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**Workshop on "Introducing standards-related issues in educational curricula"**

# Concept note for the Workshop on "Introducing standards-related issues in educational curricula", including a proposed model programme on standardization

**Note from UNECE secretariat**[1]

Following up on a recommendation to further education on standards-related issues, adopted in 1970 by the predecessor of the Working Party, the UNECE secretariat conducted a preliminary, informal review among universities and other higher-level academic institutions.

The exercise revealed that very few of these institutions include standards-related issues in the standard curriculum of students majoring in technical and scientific subjects. Additionally, there are substantial differences in the curricula adopted by the few institutions that offer courses in this domain.

The present document presents as an annex the first draft of a "model educational programme on standardization". With its 15 subject areas or modules, the model programme aims at promoting increased consistency internationally among educational programmes.

[1] Recommendation I, in its original and revised form, calls for "the introduction of the subject of standardization into the scientific and technological curricula of educational establishments". The Bureau, at its meeting in May 2012, requested the secretariat to prepare this document as an example of how the Recommendation could be practically implemented.

The UNECE secretariat hereby invites all interested experts from academia, governmental agencies, companies and international organizations to contribute to the further development of the model programme or supporting materials.

The preliminary and final results of this work will be made publicly available, free of charge, on the WP. 6 website.

# I. Introduction

1. In 1970, the UNECE Government Officials Responsible for Standardization Policies, the predecessor of WP. 6, developed a recommendation that urged governments to include standardization in the curricula of educational institutions (see: www.unece.org/fileadmin/DAM/trade/wp6/Recommendations/Rec_I.pdf. )[2].

2. In the context of awareness-raising and capacity-building activities by the secretariat, a preliminary survey was conducted in countries with economies in transition and developed countries of the UNECE region. It revealed that more than 40 years after the adoption of the recommendation, very few universities yet include standards-related issues in the standard curriculum of students majoring in technical and scientific subjects.

3. A few programmes exist primarily in specialized institutions (usually, under the umbrella of State standards bodies) offering a high school diploma in areas such as standards, certification and metrology.

4. An analysis of such courses showed differences in the underlying educational approaches. For example, in Western Europe standardization is dealt with primarily from the point of view of companies, whereas in the countries of Eastern Europe, the Caucasus and Central Asia, it is dealt with from the point of view of regulatory authorities. Almost none of the existing programmes deal with flanking issues such as metrology and market surveillance.

5. This document presents in annex the first draft of a "model educational programme on standardization". With 15 subject areas or modules, the model programme should ideally cover, in a logical order, the minimum set of issues that a programme on standardization should contain to give a student a general understanding of the major standardization, regulatory and related issues relevant to the activities of business and of regulatory and administrative authorities.

6. This programme would be for implementation by general university level academic programmes (bachelor and master) in economics, business administration and law, rather than to specialized training in standardization. While the model programme aims at establishing a core curriculum, the specific set of issues and the time allocated to each area would clearly have to be tailored to the needs of a specific educational institution and programme.

7. The first draft of the programme was prepared in February 2012 in consultation with a group of experts from educational institutions from Europe and CIS region. The draft was then presented at various forums: at the April 2012 Geneva meeting of the DCMAS (Network on Metrology, Accreditation and Standardization for Developing Countries), at the May 2012 ICES (International Cooperation for Education about Standardization)

[2] A proposed revision of this recommendation is contained in document ECE/TRADE/C/WP.6/2012/7 is currently considering the revision of the above-mentioned recommendation.

conference in Bali and at the June 2012 European conference on education about standardization in Brussels.

8. The UNECE secretariat hereby invites all interested experts from academia, governmental agencies, companies and international organizations to contribute to the further development of the model programme and supporting materials.

9. The preliminary and final results of this work will be made publicly available free of charge on the WP. 6 website.

# Annex

# Proposed model programme on standardization (15 subject areas or modules)

## 1. Standardization basics

**Objective**: to give students an understanding of how standards, regulations and related procedures (certification, accreditation) are used as standard operational tools in the global markets. The impact the standards can have on decision-making processes depends on the characteristics of the standards and related regulatory policies. For example, these policies can make markets more or less open to international trade, they can promote or limit competition, foster or hamper innovation, etc.

That's why it's important to put at the centre of the learning process a discussion on such issues as: who the regulations or standards benefit, how the standards/regulations are drawn up (who has advantages, who is excluded). The dynamics of standardization (how a balance between stability and flexibility can be ensured), competing standards and monopoly standards (the role of the State).

**Issues for consideration**:

- Definitions, functions and classification of standards (product/process/testing; national/regional/international, etc.) and of relevant issues.
- The product's life cycle from cradle to grave and related market and governmental safety requirements (design, production, distribution, waste utilization).
- Interlinkages between standards and regulations.
- Regulatory and quality infrastructure for products and services (standardization, technical regulations, conformity assessment, metrology, market surveillance).

**Time schedule**: 1 teaching unit of 90 minutes.

## 2. Benefits of standardization for society

**Objective**: to demonstrate the benefits of standardization for society as a whole and for major groups of stakeholders (industry, regulators, users, consumers, general public).

**Issues for consideration**:

- Role and importance of standards, value of standardization for different actors, including companies and governments.
- History of standards
- Different kinds of standards (e.g. process standards, product standards).
- Moving towards sustainable patterns of production and consumption: what role for standards? (e.g. requirements for the evaluation of environmental and social impact, safety and security, measurement of compliance).

**Time schedule**: 1 teaching unit of 90 minutes.

## 3. Standardization and companies

**Objective**: to show why and how standards are important for companies.

**Issues for consideration**:

- Value of standards for a company. Standards as a competition tool, use of company standards and of external standards (use of buyer's standards, of international standards, etc.).
- Standardization within a company (how to organize and manage standardization at a company level).
- Standardization and innovation; standards and intellectual property rights.
- Standardization in product development and design.
- Application of company standards..
- Regulatory requirements for documents accompanying a product placed on the market (preparation of a technical file).

**Time schedule**: 1 teaching unit of 90 minutes.

## 4. National legal and institutional framework for standardization

**Objective**: to show how standards are drawn up and used at the national level and how the relevant infrastructure is organized and functions.

**Issues for consideration**:

National approaches to standardization: company-centred and government-centred (potential conflict between companies and regulators).

- Legal basis for national standardization.
- Institutional framework for national standardization (responsible bodies, etc.).
- Role of standards in national legislation and the framework (institutional, technical and legal) for their use by economic actors.
- Participation of business in national standardization.
- Company standards and national standards. Standards developed by associations, or consortia. Stability of standards versus flexibility and innovation.
- Costs and benefits of participation in standardization.

**Time schedule**: 2 teaching units of 90 minutes each.

## 5. Regulatory policies and related institutional mechanisms

**Objective**: to explain the concept of "legitimate concerns".

To ensure a basic understanding of how these legitimate concerns can be accommodated though an appropriate regulatory framework and enforcement mechanisms—including relevant infrastructure—at the national level.

**Issues for consideration**:

- "Legitimate concerns" such as safety of products and services, the protection of competition, the promotion of innovation and compatibility of products.
- The legal framework for developing and implementing technical regulations.
- Institutional framework for national technical regulations (e.g. responsible bodies).
- Good regulatory practices, variety of regulatory approaches (regulatory toolkit, self-regulation and governmental mandatory regulations).
- Setting regulatory objectives (regulatory impact assessment, risk assessment).
- Elaboration of technical regulations, instruments and of compliance mechanisms: responsible agencies and stakeholders, process of preparation, adoption and revision. The role of business (information, consultations).
- Role and status of standards used/referenced in technical regulations.

**Time schedule**: 2 teaching units of 90 minutes each.

## 6. Managing risks through standards, regulations and regulatory impact assessments (RIAs)

**Objective**: to show that standards and regulatory policies are one of several means to manage risk—to health, safety, competition, compatibility of products, the environment, etc..

**Issues for consideration**:

- Portfolio of risks governments need to manage.
- Benefits and costs of treating risks through standards.
- Managing risks throughout the regulatory lifecycle: the role of risk management in regulations, conformity assessment and market surveillance.
- Good regulatory practice and regulatory impact assessments (RIAs).

**Time schedule:** 2 teaching units of 90 minutes each.

## 7. Metrology

**Objective**: to demonstrate the importance of measurement issues to industry, regulators, and consumers.

**Issues for consideration**:

- Legal and institutional national framework for metrology support. The importance of metrology for governments, companies, consumers and users.
- Measurement standards (national, regional and international). International, regional, national metrology organizations and measurement traceability.
- Physical quantities and their units. Measurement of physical quantities. Metrology on a company and on a national level.
- Legal metrology (international and national), Role of international and national institutions. State system of metrological testing support and supervision.

**Time schedule**: 1 teaching unit of 90 minutes

## 8. Conformity assessment and its place in business processes and the regulatory infrastructure

**Objective**: to show which policies and institutions ensure compliance with standards and regulations at the national level.

**Issues for consideration**:

- Role of conformity assessment (1st, 2nd and 3rd party certification, manufacturer's declaration of conformity).
- Which conformity assessment modes are optimal for different classes of risks (products for everyday use, products for infants, products used in high-risk facilities, etc.).
- Conceptual and legal requirements for a national conformity assessment framework.
- Institutional framework for national conformity assessment (responsible bodies, etc.). Certification agencies, testing laboratories (measuring equipment, calibration).
- Role of national accreditation and of accreditation bodies, acceptance of conformity-assessment results through accreditation, peer assessment, etc.
- Mandatory and voluntary certification schemes.

**Time schedule**: 2 teaching units of 90 minutes each.

## 9. Market surveillance

**Objective**: to explain the cycle of government controls and how these controls are organized when products have been already placed on the market.

**Issues for consideration**:

- Role of market surveillance in the regulatory infrastructure.
- The concept of market surveillance and its legal and institutional framework (scope of activities, safety and/or quality controls, consumer and/or user protection, counterfeits, etc.).
- Intensity of controls as a function of costs and risks: pervasive controls/targeted controls.
- Place of occupational safety issues.
- Transboundary cooperation to control dangerous, substandard and counterfeit goods.

**Time schedule**: 1 teaching unit of 90 minutes.

## 10. Management system standards

**Objective**: to show specific features of process-management standards and how they can contribute to improving a company's performance.

**Issues for consideration**:

- Introduction to process-management standards (quality, environment, energy, food safety, social responsibility, etc.); their use on a company level and possible use in the regulatory context.
- Examples of management standards (ISO 9000, ISO I4000, ISO 31000, ISO 26000, OHSAS 18001, etc.).
- Principles of organization of compliance schemes under quality management standard (ISO 9001-2008). Quality control in a company—its importance, managing the process, documentation, certification, auditing.
- Integrated process management system in a company.

**Time schedule**: 1 teaching unit of 90 minutes.

## 11. International standardization

**Objective**: to show how international and regional standards-setting bodies work and how industry and governments can participate in their work.

**Issues for consideration**:

- External standardization versus company standardization.
- Organizations for international (regional) standardization.
- Process of international standardization (principles, participation of governments and of business, use of international standards).
- International and regional cooperation in the field of standardization and the harmonization of standards (national alignment of standards). International organizations in the area of metrology.
- Conflicts in international standardization (competition of standards, who is represented: regulators or industry? Competition between companies' standards, etc.).

**Time schedule**: 1 teaching unit of 90 minutes.

## 12. International trade, standards and regulations

**Learning objective**: to show why the World Trade Organization (WTO) devotes significant attention to good standardization and regulatory practices so that standards, regulatory and conformity assessment procedure requirements don't become technical barriers to trade (examples will be provided of standards-related conflicts at WTO and the WTO position on such issues).

**Issues for consideration**:

- National standards policies and specifics of national regulatory regimes (EU - New Approach; USA; Russian Federation, etc.).

- Entering foreign markets (standardization, regulatory and conformity assessment requirements). National and foreign certificates of conformity (alignment of regulatory and compliance regimes, recognition of foreign certificates, issues of competence and of confidence in national laboratories abroad and in their tests/certificates, etc.).
- WTO and principles of good standardization, regulatory and conformity assessment practices (technical barriers to trade, international standards in the WTO context, international competition and standards, mutual recognition agreements (MRAs), trade facilitation, etc.). Examples of standards-related conflicts at WTO and the WTO position on such issues.
- International accreditation and confidence building (regional and international cooperation on accreditation).
- Harmonization and alignment of standards, regulations, conformity assessment procedures.

**Time schedule**: 2 teaching units of 90 minutes.

## 13. Standardization of information requirements and supply chains

**Objective**: to discuss the growing role of e-tools for the exchange of information and relevant standards to identify problems in developing standards, provide principles for data harmonization, and requirements for companies joining supply chains.

**Issues for consideration**:

- Global trade and supporting information and documentation exchange. Product-related and information requirements for companies joining supply chains.
- Harmonization of data requirements and of documents; concept of structured and harmonized data and information. Interoperability and validation of information exchange. Paper and e-documents.
- Classification and coding of information, use of codes in documents.
- Standards (international, regional, national) and regulatory regimes for the electronic exchange of information for border clearance (ensuring trust in e-information, e-signatures, etc).
- Supply chains, security issues and traceability of products (market, regulatory and marketing and social claims/requirements).

**Time schedule**: 2 teaching units of 90 minutes.

## 14. A practical exercise: Standardization within a company

**Objective**: to introduce various concepts of strategy and how standardization can help to support them.

Issues for consideration:

- the different definitions of the term “strategy” at different business levels
- how standards can help organize company processes based upon a company strategy, in development and design, procurement and production.

**Time schedule**: 1 teaching unit of 90 minutes.

Note: Including this module in the programme is recommended when these issues aren't covered by the general education curricula.

## 15. Policy issues and challenges in standardization

**Objective**. To make students aware of the current debate on standardization activities, and its efficiency, which is becoming a subject of increased attention by policymakers. To discuss other topical issues as relevant to the class or recent debates.

**Issues** for consideration**:**

- Company specifications, private standards, consortia standards: what are their respective roles in supply chains?
- Certification to different specifications and standards and related costs.
- Challenges, created by differences among national and international standards: what happens when the national standard is more stringent than the corresponding international norm?
- Coordinating the process of standardization and ensuring stakeholders' involvement.
- Maximizing the effectiveness and efficiency of standardization activities.
- Funding of standardization activities.
- Reference to standards in regulations.

**Time schedule**: 1 teaching unit of 90 minutes