How to Strengthen National Standards Competitiveness – Korea’s Human Resource Development System for Standardization

Submitted by: Korea
How to Strengthen National Standards Competitiveness

- Korea’s HRD System for Standardization-

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ABOUT MYSELF

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Organization: Korean Standards Association (KSA)
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< Working Experience >

- Secretary, ICES (May 2012 - May 2013)
- Senior Researcher, KSA (2011-present)
  * Mainly responsible for cooperation with emerging countries under the International Standards Infrastructure Cooperation Program (ISCP) (2011-2017) and APEC Project (2017-)
  * Mainly responsible for APEC Project and international standardization activities (ISO/IEC)(2018-)
  * Mainly responsible for international standardization activities and multilateral/bilateral cooperation
CONTENTS

1. Framework of Korean Standards Professional Development
2. Standards Professional Programs
3. Observations
4. Moving forward with Partners
1. Framework of Korean Standards Professional Development

- Public Sector Lead (top-down approach)
- Scope: Std., Conformity Assessment, Metrology and Quality
- Cooperation with Related Organizations
1. Framework of Korean Standards Professional Development

Why Human Resources are Important?

* The above structures were developed by Korea as NSCAF based on the concept, Building an Infrastructure for Sustainable Development (ISO, 2006) and Global Quality Management.
1. Framework of Korean Standards Professional Development

HOW TO GET STARTED

GOVERNMENT

Set up National Strategy

Secure Funding & Plan

PUBLIC ORG. STAKEHOLDERS

Have Responsible Organization

in cooperation with government, public organization, and national stakeholders

National Standards Law, Industrial Standardization Act, Quality Control & Safety Management of Industrial Products Act, Measures Act

* It highlighted the importance of HRD for Standardization, Conformity Assessment, Metrology and Quality

The Government allocated committed Staff to develop programs, curricula, materials, and granted budget. Specific committee could be set up, if necessary.

Keep Continuous Innovation

Create new approaches and contents to improve quality

Future Value, Ask KSA
2. Standards Professional Programs

- Lifelong Standardization Education
- Korea Young Professional (KYP)
- Attract Industry to Standardization
- Standards Professional Certificates (SPCs)
2.1 Lifelong Standardization Education

KSA’s Roadmap for Lifelong Standardization Education

- **Primary School**
  - Fun Standards

- **Secondary School**
  - Standards Olympiad

- **Higher Education**
  - University Program

- **International Standards**
  - Writing Skills

- **Open Workshop**
  - Global Leader Training

- **Management Development**

- **Biz/Practical Application**

- **Theoretical Application**

- **Basic Concept**

- **Standards in Daily Life**

- **Standards in Biz/Practical Application**

- **Standards in Theoretical Application**

- **Standards in Basic Concept**

- **Formal Education**
  - Learn to know/Knowledge Oriented

- **Post-Formal Education**
  - Learn to do/Skill Oriented/Biz Practices
2.1 Lifelong Standardization Education; for primary

“MEET STANDARDS” at Primary School

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>PROGRAM</td>
<td>On-demand</td>
<td>Pilot Projects with Schools</td>
<td>On-demand</td>
<td>Pilot Projects</td>
<td>On-demand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* (2013) 3,990 students in 11 schools</td>
<td>* (2014) 3,061 students in 10 schools</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEXTS</th>
<th>PPT</th>
<th>PPT + Textbook</th>
<th>PPT + Textbook + Animation</th>
<th>Textbook Authorized</th>
<th>Textbook + Customized Teaching Tools</th>
</tr>
</thead>
</table>

| GOVERNMENT POLICY FOR STANDARDS PROFESSIONALS | To raise awareness of standardization among teenagers |

▶ 11,605 students participated in 366 schools in total.
## 2.1 Lifelong Standardization Education

### How Teaches?

- Develop curriculum what/how to teach standardization according to the main project title of each school

- Develop teaching tools based on the provided tools (e.g. guideline for Teachers, animation, PPT, etc.)

### Main Project Titles for Standardization

1. Raise awareness of standardization in daily life through standards-related experiences
2. Encouragement to carry out standards-related activities through standardization education
3. Research methodology on how to carry out standardization education

### Teaching Tools Developed by Teachers

- Study books for teachers
- Design “STANDARDS ROOMS” in school with the standardized items (e.g. pencil, mobile, ruler, etc.)
- Organize standards-related events with parents (e.g. standards festival, essay contest, contest, etc.)
2.1 Lifelong Standardization Education; for primary

**How Learned?**
Textbook for Elementary School

**Ver. 1**

“Standards in Our Life”
- Chapter 1. Why Standards?
- Chapter 2. Our lives with Standards
- Chapter 3. Daily Standards
- Chapter 4. Our Promise, Standards

**Ver. 2 (2017)**

“Standards in Our Life”
- Chapter 1. About Standards
- Chapter 2. Standards in Our Daily Life
- Chapter 3. Standards in Industry
- Chapter 4. Standards for Safety

Revision was completed in 2017.

< Textbook for Students >  < Guidebook for Teachers >  < Textbook for Students >  < Guidebook for Teachers >
Standards on Street

Safety Helmet, Manhole, Tire, Tile, Traffic Light, Braille Block, Pictogram, Road, Paving Block, Stroller, Wibro, Helmet, Cart, Postbox, Motorcycle, Bicycles, Paints for Road Signs, Mobile, Bicycle, Road, Fire Hydrant, Braille Block, Concrete, Paving Block, Crosswalk, Safety Belt, Street Lamp, Window, Tire, Car, Black box, Manhole, Road, Street, Lamp, Sign, Car, Black box, Helmet, Vending Machine, Motorcycle, Paving Block, Paints for Road Signs, Helmet, Cart, Bench, Wibro, Ball Game, Pictogram.
2.1 Lifelong Standardization Education; for primary

Besides them, video-clips on standardization are presented via QR code. And other hands-on tools are placed to provide opportunities to experience standards in daily life.
2.1 Lifelong Standardization Education; for primary
2.1 Lifelong Standardization Education; for secondary

“EXPLORE STANDARDS” at Secondary School

To Bring Standards to the Real Life
To Recognize Outstanding Outcome Using Standards

Learn Standards from Textbooks

Experience Standards from Activities

[Middle School] Contents of Standardization in Technology-Home Living Subject

[High School] Standardization Unit in Engineering Technology

* Understanding/recognition of importance of standards are highlighted in curricula of middle and high schools.

YSO: International Youth Standards Olympiad
2.1 Lifelong Standardization Education; for secondary

**PURPOSE**
To raise youngsters’ awareness of standards through standardization activities in various areas

**WHEN**
Every August (summer vacation season)
* The first round is held every June.

**HOW LONG**
Normally 1 night and 2 days

**WHERE**
A place where outsiders’ visits could be controlled and accommodation is available

**WHO**

[Hosts]
Korean Agency for Technology and Standards (KATS)
Korean Standards Association (KSA)

[Participants]
Students enrolled in middle school (7-9 grade) and high school (10-12 grade) in the year shown
- A team should be consisted of 3 students and 1 guidance teacher.
- As for foreign teams, they should be selected by NSBs
2.1 Lifelong Standardization Education; for secondary

HOW

Preliminary Round
(online)

Main Tournament
(camp activity)

Award Ceremony

▶ Activities of Preliminary Contest
- Submit essay on provided topic online

▶ Activities of Main Contest
- Produce a standards model
- Submit a portfolio and make an oral presentation of the output
*
Culture Sharing Event to be held.

▶ Awards
- Prime Minister Award for 1 team
- Minister of Trade, Industry and Energy Award for 8 teams
- IEC Secretary General Award for 1 team
- Other Awards for 32 teams
2.1 Lifelong Standardization Education; for secondary

FOOT PRINTES FROM 2006 TO PRESENT

<table>
<thead>
<tr>
<th>Year</th>
<th>Participants</th>
<th>Form</th>
<th>Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Primary/Middle School Students</td>
<td>Evolved into Olympiad</td>
<td>Organize award ceremony on WSD event</td>
</tr>
<tr>
<td>2007</td>
<td>Middle/High School Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Middle/High School Students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2012</td>
<td>Created new award at ministerial level</td>
<td>Created new award at Prime Minister’s level for the first winner</td>
<td></td>
</tr>
<tr>
<td>2013-present</td>
<td>Created new award at Prime Minister’s level for the first winner</td>
<td></td>
<td></td>
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</tbody>
</table>

INTERNATIONAL YSO (2015-)

HISTORY OF YOUTH STANDARDS OLYMPIAD
<table>
<thead>
<tr>
<th>YEAR</th>
<th>MIDDLE SCHOOL</th>
<th>HIGH SCHOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Making a standardized clock using a ball</td>
<td>Building structure with standardized blocks</td>
</tr>
<tr>
<td>2009</td>
<td>Making a standardized simple traffic light</td>
<td>Making a distance measuring device</td>
</tr>
<tr>
<td>2010</td>
<td>Making a 3D transmission box</td>
<td>Making a weight scale</td>
</tr>
<tr>
<td>2011</td>
<td>Developing standards for delivery box</td>
<td>Making an escape route for a school building</td>
</tr>
<tr>
<td>2012</td>
<td>Developing a standardized anemometer</td>
<td>Creating a standardized wheelchair lifts</td>
</tr>
<tr>
<td>2013</td>
<td>Creating a pictograms</td>
<td>Making standards housing modules</td>
</tr>
<tr>
<td>2014</td>
<td>Making a standardized store sign with a feature distinguishing the type of business</td>
<td>Making a faucet with step flow adjustment control</td>
</tr>
<tr>
<td>2015</td>
<td>Design standardized blades for a wind turbine that generates wind energy</td>
<td>Design an electric kettle that optimizes heat transfer efficiency</td>
</tr>
<tr>
<td>2016</td>
<td>Fabrication and standardization of garbage cans that can hold various sizes of volume-rate garbage bags</td>
<td>Fabrication and standardization of drone delivery devices</td>
</tr>
<tr>
<td>2017</td>
<td>Development of standardized umbrella stand modules</td>
<td>Fabrication of standardized illumination adjusting house</td>
</tr>
</tbody>
</table>
2.1 Lifelong Standardization Education; for secondary

EVALUATION CRITERIA (100 POINTS)

<table>
<thead>
<tr>
<th>STANDARDIZATION PROTOTYPE EVALUATION (60)</th>
<th>PORTFOLIO EVALUATION (30)</th>
<th>PRESENTATION EVALUATION (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Point(function-ality) (30)</td>
<td>Understanding Standards and Logicality (10)</td>
<td></td>
</tr>
<tr>
<td>Creativity/Originality (25)</td>
<td>Ability to Explain the Principles Used in Standards Development (10)</td>
<td>Communicative Skills (10)</td>
</tr>
<tr>
<td>Completeness and Effectiveness (5)</td>
<td>Feasibility of Standardization (10)</td>
<td></td>
</tr>
</tbody>
</table>

MAIN ACTIVITIES

http://standards-olympiad.kr/eng/
# 2.1 Lifelong Standardization Education; for university

<table>
<thead>
<tr>
<th>Stage</th>
<th>Period</th>
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<tbody>
<tr>
<td>Preparation Stage</td>
<td>2002-04</td>
</tr>
<tr>
<td>Expanding Stage</td>
<td>2005-09</td>
</tr>
<tr>
<td>Transforming Stage</td>
<td>2010-present</td>
</tr>
</tbody>
</table>

**UEPS**: University Education Program on Std.

- ▶ Long-term Planning
- ▶ **Common Syllabus** Development & Publishing
- ▶ **Common Textbook** Development & Publishing
- ▶ **Pilot General Course** Launched
- ▶ Nationwide Promotion/Expansion
- ▶ Teachers’ Pool Expansion
- ▶ Common Textbook Revision/Publishing
- ▶ **Major-Specific Textbook** Development
- ▶ **Major-Specific Course** Launched
- ▶ **Graduate Course** Launched
- ▶ Major-Specific Textbook Revision
- ▶ **Case Studies** Development/Publishing

Natural Evolution based on the Needs of Different Professor/Schools

Introduced in ISO, ARSO, GSO, COPANT, APEC, ICES Members
2.1 Lifelong Standardization Education; for university

Number of UEPS Courses and Participated Students

- Courses
- Students

<table>
<thead>
<tr>
<th>Year</th>
<th>Courses</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>11</td>
<td>982</td>
</tr>
<tr>
<td>2005</td>
<td>64</td>
<td>640</td>
</tr>
<tr>
<td>2006</td>
<td>87</td>
<td>6,681</td>
</tr>
<tr>
<td>2007</td>
<td>91</td>
<td>6,160</td>
</tr>
<tr>
<td>2008</td>
<td>96</td>
<td>5,948</td>
</tr>
<tr>
<td>2009</td>
<td>94</td>
<td>5,613</td>
</tr>
<tr>
<td>2010</td>
<td>80</td>
<td>3,957</td>
</tr>
<tr>
<td>2011</td>
<td>81</td>
<td>3,883</td>
</tr>
</tbody>
</table>

Planning & Preparatory Period

Future Value, Ask KSA
2.2 Korean Young Professionals (KYP)

Strengthening National Standards Competitiveness
with Next Standards Generation

KYP

✓ 20 experts from industry, academia, research institutes, etc.

[Requirements]
• Mid 20s to late 30s with sufficient knowledge of English
• Work experience in std. at least for 3 years
  experience or knowledge of standardization

[Preferences]
• taking a course of Standardization in the Uni., or
  * Currently “Standardization course” is provided by some universities in Korea
• getting newly-developed “Standards Professionals Certificate”

✓ Initiated in July, 2013
✓ Selected 20 YPs
✓ Developed Curricula & Teaching Materials

Fewer experts on standardization in industry sector
Bigger needs for young professionals for international standardization

Future Value, Ask KSA
2.2 Korean Young Professionals (KYP)

4-day Training:
Courses in class
✓ Program on Procedure of Std. Development, Benefit of Standards, English skills..
* All participants are required to take test after training.

Simulation Training:
Int’l Standards WS
✓ Global standards leaders are invited to join (e.g.) TC/SC Chair, Secretary, WG Convener, etc.
✓ Technical visit is included

Participating in National/Int’l Standards Activities
✓ IEC YP
✓ Nat’l Mirror Committee meeting
✓ Int’l standards-related meetings organized in Korea

12-week Mentoring
facilitating KYP

KYP

LEARNING

EXPERIENCING

PARTICIPATING
2.3 Attract Industry to Standardization

**Std. Support Center**
Since 2013

**Funded by**
KATS
**Implemented by**
KSA

**[LONG-TERM]**
Based on demand survey, select SMEs and match standards experts

* 10 companies were matched.

**[SHORT-TERM/FOR 1 PERSON]**
Specific knowledge is provided by a standards consultant upon requests from industry

Financial support for TC/SC/WG meeting for SMEs to submit NP

**1:1 CONSULTING**

**FINANCIAL SUPPORT**

**10 companies**

**ONLY for SMEs**

**[FOR COMPANIES]**
Visit companies or organizations to provide customized program upon request

**Industry**

**Standardization**

**Anybody from Industry**
2.4 Standards Professionals Certificates (SPCs)

Systematizing Standards Knowledge Structure
Establishing Base to Foster Standards Professionals

SPCs Since 2013

DEVELOPING

- Analyze and develop standards knowledge structure
- Develop related contents/materials accordingly
- Develop pool for test items

IMPLEMENTING

Organize 5-day training program for the 1st / 2nd levels
* It is not required for the graduates completed std. course.

BEING CERTIFIED

Organize Tests for the 1st / 2nd levels
* As for the successors, “Standards Professionals Certificates” are presented.

* As for the successors, “Standards Professionals Certificates” are presented.
2.4 Standards Professionals Certificates (SPCs)

< Number of Applicants & Successful Candidates >
3. Cooperation with Partners

- APEC SCSC Projects on Std. Education & Standards Professionals (regional)
- ISO/DEVCO-Korea Workshop on Std. Education (international)
APEC SCSC Education Initiative
- 3 Phase Projects (2007-2011)

Who Participated
- Proposed by Korea
- Co-sponsored by China, Indonesia, Japan, Singapore, Thailand, Peru, USA, Vietnam

Phase I (2007-2008)
Case Study Curricula
- Advisory Groups
- Workshops
- Reference Collection
- Case Studies
- Curricula Development

Phase II (2009-2010)
Textbooks Manuals
- Meetings and Workshops
- Textbook Development
- Teaching Manual Development
- Networking

Phase III (2011)
Pilot School Guideline
- Meetings
- Teachers’ Workshop
- Implementation Guideline
- Pilot Schools
- Lesson Book
3. Cooperation with Partners; APEC SCSC Projects

APEC SCSC Standards Professional Initiative

Phase 1
- Proposed by Korea
- Co-sponsored by China, Indonesia, Malaysia, Japan, Singapore, Peru, USA, Vietnam
- Published final project report presenting definition/classification of standards professional to be used in developing occupation standard or competency requirements of standards professionals in the future.

Phase 2
Career Roadmap (2017-2018)
- Proposed by Korea
- Co-sponsored by China, Indonesia, Japan, Malaysia, Peru, Philippines, Thailand, USA, Vietnam
- To publish final project report presenting career path or roadmap for standards professionals

Main Activities; Online survey and its analysis, interview, workshop, meetings, etc.
3. Cooperation with Partners; ISO/DEVCO Workshop

• ISO Action Plan for developing countries
• Planning std. education initiatives
• Network with ISO members in ALL region

• Life-long std. education system related experiences and experts
• Teaching materials ; textbooks, animation...
• Experience of leading APEC projects on std. education

ISO/KATS REGIONAL WS ON STD. EDUCATION

• [PARTICIPANTS] around 50 person NSBs, academia, institutions, other stakeholders
• [1st WS_Africa/Asia/Pacific Region] April 7-9, 2012 / Bali, Indonesia
• [2nd WS_Latin American/Caribbean Region] April 15-17, 2013 / Sao Paulo, Brazil
• [3rd WS_African Region] Nov. 19-21, 2013 / Pretoria, S. Africa
3. Cooperation with Partners
3. Observations
4. Observations

[ at International Level ]

• Raised awareness of importance of HRD in the fields of Std., CA and LM to strengthen national standards competitiveness

[ at National Level ]

• Raised needs to re-organize HRD system more systematically for national and international participants

  ➢ Strengthened cooperation with academia, government, industry, regional/international organizations, etc.

* (e.g.) Establishment of Society for Standards and Standardization (SSS) in 2010, Cooperation with the Korean Federation of Technology Education Societies for Standards Youth Olympiad Suggestion
  Organization of Joint ISO/DEVCO-KATS Regional Workshop on Standardization Education (4 times during 2012-2014)

  ➢ Organized International Youth Standards Olympiad since 2015

  ➢ Developed teaching materials in the English version

  ➢ Developed stepping-stone to establish graduate school of standardization
4. Moving forward with Partners
GOAL Sustainable Development

4. Moving Forward with Partners

ANY OTHER IDEAS/SUGGESTIONS?!

Joint Projects (APEC, ISO, IEC...)

International Youth Standards Olympiad

Sharing HRD Programs (ST. CA. M. QM)

Sharing Teaching Materials

GLOBAL Cooperation

FOSTERING PROFESSIONALS FOR STANDARDIZATION