined able to provide effective access.

The conference was organized similar to traditional, place-bound conferences. Accepted papers were arranged into thematic sessions. This was accomplished on the worldwide web by placing related papers under various entry points from the main conference web site. The conference papers could be presented in text form or via web-based slides, a format common at conferences. PowerPoint could be used to generate the slide presentations and accompanying audio. The full text of each paper was available for either reading directly on the web or downloading for later reading and/or printing.

As is the case at traditional conferences, discussions related to individual papers were encouraged. Threaded discussion groups were associated with each individual paper to facilitate discussion between participants, including authors.

To stimulate the type of discussion that often occurs as a wrap-up at the end of a session, treaded discussions were also organized around each of the thematic sections of the conference. These discussion groups could explore global issues related to the sessions' themes. Participants could discuss broader issues, compare and contrast papers, and make connections with participants with similar interests.

At the completion of the electronic conference, a summary session was held in Copenhagen. A group of technical experts was formed to review the electronic conference activities. This group conducted a half-day session to present their summaries, and interact with one another. Transmission of the session by video means to electronic participants worldwide followed. An audience was present, consisting of participants in the face-to-face conference to which the electronic conference was adhered. Logistics of live electronic interaction with electronic participants, and time zone constraints precluded direct live transmission.

A set of effective processes has been demonstrated through this pilot demonstration conference, and the results may be easily transferred to other conference sponsoring groups for inclusion in the normal conference set of activities. Thus, such conferences would become part of the general framework for many international conferences.

The convergence of computing and telecommunications has been pointed at for several decades as a changing paradigm. Yet most of the changes have been relatively simple. Certainly, the World Wide Web alters the ease of getting information and the hypertext transfer protocol is the killer application that killed client/server computing. As the globe becomes more abstract, movement of more than data and information has to occur. Global electronic communities have to be constructed. This project aims to develop a global electronic community among engineering educators and for the first time, include as citizens, engineering educators from developing nations to share their experiences and learn from their peers.

In the not too distant future, conferences as described herein should become pervasive. Travel requirements must decrease if our global society is truly to become a sustainable environment. This project was a pilot to demonstrate that a meaningful transfer of practices can be accomplished without individuals' traveling thousands of miles to meet in a face-to-face setting.

At the session at SEFI 2001 where the electronic submissions were presented, discussion suggested that the main conference could be further enhanced if its major elements were also made available electronically afterwards – such as video recording of plenary session presentations, to be posted on a web site for viewing by interested persons who were unable to travel to the conference. Such extensions could significantly enhance the effectiveness of such major international conferences.

Engineering has always been a major part of the development of nations and wealth creation. Building infrastructure from roads, bridges, sanitation facilities, potable water, and the development of industries from mining to high technology all require that a nation educate its own engineers. Sending bright young people abroad for education works for a while, but the process ultimately requires that these people is educated at home. In the developing world, many engineering educators have been educated abroad, return home to educate the local population, but then fall further and further behind due to the inaccessibility of state-of-the-art methods in engineering education, 'best practices' of peer instructors, etc. Maintaining networked connectivity is one way the future will provide a nation with a base of well-educated engineering graduates to fuel technical industries

### **The post-conference**

The ASEE took the lead in organizing a post-conference designed to be held in Berlin directly after the close of the SEFI meeting in Copenhagen, on September 15 – 18. The intent was to allow US participants in the SEFI meeting, and others, to take advantage of an additional conference while in Europe. With travel money becoming increasingly scarce in universities, it is important for participants in international conferences to be able to demonstrate the cost effectiveness of the expenditure.

“Global Changes in Engineering Education” was the title of the ASEE post-conference, and included as its main topics.

- National Accreditation / Global Practices
- Educating Engineering Students in Entrepreneurship
- Technology and Learning Systems

Each of these themes was to be addressed by invited speakers in both plenary and breakout sessions. In addition, poster sessions were organized for attendees who wanted to add to the intellectual discussions at the conference.

Unfortunately, the terrorist attacks in the US on 11 September 2001 disrupted air travel sufficiently that it was not possible for individuals planning to attend the post-conference to travel to Berlin, so the entire meeting had to be cancelled. It is being rescheduled for 2002.

### **Conclusions**

Major international conferences on topics such as engineering education can be enhanced by several means:

- Organize an electronic conference run in advance of the conference, to attract papers from international educators in developing countries who will not be able to participate in the conference in person;

- Design a pre-conference aimed at introducing new international conference participants to overall trends and background reflected in the main conference, so that they will benefit more from the presentations and discussions. Given the continuing problem of preparing engineering students for international practice, it is important that more and more US engineering faculty become familiar with international trends. But there is an understandable reluctance on the part of US educators simply to appear at an international conference if there is no educational infrastructure in place to make their integration into the conference activities meaningful and informative.
- Plan a tightly focused main conference, with traditional plenary sessions and breakout sessions – and the papers from those sessions. In planning, make sure that this central organization reflects and acknowledges the three additional components, taking into account the presence of newcomers, both real and virtual, who are participating in the intellectual discussion in innovative formats.
- Offer a post-conference on more narrowly focused topics, aimed at optimizing travel times and costs for participants in the main conference. The post-conference is optimal for structuring person-to-person contacts among engineering educators, without which no progress is going to be made in internationalizing the engineering curriculum.

SEFI 2001 at Copenhagen was a model for this type of enhanced meeting. It is hoped that future international conferences will follow similar patterns, to make their impact more significant.

---

NOTE: The electronic conference described in this paper was previously covered in more detail in “Continuing Education for Engineering Educators in Developing Countries via Electronic Communications”, by T. J. Siller, R. C. Jones, and G. R. Johnson, in the Proceedings of the 8<sup>th</sup> World Conference on Continuing Engineering Education, International Association for Continuing Engineering Education, Toronto, Canada, May 2001, p. 538 – 543.

---

RUSSEL C. JONES

Russel C. Jones is a private consultant, working through World Expertise LLC to offer services in engineering education in the international arena. He previously served as Executive Director of the National Society of Professional Engineers. Prior to that, he had a long career in education: faculty member at MIT, department chair in civil engineering at Ohio State University, dean of engineering at University of Massachusetts, academic vice president at Boston University, and President at University of Delaware.

BETHANY S. OBERST

Bethany S. Oberst is Executive Director of International Education at James Madison University. She previously served as Vice President for Academic Affairs at James Madison University, Dean of the College of Arts and Letters at Southwest Missouri State University, Special Assistant to the President for Strategic Planning at University of Delaware, and Department Chair of Modern Languages at Cleveland State University.

THOMAS J. SILLER

Thomas J. Siller is an Associate Professor at Colorado State University where he has been on the faculty since 1988. He served as a visiting professor at the National Technological University during 2000-2001. During 1997-1998 he served as the Associate Dean for Undergraduate Studies at Colorado State University. Dr. Siller served on the Board of Directors for the Technology-Based Engineering Education Consortium (TBEEC), and was the program chair for the 1997 national conference.