



United States Standards Education Methods

Donald E. Purcell, Chairman

The Center for Global Standards Analysis

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Standards Govern Markets

- ★ “If you control an industry’s standards, you control that industry lock, stock, and ledger” [Out of the Crisis, W. Edwards Deming, Published by the Center for Advanced Engineering Study, MIT (1982) at 302]



Global Trade Impact Related to Standards

- ✦ More than 80 percent of global product trade, equivalent to at least \$4 trillion, is affected by standards and technical regulations. [Raymond Kammer, Director, National Institute of Standards and Technology (1999)]

The Mystery of Standards

- ★ “Standards generally go unnoticed. They are mostly quiet, unseen forces, such as specifications, regulations and protocols, that ensure that things work properly, interactively, and responsibly. How standards come about is a mystery to most people should they even ponder the question.” [See Global Standards: Building Blocks for the Future, Office of Technology Assessment Congressional Report (March 1992); see also the following website for this report - http://www.wws.princeton.edu/~ota/ns20/year_f.html]

The National Standards Policy of the United States

- ✦ For over 100 years, the National Standards Policy of the United States has been that the private sector will lead in the development of consensus standards and the government will play a supporting role. [See National Technology Transfer and Advancement Act , Section 12 (1996); see *also* National Institute for Standards & Technology website: www.nist.gov]
- ✦ Standards Education is Critical...“Section 11- Make the value of standards development both apparent and real by educating public and private sector decision-makers about the value of standards and how to take advantage of the process.” [See National Standards Strategy for the United States (2000); see *also* www.nist.gov]

Global Competition: A Major Challenge

- ★ “The United States has been fortunate to have a pluralistic, industry-led standards setting process that has served us well in the past. Whether it will continue to do so in the future in the face of bruising international economic competition is uncertain.” [U.S. Congress, Office of Technology Assessment, Global Standards: Building Blocks for the Future(March 1992)]



United States Standards Education Methods

- ✦ In the United States, standards education is firmly in the hands of professional organizations and private corporations.
- ✦ Academic institutions and the government play a supporting role for standards education.

The Center for Global Standards Analysis

- ✦ In 1999, The Center for Global Standards Analysis was formed to create standards education programs, and to conduct research efforts related to the development of global standards. [See http://engineering.cua.edu/StandardsCenter/center_for_global_standards_anal.htm]
- ✦ The Center is located at the Catholic University of America in Washington, DC.
- ✦ From 1999-2001, the Center offered a course on “*Strategic Standardization*” for graduate engineering and law students.
- ✦ In 2003, “*Strategic Standardization*” is again being offered at the CUA School of Engineering. [See http://faculty.cua.edu/kellyw/ENGR510/syllabus_draft.htm].

“Strategic Standardization”

- ✦ The purpose of the graduate course for *Strategic Standardization* has been to raise awareness and unravel the mystery of standardization for graduate students.
- ✦ The course is intended for graduate students in engineering, law, government, public policy and standards program managers.
- ✦ The course seeks to create a multidisciplinary perspective for students.

I Fundamental Standards Issues

- ★ Review need for and significance of standards
 - Historical perspectives
 - Governance
 - Economic Impact
 - Interoperability
- ★ Review definitions
- ★ Review policies
 - National and International
 - Government
 - Private Sector
- ★ Review procedures
 - Government
 - Private Sector (Traditional – Consortia)
- ★ Testing, Certification and Conformity Assessment

II Strategic Standards Issues

- ✦ Health
- ✦ Safety
- ✦ Environment
- ✦ Sustainability
- ✦ Energy
- ✦ Intellectual Property
- ✦ Trade
- ✦ Internet & Electronic Commerce
- ✦ Ethics
- ✦ Competition & Antitrust

Catholic University of America

☀ Joint Course [1999-2001]

- School of Engineering
- School of Law: in 2002 the School of Law discontinued joint sponsorship because an insufficient number of students signed up for the course.
- During 1999-2001, 14 law students and 4 engineering students took the course for Strategic Standardization.

☀ School of Engineering [Fall 2003]

- 4 students are currently enrolled in the course. One student is taking the course long distance from Pittsburg, Pennsylvania.

Multidisciplinary Approach

- ★ During the period 1999-2001, several guest lecturers were invited to address the class for *Strategic Standardization* to ensure creation of a multidisciplinary environment.
- ★ These expert speakers came from standards development organizations, associations, corporations, testing laboratories, government departments & agencies, law firms and the academic community.

Private Sector Experts [1999-2001]

- ✦ American National Standards Institute
- ✦ Air-Conditioning & Refrigeration Inst
- ✦ Alliance for Telecommunications Industry Solutions
- ✦ American Gear Manufacturers Assn
- ✦ American Society of Mechanical Engineers
- ✦ American Society for Testing & Materials
- ✦ Chemical Manufacturers Assn
- ✦ Electronic Industries Assn
- ✦ Gas Appliance Manufacturers Assn
- ✦ InfoTech Strategies
- ✦ National Cooperation for Laboratory Accreditation
- ✦ National Evaluation Service [Building Codes]
- ✦ National Society of Professional Engineers
- ✦ National Swimming Pool Institute
- ✦ Organization of American States
- ✦ Underwriters Laboratories

Government Experts [1999-2001]

- ✦ National Institute of Standards & Technology
- ✦ Department of Defense
- ✦ Department of Energy
- ✦ Department of Justice
- ✦ Department of Transportation
- ✦ White House Office of Management & Budget
- ✦ Consumer Product Safety Commission
- ✦ Congressional Staff
- ✦ Environmental Protection Agency
- ✦ Federal Trade Commission
- ✦ Food & Drug Administration

Academic & Legal Experts (1999-2001)

- ✦ Catholic University of America
 - ✦ School of Engineering
 - ✦ School of Law
- ✦ Georgetown University
- ✦ Reed & Smith, LLP
- ✦ White & Case, LLP

Center's 2002 Standards Education Survey: Major Findings [published March 2003]

- ✦ The United States continues to rely on an informal private sector education system for standards education.
- ✦ A very strong consensus exists for a multidisciplinary approach to standards education.
- ✦ Fairness is critical to the standards education process.

Center's 2003 Standards Education Survey: Preliminary Findings for Schools of Engineering [to be published in January 2004]

- ★ Survey: Fall 2003 [Top 100 Universities – Schools of Engineering]
- ★ Very few universities offer a course dedicated to development of engineering standards:
 - ★ Catholic University of America [Strategic]
 - ★ University of Colorado [Boulder – IT]
 - ★ University of Maryland [Strategic]
 - ★ University of Pittsburg [IT (dormant)]
- ★ Most universities integrate a discussion of standards in engineering design, ethics or related courses.

“Accreditation Board for Engineering & Technology” Standards Education Requirement

- ★ “...Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical, health and safety; social; and political.” [Engineering Criteria 2000: Section 4: Professional Component (2000)]
- ★ This accreditation requirement took effect in 2001; see ABET website for more details [www.abet.org].

Standards education is critical to development of a global marketplace

- ★ “There is a clear need in [all nations] for greater attention to standards. In an information-based global economy, where standards are not only employed strategically as marketing tools but also serve to interconnect economic activities, inadequate support for the standards setting process will have [serious] detrimental effects.” [OTA Congressional Report at 9, emphasis added.]
- ★ Because standards education is critical to development of a global marketplace, it cannot be ignored...

Standards Education Proposal

- ★ Create standards education courses that provide a multidisciplinary approach:
 - I Fundamentals [policies, due process, standardization systems management, etc.]
 - II Strategic considerations [health, safety, environmental, sustainability, energy, etc.]
- ★ Create a global education system using interactive internet and CD-Rom technology that integrates all private sector and government organizations interested in global standardization.
- ★ Expand certification requirements such as ABET to science, business, trade, public policy, law and related academic areas.

Contact Information

- ★ Donald E. Purcell, Chairman, The Center for Global Standards Analysis located at the Catholic University of America: email: purcelld@cua.edu or donpurcell@yahoo.com; telephone: 202/314-5232 or 202/319-5140; FAX: 202/319-4459; address: Columbus School of Law, 3600 John McCormick Street, Washington, DC 20064.