The Second Symposium on Teaching and Learning in East Asian Research Universities, Nanjing, 2015

Strategies for Transforming, Sharing, and Connecting Teaching and Learning

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(Former Director of Center for Excellence in Learning & Teaching)

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- **Korea Advanced Institute of Science and Technology**
  - Fully sponsored by government, established in 1972
- **4,000 undergraduate, 6,000 graduate students**
  - Full Scholarship, All in Dormitory
- **650 tenure-track professors**

- **Science, Engineering, Business**
- **THE Times World University Ranking: Engineering 25th**

- **Highly research-oriented**

- **No significant educational innovation effort**
- **No expert on educational studies & teaching and learning**

Until 4 years ago

Transforming Teaching & Learning

Eliminate Lecturing from Classrooms

Now, Enough Class Hours

Maximize Interaction & Participation

Lecturing
by e-Learning
Outside Classrooms

Implement
Creative & Innovative
Pedagogies in
Classrooms

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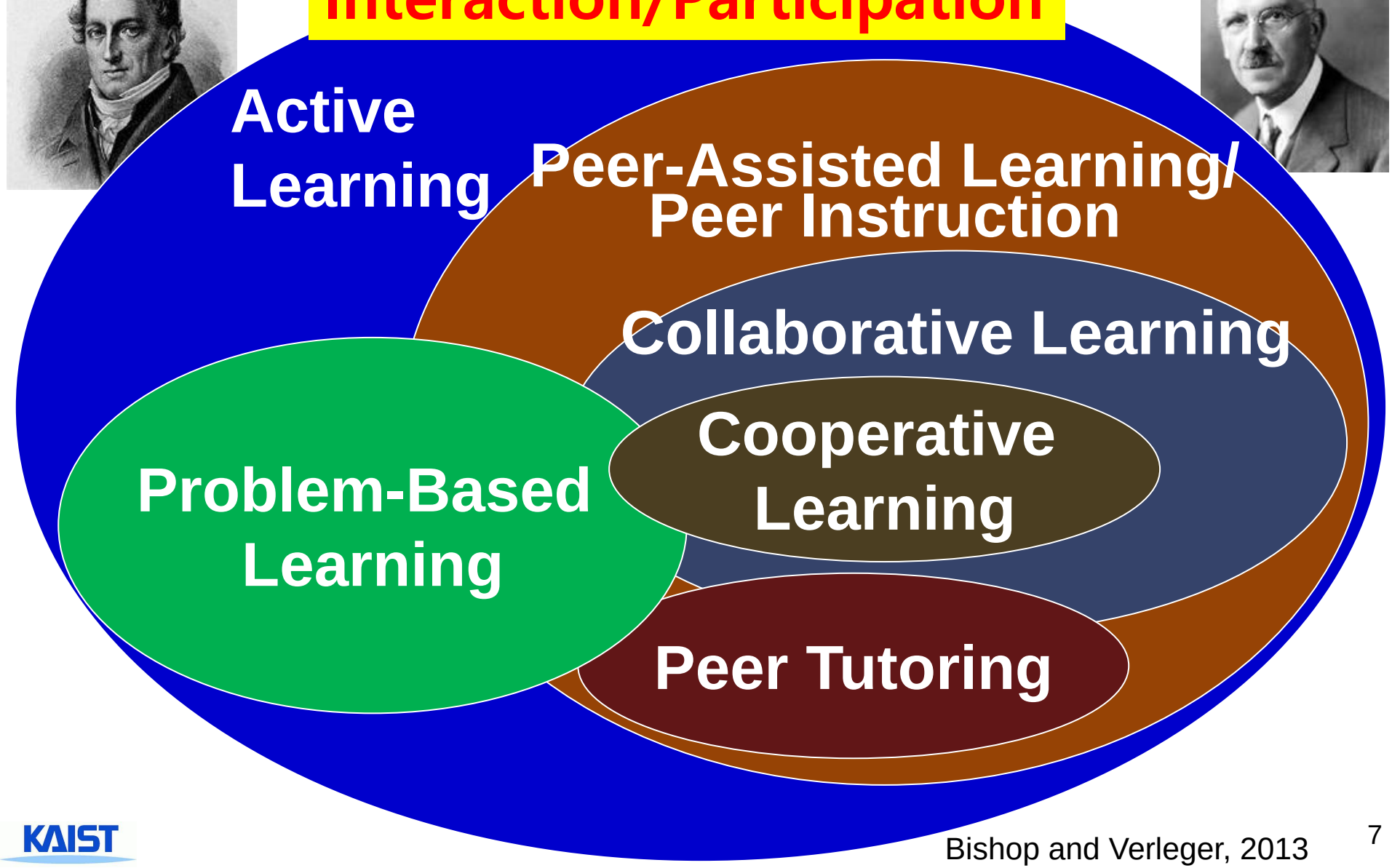
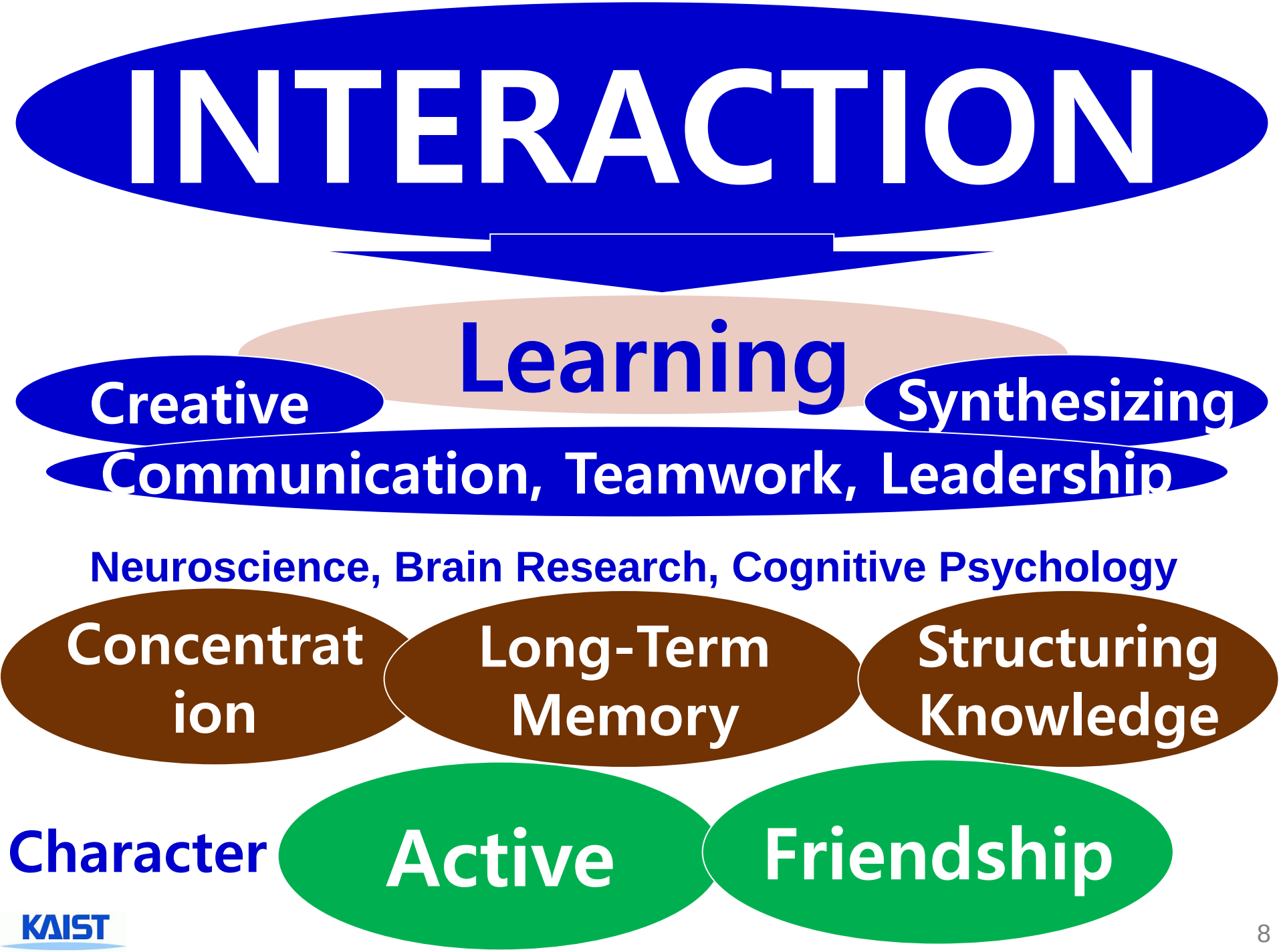
Educational Studies: Student-Centric Learning



Bishop and Verleger, 2013


INTERACTION
Learning
Creative
Synthesizing
Communication, Teamwork, Leadership
Neuroscience, Brain Research, Cognitive Psychology
Concentrat ion
Long-Term Memory
Structuring Knowledge
Character
Active
Friendship

Education 3.0 Class

Interactive/ Student Participative Class (≅ Active Learning)

e-Learning (Out-class Activities)

Q&A, Team Learning, Discussion, Problem Solving, Cases, Labs, …

Lecturing, Exercises, Short Discussion

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Happen to be close to a kind of flipped learning

"a" Flipped Learning

But, more emphasis on interaction, participation, teamwork, …

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What do we do in classrooms?

Review, Quiz
Discussion,
Q&A

Interactive Problem Solving - Teamwork

Team Learning
- Team Assignment
- Labs, Cases

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Guidelines for Offline Classes

Real Learning at Classroom NOT at Home,
NOT receiving information

- Focus on 1~3 Key Subjects
- Focus on Ways of Thinking
- Closely Relate to Lecture Video
- Step-by-Step Guides/Tips
- Unique, Creative Methods
- Team Formation & Management

Clear Materials for Teamwork/ Assignment

Use Round Tables, Glassboards, …

Teamwork, Team Discussion & Individual Report

Use and Train TAs

Guidelines for e-Learning

Prepare Basic Knowledge by Self-Learning

10~20 Minutes Modules

Self-Recording, Studio Recording

Review Questions, Homeworks

One-Page Handwritten Summary

Audio Quality rather than Video Quality

Recording
- Easy Access
- Own pace

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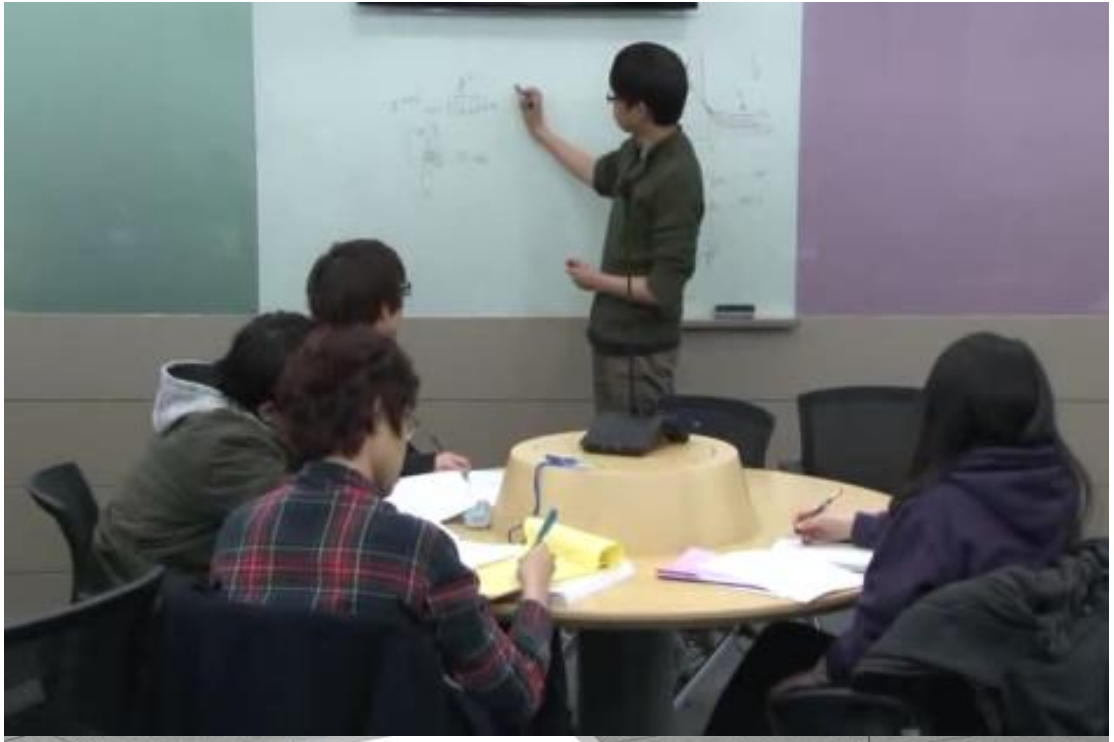

Roundtable + Glassboard +

Screen/Beam Projectors +

Internet + Interior Design + …

17 classrooms

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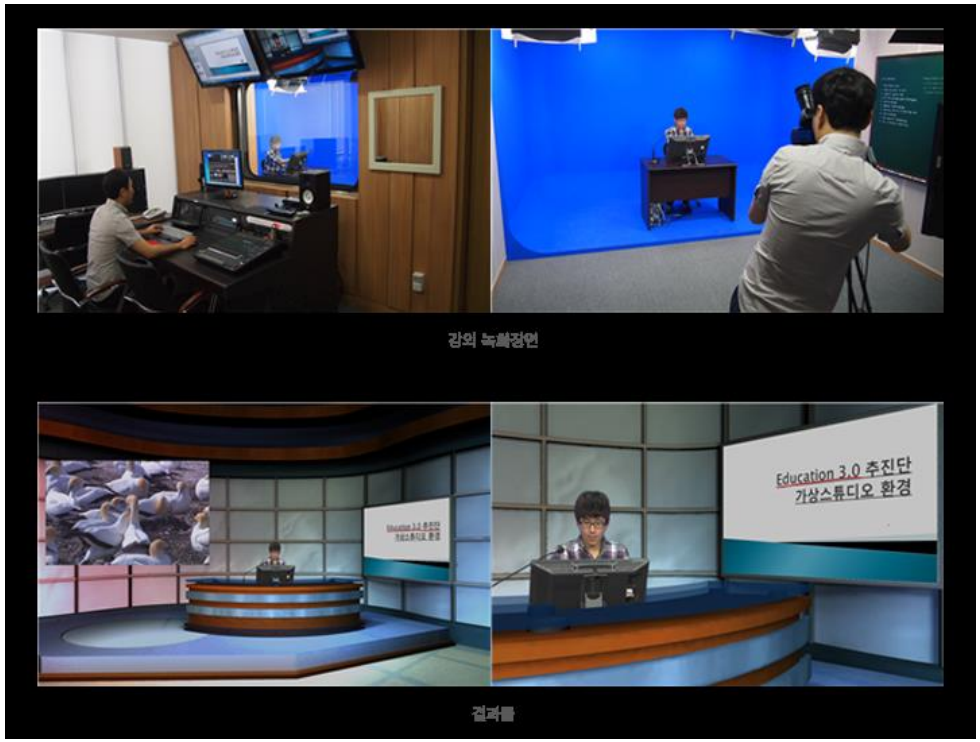
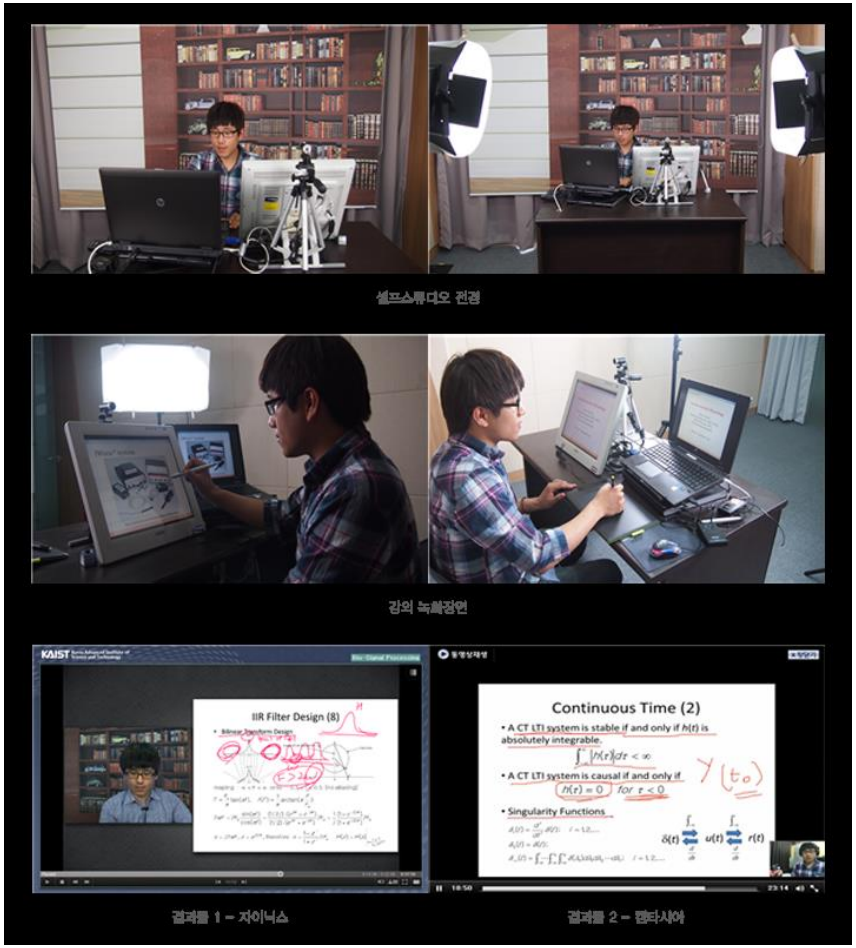
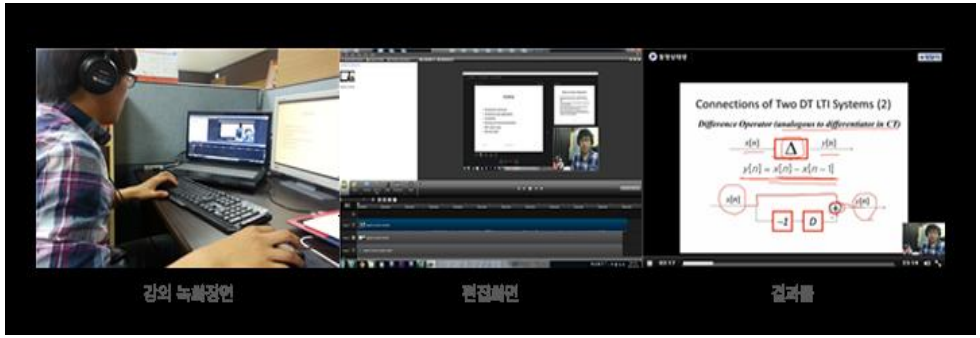
Lecture Video Production



Central Studio:
Blue Screen, Control Room, Staff

Self-Studio at Departments





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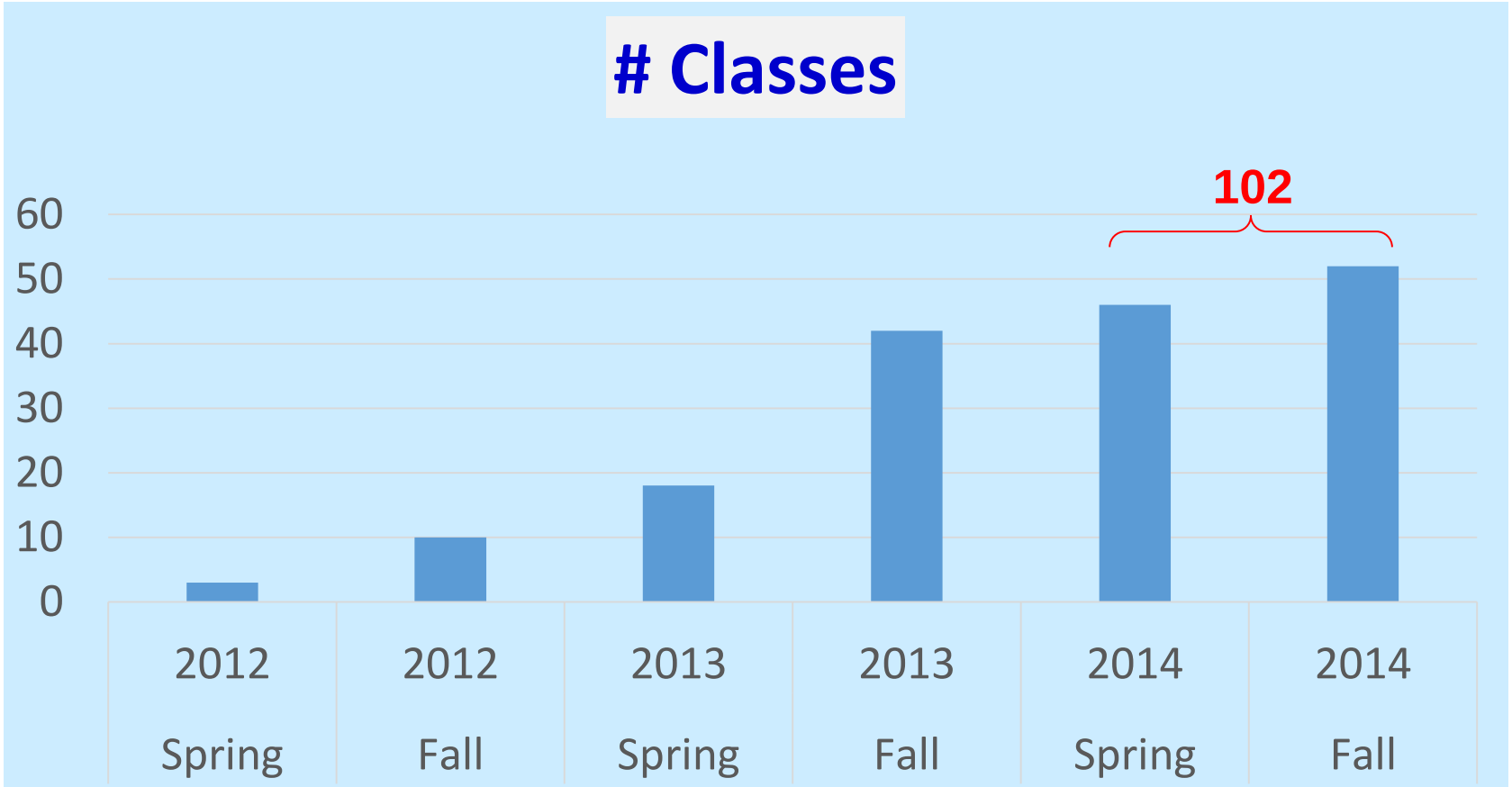
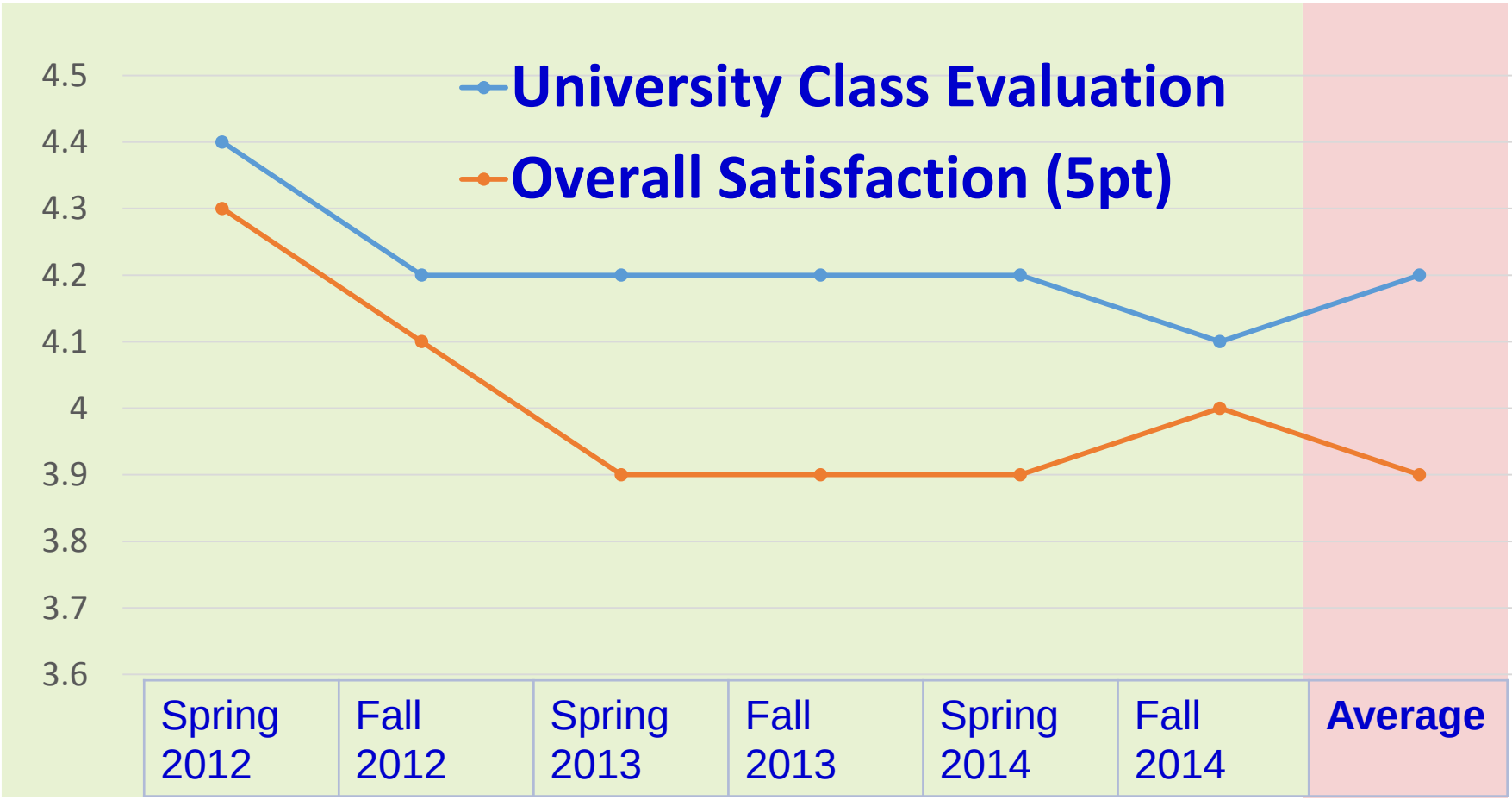
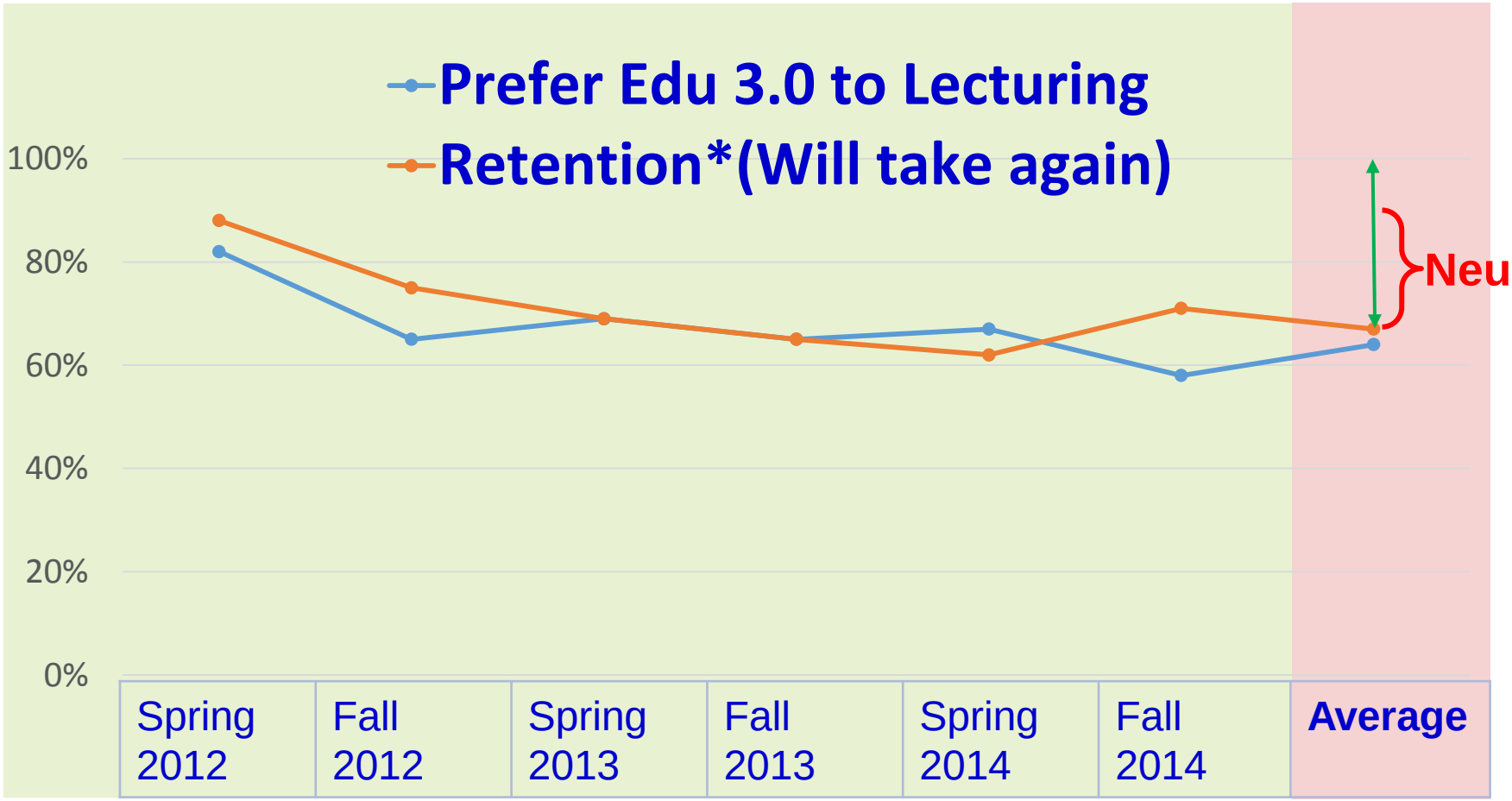
Feedback from Students?



- **All disciplines, Undergraduate & Graduate**
- **Applications from Professors**
- **Small Incentives**

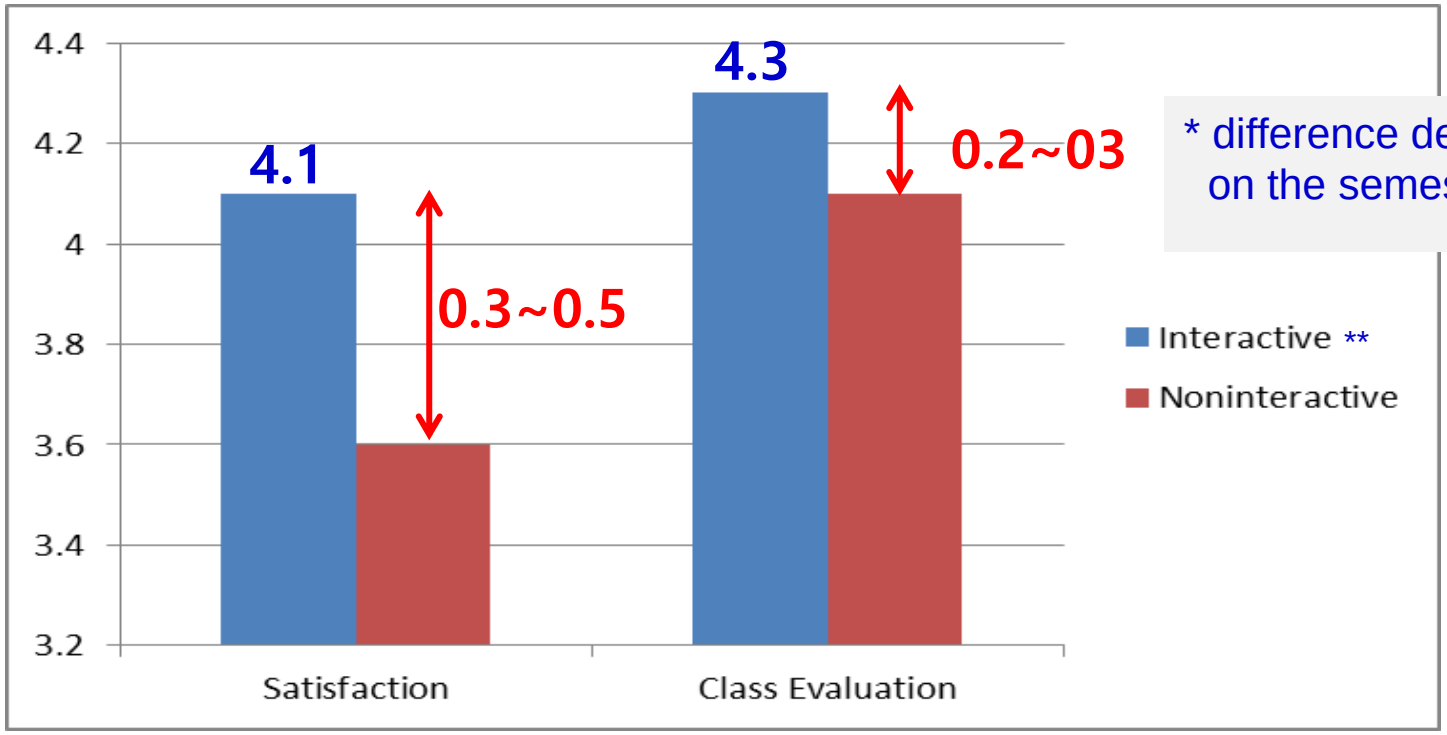


- **Steady Satisfaction**
- **Correlated to University Class Evaluation**



- **Steadily Positive, but**
- **Differences between classes**
- **Need to improve quality**

Effectiveness of Interaction



* difference depending on the semester

Interactive: Top 30% Classes of Interaction

Non-interactive: Low 30% Classes of Interaction

Interactive classes have significantly higher satisfaction and evaluation

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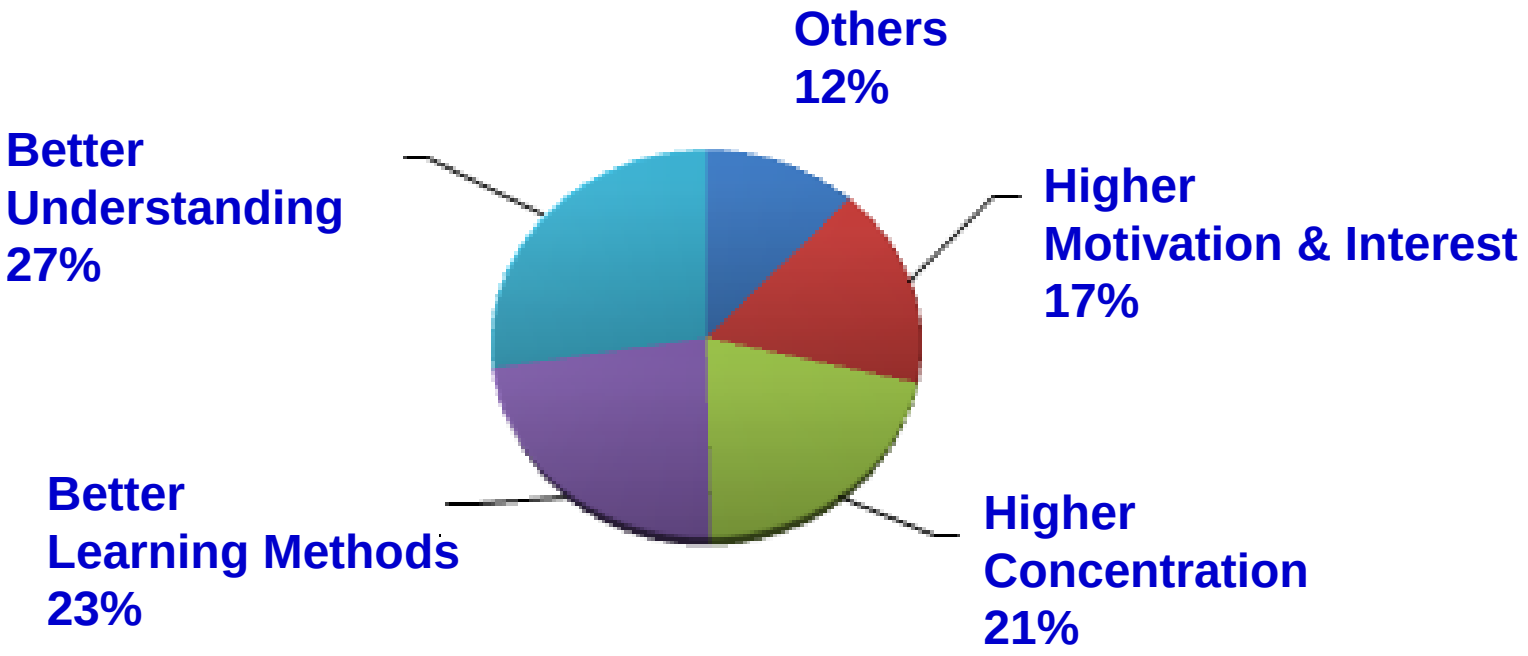
71% of students reported changes in their learning methods & habits



Others

- better time management
- learning habits
- preparing for classes and discussion
- collaborative learning with students

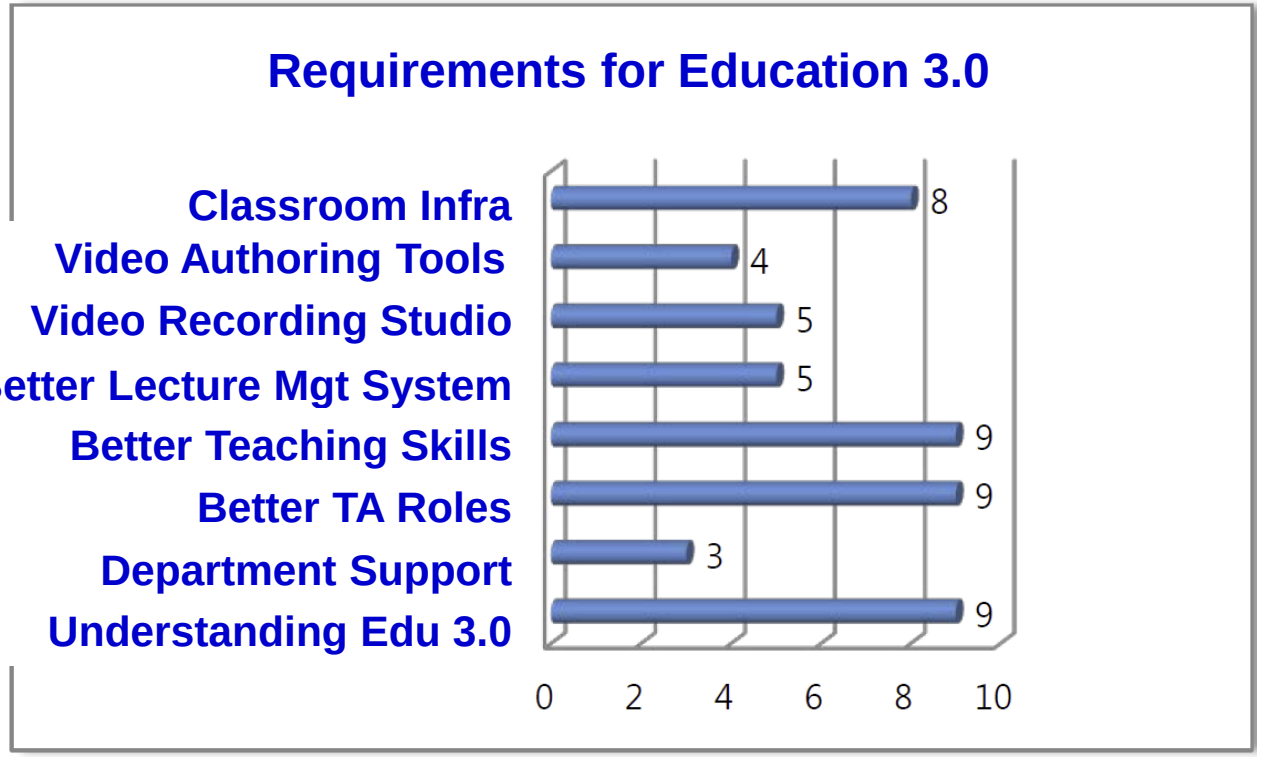

Feedback from Professors?

Professor Feedback

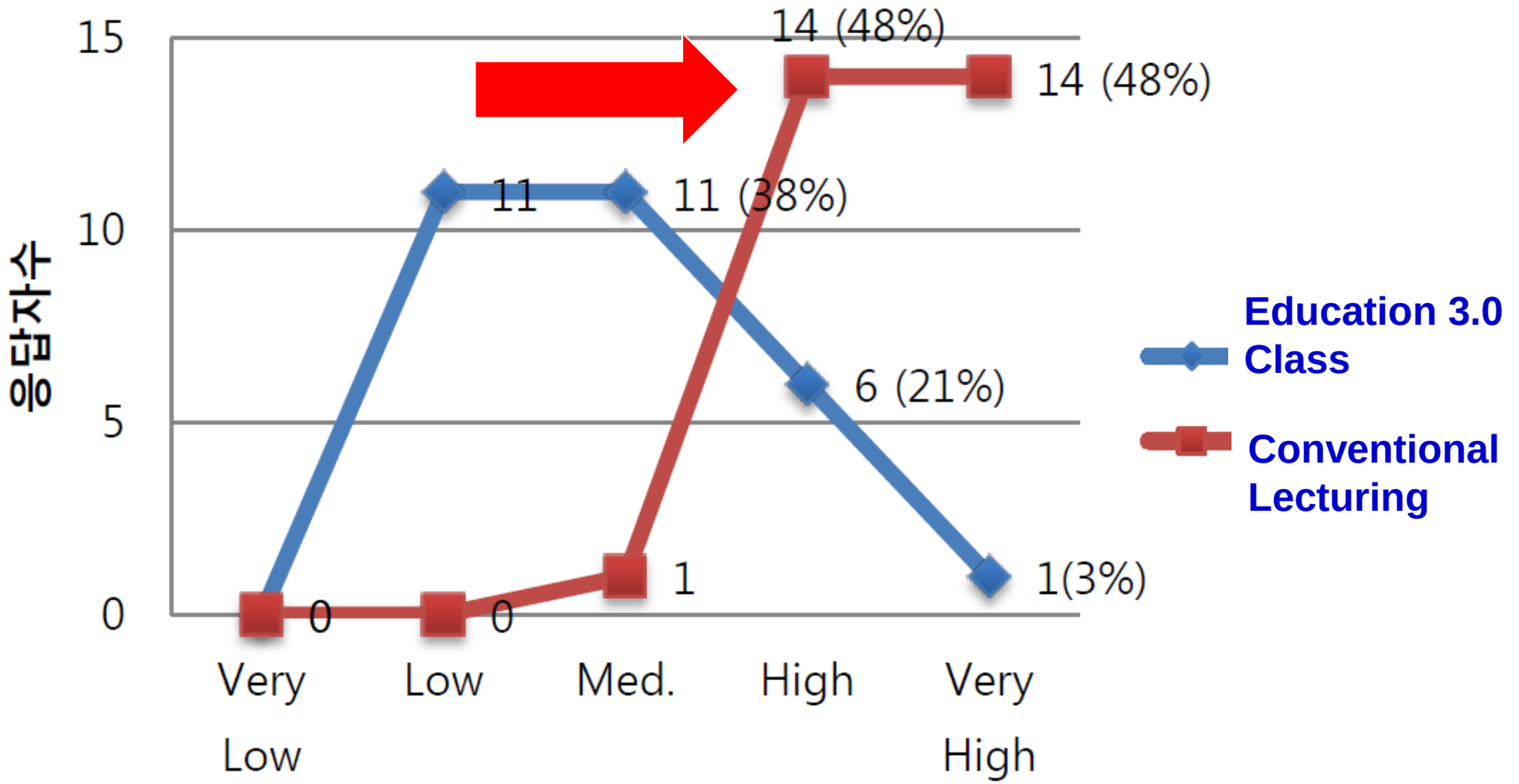
Better Understanding: 75~88%*

Retention: 87~98%*

* Depends on the semester

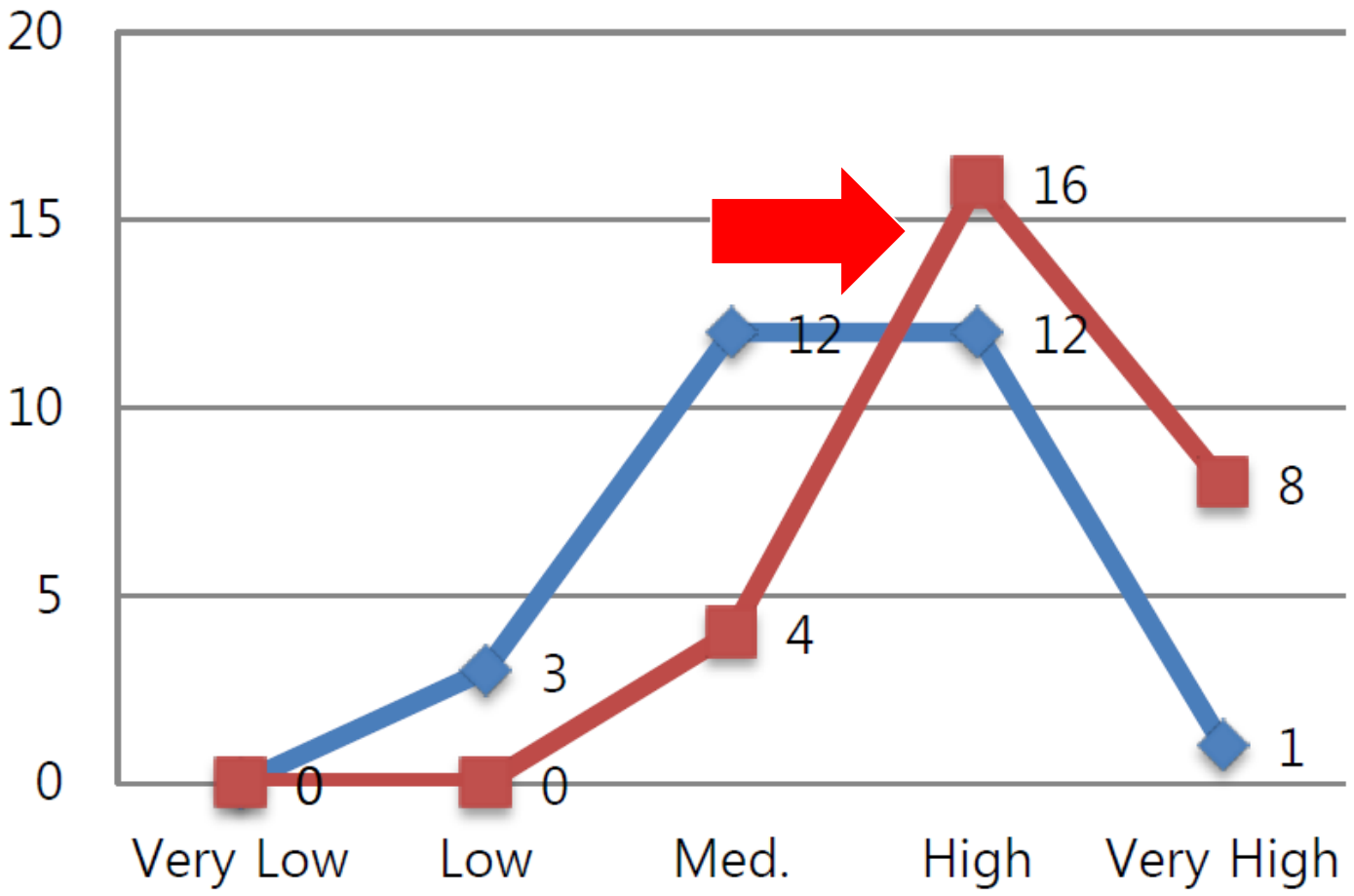


Interaction in Classroom



86% professors reported higher interaction

Understanding



Education 3.0 Class

Conventional Lecturing

96% professors reported better understanding

Lessons on "e-Learning"

VERY HIGH Expectation on Lecture Video/Contents & LMS

Don't simply repeat textbook

Improve Lecturing Techniques – Much Better Interactive Teaching Skills

Interactive

Lecture Management System
- Fast Forward, UI
- Interactive, Discussion, ..

More than Video
- Review Questions
- Interactive Learning Materials

Lessons on Interactive Classes

Need
New Mindsets & Attitudes

Professors don't know
What to do, Why, and How,
Not so ready,
Not changed yet!

So do even **Students**!

They need training!
Should develop their own
Optimal models.

Share experiences and
Best practices


Problems? How many?
>> 1,000 in Golf?
Nonetheless,
Why?
There are
solutions!

Problems & Issues

- Don't study the lecture videos
- Insufficient & poor lecture videos
- Overload for Professors
- Too much contents to deliver
- Not for math, science, engineering
- Not flexible
- Don't participate in class
- Poor guide, control in class
- Overload for Students
- Expensive, Costly
- Risk of lower achievement
- Scientific Evidence?

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Future Challenges (1)

New Assessment Methods

New LMS
- Interactive Learning More than Video

New Learning Contents Authoring Tools/ Production Systems

Future Challenges (2)

New Classrooms

- Learning Oriented, Integrated to LMS
- Noise-Controlled
- Networked/Connected

New Pedagogies at Classrooms

- Student-Oriented Learning
- Learning at Classrooms

New Mindsets

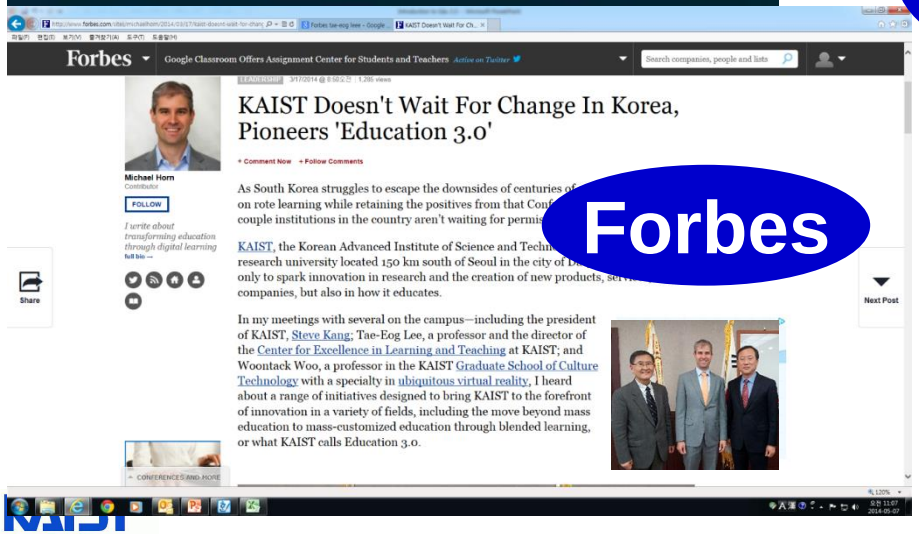
- Students
- Professors
- Management

Nature,
vol. 514 No. 7522, Oct. 16, 2014

The Flipped University: KAIST Education 3.0

Make sense!

Keynote at Global Engineering Deans Council Conference



Forbes

USD 9 million donation


Sustainable!
Even Better!
Just Begun!

Opening and Sharing Lecturing: MOOC

MOOC(Massive Open Online Course)?

Lecture Video, Exercises, …

e-Learning Contents

Free, Open, Massive

Quality, Best

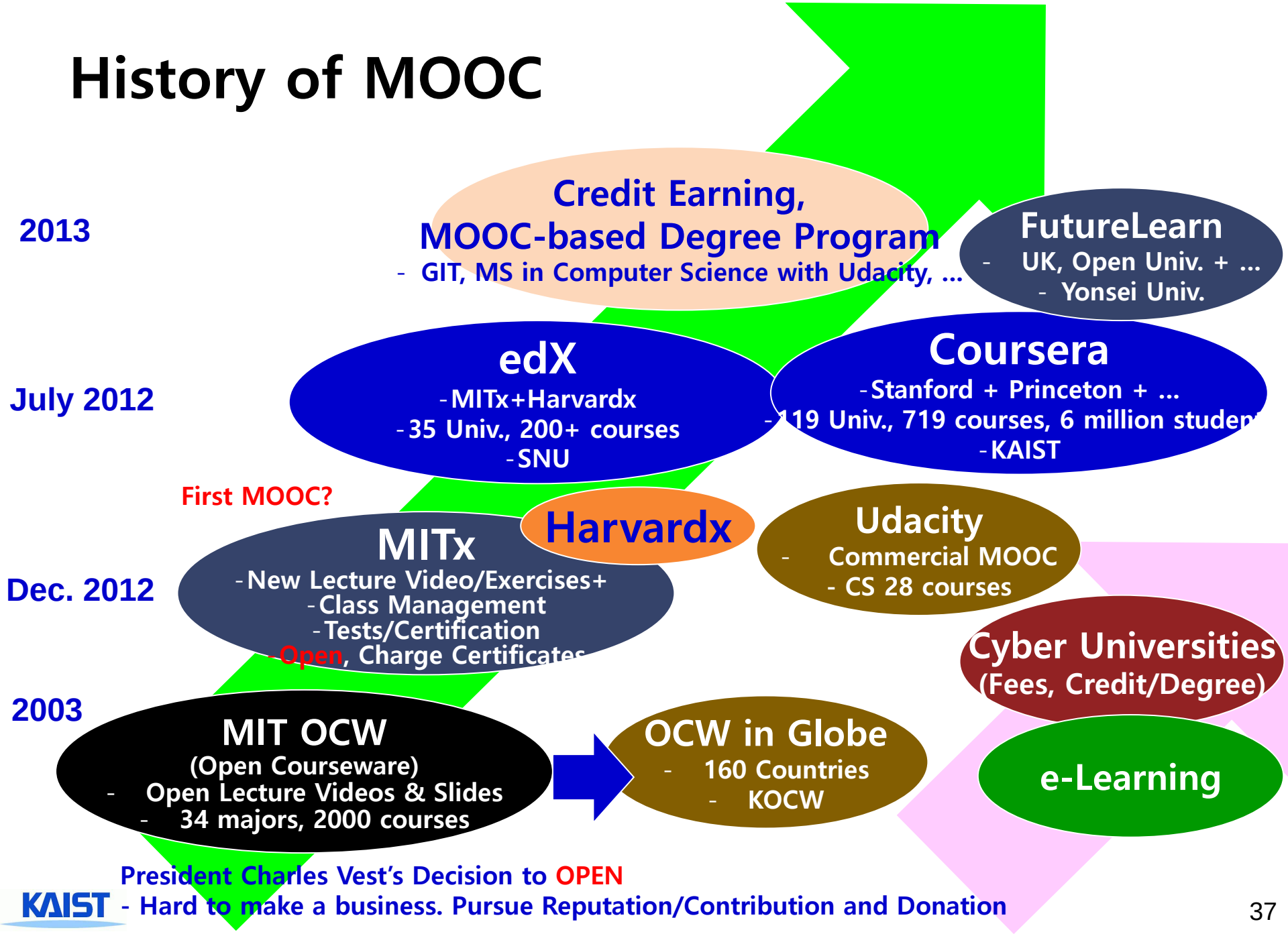
Class Management

Automation

Test & Evaluation

Social Learning
(Peer-to-Peer)

History of MOOC



President Charles Vest's Decision to OPEN
- Hard to make a business. Pursue Reputation/Contribution and Donation

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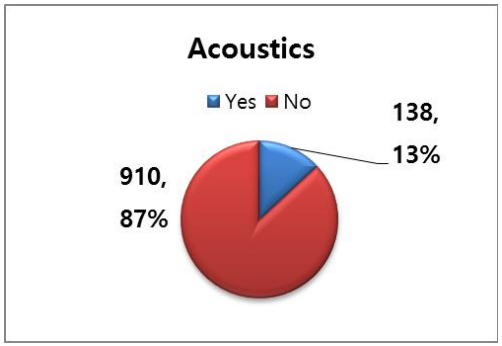
KAIST at Coursera

Course	Session	Instructor	Enrollment	Passed
Introduction to Acoustics	5/12~6/15 (5 weeks)	Y.H. Kim (ME)	**10,921** 145 countries (emerging countries 34%)	5%
Introduction to Light, Color & Life	5/26~7/13 (6 weeks)	Y.G. Park(Physics), C.H. Choi(Bio &Brain Eng.), H.J. Seok (Industrial Design)	**7,835** 141 countries (emerging countries 39%)	6%
Supply Chain Management: A Learning Perspective	6/16~8/11 (8 weeks)	B.W. Kim (Business School)	**20,352** 175 countries (emerging countries 47%)	6%

Joined in Oct. 2013, First in Korea



First learned of KAIST through the course

Why MOOC by Universities & Professors

Reputation/ Leadership

Quality

Social Contribution

- Equal opportunitie

Revenue/ Incentives???

Use it for his own campus class

KOOC

KAIST Open Online Course

10~20 Courses in 2015

Industry & Research Inst.

Other Universities

High School Students

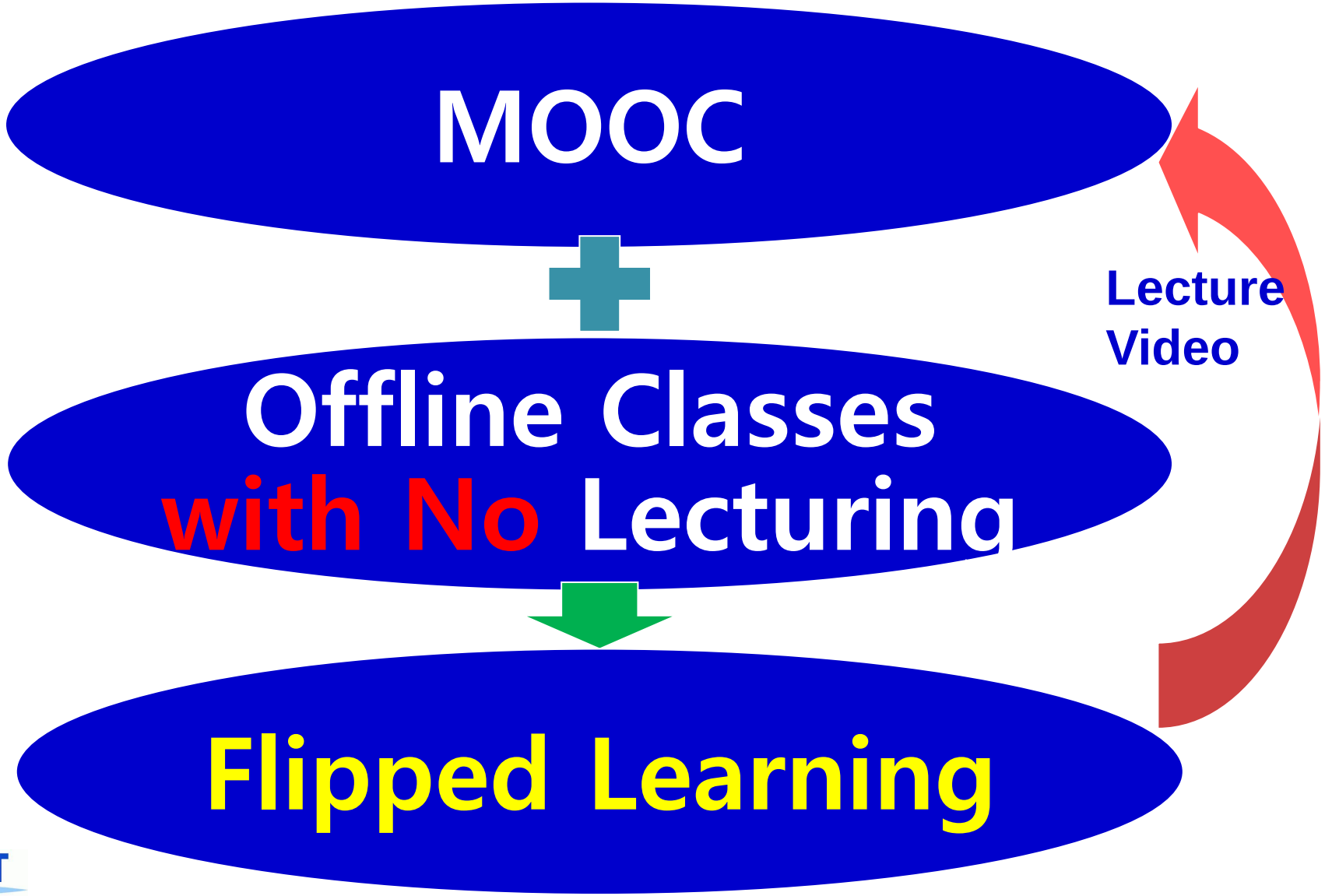
Entrepreneur/ Ventures

KAIST Alumni

KAIST Faculty & Staff

KAIST Students

Synergy between MOOC & Flipped Learning




Networking &
Collaborating
Classes

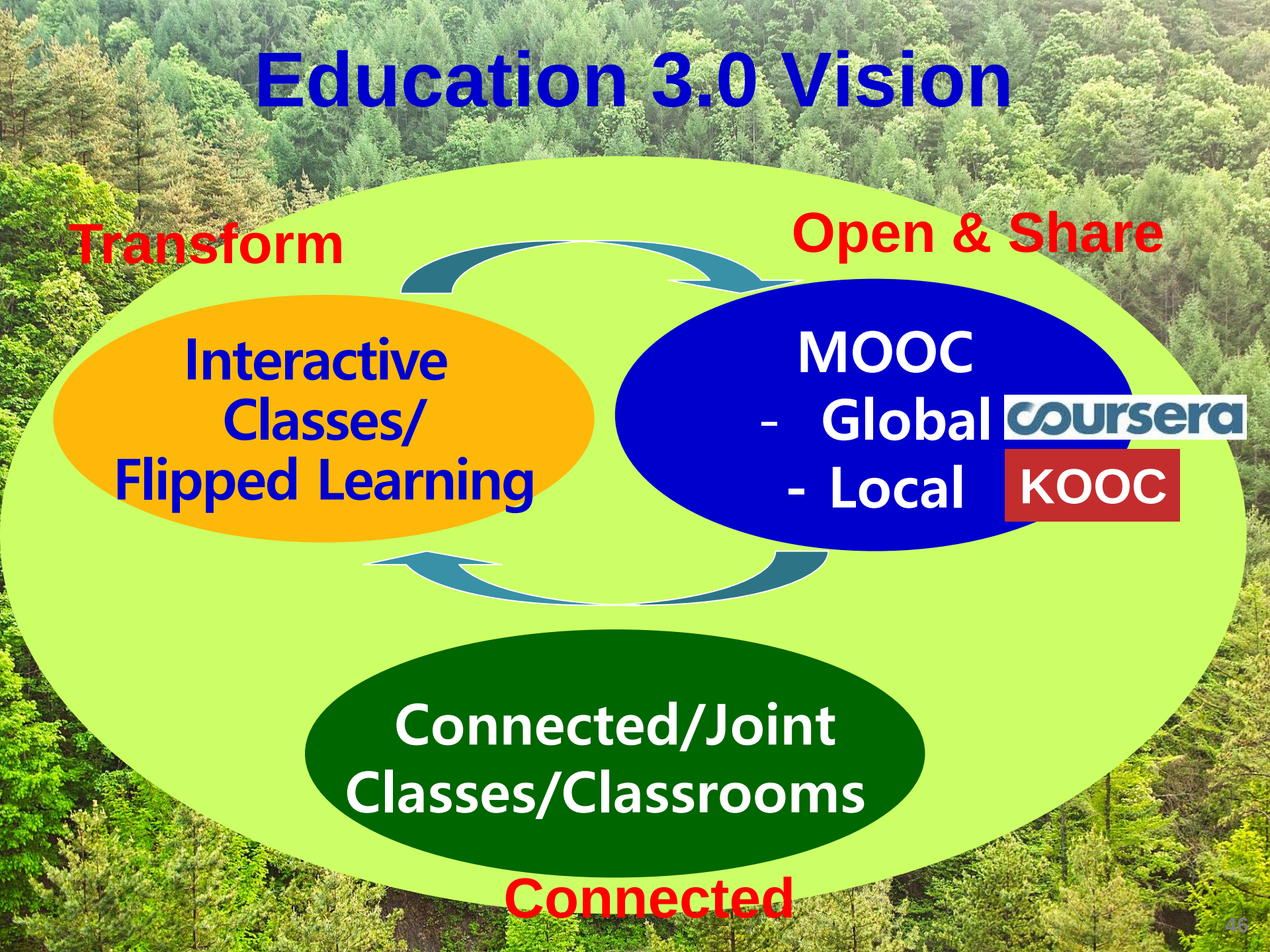
Global Classroom Networking

- **Joint interactive class with other universities**
- **Remote team learning/teamwork**


Concluding


Lectures will disappear!
They will be multimedia Textbooks.
Professors and universities should change!
Otherwise, they will perish!

Education 3.0 Vision



孔子
Confucius

听而易忘，见而易记，做而易懂.
学而不思则罔，思而不学则殆.

擧一隅, 不以三隅反, 則不復也. 不以三隅反, 則不復也.

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Thank You!