Education Ecosystem to Challenge Higher Education Issues in Korea

25th March 2015

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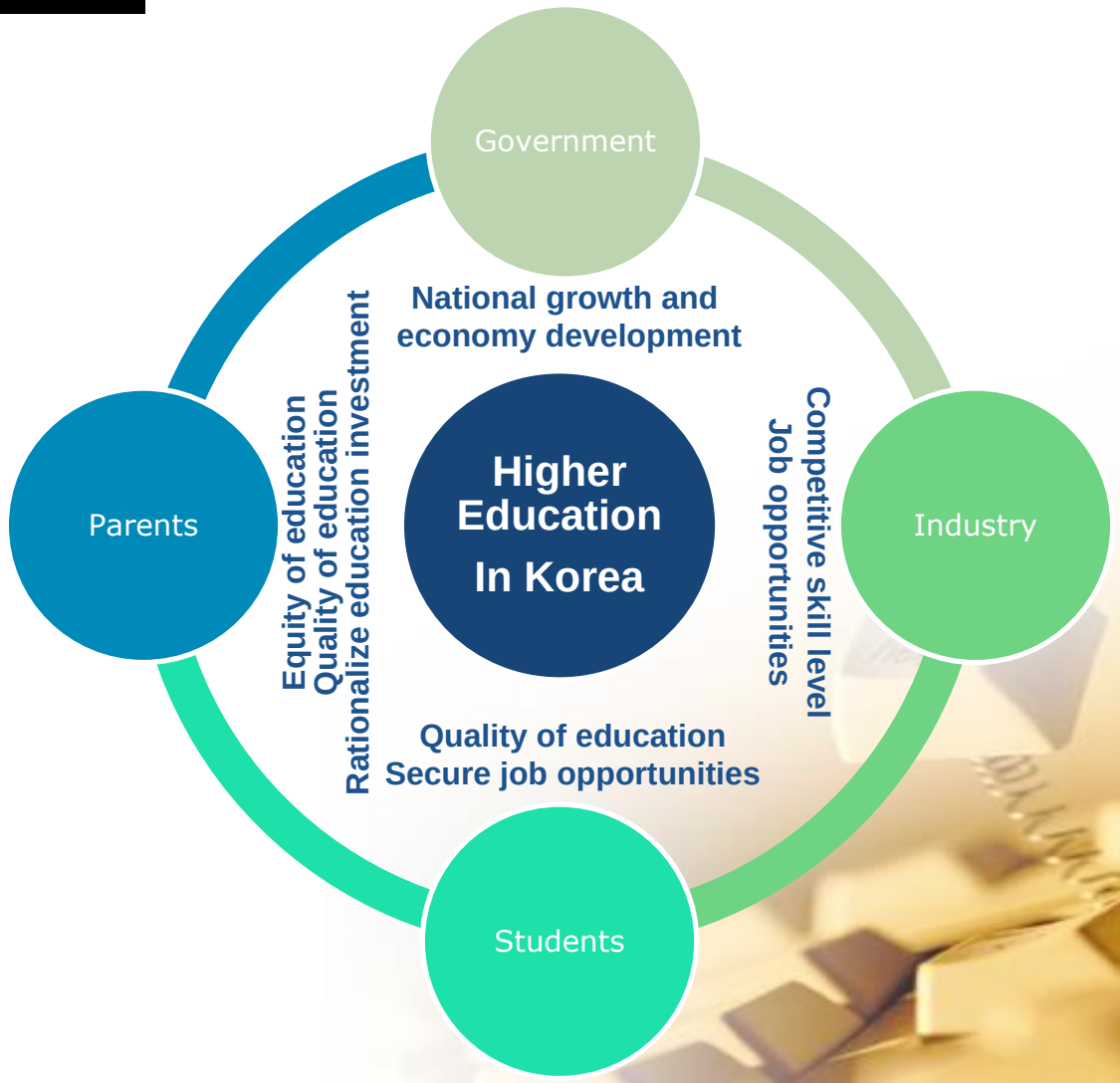
Voices from the Stakeholders with Different Background



Content

Overview of ICT in Education: Korea

Focus of Policies of ICT in Education

1970 Audio-Video Education
Education of Computer and Internet
Teacher training based on CBT

Built ICT Infrastructure
1996
Internet connection for all schools
Cyber universities accredited

Facilitated ICT use in Education
2000
Cyber Home Learning System for schools
e-Learning Regional Support Center established

2004
2007
Digital Textbooks for primary and secondary schools
KOCW and mobile campus established

Mobile Education Services
2011 Build Smart schools
Promote Smart Education

Just-in-Time & Person Education Services
2015
Practicing new pedagogies
K-MOOC began
Cloud campus
Education 3.0

Impacts of ICT on Education

- Catalyst for education innovation: average adoption rate (86.2%) in 2013
- HEIs (79%): 4-Year Univ., (82.1%)
  - ✓ Cyber Universities (22, 100%)
  - ✓ Junior College (71.9%)
  - ✓ School education: Primary (92.7%), Secondary (83.1%), High school (79.6/60.8%), Cyber Home Learning System (nation-wide e-Learning system)
  - ✓ e-Teacher training at MOE Training Institute: 70% in 2013
  - ✓ Global competence : levels of person(teacher, professor), institution, and state
- ICT became a platform for achieving social inclusion and educational welfare: decrease divides of education due to region, economy, and to culture
- e-Learning Regional Centers (10) established during 2002-2004 contributed to promote cooperation among member universities through learning
- KOCW project initiated in 2007 for encouraging sharing contents among HEIs
- K-MOOC initiated Mar 2015 for providing open education

Impacts of ICT on Societal Sectors

- Well established ICT infrastructure support societal changes : IDI, e-Government readiness <- mobile users (35 millions)
- e-Learning has been evolving to a major knowledge business with higher growth potential: USD 2.947 Billion for the supplier market in 2013
- A holistic approach taken to promote e-Learning using world class ICT infrastructure
- e-Learning as a major tools for national HRD
  - ✓ Government official training: 670,000/517,000, 72 courses
  - ✓ Company employee training (25.4%, USD1 billion): 63.0%, 37/247 (25.4% the company with less than 300 employees, 23.5% the company with more than 300 employees), 2.05million in 2011 (vs. 20,000 in 1999)
- ICT became a platform for achieving lifelong learning society to challenge quality of life and ever-changing demands on education
- Positive impacts recognized in every sector of society: productivity, education opportunity, cost saving, capacity building, and social safety network.

Conferment of Academic Degree by Age Group

(unit: person)

Year Age* adu	Less than 24 age	25~30 age	30~40 age	40~50 age	Over 50 age	Total
2011	5,161 (10.6%)	13,490 (27.8%)	16,915 (34.8%)	9,418 (19.4%)	3,589 (7.4%)	48,604 (100.0%)
2012	6,262 (10.9%)	12,359 (21.6%)	21,854 (38.2%)	12,314 (21.5%)	4,472 (7.8%)	57,261 (100.0%)
2013	7,481 (11.5%)	12,187 (18.7%)	24,453 (37.4%)	15,903 (24.3%)	5,316 (8.1%)	65,340 (100.0%)

Source: Lifelong Learning Guide, National Institute for Lifelong Learning, 2013

Statistics of Cyber Universities

Category	Students registered in 2013				Graduates in 2013	To be graduated in 2014
	Total	Freshman	Students transferred	Undergraduates registered		
Total	271,893	12,665	13,030	245,996	49,174	48,895
Humanities (93.3%)	143,978	4,949	4,484	134,546	26,592	26,635
Social Sciences (73.3%)	62,650	4,800	4,223	53,627	10,742	9,472
Engineering (40.0%)	5,108	527	337	4,245	1,476	1,666
Natural Science (20.0%)	48,638	1,421	2,377	42,885	8,700	7,723
Special majors (6.7%)	117	59	-	59	-	-
Others (33.0%)	35,232	909	1,609	10,657	1,662	1,399

*Now there are 22 Cyber Universities running HE programs since initiation in 2000
*Distribution of students by age: 20s (28.1%), 30s (31.1%), 40s (28.3%), over 50s (12.5%)

Source: Survey of e-Learning Industry in Korea, NIPA , Dec 2014

Content

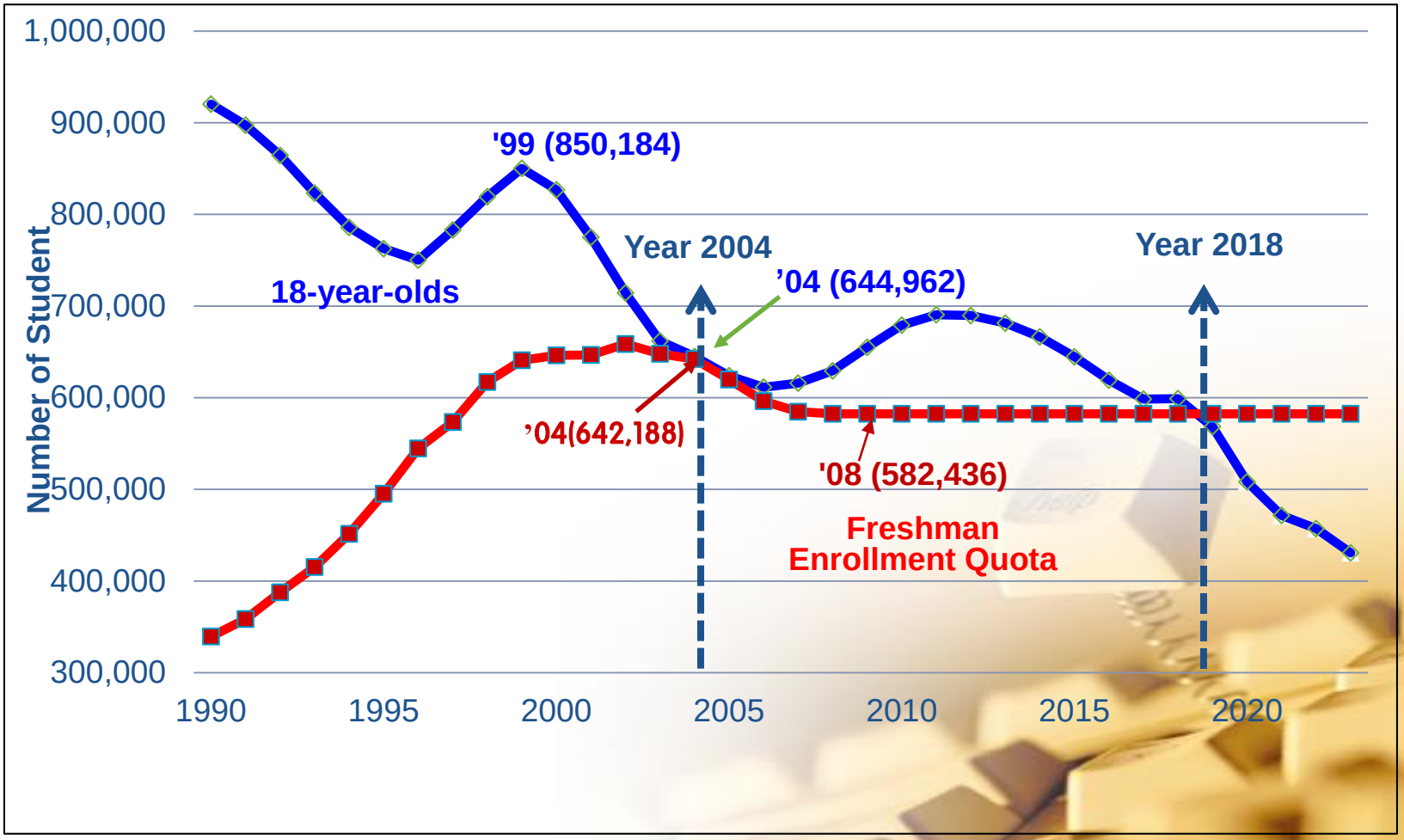
I. Background

II. Ecosystem of Education 3.0

III. Content Development

IV. Conclusion

Shortage of Students for Higher Education



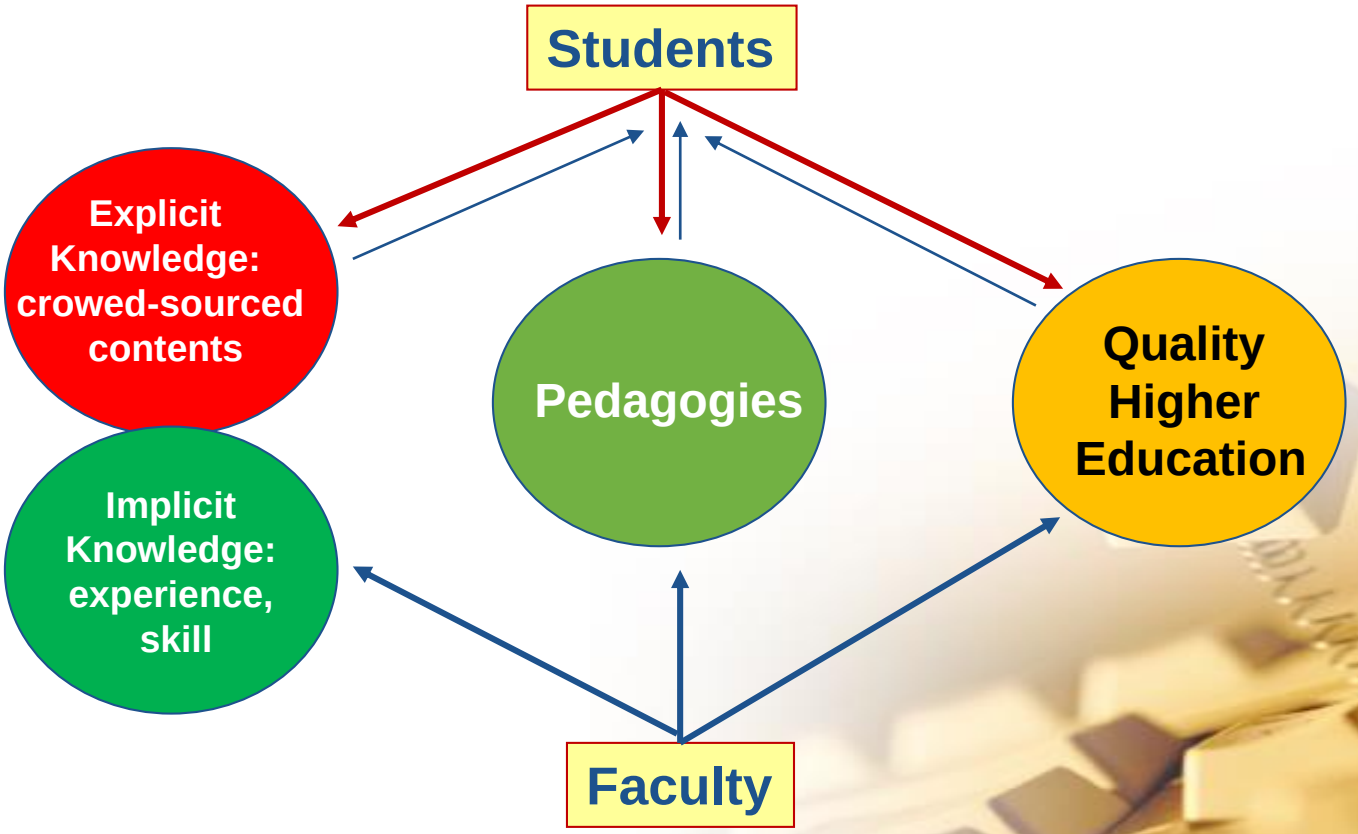
Sources: MEST&KEDI.(2008); Education Statistics Yearbook 1990~2008 (http://std.kedi.re.kr/index.jsp)

Sustainability Issue of Higher Education

- Changes of students demographics and behaviors: shortage of traditional students, adult learners, lifelong learners
- Challenge shortage of financial resources
- Establish education ecosystem: scalability wall, knowledge transformation wall, de-synchronization wall <- gab between education skill level
  - ✓ Leveraging potential of technology in establishing new education environment: cloud campus, mobile campus
  - ✓ Sourcing content: Crowd-sourcing, in-sourcing, out-sourcing
    - Open access to KOCW (OCW and OER): scale contents
    - K-MOOC: scale lecturers
    - Student as contributor to content creation (SCC)
  - ✓ Pedagogy-centric approach: flipped learning, blended, action learning
  - ✓ Promote partnerships
    - ✓ University-industry cooperation: research, contract departments such as semiconductor, automobile parts, smart phone)
    - ✓ University-university cooperation: dual degree program, franchise campus, oversea campus
- Data-driven planning and decision making: Learning Analytics, Academic Analytics, Predictive Analytics, Institutional Research (IR)
- Pay more attention to assessment and culture of stakeholders of HE

Sustainability of Higher Education

- **Personalized learning and student's satisfaction first in mind**
- **From "What-centric education" to "How-, and Why-centric" learning**



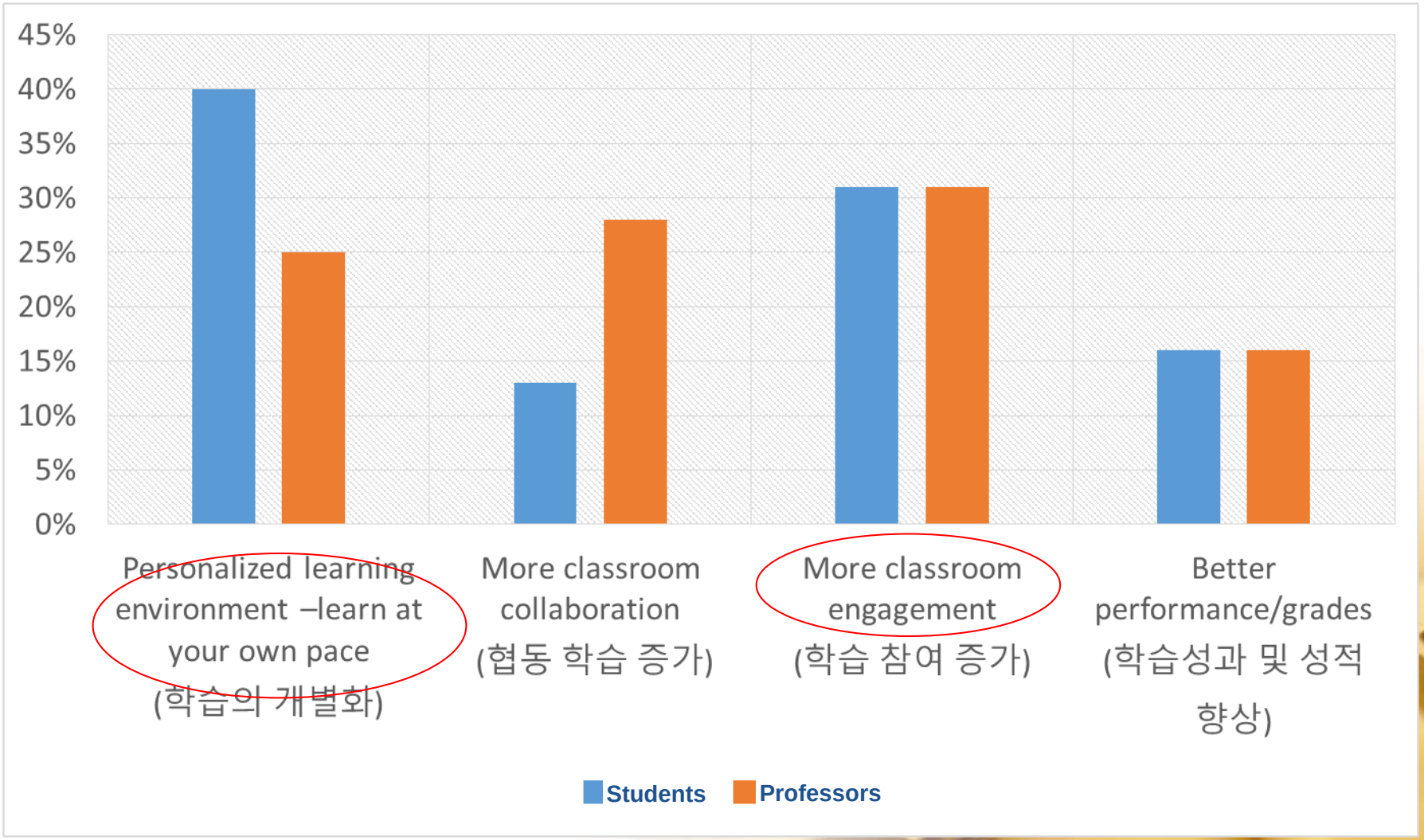
Engagement
Participating
Motivation
Satisfaction

The e-Education Project of UNIST (Ulsan National Institute of Technology)

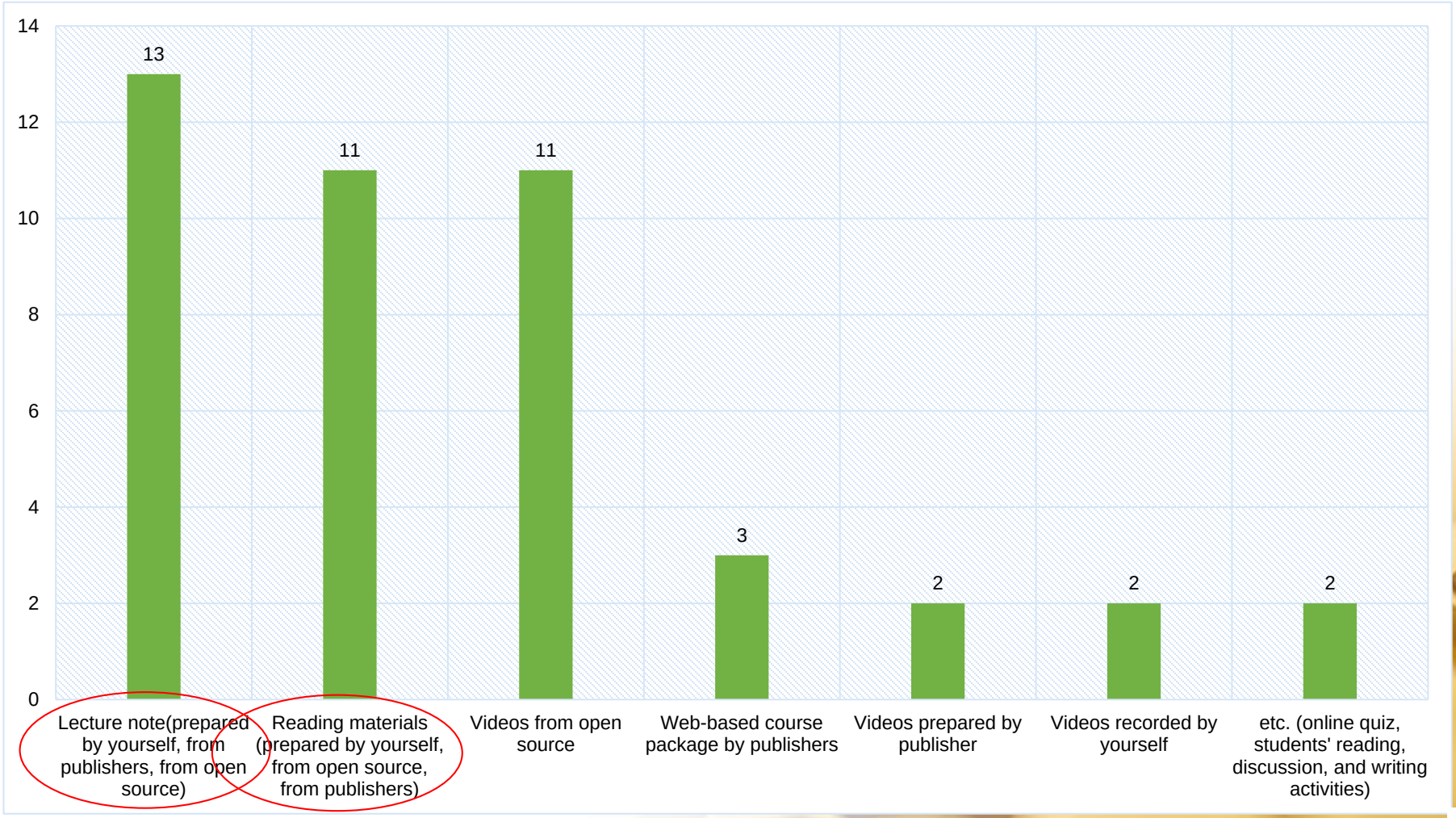
- Goal: Enhance the quality of HE through promoting e-Education
  - ✓ Students: provide high quality of education
  - ✓ Professors: Innovate teaching and learning skill for efficiency and competitiveness
  - ✓ University authority: reduce education cost
- Strategy
  - ✓ Adopt IT-enabled Active Learning based on Flipped Learning infrastructure
  - ✓ Redesign of curriculum of disciplines of each specific track
- Plan for redesign of curriculum

Classify	**2013**	**2014**	**2015**	**2016**
Basics	18	20	24	25
Disciplines	14	40	54	73
Total	32 (9%)	60 (18%)	78 (23%)	98 (30%)

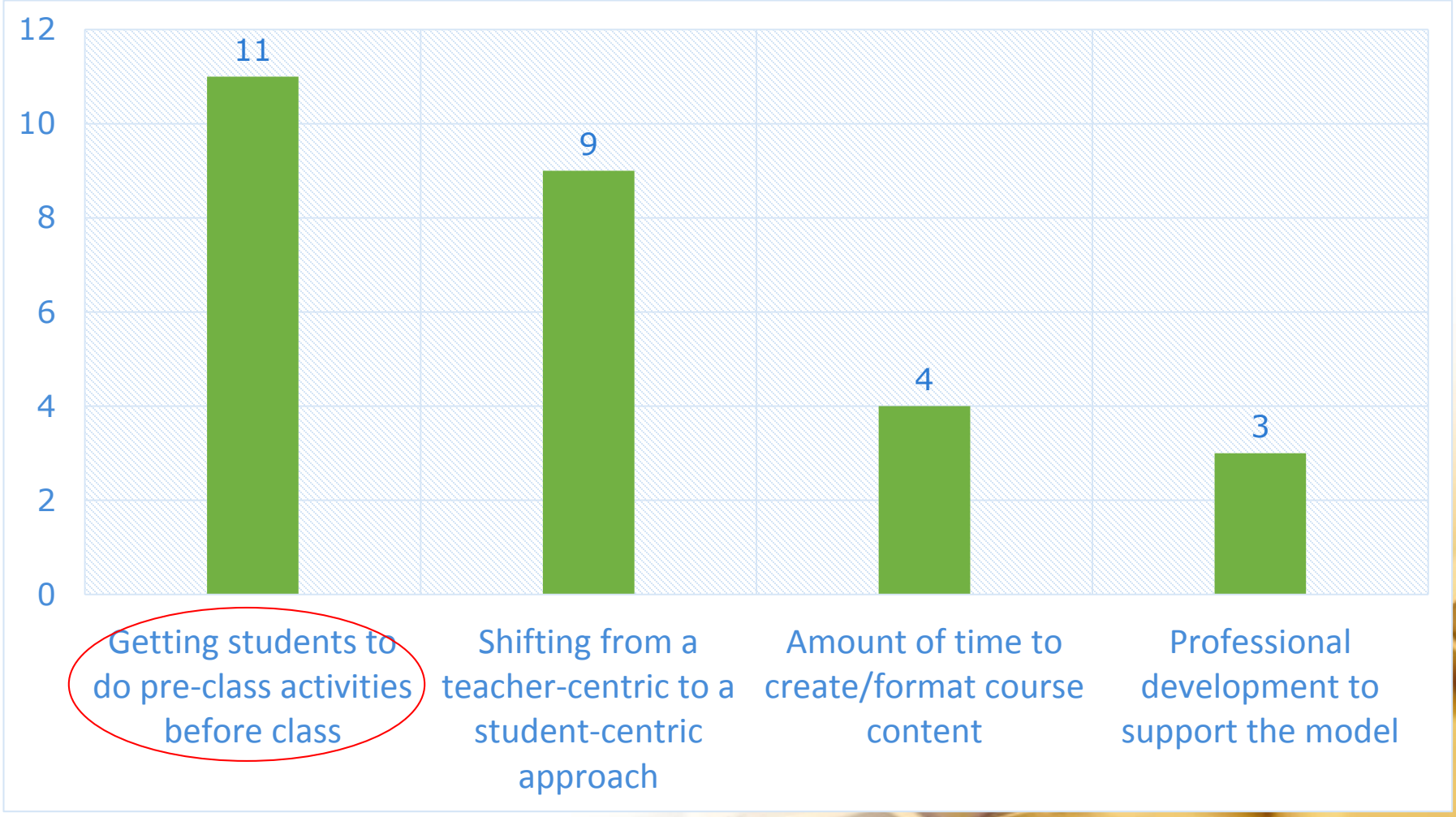
Responses from Students and Professors for Flipped Learning



Composition of Learning Materials



Considerations in Flipped Learning in Classroom



Course Organization of Differential and Integral Calculus

Pre-class Activities

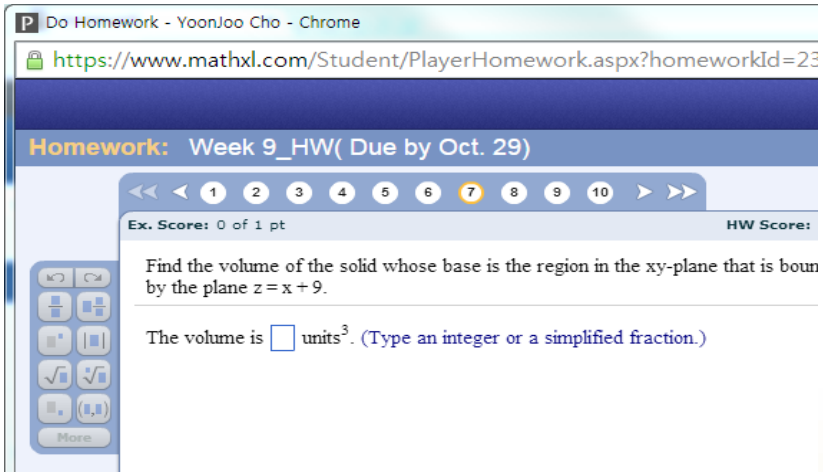
- Key-Term Assignment
- Mymathlab.com HW
- Linked Video Lecture

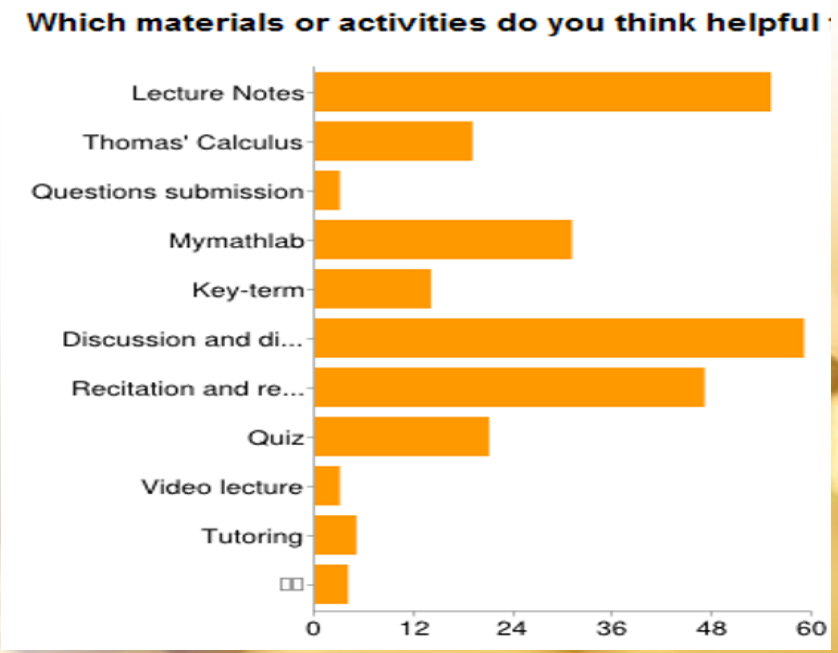
In-Class Activities

- Lecture(3 Professors)
- Discussion(3 AI+25 TA)

After-(In)Class Activities

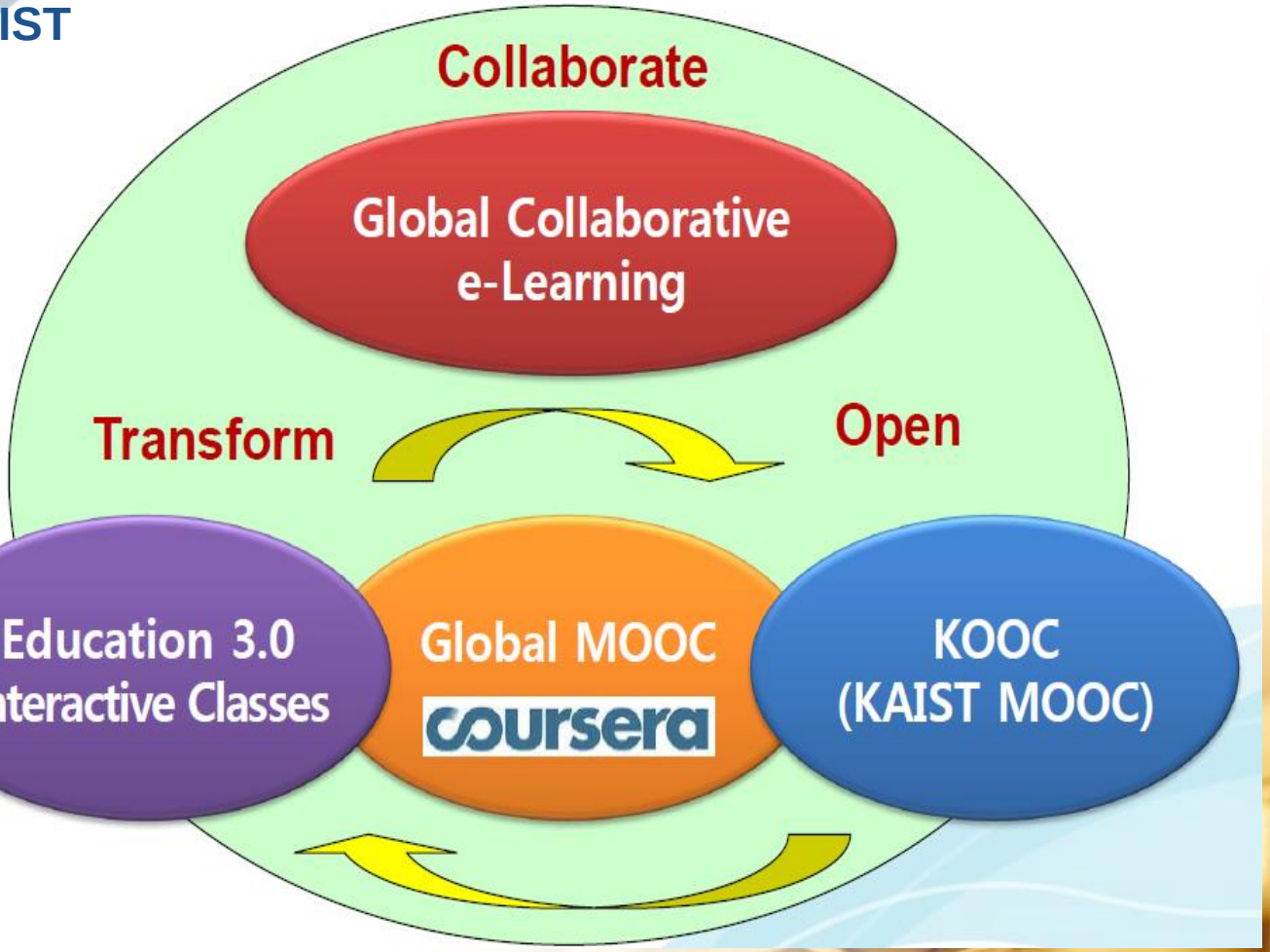
- Recitation(3 AI)
- Quiz





e-KAIST

e-KAIST



Source: Education 3.0, KAIST, 2014

Education 3.0: “Flipped Learning”

Interactive Class

No Lecturing

Problem-Based, Collaborative, Active

Interaction in Class

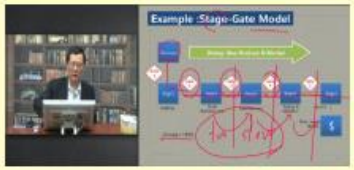
Q&A	Discussion	Team Learning/Task	Interactive Exercise	Evaluation	Presentation	Labs

Team Learning + TA Support

Flipped

Online Self-Learning

Lecture Video



Lecture Slides

Textbook

Quiz & HW

Virtual Lab

Q&A,
Information Sharing,
Social Network Services

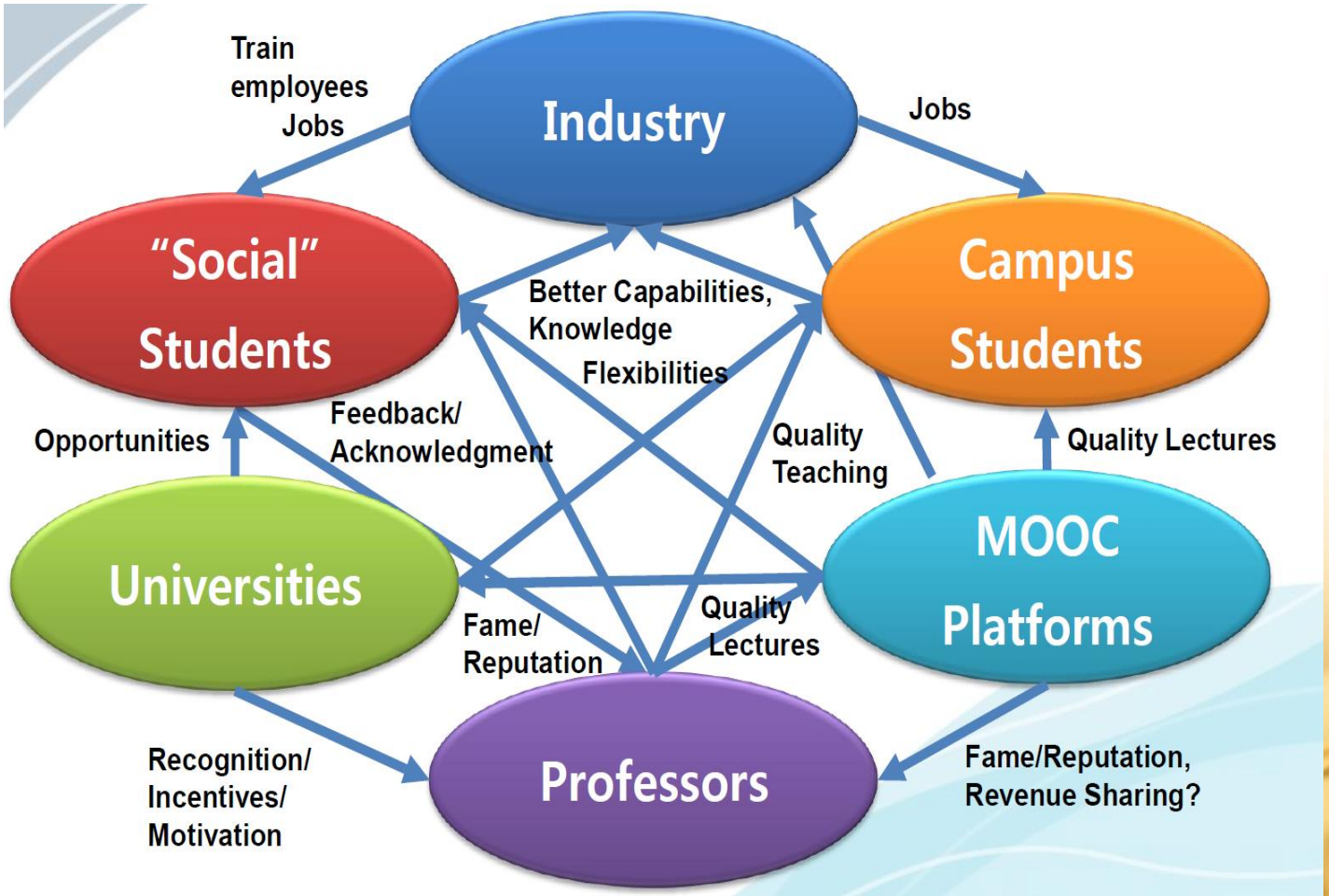
Online Interaction

Query Search	Interactive Watching	Q&A	Inform. Sharing	Discussion	Authentifi-cation	Evaluation

MOOC or e-Learning

Source: Education 3.0, KAIST, 2014

A MOOC Ecosystem: KAIST



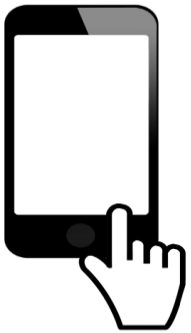
Source: Education 3.0, KAIST, 2014

Ecological Education Infrastructure: Cloud Campus

- Changes in education: student's behavior and demography, technology, role of professors, diversify contents, Big Data -> provide students with personal learning space

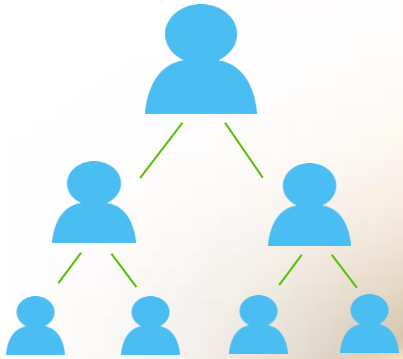
Polarization of Smart Phones

35 Million Users in Korea



The Era of Sharing

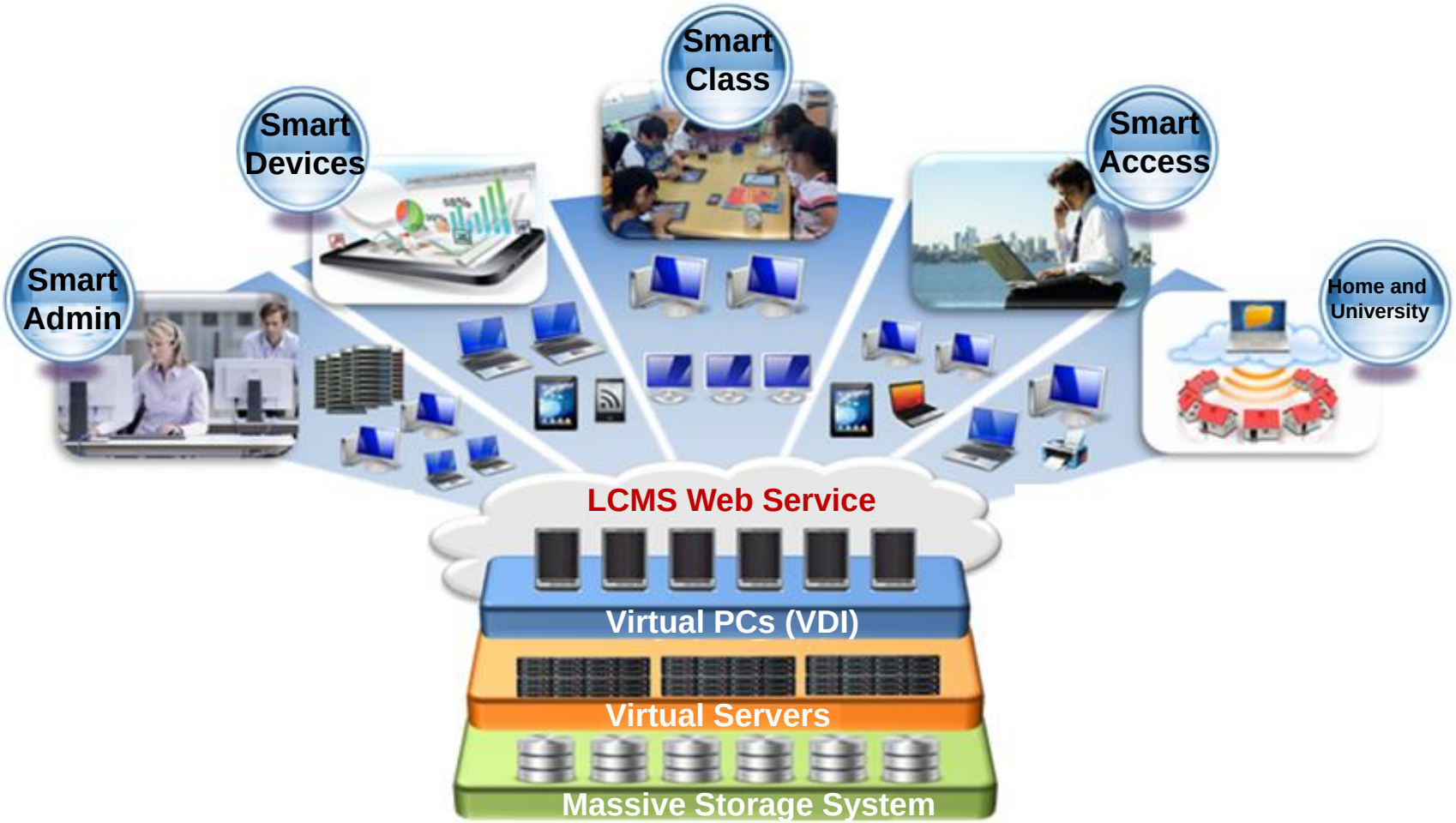
Web 3.0



Data Economy

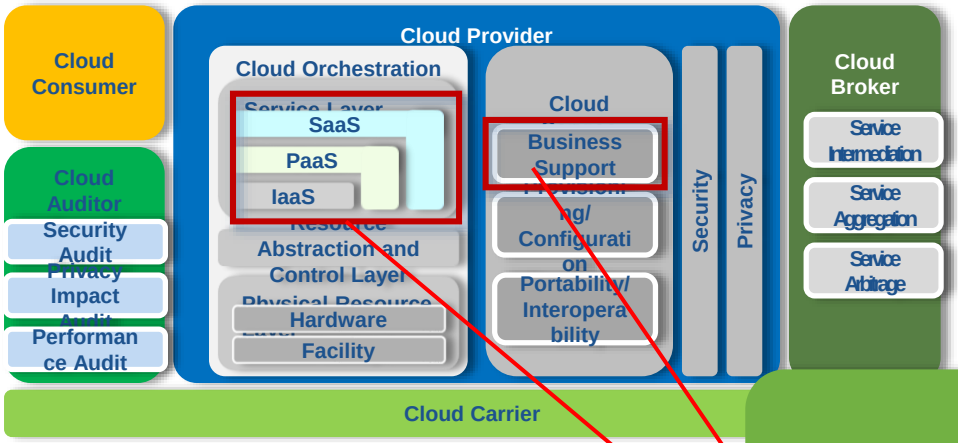
Big Data, Social Data, Cyber Money

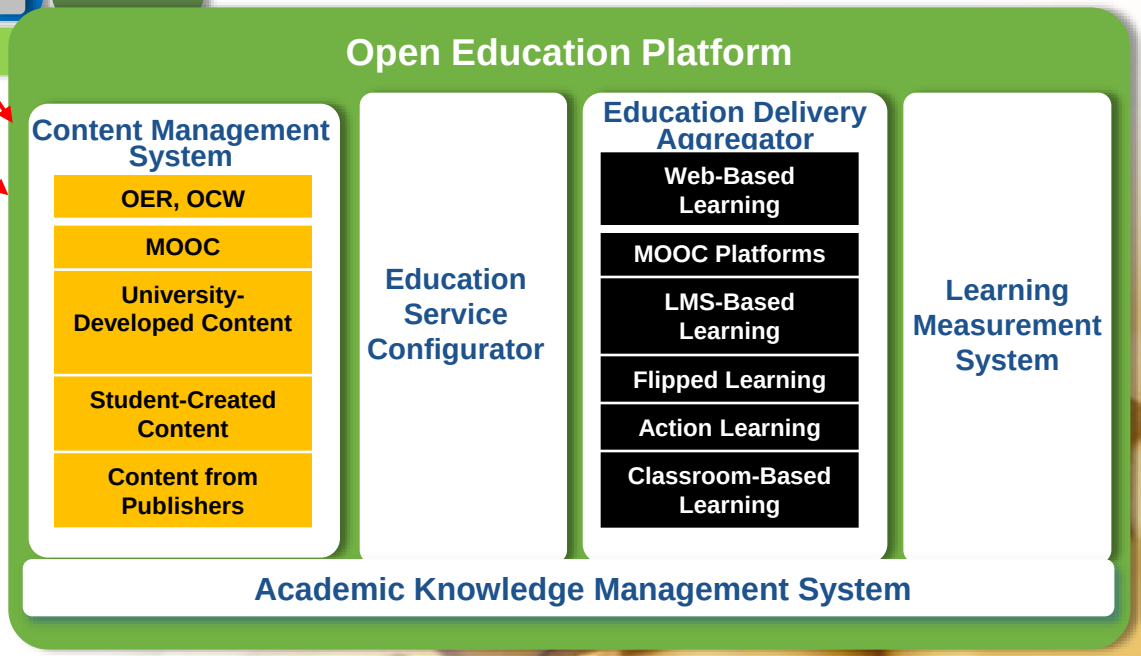
Cloud Campus 3.0



Cloud Campus 3.0

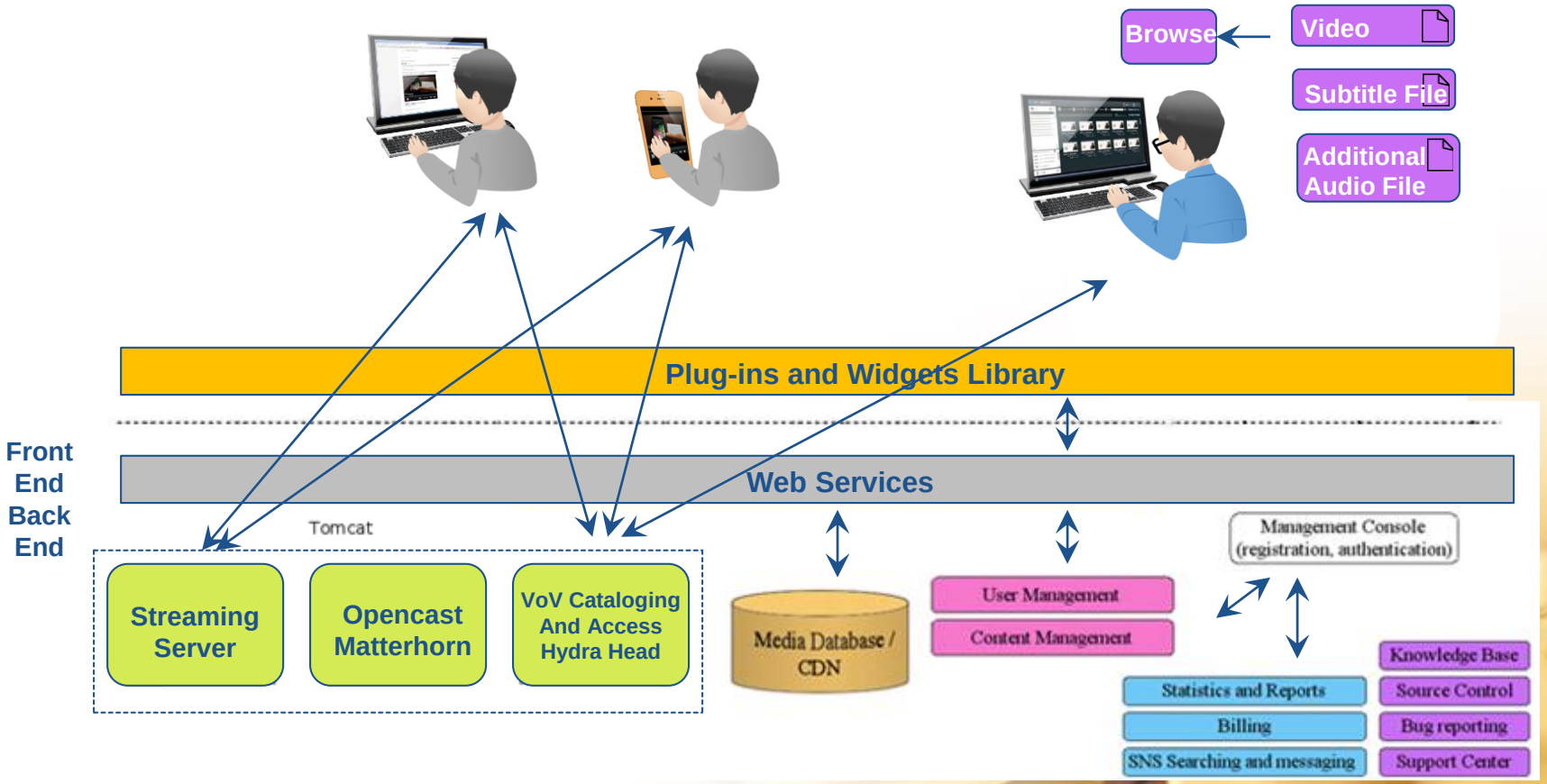
Open Education Platform





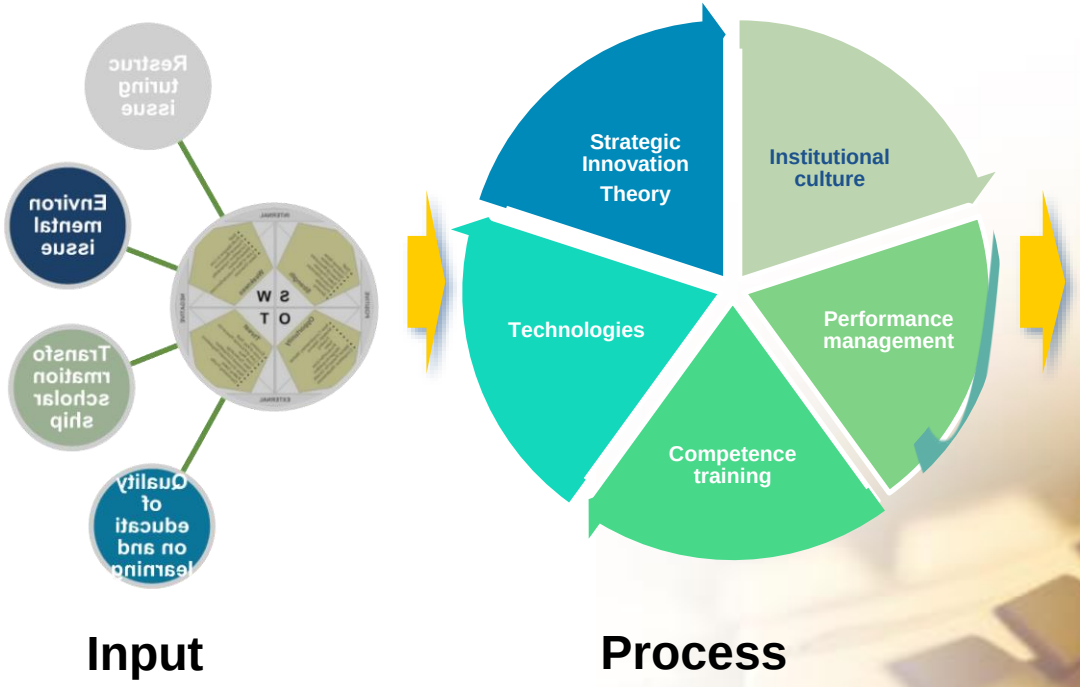
Source: Dae Joon Hwang, Ecological Infrastructure for Open Education, ICDE Conference2014, 25-26 Sept 2014, MESI, Moscow, Russia

Management of Lectures and Student Service



Strategic Innovation: Sungkyunwan Univ. (SKKU)

- Key considerations
  - ✓ Be able to encompass both conceptual and practical perspectives
  - ✓ Instrumentation is based on contextual and structural ambidextrous approaches
  - ✓ Innovation should be adaptable to individual HEI based on real issues and problems facing
  - ✓ Harness available resources: technologies, open paradigms (contents sourcing)



Implementation of Strategic Innovation: SKKU

- World University Ranking (QS): 2005 (550th– 2014 (148th)
- Student satisfaction, community service, and in R & D competences
- Create culture for collaboration and innovation
- Tangible outcomes: budget saving ($2.85 million/year), administration process improvement (111%)

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K-MOOC Initiative

- Vision: Higher education innovation through open education environment
- Goals
  - ✓ Innovation university class through openness of premium lectures
  - ✓ Equity of HE
  - ✓ Establish infrastructure for lifelong HE
- Strategies
  - ✓ Establish high brand of lectures and scale them
  - ✓ Manage K-MOOC based on university autonomy and diversity
  - ✓ Establish nation-wide infrastructure and develop value-added services
  - ✓ Globalization after stabilization of home service
- Projects started in Mar 2015
  - ✓ Content development: 20 (‘15), 100 (‘16), 200 (‘17), 500 (‘18)
  - ✓ Common platform establishment and management
  - ✓ Quality management of content and service
  - ✓ Establish Ecosystem of K-MOOC
  - ✓ Collective approach: MOE, Institutes, EBS, Universities, KCUE

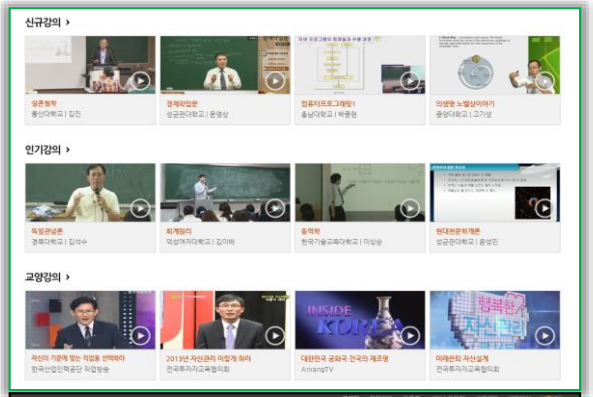
Source: MOE, Basic plan for building K-MOOC infrastructure and management, MOE, Feb 2015, Republic of Korea

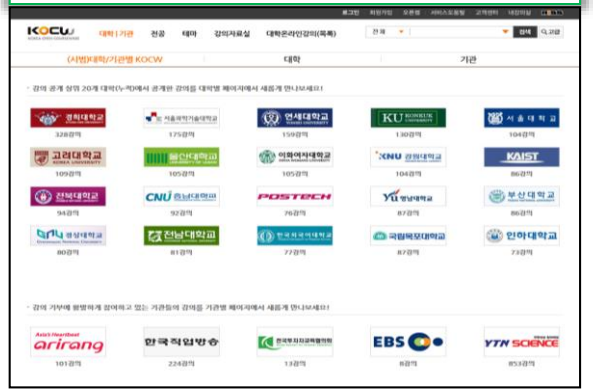
Statistics of KOCW

- Initiated in July 2007 and running by KERIS
- Category of contents (7): Social Sci. and Humanities, Natural Sci. Engineering, Medical and Pharmaceutical Sci., and Arts and Sports
- Provide curation service for each theme according to user group with diverse interest
- Types of KOCW: university developed, video-tapped lectures by broadcasting station and institutes, distinguished scholar, linkage with oversea content

Category		2012			2013			2014		
		No. of Organizations	No. of Lectures	No. of Contents	No. of Organizations	No. of Lectures	No. of Contents	No. of Organizations	No. of Lectures	No. of Contents
Korea	University	137	4,103	62,005	151	6,173	95,992	160	7,894	126,551
	Institutes	15	535	1,390	20	627	2,470	23	1,734	3,562
Oversea	University and Institutes	12	354	122,158	11	356	123,026	11	342	125,265
Total		**164**	**4,992**	**185,553**	**182**	**7,156**	**221,488**	**194**	**9,970**	**255,3**

KOCW: Korea Open Course Ware





구분	강의명	제공학기	기관명	교수자	주제분류	언어	등록일
1	Understanding of psychology	2011년	이화여자대학교	양윤	인문과학>인문과학기타>심리학	KO	2011-09-21
2	Linear algebra and statistics	2011년	한밭대학교	최상규	자연과학>수학・물리・천문・지리>수학	KO	2011-12-20
3	Material dynamics	2013년	한국기술교육대학교	이상순	공학>기계・금속>기계공학	KO	2013-02-19
4	Microprocessor and practice	2010년	한국기술교육대학교	이인석	공학>컴퓨터・통신>컴퓨터공학	KO	2010-04-29
5	계량경제학	2011년 2학기	제주대학교	강기춘	사회과학>경영・경제>경제학	KO	2011-09-26
6	고체역학	2011년 1학기	부산대학교	안득만	공학>기계・금속>기계공학	KO	2011-03-16
7	열역학 1	2012년 2학기	금오공과대학교	박준영	공학>기계・금속>기계공학	KO	2012-11-26
8	인적자원 관리	2013년 2학기	부산외국어대학교	윤갑호	사회과학>경영・경제>e-비지니스학	KO	2014-04-18
9	조선시대사		서강대학교	정두희	인문과학>인문과학기타>사학	KO	2010-10-22
10	전자기학1	2011년 1학기	한양대학교	양성일	공학>컴퓨터・통신>정보통신공학	KO	2011-09-21
11	동역학	2011년 1학기	한국기술교육대학교	이상순	공학>기계・금속>기계공학	KO	2011-02-28
12	통계자료분석(SPSS)		전남대학교	김준우	자연과학>수학・물리・천문・지리>통계학	KO	2008-12-19
13	정역학	2011년 2학기	안동대학교	신형섭	공학>기계・금속>기계설계공학	KO	2012-02-10
14	물리학1	2011년 1학기	인하대학교	차동우	자연과학>수학・물리・천문・지리>물리학	KO	2010-10-11
15	유체역학1	2010년 2학기	금오공과대학교	박준영	공학>기계・금속>기계공학	KO	2011-02-28
16	마이크로프로세서 및 실습		한국기술교육대학교	강형주	공학>컴퓨터・통신>컴퓨터공학	KO	2011-02-09
17	품질경영	2012년 1학기	한밭대학교	심상오	사회과학>경영・경제>경제학	KO	2012-07-26
18	위상수학1	2012년 1학기	덕성여자대학교	최성우	자연과학>수학・물리・천문・지리>수학	KO	2012-07-30
19	전자회로	2013년 2학기	영남대학교	김성원	공학>전기・전자>전자공학	KO	2013-09-06
20	공업수학 (1)	2013년 1학기	한밭대학교	이종광	공학>기계・금속>기계공학	KO	2013-07-19

Content Creation and Management

Crowd-Sourced Contents

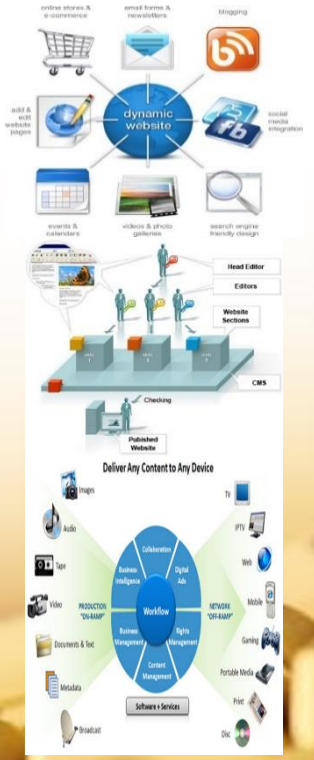
QA, Peer review *

Student-Created Content (SCC)	Faculty-Created Content (FDC)	OER, OCW, MOOCs
	QA*	Peer review*

Content life cycle

- Creating
- Managing
- Measuring
- Delivery
- Developing
- Optimizing
- Extending
- Modifying

Content sources



Source: Dae Joon Hwang, Management of Content and Academic Knowledge Based on Metadata A Master Class on KM and Metadata, 29 Sept. 2014, MESI, Moscow, Russian Federation

Student Created Content in HEI: SNOWNOTE

- **Online learning tool based on Wiki**
  - ✓ **Group study**
  - ✓ **Individual study**
- **Powerful editing system developed using the Daum web editor**
- **Collecting and integrating contents using SNOWNOTE**
- **Sharing contents and ideas with members**

Source: SNOW, SookMyung Women's University, Sept 2014, http//SNOW.or.kr

Student-Created Content (SCC) Emerging in Higher Education

- Higher education institutions are demanded to **transform** into learning organizations to meet the challenges of the 21st century
- **De-synchronization** problems
  - ✓ Students face **ever-increasing challenge,** who seek to learn current developments and technology: de-synchronization between what to know and how they are educated
  - ✓ Teachers: challenged to incorporate **leading-edge content** to their courses: de-synchronization of content development and use in courses
- **Unbundling** teaching role of the faculty in universal stage of higher education due to changes to faculty scholarship
- N**ew framework** for recognizing students as content creators
  - ✓ Delineating the skills that students need for creating content within the disciplinary context
  - ✓ Convergence of literacies: written, information, technology, new media/visual that that would be affordable to student's content creation
- Define **new roles of students** in a learning organization
- **Impact** of new roles of students
- The **conditions** for student's participation to content creation

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Conclusion

- Establish education ecosystem to challenge issues of (future) higher education and HEIs
- Recognize students as an enable to change education
- Leveraging ICT to challenge higher education issues in pervasive connectivity-based education environment: accessibility, efficiency, scalability, and satisfaction of stakeholders
- Data-driven student support and decision making: Learning Analytics, Academic Analytics, Predictive Analytics, Institutional Research (IR)
- Pay attention to culture and assessment in new education environment

감사합니다
Thank You

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