



The Standards People

Project Overview - ETSI STF 515 “Design and Development of Teaching Materials for Education on ICT Standardization”

Presented by: **Dr. habil. Nizar Abdelkafi** For: **ETSI Conference “Boosting ICT Business**



**and Innovation: A Comprehensive
Approach to Standardization Education
in Europe”, 4th and 5th October 2018**

4th October 2018

Agenda

- ✔ ETSI STF515 – Education on ICT standardization – an overview
- ✔ Project details
- ✔ Teaching materials – a closer look



ETSI STF515 - Education on ICT standardization

Project Overview




- ✔ Specialist Task Force (STF) 515 initiated by European Telecommunications Standards Institute (ETSI) and supported with funds from the European Commission
- ✔ A team of six experts in standardization research and practice developed education materials on ICT standardization
- ✔ **Project lead:** Fraunhofer Center for International Management and Knowledge Economy (Fraunhofer IMW)
- ✔ **Project duration:** about 2,5 years

ETSI STF515 - Education on ICT standardization Specialist Task Force 515



STF 515 Experts

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ETSI Project Coordinator

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ETSI STF515 - Education on ICT standardization

Main goals



- ✔ To facilitate education on ICT standardization among lecturers and students
- ✔ To foster the position of ICT standardization in educational programs, trainings, and academic curricula
- ✔ To improve the employability of future graduates in the area of standardization



ETSI STF515 - Education on ICT standardization

Project schedule



✓ Overall duration of the proposed action:

01.06.2016 – 31.12.2018



Project details

WP 1 – Exploratory study of educational requirements in ICT



✔ Main objectives:

- ✔ To identify relevant (current and future) topics to evolve existing teaching materials to the next level beyond basic knowledge about key concepts in ICT standardization
- ✔ To capture best practices in standardization education

✔ Methods:

- ✔ Literature analysis
- ✔ Interview study based on a semi-structured interview guide targeting practitioners, researchers and lecturers in ICT standardization
- ✔ Qualitative content analysis

Project details

WP 1 – Exploratory study of educational requirements in ICT



- ✔ The STF515 conducted and analyzed in total **26 interviews**
- ✔ Identified **7 main topics** for the teaching materials:
 - ✔ Introduction to the basics of standardization
 - ✔ Working with standards
 - ✔ The standardization environment (landscape, processes, rules etc.)
 - ✔ Standardization management
 - ✔ IPR and standardization in a business context
 - ✔ Macro-economic perspective on standardization
 - ✔ Standardization, regulation and law

“You can only get people with standardization experience from your competitors. Graduates usually do not have any standardization experience.”

“Use pictures, that are easy to understand and that people can easily relate to. For example QWERTY, beer bottles, stairs in different countries.”

“Many people teach standards as a minor part of their lecture, but it is difficult to identify them.”

“Keep the material rather short and focused.”

Project details

WP 2 – Development of main teaching materials



Main objectives:

- To develop teaching materials consisting of a set of slides and an accompanying textbook
- Validation of structure and content of the teaching materials through workshops and reviews with several experts from the area of ICT standardization and standardization education

Outcome:

- Set of more than 350 slides and an accompanying textbook in a modular structure

2.1 Basics of standardization

What standards are (in a wide sense) and why they're needed

The most general definition for a «standard» may be «a widely agreed way for doing something»

... where, depending on the specific area of application, "doing something" may be replaced by, e.g., "designing a product", "building a process", "implementing a procedure" or "delivering a service".

«Standards» (i.e. agreed and common) ways of doing things bring lot of benefits; our technological world without «standards» simply would not work (or, at least, it would be harder to make it work)



3 The standards ecosystem

- As previously introduced, the standardization landscape is rich and complex, because of the variety in standard development organizations (SDOs) and the documents they produce...



Figure 2.16: Influence of opinion pieces on standards

To persuade them, the philosopher "One of the penalties for refusing to participate in standards? They usually saddle the consumer of policy. You're not up being governed by your relations?"

A second possible risk, often feared by both consumers and companies (especially SMEs) is the fact that standards might be problematic for competition among innovative and startups, as SDOs may be perceived as unfairly influencing "open markets".

In general, it is a major and widespread fear for all or most firms of the participants in the standard creation process. To the extent that business of the companies, countries, and cities may be impacted, to enhance this risk, the main actors that SDOs put in place are, on the one hand, to engage the participation and transparency in managing the standard development and the participation in standards is a key point to guarantee the participation in standards and companies' contributions.

«Standards» (i.e. agreed and common) ways of doing things bring lot of benefits; our technological world without «standards» simply would not work (or, at least, it would be harder to make it work)



Figure 2.17: Standard ecosystem

«Standards» (i.e. agreed and common) ways of doing things bring lot of benefits; our technological world without «standards» simply would not work (or, at least, it would be harder to make it work)

Project details

WP 2 – Development of main teaching materials



✔ Contents/Chapter structure:

1. Introduction
2. Introduction to standards
3. The standards ecosystem
4. The production of standards
5. Standardization and innovation
6. A strategic perspective on standardization
7. A business perspective: IPR and standardization
8. An economic perspective on standardization
9. Conclusion

Key concepts

More advanced topics

✔ Each textbook chapter includes

- ✔ Learning objectives and key messages
- ✔ Glossary, list of abbreviations, useful reference list



Project details

WP 3 – Development of supplementary materials



✔ Main objective:

- ✔ To design of supplementary materials such as visual aids, quizzes, practical exercises, and case studies that enhance the learning performance and employability of students

✔ Outcome:

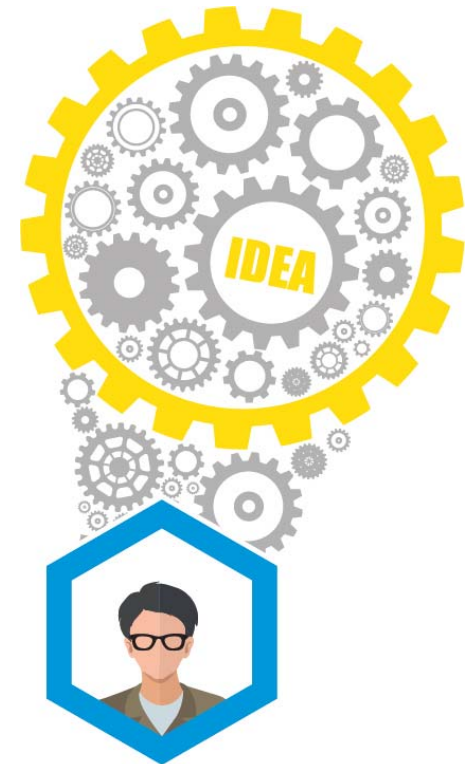
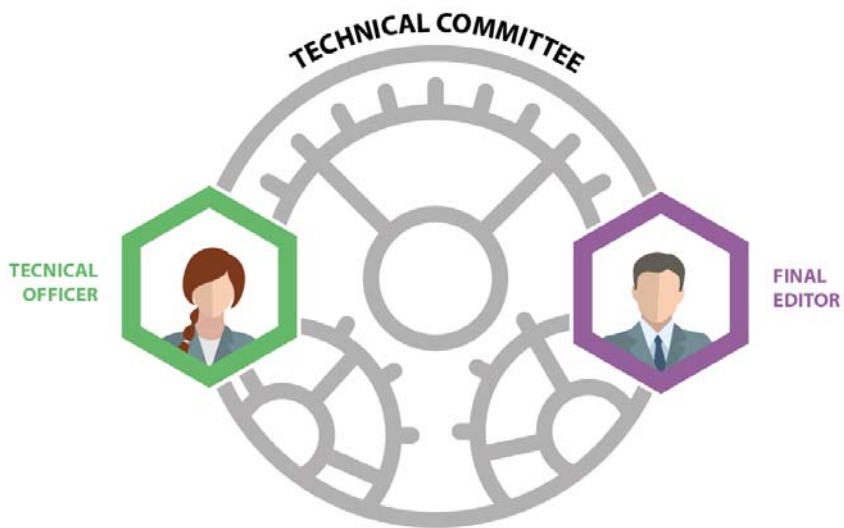
- ✔ More than 110 classical figures, tables, diagrams, sketches and drawings
- ✔ Selected examples from real standardization practice to illustrate key theoretical concepts
- ✔ Case studies to make readers reflect on the content and to enable classroom activities
- ✔ Quizzes: More than 100 questions at the end of each chapter as a self-assessment learning activity

Project details

WP 3 – Development of supplementary materials



- ✓ Outcome:
- ✓ Sample images



Project details

WP 2,3 – Development of teaching/supplementary materials



✓ Validation of the content:

- ✓ **Validation Workshop** in May 2017: 8 (external) experts from the area of ICT standardization and standardization education evaluated and provided feedback regarding the set of slides
- ✓ **Internal review** process of the textbook in the beginning of 2018
- ✓ **External review** process of the textbook in June and July 2018: Seven experts from the area of ICT standardization and standardization education evaluated the textbook



Project details

WP 4 – Design and publishing



🎯 Main objective:

- 🎯 To provide attractive design to enhance learning performance
- 🎯 To ensure accessibility of the book and its contents for all interested parties

🎯 Outcome:

- 🎯 Uniquely designed textbook, slides and visualizations
- 🎯 All teaching materials will be available in an electronic version and can be downloaded for free: www.etsi.org/standardization-education

UNDERSTANDING ICT STANDARDIZATION:
PRINCIPLES AND PRACTICE

2. INTRODUCTION TO STANDARDS

LEARNING OBJECTIVES

This chapter aims to provide a high level overview of the scope and process of standardization, while at the same time introducing the main subjects that will be covered in greater depth and detail in the following chapters.

It is an initial introduction to the basic concepts of the book by using examples. The chapter can also be used as a guide for providing the fundamental knowledge on standardization to a general audience.

This chapter has the following objectives:

- to identify what standards are, what they are not, and how they impact everyday life;
- to explain what benefits standards bring and what undesired drawbacks they may imply;
- to introduce the complex international standardization landscape, where multiple organizations operate and collaborate to create standards;
- to briefly explain the structure of the standards development process;
- to provide hints about the use of standards, i.e., how to select relevant standards and how to go through standards documents.

LEARNING OBJECTIVES

- Students should grasp how standards—generally defined as “widely agreed ways of doing things”—are needed to guarantee the interoperability of “things”, which is essential to the functioning of our technological world;
- Students should understand the role of Standards Development Organizations and how their structured approach to standards development benefits innovation, trade and society; they should also realize that the conceived usage of standards and the standards development process has its drawbacks;
- Students should get a glimpse of major SDOs active in the ICT sector;
- Students should understand the main basic concepts of the SDOs’ processes and the characteristics of the main deliverables.

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UNDERSTANDING ICT STANDARDIZATION:
PRINCIPLES AND PRACTICE

2.1. BASICS OF STANDARDIZATION

2.1.1. INTRODUCTION

The online Cambridge dictionary provides the following definitions for the term “standard”: “a pattern or model that is generally accepted” (example: “This program is an industry standard for computers”) and “a level of quality” (example: “This piece of work is below standards set up to standards”). As we will see in the next part of this chapter, both definitions may apply to the specific purpose of our work.

DEFINITION

For the time being, we will primarily stick to the first definition, which, in an even more general and informal way, can be expressed as such: a “standard” is “a widely agreed way of doing something”. Depending on the specific area of application, “doing something” may be replaced by, for example, “designing a product”, “building a process”, “implementing a procedure”, or “delivering a service”.

Clearly, “standard”, i.e., “largely agreed and common” ways of doing things provide many benefits: our technological world simply would not work, or, at least, it would be harder and more uncomfortable to make it work without “standards”. In fact, let us think about how we, computer users, would be in difficulty if each computer maker used a different way of arranging keys on a keyboard, or if each producer of computer peripherals used its own specific connectors or, even, its own protocol (Figure 2.1). On the one hand, we, as users, would be confused by choosing from a vast selection of compatible devices and, on the other hand, computer and peripheral makers would be forced to pre-select, by design, the counterparts they want to interoperate with.



Figure 2.1: Technologies would not work without standards.

What if computer keyboard layouts differed from one manufacturer to the next? For instance, one computer manufacturer might design a popular QWERTY design, while another could use the alternative DVORAK arrangement. Should we have to learn to type every time we replace our PC?

What if each company making PCs and peripherals (such as monitors, printers, or mass storage devices) used different and proprietary physical connectors? How many cabling options would we have to manage? These are just two examples that show how a certain degree of standardization makes our life as PC users simpler.

¹ While “standard” refers to the set of messages that are defined in the IEEE 802.11-2016, a PC with a standard network card can connect to these. The amount of data that can be sent is limited by the speed of the network card and the speed of the network. The amount of data that can be sent is limited by the speed of the network card and the speed of the network. The amount of data that can be sent is limited by the speed of the network card and the speed of the network.

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Project details

WP 5 – Impact generation



✔ Main objective:

- ✔ To test teaching materials in a real context
- ✔ To initiate widespread dissemination

✔ Outcome:

- ✔ Concept for a teaching module
- ✔ Integration of the teaching module or parts of it within existing curricula, e.g.
 - ✔ Lecture at Telecom Evolution (Paris) - Included in the course CES “Internet des Objets” (IoT)
- ✔ Conference on ICT standardization education

Teaching materials – a closer look

Overall concept



- ✓ The topics derived from the literature review and the interview study were used structure of the set of slides and textbook
- ✓ The modular approach has been chosen: each chapter represents self-contained unit
- ✓ In total, nine chapters have been proposed and assigned to the STF experts according to their competencies and background.

Teaching materials – a closer look

Contents textbook and slides



✔ Contents/Chapter structure:

1. Introduction
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9. Conclusion

Key concepts

More advanced topics

Teaching materials – a closer look

Contents textbook and slides



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- Key concepts
- More advanced topics

Teaching materials – a closer look

Chapter 1 – Introduction/ Chapter 2 – Introduction to standards



✓ Goal: To provide high-level overview of standardization scope and process.

✓ Prerequisite: none

✓ Main content:

1.	Introduction
2.	Introduction to standards
2.1	Basics of standardization
2.2	Benefits and risks of standardization
2.3	Standardization landscape
2.4	The standardization process at a glance
2.5	Using standards

Teaching materials – a closer look

Contents textbook and slides



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Teaching materials – a closer look

Chapter 3 – The standards ecosystem



- ✔ **Goal:** To learn about the SDO environment and the standards they produce
- ✔ **Prerequisite:** chapter 2
- ✔ **Main content:**

3.	The standards ecosystem
3.1	Types of organizations and standardization documents
3.2	National, regional and international standardization: co-operation and co-ordination
3.3	Adoption/Transposition of standards
3.4	Types of documents produced by SDOs
3.5	Naming conventions for standardization documents
3.6	Case study: the revision of a national standard about telecare from the ICT accessibility perspective

Teaching materials – a closer look

Contents textbook and slides



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Teaching materials – a closer look

Chapter 4 – The production of standards



✔ **Goal:** To understand the standard development process, its context and gain the necessary competencies to participate in and handle standardization activities in a company

✔ **Prerequisite:** chapter 2

✔ **Main content:**

4.	The production of standards
4.1	Introduction
4.2	The standardization scene
4.3	Roles and competencies of a standardization expert
4.4	Activities of a standardization expert
4.5	Case study: the 3rd Generation Partnership Project (3GPP)

Teaching materials – a closer look

Contents textbook and slides



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Teaching materials – a closer look

Chapter 5 – Standardization and innovation



- ✔ **Goal:** To learn about the interdependencies between innovation and standards/standardization and also about the relationships between research and standardization
- ✔ **Prerequisite:** key concepts
- ✔ **Main content:**

5.	Standardisation and innovation
5.1	Introduction
5.2	Interdependencies between standardization and innovation
5.3	Research and standardisation
5.4	Formal standardization: a driver for innovation

Teaching materials – a closer look

Contents textbook and slides



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9. Conclusion

Key concepts

More advanced topics

Teaching materials – a closer look

Chapter 6 – A strategic perspective on standardization



- ✔ **Goal:** To gain knowledge on how to use standardization strategically in a company and how to organize the standardization activities to get the most out of standardization
- ✔ **Prerequisite:** key concepts
- ✔ **Main content:**

6.	A strategic perspective on standardization
6.1	Introduction
6.2	Different strategies for participation
6.3	Conditions and external influences
6.4	Communication within standardization activities
6.5	Choosing your standard(s)

Teaching materials – a closer look

Contents textbook and slides



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-
- Key concepts
- More advanced topics

Teaching materials – a closer look

Chapter 7 – A business perspective: IPR and standardization



- ✔ **Goal:** To develop the necessary background knowledge to make informed decisions regarding different instruments in the context of intellectual property
- ✔ **Prerequisite:** key concepts
- ✔ **Main content:**

7.	A business perspective: IPR and standardization
7.1	Introduction
7.2	IPR and SDO-supported standardization: two valuable instruments
7.3	A decision-making tool: IPR vs. standardization
7.4	Case studies: to standardize or to patent?

Teaching materials – a closer look

Contents textbook and slides



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 9. Conclusion
- Key concepts
- More advanced topics

Teaching materials – a closer look



Chapter 8 – An economic perspective on standardization/ Chapter 9

- ✔ **Goal:** To know the impacts of standardization on a macro-economic level and gain insights into the relationship between public procurement and standardization
- ✔ **Prerequisite:** key concepts
- ✔ **Main content:**

8.	A economic perspective on standardization
8.1	Introduction
8.2	The economic contribution of standards
8.3	The economic effects of standardization
8.4	Public procurement and standardization
9.	Conclusion

Feedback appreciated

- ✔ We will be very pleased to get your feedback with respect to the teaching materials and to introduce your improvements in the second edition



Source: pngall.com

Conclusions

- ✔ The contents of the textbook have not been only derived from literature, but also based on the **experience of academics and practitioners**.
- ✔ A **validation workshop** as well as **internal and external reviews** have been used as mechanisms to ensure a good quality of the education materials.
- ✔ **Illustrations** have been produced make the design of the textbook and slides attractive to students and lecturers, whereas **quizzes** (with answers) make it possible for students to self-evaluate their knowledge and comprehension level
- ✔ The teaching materials have a **modular design** and will be provided **for free**; lecturers can use all the materials for a whole course or may pick only specific subjects they integrate into their existing courses.

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