MOOCs for Science and Engineering Symp.
March 9, 2015

About TokyoTechX

@ Tokyo Tech Front

Jeffrey S. Cross
Engineering Professor with Online
Education Development Office (OEDO)
Tokyo Institute of Technology

Outline of talk

- Overview of Japan HE
- Ranking and International Activity
- Student Education Skills Survey Results
- Tokyo Tech Institutional Reform
- Online Education Development Office (OEDO)
- edX & MOOC making for TokyoTechX
- The big picture

Trends in Japan Higher Education

- Internationalization (Englification) – Top Global Univ. (TGU) MEXT fund, 37 Univ., 10 yr
- University Reformation Act - MEXT
- Shift to 4 Terms (Quarters)/yr - 2016
- Adoption of Edu technology – learner focused
- Shrinking18 year olds population
- Academic Ranking Preoccupation (*GaiAtsu*)

Globalization and Higher Education Reforms in Japan: The Obstacles to Greater International Competitiveness
ref. http://www.nippon.com/en/in-depth/a02801/

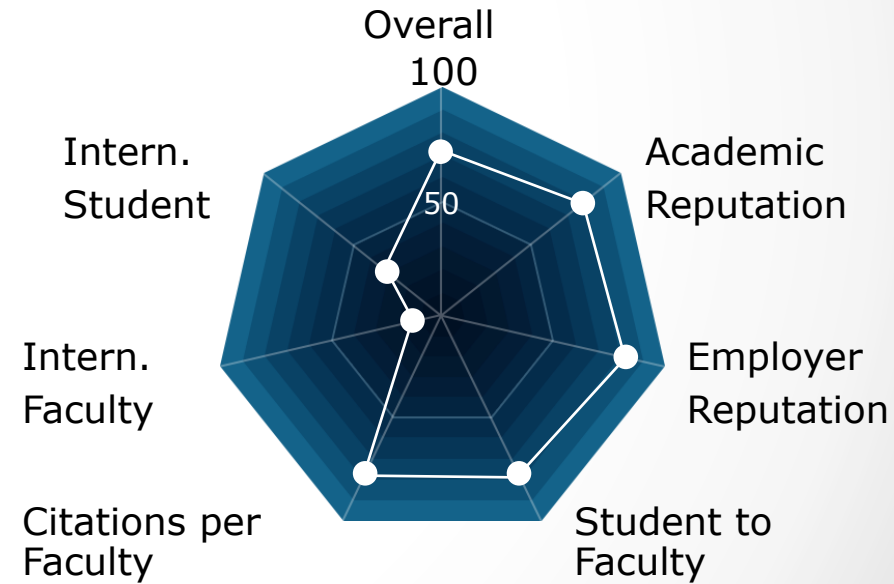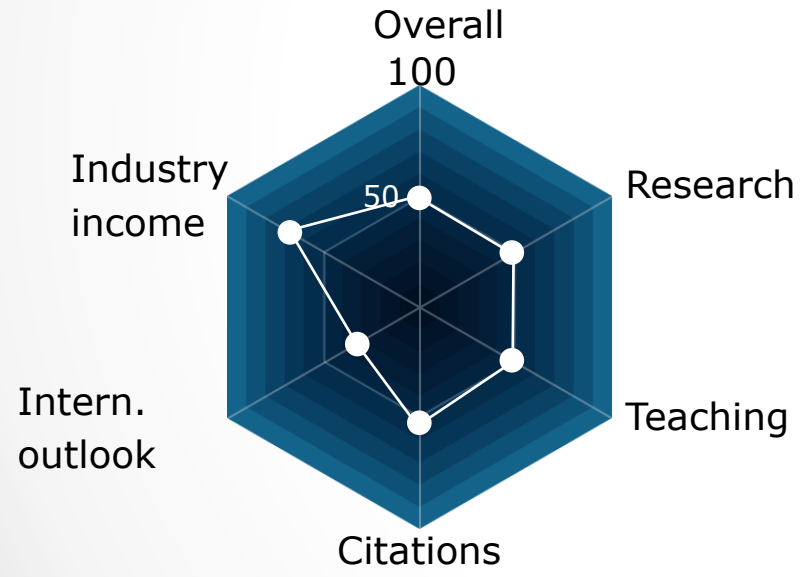# Tokyo Tech World University Ranking

THE 3rd

- Overall: 3rd in Japan (Global: 125th)
- Engineering: 3rd in Japan (Global: 58th)

Overall 100 · 50 · Research · Teaching · Citations · Intern. outlook · Industry income

QS 4th

- Overall: 4th in Japan (Global: 66th)
- Engineering & Technology: 2nd in Japan (Global: 42nd)

Overall 100 · 50 · Academic Reputation · Employer Reputation · Student to Faculty · Citations per Faculty · Intern. Faculty · Intern. Student

Global Employability University Ranking

- 2013: 2nd in Japan (Global: 25th)
- 2012: 1st in Japan (Global: 15th)

(Source: e-Merging)

4

Skill Survey of Engr. Graduates May 2014

- Survey prepared by Prof. M. Shirabe in Japanese
- Basic information
  - o gender, departments, job placement
- Evaluation of education and life
- Knowledge and skills learned
- 140 responses from MS and BS students

Tokodai Engr Graduate Skill Survey 2014
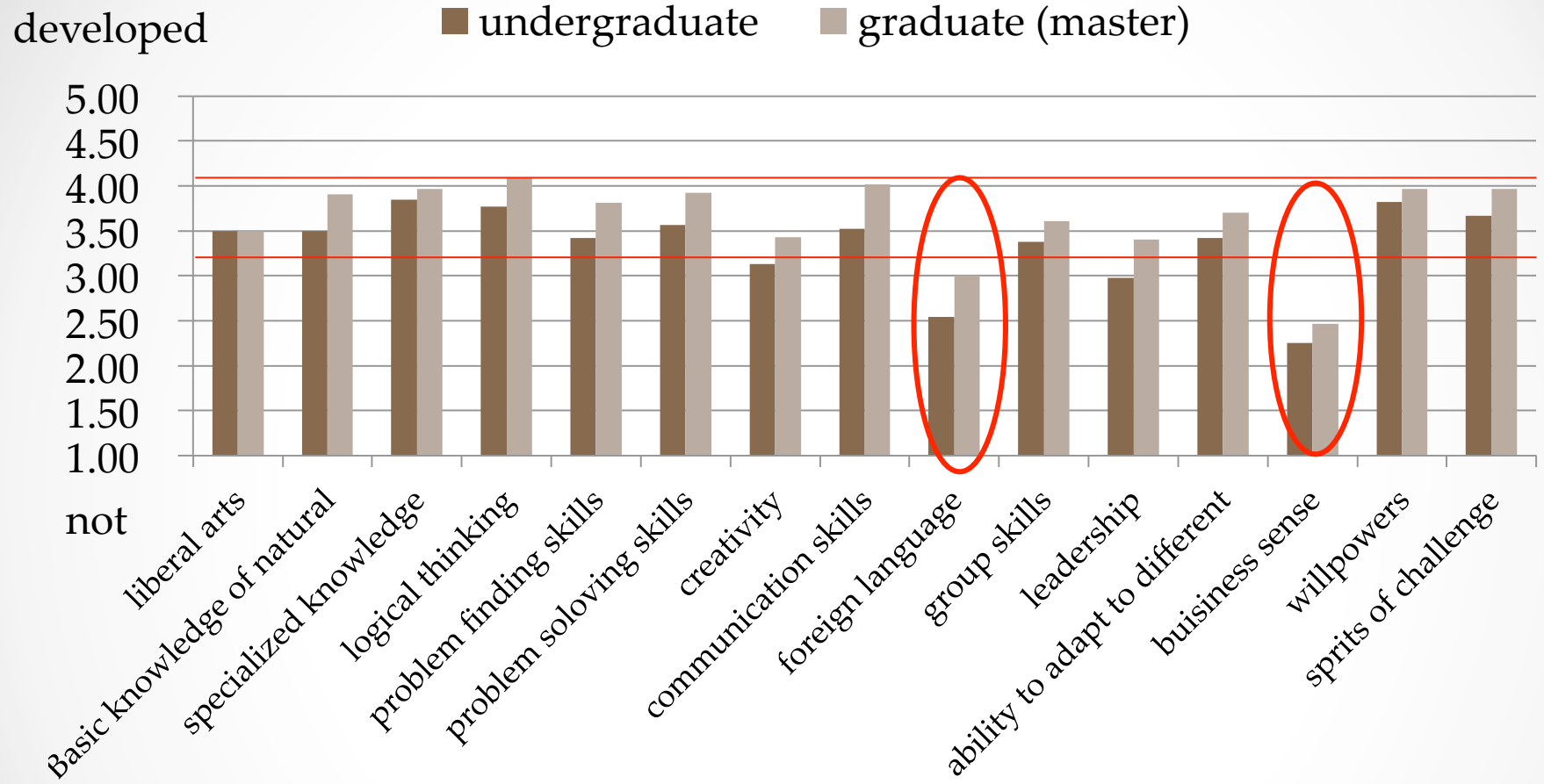
- Lack of English ability (few UG courses) and Business knowledge
- 2014 Started **Cross Border Entrepreneurship Education Program**
- 2016 Reform of Univ. Curriculum (UG/Grad.) – BS/MS integration

Our Research Question/Objective

- **How can online learning with edX and internationalization improve edu at Tokyo Tech? TokyoTechX (MOOCs) + alpha**

Our Goal

Aiming to become one of the world's top ten research universities

Education & Admin Reform

Achieve worldwide success in research and innovation & develop infrastructure to enhance research

Leading Research

Produce techno-sci graduates who lead and communicate with society

Globalization

Create a global campus environment on our 3 campuses

Contribution to Global Society

Contribute to society through research and educational achievements

Top Global University Projects until 2024 (funded by MEXT)

Hokkaido University

Tohoku University

University of Tsukuba

The University of Tokyo

Tokyo Medical and Dental University

Tokyo Institute of Technology — Enhancing Tokyo Tech Education and Research Quality through Administrative Reforms for Internationalization

Nagoya University

Kyoto University

Osaka University

Hiroshima University

Kyushu University

Keio University

Waseda University

Internationalization Project Principles

Provide globally recognized education and research

Share Tokyo Tech Research and Edu. Quality world-wide

Tokyo Tech Reorganization

- Reform the (UG, Grad) schools, depts., curriculum, degrees…
- Institution-wide re-organization
- Internationalization and mobilization
- Englification of Grad courses (UG)
- …..

Education Reform Outreach & Review

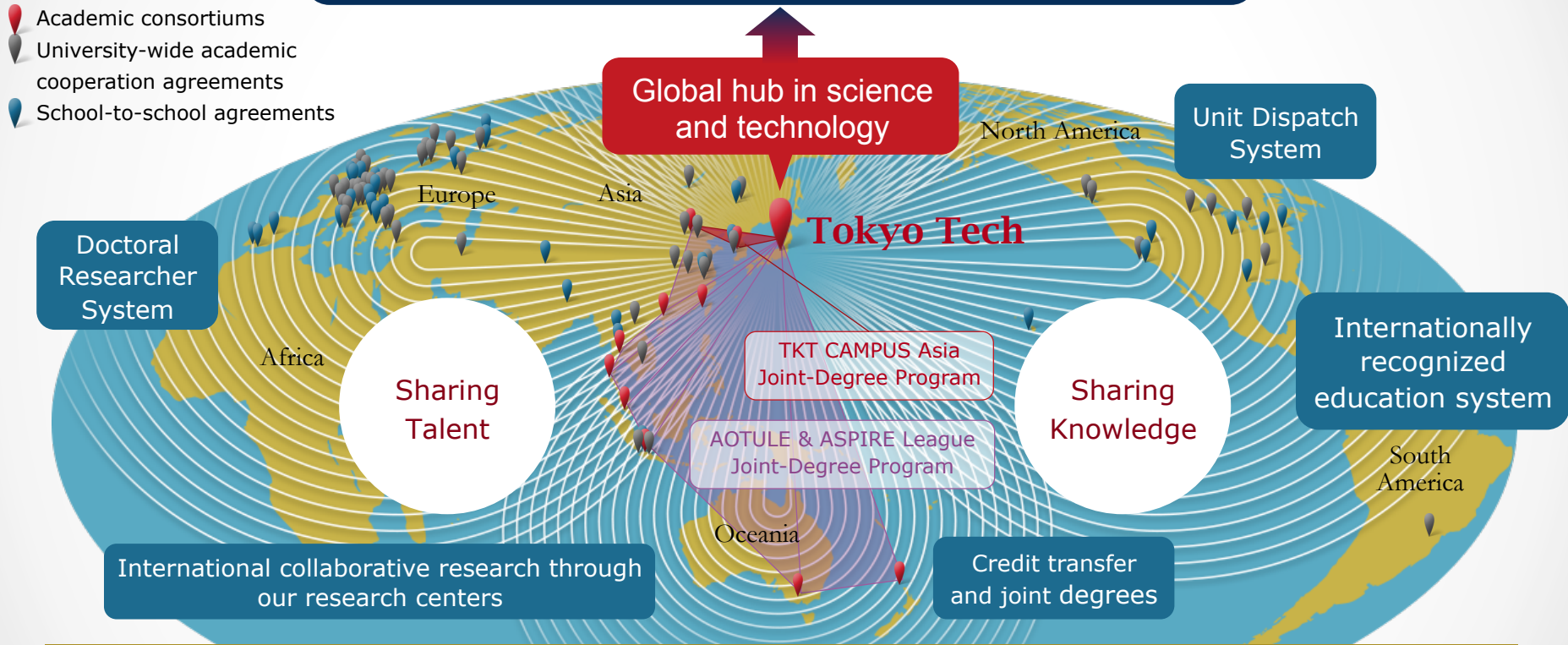## International Symposium on Education Reform

Date: March 14, 2014

Place: Tokyo Tech

Speakers and Panel Discussion

- Eric Grimson (MIT)
- Ronald Gronsky (UC Berkley)
- Y. Mishima(Tokyo Tech)
- K. Craig-Henderson (NSF)
- Etsuhiko Shoyama (Hitachi)
- Kakutaro Kitashiro (IBM Japan)

Tokyo Tech 10 Years from Now

Tokyo Tech Quality
Value and Impact in Education and Research

Academic consortiums
University-wide academic cooperation agreements
School-to-school agreements

Global hub in science and technology

North America

Unit Dispatch System

Tokyo Tech

Europe

Asia

Doctoral Researcher System

Internationally recognized education system

Africa

TKT CAMPUS Asia Joint-Degree Program

Sharing Talent

Sharing Knowledge

AOTULE & ASPIRE League Joint-Degree Program

South America

Oceania

International collaborative research through our research centers

Credit transfer and joint degrees

Sharing Tokyo Tech education and research quality world –wide through mobility and outreach

Tokyo Tech joins edX Oct. 2014 (3 yr)

http://www.titech.ac.jp/english/news/2014/029068.html

Merit for joining edX

- to provide quality courses for Tokyo Tech and overseas students, 24/7 access
- to provide online course creation facilities/ knowhow to faculty, staff and students
- to improve learning of course content thru research
- to disseminate Tokyo Tech research results worldwide- MOOCs
- to collaborate with edX partners
- Open Studio LMS – course learning outcome assessment – CLOCE – Japan/Aust./Canada

Tokyo Tech CITL-OEDO Structure

Center for Innovative Teaching and Learning (CITL)

教育の質保証体制
Evaluation, Quality Control

教育能力開発
Faculty Development (J/E)

教育学習環境開発
Education environment

Active Learning & PBL training

Online Education Development Office (OEDO)
MOOC strategy
MOOC project management
Course production, consulting & training
Learning outcome based research

Data Analysis and Learning Innovation

Course Support & Blended Learning

edX

Out source Online Course (Editing, Video shooting, translation)

Learner (Onsite, Offsite)

OEDO start-up and capacity building

- Starting from Scratch (No video recording studio)
- Ordered Equipment and design video studio in S3 bldg., operation in July 2015.
- Training TAs and faculty on MOOC production
- Develop online course production know-how and sustainable model
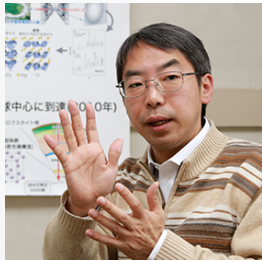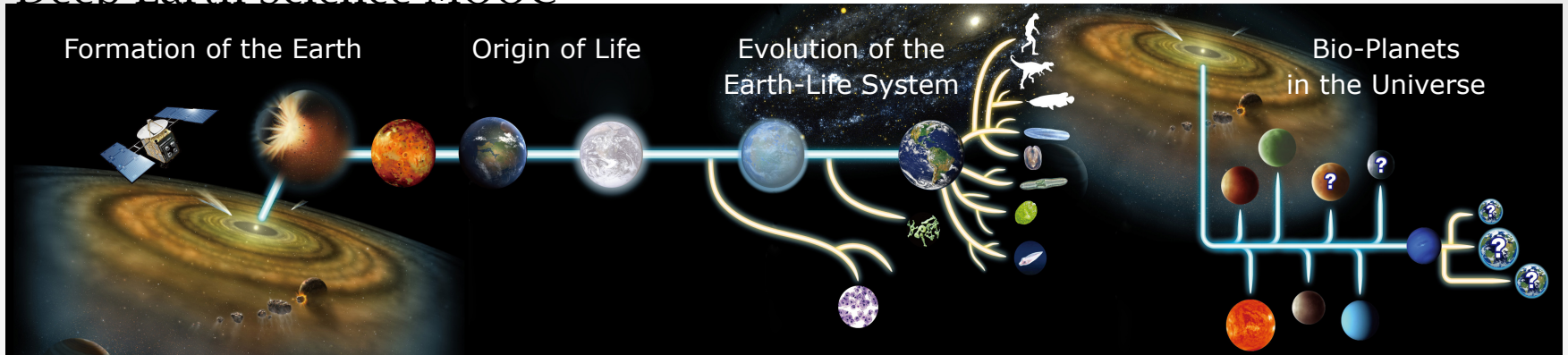- Raising awareness of OEDO activity – today

Tokyo Tech OEDO Mission Statement

1. To develop an online teaching/learning/research eco-system
2. To develop and run MOOCs with edX emphasizing sci-tech education through research approach for students
3. To become a campus online course knowledge hub
4. Engage online learning experts worldwide to accomplish above mission statements

edX support of Tokyo Tech OEDO

- Manuals on MOOC making and quality check
- edX MOOC web hosting portal
- edX 2nd site "edge" for small private online course (SPOC) – trial site to develop online course
- Training of staff in MOOC making
- Proposals for MOOC making (AP, CLEP, Freshman) & potential funds
- Revenue Sharing Potential – Verified Certificate
- Project Manager – interface
- edX Forum twice/yr – edX partner meeting and conference – best practice sharing etc.

Earth-Life Science Institute (ELSI) –
Deep Earth Science MOOC

Formation of the Earth — Origin of Life — Evolution of the Earth-Life System — Bio-Planets in the Universe
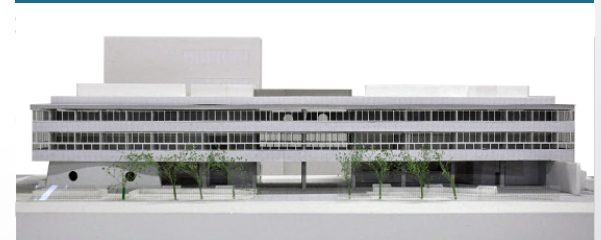
Prof. Kei Hirose
Director

Overview

- Established in 2012 (10-year project)
- Explore the origin of the Earth and origin of life on Earth by linking Earth and life sciences
- 46 researchers (30% international)
- Funded $5M (2014) by the Japanese government World Premier International Research Center initiative (WPI)
- In cooperation with
  - Institute of Advanced Study (Princeton, USA)
  - Harvard University
  - Ehime University (Japan)

Discovery Highlights

- Synthesis of hydrocarbons in hot spring environments
- Hydrogen in the Earth's deep mantle
- Presence of significant amounts of water during Earth's formation

New ELSI Building (June 2015)

OEDO MOOC making, DES

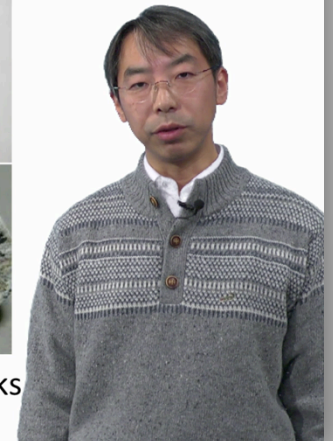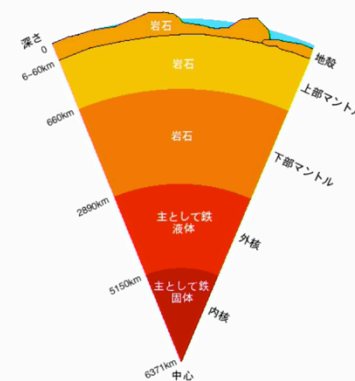Introduction to Deep Earth Science (DES) Parts 1 & 2
  What is inside the Earth?

Instructor: Prof. Kei Hirose
Courses Start: Part 1 Sept. 2015, Part 2 TBD
Course Length: 4 weeks each

Crusts are thin and composed of a variety of rocks

Campus building Architecture – award winning 2nd MOOC plan

EEI bldg. – Solar Envelop


Library "Cheese Cake"

Centennial Bldg. "Gundam"

Suzukakedai Hall and J1-2

Japanese Architecture MOOC plan

- Modernist Japanese Architecture (currently no MOOC)
- Learning Objectives: familiarize students with basic knowledge of Japanese modern architecture including campus buildings
- Benefit for Tokyo Tech Faculty/students and outreach
- Course length: 6 weeks
- Planned Kick-off Fall 2015 (continuous)
- Navigator: Dr. David Stewart with support from Tokyo Tech Architecture Faculty

Connecting the Dots – TokyoTechX

Education	Research
CITL/OEDO (edX – TokyoTechX)	
International	Reform
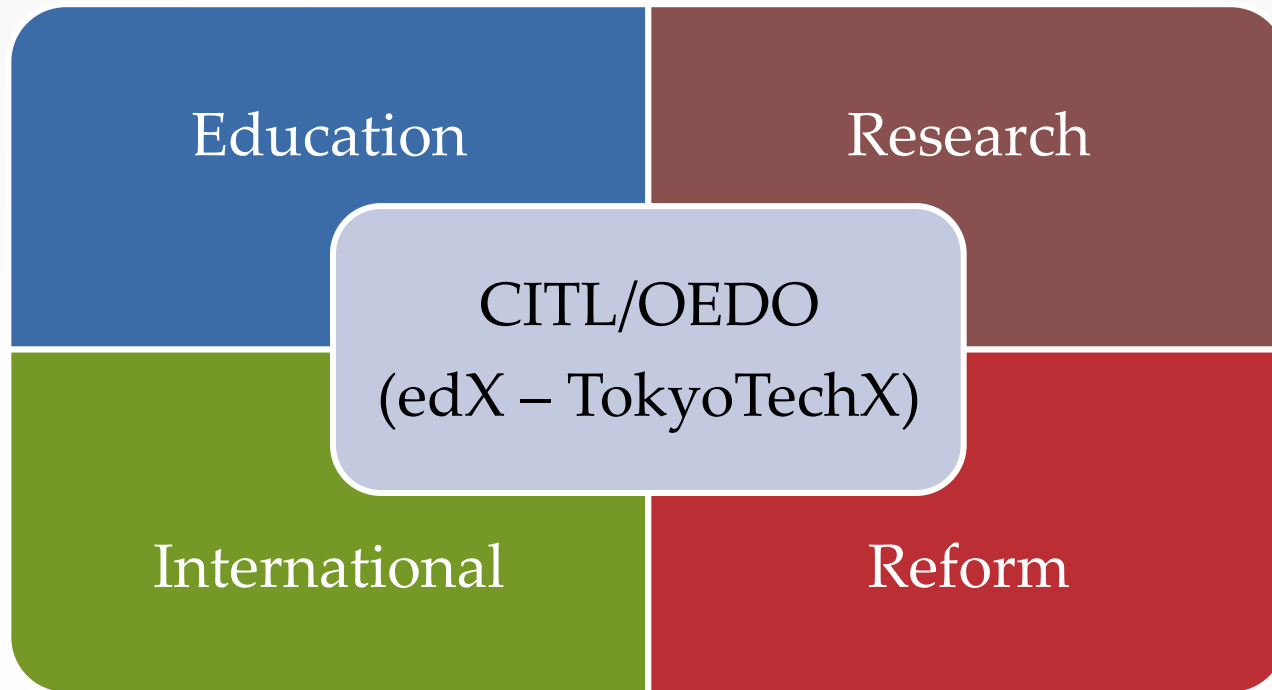
- Vision: Utilize online learning (OEDO) know-how and TokyoTechX to achieve Tokyo Tech's goals.
- Fall 2015 – Tokyo Tech online education grad course for TA training (SPOC)

OEDO Online Presence (Facebook, website)

http://www.eduplan.titech.ac.jp/oedo/

Acknowledgements

- NIER: Dr. Satoko Fukahori
- Tokyo Tech Colleagues: Dean Kishimoto, Dr. Masashi Shirabe,…
- President Mishima, Exec. VPs: K. Okada, Toshio Maruyama
- Eduplan and OEDO