Standardization as Emerging Content
at All Levels of Technology Education

– Toward a lifelong education on Standardization –

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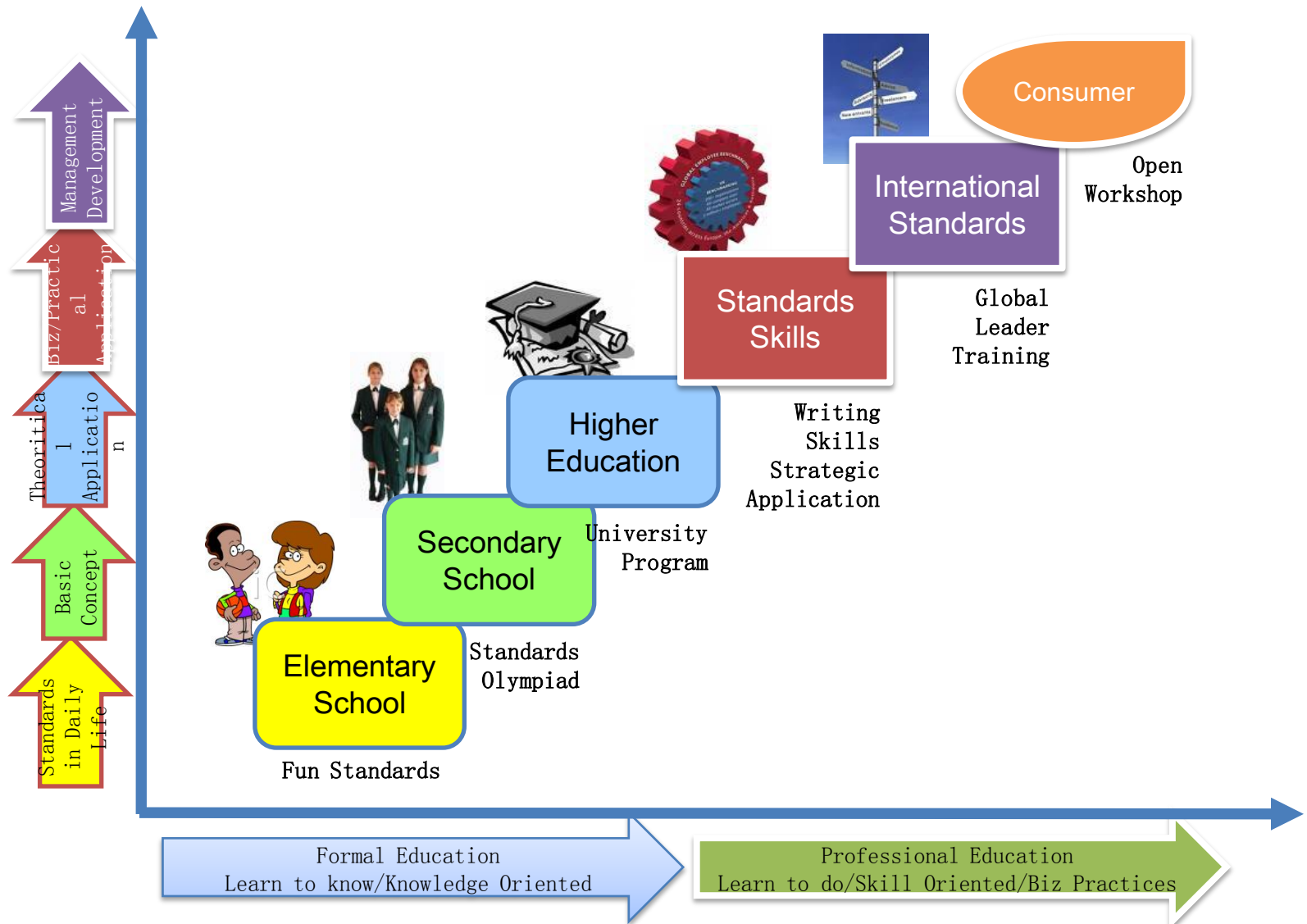
For Today

I. Global Experiences

II. Content Modules

III. Proposed Framework

Question onboard

How to develop and implement hierarchically structured and functionally unified standardization education programs from primary to post-formal education

** KSA's Roadmap for Lifelong Standardization Education

Management Development

Biz/Practical Application

Theoritical Application

Basic Concept

Standards in Daily Life

Consumer

Open Workshop

International Standards

Global Leader Training

Standards Skills

Writing Skills Strategic Application

Higher Education

University Program

Secondary School

Standards Olympiad

Elementary School

Fun Standards

Formal Education
Learn to know/Knowledge Oriented

Professional Education
Learn to do/Skill Oriented/Biz Practices

I. Global Case Studies at Different Levels

What we surveyed

Category	Number of Practices
General Promotion Activities	16 cases
Formal Education I – Primary and Secondary (F1, F2)	10 cases
Formal Education II – Higher Education (F3, F4)	27 cases
Post-Formal Education (P1~P8)	65 cases
Summary	118 cases

Primary & Secondary

		One time event	Module(s) Sub-Chapter	Single Subject
<Level of Expansion>	(Semi) nation-widely	-	#6 Thailand-TISI (completed) #3 Korea-KSA (in development) #4 Philippines-BPS (in expanding)	#7 Turkey-TSE (data incomplete)
	One to Dozens of Schools	#1 Japan-METI (delivery service)	#8/#9/#10 UK-BSI	-
	One time event	#2 Korea-KSA (camping) #5 Philippines-BPS (writing contest)	-	-
		<Level of Intensiveness>		

Primary & Secondary
– Turkey and Thailand –

Exceptional is Turkey (#7)

- as they developed a textbook for a single subject. Verification about detailed operation is needed as the information in gained in phone conversation.
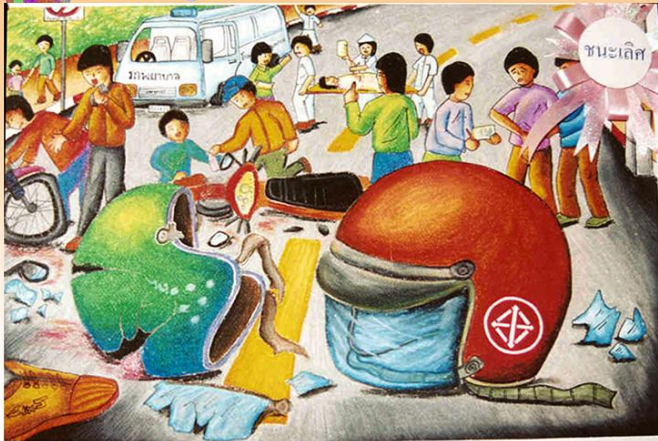
Outstanding is Thailand (#6)

- as they operated nationwide program for four years, and around half a million secondary school students participated in the program. Its detailed operation methods and various types of contests are good practices for all. This program is considered as best practice of leadership and cooperation between standards institution and education ministry. For details, please see Annex D5.

Primary & Secondary
– Turkey and Thailand –

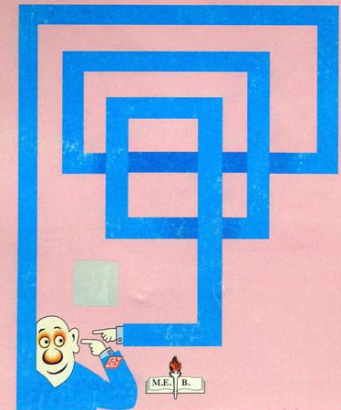Painting contest

Costume Contest

TEKNİK, ANADOLU TEKNİK, ANADOLU MESLEK VE ENDÜSTRİ MESLEK LİSELERİ

STANDARDİZASYON VE KALİTE

LİSE, ANADOLU LİSELERİ, YABANCI DİL AĞIRLIKLI LİSELER, FEN LİSELERİ

STANDARDİZASYON VE KALİTE

Higher Education

		One Subject	Multi Subjects - a few subjects/thesis-	Multi Subjects - degree/program -
<Level of Expansion>	Multi Universities	#27 Korea-KSA UEPS #17 EU-Asia Link #23 DEVCO(dormant)	#13 China-CJLU	#12 China-CJLU
	One University	#20.#21 France-ZFIB #24 Japan-JSA #30 Univ Moratuwa #34 USA-Catholic	#26 Korea–FEU(multi) #25 Japan-T.U(multi) #28/#29 Neth-RSM (thesis, optional)	#18 Egpyt – PQI #19 France – U.C.
		One Subject	Multi Subjects - a few subjects/thesis-	Multi Subjects - degree/program -
		<Level of Intensiveness>		

Higher Education
– CJLU, Egypt, France –

Most intensive and impressive case is CJLU

- providing seven different courses and two additional special courses.
- In total, 592 students graduated in 2003-2006 and surprisingly more than 90% of them are working in the field of standardization

Other two intensive courses are

- PQI's program for post graduate degrees in Egypt (#18), and University of Technology Compienge's courses in France (#19).
- The two courses are covering variety of standardization, quality management, certification and metrology.

Higher Education
- Korea, EU-Asia, ISO-Devco -

Outstanding is Korea's UEPS (#27)

- Semi-nationwide outreach
- Common textbook *'Future Society and Standards'*
- Team-teaching arrangement
- Database, Various types of students
- KSA assists universities to prepare syllabus and to arrange speakers

EU-Asia Link (EC funded project)

- Eye opener of 718 page textbook (2006)
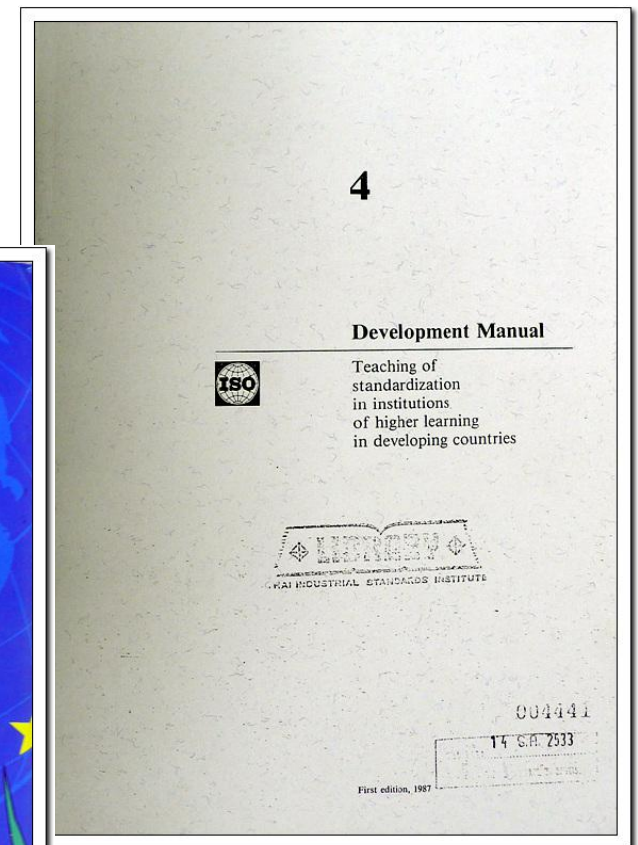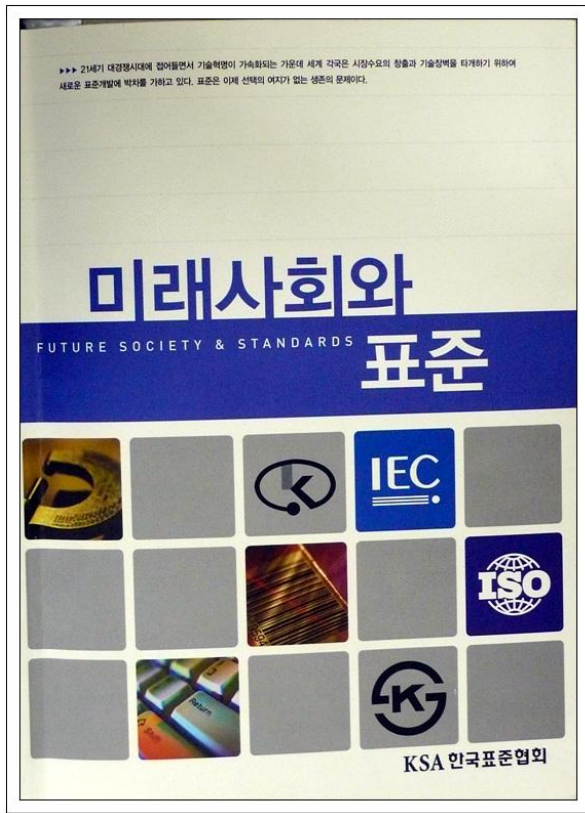- eLearning platform for graduate school

ISO DEVCO

- Development Manual 4 *'Teaching of standardization on institutions of higher learning'* (1987)

Higher Education
- Korea, EU-Asia, ISO-Devco -

Higher Education
– MOT/MBA Courses –

Noteworthy enough is that six graduate courses (F4)

- Tokyo Univ, RSM Erasmus, Catholic, ZFIB, JSA and Moratuwa
- Targeting for graduates students in engineering, MOT or MBA
- As Strategic Management tool.

Interdisciplinary characteristics

- Standardization is interrelated with technology, management, administration and its education is better accepted when to be discussed with academic theory and business practices together.
  - ➔ At graduate level, standards education seems to be fitting well as part of graduate program such as MOT or MBA curriculum.

Post-Formal Education Programs

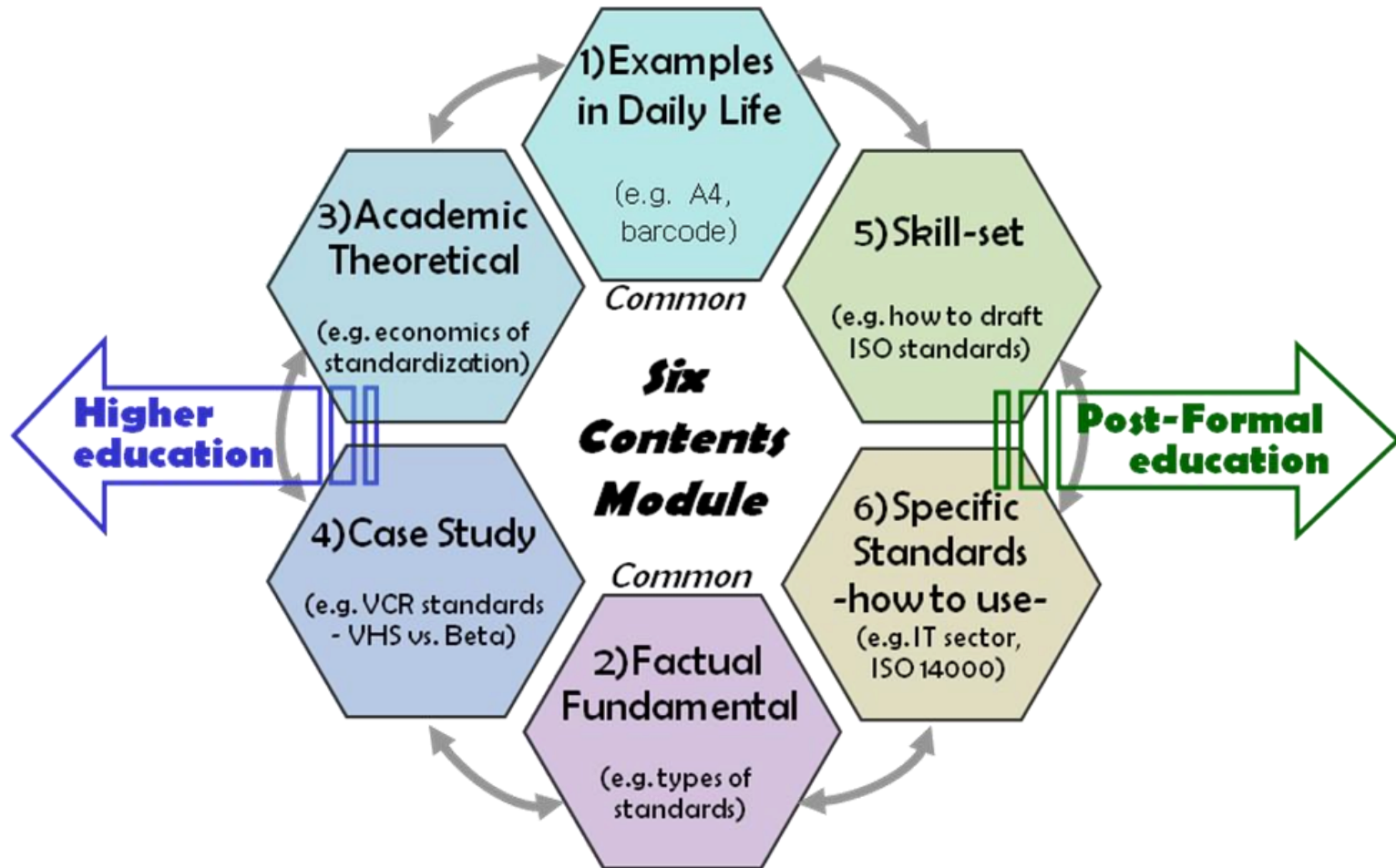| No	Topics or Skills	Main Target Groups
1	Conformity assessment Skills - testing, assessing, and documentation	NMI, laboratories Business experts
2	Administration of standardization activities	NSB, NMI, SDOs Committee chair/secretariat
3	Technical Standards in relation to technical regulations or legislation	Government officials NSB, NMI, SDOs
4	Communication skills - chairing/moderating a meeting	Committee chair/secretariat
5	Working across cultures - cultural differences	Committee chair, secretariat, members
6	Developing/Drafting technical standards	Committee members Business experts
	Specific industry/technology sta	Specific Industry expe

Post-Formal Education Programs

No	Topics or Skills	Main Target Groups
8	Communication skills - language (English)	All Committee members
9	Communication skills - consensus, negotiation, discussion	All Committee members
10	Procedures for developing technical standards	Committee members Business experts
11	Standardization process, practices in general	All Committee members
12	Structure of national standardization system	All Committee members
13	Structure of international standardization system	All Committee members
14	Basics, Fundamentals about standardization	All

II. Content Modules and Teaching Methods

Segmentation of Contents Modules for Standardization education

Common Core Domain

- <Module 1>
  - Example standards in daily life related contents
- <Module 2>
  - Factual or Fundamental information related contents.
- We place these two modules in central part of the map as they are common core contents and are considered part of any level of educations.
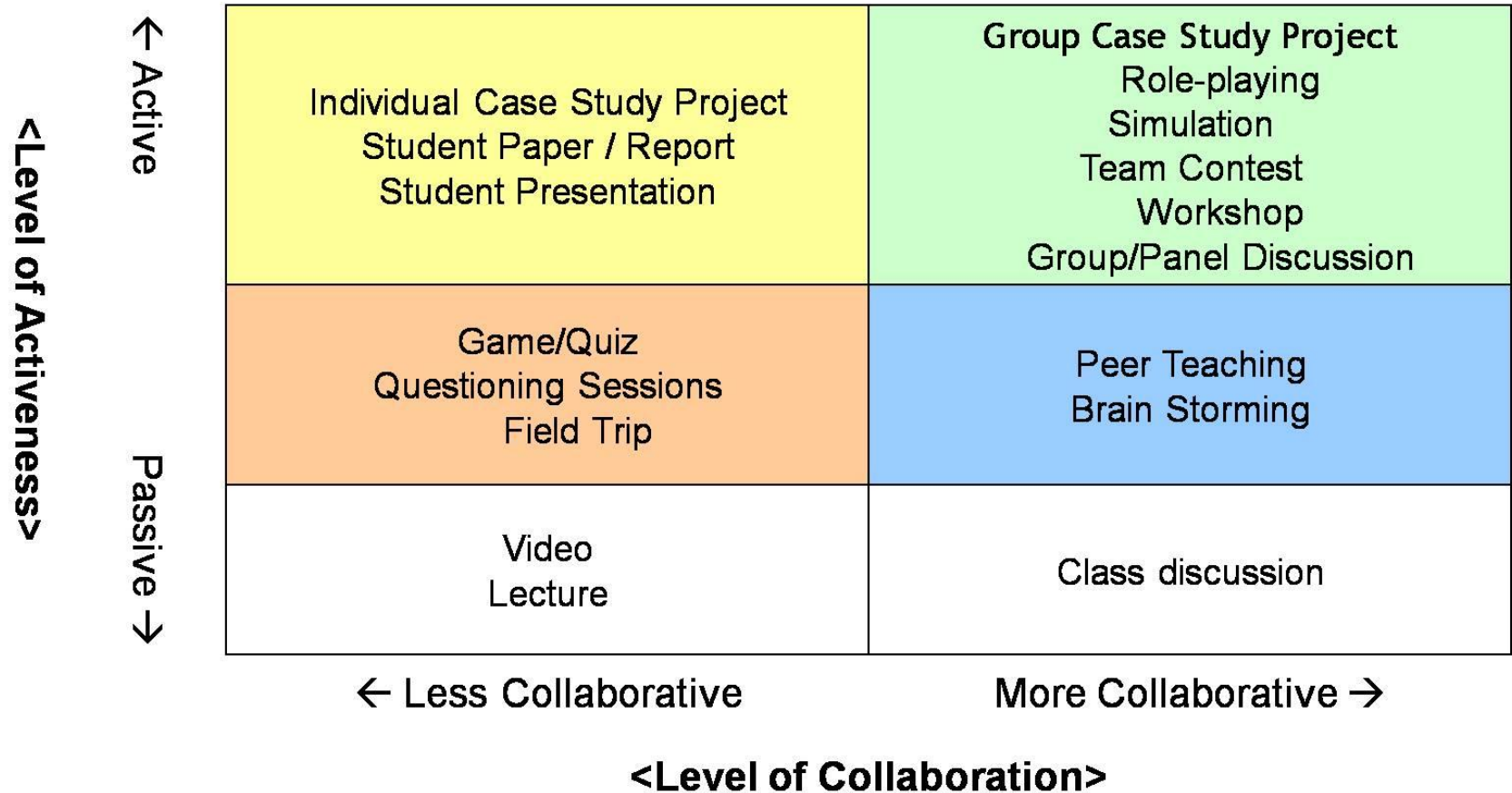
Higher-Education Oriented Domain

- <Module 3>
  - Academic/ Theoretical aspects of standards and conformance related contents, and
- <Module 4>
  - Case Study of standardization related contents.
- We place these two modules in left part of the map, as they are commonly found in the courses in higher education, universities.
  - However, you always have freedom to use these higher education oriented modules in professional education, either to meet specific objectives or to increase variety of an education program.

Professional Education Oriented Domain

- <Module 5>
  - Skill-set related contents, and
- <Module 6>
  - (How to use) Specific Standards related contents. *many introductory course increasingly found in higher education as well
- We place those two modules in right part of the map, as they are commonly found in the course in professional education.
  - However, you always have freedom to use these professional education oriented modules in higher education, either to meet specific objectives or to increase variety of an education program.

Teaching Methods

III. Proposed Framework

Inclusiveness
Harmonization
AT ALL LEVELS OF EDUCATION

Leadership of Gov/NSB/SDO
Strategy for Self-Diffusion

Proposed Framework for Standardization Education

Who - Students	Why - Learning Objectives	Where -Operator	What - Contents -		How - Methods	Good Practices (in Annex B)
			main contents	subsidiary contents		
Primary/ Secondary Education	Awareness	Gov NSBs	Module 1 - examples (simplified)	Module 2 (simplified)	Contest Camping Quiz Game	# 3 (Korea) # 6 (Thailand) # 7 (Turkey) # 8-10 (UK)
Higher Education - Under-graduate	Awareness/ Specialized Knowledge	Gov NSBs SDOs Univ	Module 2 - fundamental Module 3 - academic Module 1 - example	Module 4 Module 5 Module 6	Team Project Presentation Field Trip	#12 (China) #27 (Korea) #28 (Netherlands)
Higher Education - Graduate	Specialized Knowledge/ Theory	Univ Gov NSBs SDOs	Module 3 - academic Module 4 - case study	Module 6 Module 2 Module 5 Module 1	Case Study Term Paper Workshop	#13 (China) #17 (EC) #18 (Egypt) #19 (France) # 25 (Japan)
Post-formal Education - Gov - Executive	Strategic Decision/ Policy Development	NSBs SDOs Gov	Module 2 - fundamental Module 4 - case study (abridged) Module 3 - academic	Module 1 Module 5 Module 6	Workshop Panel Discussion	#67(Thailand) #89(USA)
Post-formal Education - Committee Members - SDO staff	Practical Skills or Ability	NSBs SDOs Gov	Module 5 - skill-set	Module 4 Module 3 Module 2 Module 1 Module 6	Simulation Role Paying Workshop	#48 (ISO) #49 (ISO) # Many more, but not listed all here
Post-formal Education - Engineer - Researcher	How to use Specific Standards	Biz Univ R&D	Module 6 - standards	Module 4 Module 3 Module 2 Module 1 Module 5	Experiments Practices	#58(Singapore) #100(USA) Many more, but not listed all here

** KSA's Activities for Lifelong Standardization Education

ITEM/YEAR	2003	2004	2005	2006	2007	2008	2009
Consumers						151	
Multi Group of Experts	226	287	329	150	249	181	
Higher (univ-course)	–	982 (11-11)	4,830 (35-64)	6,681 (46-87)	6,160 (49-91)	5,948 (48-96)	5,693 (49-90)
Higher - textbook	Common				Common -Revision	Electronics ICT	Mechanic Environment
Secondary - olympiad				217	240	240	240
Secondary - textbook, teacher					Ver 0.5	(30)	Ver1.0 (36)
Primary						970 (11)	4,318 (43)
Primary - textbook							Textbook (37)

Thank you

- **For More Information**

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  - Also, you can visit:
    - www.wisestandard.org
    - http://www.springerlink.com/content/77566372j57240j1/fulltext.pdf