Chapter 11
How Engineers Learn about Standards

Ken Krechmer
University of Colorado, USA

ABSTRACT
This chapter focuses on the training needed by technical experts and explores the type of academic coursework as well as training that technical experts need in the field of standards and standardization.

INTRODUCTION
Standardization has been practiced for a long time. Until recently, the people who attended standardization meetings were skilled in the technical field associated with the standardization efforts. As the Internet has become more important to all of society, more people recognize the importance of standardization; some Internet standardization activities (e.g., ICANN) now attract significant non-technical participation. While standards impact many fields (e.g., law, economics, business, etc.), creating functional standards in every technical area still requires technical experts. This paper focuses on the training needed by technical experts and explores the type of academic coursework as well as training that technical experts need in the field of standards and standardization.

Successful technical courses are quite different from successful non-technical courses. Lucky (2006) states that, “We engineers are used to building on the foundation of a relatively small set of rules - Maxwell’s Laws are the proto-typical example - where everything can be reduced to the application of a few equations. This kind of ordered world fits very nicely into textbooks and test questions.” Some existing standardization courses focus on technical students successfully (see below), but no existing standardization courses describe standardization using a relatively small set of rules where the use of such rules allows inference into future system behavior.

The current focus of standards and standardization education is on standardization, the process of
creating, implementing or using a standard, usually with examples of different standardization processes. A “standard” describes a concept or realization based on common agreements. While learning about standardization is desirable, as it offers insight into the importance of standards in every technical and commercial field, this short paper argues that academic courses would be better to focus on teaching the relatively small set of rules that underlie standards and standardization and use specific standardization examples for demonstration that the rules function as proposed.

With the view that there are basic rules underlying it, the entire field of standards and standardization is a science and thus can be termed *isology* - the science of standards. The author argues that studying the science of standards is an academic endeavor while creating standards is a practiced skill.

**REVIEWING STANDARDIZATION EDUCATION WORLDWIDE**

A 2003 European survey on standardization education, Acyl (2003) states, “...the survey shows that very little effort is done in Europe related to standardization training and Education. It also shows that although standardization is above all an issue of business more than a technical issue, Business Schools are not in general involved in any curriculum or session in a curriculum on this matter. More important, it appears a general feeling of lack of understanding about the subject itself [sic].” Courses with some standardization focus identified in this survey include IT Security, Quality Engineering and Software Engineering.

In a report on the Standards Education in Korea - University education program, Kim (2006a) indicates that a common standardization course is given in 35 technical universities and has achieved an enrollment of 2,639 spring semester and 2,323 fall semester students (roughly 100 students per course in 2005) with a good satisfaction rating from the students. Initially the courses suffered from low enrollment, but recommendations from previous students, some publicity and the course being required by the engineering schools increased enrollment (Kim, 2006b).

A course on strategic standardization was offered jointly by the School of Law and the School of Engineering at Catholic University Washington, DC from 1999 to 2001. In three years, 18 students attended. The course was then discontinued (Purcell, 2003).

In a US engineering school survey in 2004 (Center for Global Standards Analysis, 2004), the major findings were:

1. Standards education is not a priority issue among schools of engineering in the United States;
2. Schools of Engineering in the United States do yet not accept the critical nature of standards in the new 21st century global economy.

A survey of standards-related education in Japan conducted by Kurokawa (2005) of the Science and Technology Foresight Center, identified 28 different universities with current standardization courses. These courses are focused on technical students and include lecturers from local standardization organizations. The survey’s author also indicates that the Chinese have a program of standardization education similar to the Koreans.

At two universities in the Netherlands which teach a standardization course, each course attracts between 10 and 30 students per year. The professor teaching the courses notes the difficulty in attracting students to a course in standardization (deVries, 2005, p. 80).

For further standardization course examples see the EU’s European Commission (2006) catalogue of academic institutions involved in research and training related to standardization.

Reviewing these surveys in more detail suggests the following:
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