Teaching Standards: Global Overview

4 March 2013
Northwestern Univ, Evanston, IL

Donggeun Choi
Chief Manager, KSA
Project Editor, APEC SCSC Education Initiative

5 June 2013
UCLA, Los Angeles CA

Erik Puskar, NIST
Today’s discussion

Global

Korea

U.S.
I. Snapshot of other Economies Globally

APEC Presentations
APEC Survey 2007
ICES Presentations
### Preview – Eagle’s view

<table>
<thead>
<tr>
<th>Country</th>
<th>Activity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APEC</strong></td>
<td>MM 2007, PJ 2007~11</td>
</tr>
<tr>
<td><strong>Korea</strong></td>
<td>±50 (KSA 2003~)</td>
</tr>
<tr>
<td><strong>China</strong></td>
<td>±30 (CJLU, CNIS..)</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td>±8 (JISC, JSA)</td>
</tr>
<tr>
<td><strong>Indonesia</strong></td>
<td>8 (28 MOU) (BSN 2005~)</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td>n/a (DSM 2011~)</td>
</tr>
<tr>
<td><strong>Peru</strong></td>
<td>a few (INDECOPI 2012~)</td>
</tr>
<tr>
<td><strong>U.S.</strong></td>
<td>5 (\rightarrow) 10? (ANSI, NIST)</td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td>a few</td>
</tr>
</tbody>
</table>
China
- Fed agencies, local governments
  - CNIS Magazine article: 28 schools
  - CNIS Presentation (2010 May, Beijing): 21 Schools

<table>
<thead>
<tr>
<th>Schools which have the related majors in China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
</tr>
<tr>
<td>Graduate</td>
</tr>
<tr>
<td>PHD</td>
</tr>
<tr>
<td>Postdoctoral Program</td>
</tr>
</tbody>
</table>

21 schools have standardization courses

**Dissertation**

<table>
<thead>
<tr>
<th>dissertation</th>
<th>count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral Thesis and Excellent Masters' Thesis</td>
<td>288</td>
</tr>
<tr>
<td>From Universities and Colleges</td>
<td>118</td>
</tr>
</tbody>
</table>
Japan
- higher education level

- JISC: HRD Committee, textbook developments
- Undergraduate level: Waseda university (2011 ICES)
- Graduate level: 6 universities (2009 ICES)
Indonesia
- 8 universities (28MoUs)
  - Primary/Secondary Program (games)
  - University program (ICES 2011, BSN)
Malaysia

- DSM presentation (KL, Dec 2011)

  • Past National Status (~2011)
    • Video competition about standards
    • Collaboration with Malaysian Association of Standards Users
    • Collaboration with Ministry of Higher Education together with Institutes of Higher Learning

  • Ongoing National Projects, Way forward (2011~)
    • 2011 National workshop (Dec 2011)
    • Constant and multiple channels of communication with stakeholders to establish partnerships
      • Regular dialogues and promotions
      • Identify partners & areas of interest based on needs
    • Staying relevant to stakeholders’ needs
      • Conducting periodic studies on standardisation needs
      • Timely delivery of standards needed
Peru

- 2011: APEC trial program
  - P.U.C.P
  - Quality Institute
- INDECOPI and Catholic university
  - National workshop in 23-24 August
  - Detailed information is not publically available
Europe
- ESO, EC just published master plan

• Individual Activities in the region until recently by universities and standards bodies.

• ESO (CEN-CENELEC-ETSI) JWG-EaS established (2011)
  • Joint Working Group Education about Standardization
    • [http://www.cen.eu/cen/Services/Education/Educationaboutstandards/Pages/default.aspx](http://www.cen.eu/cen/Services/Education/Educationaboutstandards/Pages/default.aspx)
  • Cooperation with Academia (EURAS)
  • Support/Collaboration through NSBs
  • Support/Cooperation from/with EC

• Activities
  • Common Policy (Feb 2011)
  • Model Curriculum (Jun 2011)
  • Master-plan (Jan 2013)
Overview: What’s in APEC project?

**Project Initiation**

- Korea: 2006 (co-sponsors by 9 economies including the U.S.)
- Projects: Three phases 2007-8, 9-10, 11

**Outcomes**

- 7 Meetings (2007~)
- 4 Guidelines
  - (2008) 118 case practices, Curricula models
  - (2009) Education Outreach Strategy
  - (2009) APEC Education textbook (higher education)
  - (2011) APEC Pilot Program reports (14 universities)
- APEC Education portal website (2009~)
APEC SCSC Education Initiative  
- Three Phase Projects 2007-2011 -

- Proposing Economy: Rep. of Korea
- Co-sponsoring Economies:
  - China, Indonesia, Japan, Singapore, Thailand, Peru, USA, Vietnam

**Phase I** (2007~8)
- Case Study Curricula
  - Advisory Groups
  - Workshops
  - Reference Collection
  - Case Studies
  - Curricula Development

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

**Phase III** (2011)
- Pilot School Guideline
  - Meetings
  - Teachers’ Workshop
  - Implementation Guideline
  - Pilot Schools
  - Lesson Book
Phase II – Guide 3
Textbook for Higher Education: ToC

Part I. FUNDAMENTALS

• Chapter 1 Definitions and Functions (Prof. Minabu Eto, JP)
• Chapter 2 Lifecycles, Organizations, and Development Procedures (Prof. Minabu Eto, JP)
• Chapter 3 Conformity Assessment (Prof. Mingshun Song, CN)

PART II. IMPACTS

• Chapter 4 Economic Impacts - Macro Perspective (Mr. John Henry, AU)
• Chapter 5 Economic Impacts - Micro Perspective (Mr. John Henry, AU)
• Chapter 6 Legal Impacts (Mr. John Henry, AU)

PART III. BUSINESS STRATEGY

• Chapter 7 Standardization and Innovation (Prof. Hee-Sang Lee, KR)
• Chapter 8 Competitive Strategy (Prof. Byung-Goo Kang, KR)
• Chapter 9 Collaborative Strategy (Prof. Hee-Dong Yang, KR)
• Chapter 10 Two Case Studies of ICT Standard (Prof. HeeJin Lee & Prof. Hee-Dong Yang, KR)

ANNEXES A. B
## Phase III – Guide 4: Casebook
### Universities with Major/Students

<table>
<thead>
<tr>
<th>Ch. University (Economy)</th>
<th>Major/Dep.</th>
<th>Ba</th>
<th>Ma</th>
<th>PhD</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.CJLU (China)</td>
<td>Biz Management</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02.Chungang (Korea)</td>
<td>Business</td>
<td>5</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03.Diponegoro (Indonesia)</td>
<td>Industrial Eng.</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04.EWHA (Korea)</td>
<td>MBA</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05.HUFS (Korea)</td>
<td>Industrial Eng.</td>
<td>6</td>
<td>1</td>
<td></td>
<td>Work experienced</td>
</tr>
<tr>
<td>06.Hanyang (Korea)</td>
<td>Business</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07.Kookmin (Korea)</td>
<td>Open for all</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08.KNU.Educ. (Korea)</td>
<td>Technology Educ.</td>
<td>12</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09.Korea Un. (Korea)</td>
<td>Elect. &amp; ICT Eng</td>
<td>(3)</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10.NEU (Vietnam)</td>
<td>Business - Quality</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.P.U.C.P(Peru)</td>
<td>Quality Institute</td>
<td>19</td>
<td>1</td>
<td></td>
<td>Work experienced</td>
</tr>
<tr>
<td>12.Trisakti (Indonesia)</td>
<td>Industrial Mgt</td>
<td>21</td>
<td></td>
<td></td>
<td>Work experienced</td>
</tr>
<tr>
<td>13.Waseda (Japan)</td>
<td>Global Biz School</td>
<td>54</td>
<td>98</td>
<td></td>
<td>Distance learning</td>
</tr>
<tr>
<td>14.Yeonsei (Korea)</td>
<td>International Mgt.</td>
<td>18</td>
<td></td>
<td></td>
<td>Multi-national</td>
</tr>
</tbody>
</table>

**Total: 468 Students in 14 Universities**

|            |            | 251 | 191 | 26 |
Next Step: New APEC Proposal 2013~
- Submitted for approval of APEC in May 2013

Title

- Inspiring Next Generation of Standards Professional Development: Phase I. Identifying Stakeholder Requirements

Topics for Case Study Series

- This project is designed to define next generation of standards professional, future human resources in the area of standards and conformity assessment, so as to improve the competitiveness of the APEC Member economies.

- Even though standards education activities have increased during the last decade in the region, the concept of 'standards professional' has been hardly defined and the needs of stakeholders have not been clearly disclosed yet. APEC-wide survey, in-depth interviews with thought-leaders in various stakeholders, and a workshop will be held to shed light on identifying, first, the current and future workforce requirements and, second, the gap between demand and supply side for standards professionals collected from stakeholders.

- The project will identify the stakeholder requirements for standards professionals in public and private stakeholders, and provide recommendations on how best to meet these requirements.
1. In Korea in 2003-2011
Korea’s Roadmap for Lifelong Standardization Education

- Primary School
  - Fun Standards

- Secondary School
  - Standards Olympiad

- Higher Education
  - University Program
  - Writing Skills Strategic Application

- International Standards
  - Global Leader Training
  - Open Workshop
  - Consumer

- Standards Skills

- Formal Education
  - Learn to know/Knowledge Oriented

- Post-Formal Education
  - Learn to do/Skill Oriented/Biz Practices
## Korea’s Activities for Lifelong Standardization Education

<table>
<thead>
<tr>
<th>ITEM/YEAR</th>
<th>2003</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Higher</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- classroom</td>
<td></td>
<td>982</td>
<td>4,830</td>
<td>6,681</td>
<td>6,160</td>
<td>5,948</td>
<td>5,693</td>
<td>4,218</td>
<td>4,015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(11-11)</td>
<td>(35-64)</td>
<td>(46-87)</td>
<td>(49-91)</td>
<td>(48-96)</td>
<td>(49-90)</td>
<td>(43-80)</td>
<td>(41-81)</td>
</tr>
<tr>
<td>- textbook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Olympiad</td>
<td></td>
<td>217</td>
<td>240</td>
<td>639</td>
<td>534</td>
<td>888</td>
<td>774</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(240)</td>
<td>(240)</td>
<td>(240)</td>
<td>(300)</td>
<td>(240)</td>
<td>(240)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- textbook, ToT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Primary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- classroom</td>
<td></td>
<td>970</td>
<td>4,318</td>
<td>4,381</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(11)</td>
<td>(43)</td>
<td>(43)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- textbook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Evolution in UEPS Programs

Basic Contents
- 2~3 Credits Per Semester
- Common Textbook
- Team Teaching Methods (50 → 340 Experts in Korea)
- Field Trips

Diversities
- Major Specific Textbooks (EE/ICT, Env, Mech)
- Major Specific Case Studies (Science and Social Science)
- Advanced Program for Major/Subject Specific Programs
- Graduate School Programs
- Mentoring System
- Case Study Competitions
- Term Projects
- Field Trips
Higher Education: UEPS – Growth And Characteristics

- Number of UEPS courses and participating students

- Share of different categories of different UEPS courses
Higher Education: UEPS – Textbook

- “Future Society and Standards”

Ch 1. Standardization Overview
Ch 2. International Standardization
Ch 3. Industrial Standardization in Korea
Ch 4. Enterprises and Standards
Ch 5. Measurement and Reference Standards
Ch 6. Conformity Assessment
Ch 7. Standards & Intellectual Property Rights
Ch 8. Future of Standardization
## Standards Education Activities

**Number of People Participated in Programs**

<table>
<thead>
<tr>
<th>Program/Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>University</td>
<td>982</td>
<td>4,830</td>
<td>6,681</td>
<td>7,500</td>
<td>5,948</td>
<td>5,693</td>
<td>4,218</td>
<td>4,015</td>
</tr>
<tr>
<td>High &amp; Middle</td>
<td>-</td>
<td>-</td>
<td>119</td>
<td>270</td>
<td>240</td>
<td>240</td>
<td>300</td>
<td>240</td>
</tr>
<tr>
<td>School</td>
<td>-</td>
<td>-</td>
<td>98</td>
<td>240</td>
<td>970</td>
<td>4,318</td>
<td>4,381</td>
<td>(4,000)</td>
</tr>
<tr>
<td>Elementary School</td>
<td>-</td>
<td>-</td>
<td>98</td>
<td>240</td>
<td>970</td>
<td>4,318</td>
<td>4,381</td>
<td>(4,000)</td>
</tr>
<tr>
<td>Business</td>
<td>287</td>
<td>329</td>
<td>150</td>
<td>249</td>
<td>181</td>
<td>150</td>
<td>406</td>
<td>(400)</td>
</tr>
<tr>
<td>Consumers</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>151(1)</td>
<td>85(2)</td>
<td>321(4)</td>
<td>353(4)</td>
</tr>
<tr>
<td>Total</td>
<td>1,269</td>
<td>5,159</td>
<td>7,048</td>
<td>8,259</td>
<td>7,490</td>
<td>10,486</td>
<td>9,503</td>
<td>(10000)</td>
</tr>
</tbody>
</table>

*These numbers are limited in the regular courses.*
• ANSI
  • US Standards Strategy
    • Key priority
  • Committee on Education
    • SDO, NIST, Unit, Industry
    • 2012 student paper competition
• SDOs
  • ASTM: Student, Professor
  • IEEE: Website, Magazine
  • UL: wide range training
  • …

• NIST
  • Fed government training
  • 2011-2012 University Grant program
    • 2012 - 5 universities
    • 2013~ 2-3 universities
  • 2012-2013 workshops via GATIC
    • Northwestern Univ.
    • UCLA
  • 2013 Education Summit
Summary Highlights

- Education done at many levels
  - Herein formal education level with a focus of university
- In Asia, Education about Standards are observed more active explicitly with mostly top-down approach
  - Korea, China, Indonesia, Japan are very active
    - All initiated by national policy based sponsorship initiated by governments or standards organizations
  - Korea proposed and lead APEC standards education initiative, and provided common ground and productive outreach
  - Malaysia, Peru started, and a few others to do national projects
    - Similar type of movements
- In North America and Europe, Less activities are observed with limited national level of projects or activities (some exceptions)
Thank you for your attention!