



**EKONOMICKÁ  
FAKULTA**

UNIVERZITA MATEJA BELA  
V BANSKEJ BYSTRICI



**Faculty of Economics**  
**Matej Bel University**  
Banská Bystrica  
Slovakia

# The Role of Multidisciplinary Education in Promoting Infrastructure Quality

prof. Ing. Marta Orviska, PhD.  
marta.orviska@umb.sk



AGENTÚRA  
NA PODPÓRU  
VÝSKUMU A VÝVOJA

27th Session of the Working Party on Regulatory  
Cooperation and Standardization Policies (WP.6)  
Geneva, 28 - 30 November 2017

# Outline

In this I will focus on university education and courses, rather than education in schools or , e.g., one-off two week courses – although they too have a role.

By infrastructure I am referring to the infrastructure of standards and standardization.

This covers the institutions of standardization, accreditation, conformity assessment, metrology and market surveillance

I will argue that the EU needs more structured degrees targeted at educating the standards professionals of tomorrow as well as single courses within a degree for businessmen, engineers and others.

# Multidisciplinary Education

**A multidisciplinary curriculum** is one in which the same topic is studied from the viewpoint of more than one discipline.

For example IT standards can be studied not only within IT technology but also within economics, the law, and business.

Each part of the course would be taught from a specialist from that area.

**Compare this to: An Interdisciplinary Approach** which is a synthesis of two or more disciplines.

<http://www.ibe.unesco.org/en/glossary-curriculum-terminology/m/multidisciplinary-approach>

# Why do we need standards education?

It is important that people involved in standards in standards bodies such as the national, EU and international ones, have an understanding of the economics of standards.

How standards can impact on competition and innovation in both a positive and a negative way. This requires a knowledge of economics.

A knowledge of business studies, the law and politics is also desirable.

## Teaching standardization at Matej Bel University

Included in our degree to our masters students is a course on standards, which has run for the first time in 2016/2017

- **Study program:** Finance, banking and investment
- **Degree:** Master's degree
- **Recommended hours of teaching:** 39 hours

One of the examples of the successful cooperation between the national standards body (Slovak Office of Standards, Metrology and Testing) and Academia.

# Subject: Standardization and international standards

## Content

- 1) Introduction to standardization
- 2) Standards, regulation, certification, accreditation and global markets.
- 3) Economics of standardization
- 4) Standardization and innovations
- 5) National legislative and institutional frameworks of standardization
- 6) Market surveillance and the role of state
- 7) Standards and management of firms
- 8) International standardization and international cooperation in the area of standardization
- 9) Regulative measurements and standards in finance.
- 10) International trade, standards and regulation
- 11) Standardization in the EU
- 12) International institutions in the area of standardization
- 13) Political implications of standardization

# Educating the managers of tomorrow

This is an example of educating not standards specialists, but people who need to be aware of standards.

For them, a single standards course in their degree is sufficient.

Such a course is also relevant for those working in standards committees

But we also need more intensive standards education.

# Educating the working groups of tomorrow

- There is also a need for standards expertise amongst those who contribute to the working groups and committees, i.e those groups of people who actually write standards.
- They are just as important for standards development as the full time professionals.



# Educating 'the engineers' of tomorrow

They will need specialist knowledge in the area their firm or organisation is engaged in, e.g. IT, engineering, robotics. In this case a joint degree, 'engineering and standards', 'IT and standards', 'the environment and standards' might be a possibility. They will not need to know economics, although patent law is useful.

*Hence there is a need for joint degrees involving standardization.*

*Such specialist degrees would also be relevant for those in the standards infrastructure, focusing on metrology, conformity assessment, market surveillance, etc.*

# Educating the standards professionals of tomorrow

In general several countries are more advanced in providing a standards education than we in the EU.

The Academy for Standardization, Metrology and Certification in Russia is engaged in such training, some of it online.

The College of Standardization in China's Jiliang University offers a degree with a strong focus on standards.

Another Example is from Korea

The University Education Promotion on Standardization (UEPS) stimulated and influenced the teaching of standards in Korea.

This is very standards focused including metrology and conformity assessment

Choi, D. G., & de Vries, H. J. (2013)  
**Integrating standardization into engineering  
education: the case of forerunner Korea.**

*International Journal of Technology and Design Education, 23(4), 1111-1126.*

**The syllabus for the general UEPS (The University Education Promotion on Standardization) courses was.**

**I. Introduction of standardization**

- **1. Standardization overview: Definitions, classifications, objectives, impacts and importance**

**II. Standardization activities**

- **2. International standardization**  
International standards, standardization, organizations
- **3. National standardization**  
Development, structure, implementation and future
- **4. Company standardization**  
**Business strategy, management, and standardization**

### **III. Contents of standards**

- **5. Metrology and reference materials**

**Scientific/industrial and legal metrology, reference materials, SI, international cooperation**

- **6. Conformity assessment**

**Conformity assessment overview, conformity assessment in Korea, major countries, mutual recognition agreement**

### **IV. Use of standards**

- **7. Standards and IPR**

**IPR and economic activities, standards and IPR, standardization and anticompetition**

- **8. Future of standards**

**Current and future trends and issues of standards**

# Another example specialising in metrology

Not all roles in standardisation require a wide multidisciplinary education. Metrology e.g.. Thus the University of Coventry in the UK offer the following modules:

- Introduction to Metrology
- Mathematics for Metrology
- Engineering Science for Metrology
- Standards and Traceability in Metrology
- Measurement Methods
- Uncertainty in measurement
- Measurement Systems Analysis
- Coordinate metrology practices
- Production measurement practices

**This is in the context of a foundation degree in metrology.** A **foundation degree** is a combined academic and vocational equivalent to two thirds of an undergraduate degree. Its done part time whilst the individual is working.

## In the EU

Of course in the EU there are standards courses in university degrees and even standards degrees such as the Masters in Standardization, Social Regulation and Sustainable Development at the University of Geneva and the one at Coventry.

But there is need for an education specifically aimed at providing the human capital for the standards infrastructure of tomorrow for the whole of the EU and member countries.

# Providing the human capital for the standards infrastructure of tomorrow

For standards organisations a dedicated standards degree would be beneficial, similar in a way to that taught in the Chinese example.

*One possibility is that the European and national standards bodies could cooperate with a university in the delivery of such a course, and provide some of the teaching. Placements and internships could be done both in the student's home country standards body or, e.g., at CEN/CENELEC/ETSI.*

*The aim would be that graduates from this degree would work in all of the national standards organisations as well as the EU ones and even non-EU standards bodies.*

*Such a course would be multidisciplinary, giving graduates insights into a whole range of subjects. They would not be engineers or economists or lawyers. Their focus would be standards, but they would understand the perspective of the engineer and have insights into the way the economy and legal system work.*

# Streams

- Potentially, different streams for general standardization, accreditation, conformity assessment, metrology and market surveillance.
- Potentially too joint degree options in aspects of engineering, pharmacy, biology, the law and so on.
- Having all this done in one place would ensure that throughout the EU standards are implemented in a consistent manner.
- The social networks that graduates would develop with other standards professionals, would also be an advantage to them throughout their career.



# The role of the practitioner in the education process

Standards education is also different to many other university courses in the extent to which it can profitably draw on the knowledge and the experience of the practitioner outside of academia.

They need to be engaged in the teaching of the courses.

# Distance learning

With the increased sophistication of IT, online courses are becoming increasingly effective. It is possible that standards professionals and others who are engaged in some way with standards, could do such courses as we have been discussing via distance learning.

This would be easy to set up by a university which is already running a standards degree or standards courses. They would be targeted at people currently involved with standards, rather than future professionals.

# Questions and problems which remain

- These are just some possibilities and the exact composition of each type of course is for discussion.
- For someone seeking a career in market surveillance. There will be context specific skills relating to the nature of the market. But also more general skills.
- What are they?
- We need this skill mapping done for every specialisation in the standards infrastructure.

# EURAS

- EURAS is primarily focused on standards education. But it provides a valuable network of contacts.
- have issued a White paper on the way forward for standardisation in Europe.
- The White paper is focused on education at all levels and amongst their recommendations are:

# A European Standardization Education Agency

An organisational infrastructure at the European level is needed consisting of a European Standardization Education Agency and a steering group.

The agency should be funded by the EU Commission.

A European Standardization Education Agency is not necessarily inconsistent with the ideas we have put forward in this presentation.

# The need for a discussion and then progress

There are many things I have left out in this short time. Including whether some of this education is best done at masters or undergraduate level or both.

The ideas I have put forward are suggestions. But other ways forward are also possible. The issue is important and a discussion on the way forward is badly needed.



**EKONOMICKÁ  
FAKULTA**  
UNIVERZITA MATEJA BELA  
V BANSKEJ BYSTRICI



Thank you for your attention

