Slide 1

Open Innovation in Education

Dr. Vijay Kumar
Senior Associate Dean
Director, the Office of Educational Innovation and Technology
MIT

University of Tokyo

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Slide 2

Open Education Vision Elements

- Blended Learning
  - Intelligently combines the physical and the virtual
  - Integrate conventional pedagogy with net-learning to deliver quality educational opportunities

- Socially Constructed Knowledge

- Boundariless Education

Higher Education's Readiness?

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Slide 3

Today

One Goal

Extensive Access to Quality Education
For a variety of goals and audiences

Two Trends

Open Everything
Collectivity

Three (or more) Initiatives

OpenCourseWare
iLab
O.K.I (Open Knowledge Initiative)

One Question

Readiness?

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Slide 4

Trend 1: Open for Educational Opportunity

Open Content

Open Tools

Open Architecture

Open Standards

Open Systems

Open Access and Opportunity

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Slide 5

- **Concept: Make the basic teaching materials for 2,000 MIT subjects available on the Web to teachers and learners everywhere free of charge.**

- **MIT has committed to OCW as a permanent, sustainable activity**

Slide 6

Other Open Resources for Scholarship and Education

- Curriki (Global Reducational Learning Community)
- JSTOR, ARTSTOR
- MERLOT, GLOBE
- Open Learning Initiative (CMU)
  - Causal Reasoning, Chemistry, Economics, Logic, Statistics
- Connexions (Rice U)
- UC Berkeley (Digital Chemistry)
- Monterey Tech National Repository for Online Courses
- OKI (MIT)
- SAKAI, Moodle
- VUE (Tufts)
- Open Source Portfolio
- PHET

And many more …

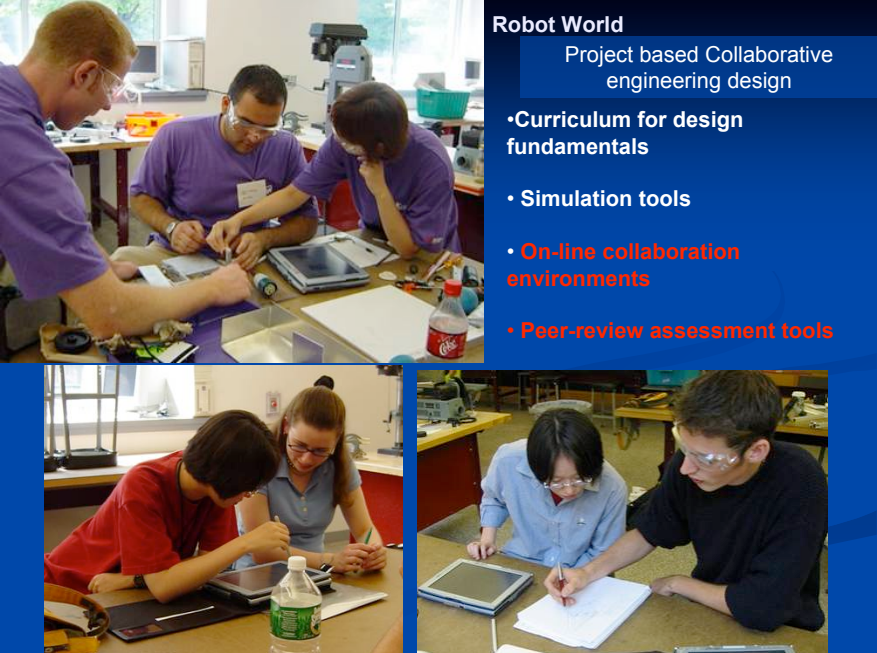## Slide 7

Trend 2: Collectivity

- Participatory Models for Developing and Sharing Educational Materials

- Collaborative Practices
  - Social Software, networks
    - Wikis; Blogs; Shared Bookmarks; flickr…..
    - Virtual Environments: Second Life.
  - Collaboration environments for Construction and Presentation
    - Tablet PCs; Classroom Learning Partner
- Remix

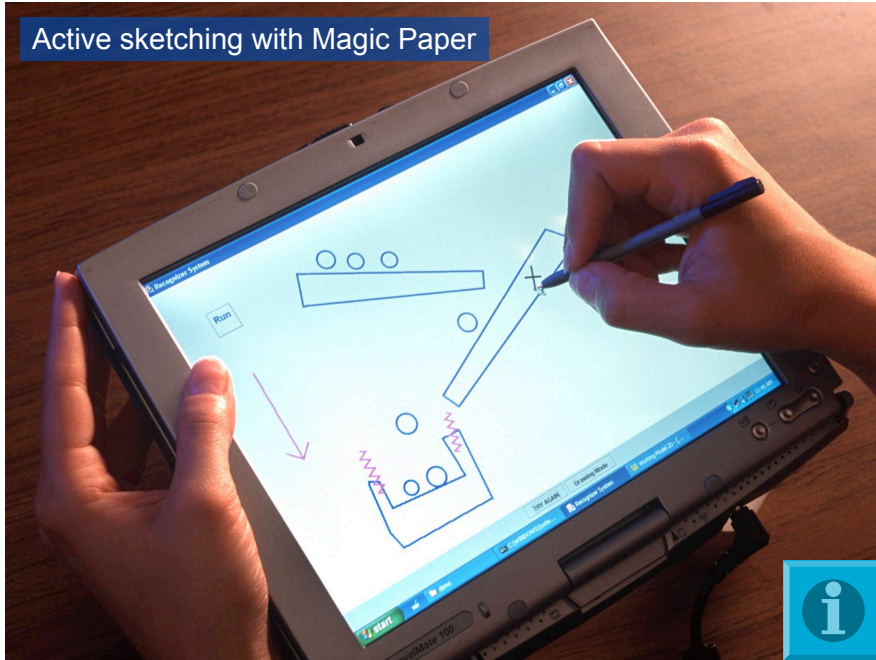Enablers: Open & Community Source
Legal: Creative Commons

Slide 8

Robot World

Project based Collaborative engineering design

- Curriculum for design fundamentals
- Simulation tools
- On-line collaboration environments
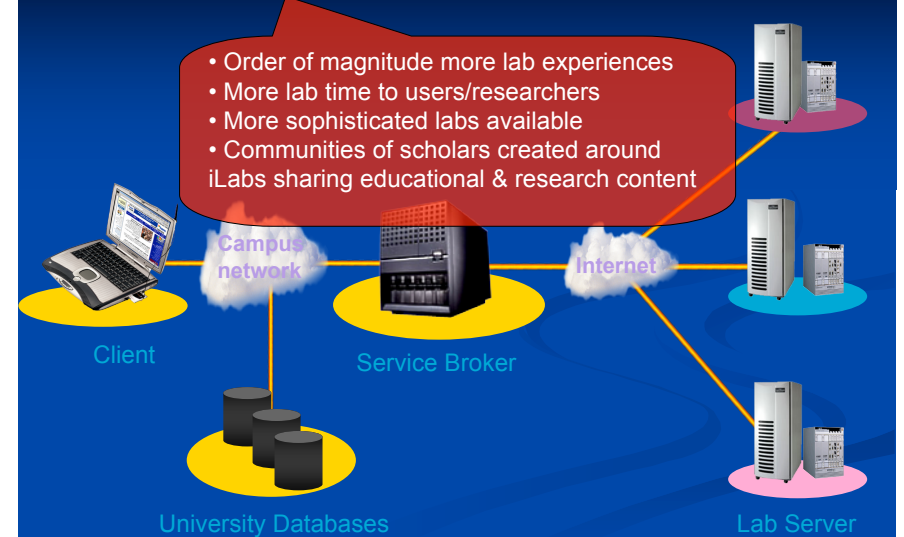- Peer-review assessment tools

Active sketching with Magic Paper

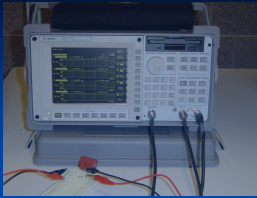"If you can't come to the lab… the lab will come to you!"

iLab: the Vision

- Students will perform a broad range of educationally meaningful experiments online in real time.

- Online laboratories will be embedded inside rich educational platforms that include visualization tools, simulations, data processing, collaboration, etc.

- Online laboratories and their educational content will be broadly shared across many institutions all over the world.

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The iLab Vision

- Order of magnitude more lab experiences
- More lab time to users/researchers
- More sophisticated labs available
- Communities of scholars created around iLabs sharing educational & research content

Campus network

Internet

Client

Service Broker

University Databases

Lab Server

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iLabs at MIT

Dynamic signal analyzer *(EECS, deployed 2004)*

Shake table *(Civil Eng., deployed 2004)*

Polymer crystallization *(Chem. E., deployed 2003)*

Microelectronics device characterization *(EECS, deployed 1998)*

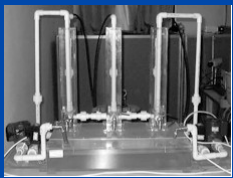Heat exchanger *(Chem. E., deployed 2001)*

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iLabs at UQ

- Ported an existing experiment to iLabs Architecture
- New iLab Projects
  - Microprocessor Lab (microprocessor development board,; a platform for embedded systems)
  - Electronic Experiments
  - NetPhone Experiment
  - Computer Peripherals Experiments
  - Dynamometer Experiment
  - Micro-mirror Device Experiment
  - Chemical Pilot Plant (Murdoch University)

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iLabs in China

- Zhejiang University
  - 50 Net Labs today (Electronic, Power and Automation/Controls)
  - Strong interest in adopting iLabs

triple-tank system   electromotor system   elevator system
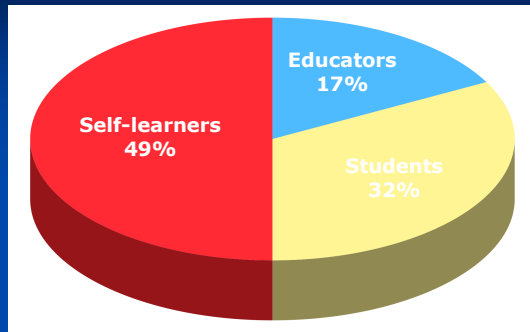

MIT Case 2: OpenCourseWare – 1600 Courses

- Syllabus
- Lecture notes
- Problem sets
- Exams
- Reading lists
- Simulations
- Video lectures

MITOPENCOURSEWARE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Making a Difference - Access by Role

Educators
17%

Self-learners
49%

Students
32%

- 66% of visitors hold a bachelor's or master's degree

- Visitors most frequently interested in courses in electrical engineering, business, physics, and mathematics

MITOPENCOURSEWARE
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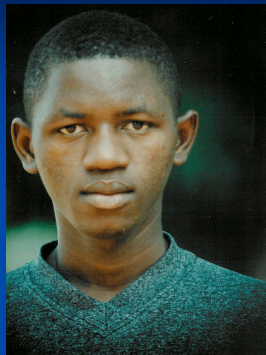---

Making a Difference – Educator Use

Professor Richard Hall
LaTrobe University in Melbourne, Australia, now teaching information systems, beginning microprocessors, and advanced computer-aided software engineering.
OCW saved him *"an enormous amount of time and stress."*
"I was delighted by the way the material is so coherently presented. It is truly inspiring to see this level of excellence."

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Making a Difference – Student Use

"Last semester, I had a course in metallurgical engineering. I didn't have notes, so I went to OCW. I downloaded a course outline on this, and also some review questions, and these helped me gain a deeper understanding of the material."

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The OCW Movement

OCW Consortium (150 Institutions)

- Mission: To advance education and empower people worldwide through OpenCourseWare

- Goals of OCW Consortium:
  - Extend the reach and impact of OpenCourseWare
  - Foster the development of additional OpenCourseWare projects
  - Ensure long-term sustainability of OpenCourseWare projects

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The Big Idea - Translations

Spanish (143) Portuguese (94)

Spoken Lecture Transcription

- Effectively use audio/visual digital recordings, breaking through sequential access to random access

- Uses Automated speech recognition and language processing

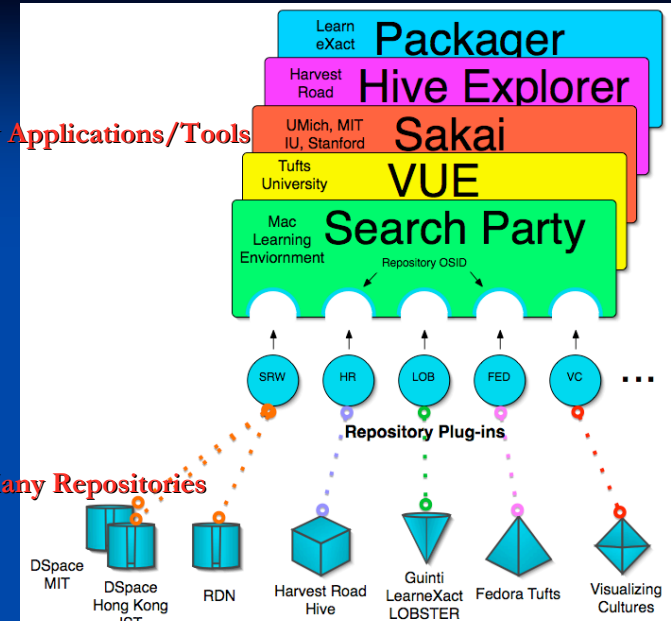- Generates summarized material to help navigation

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MIT Case 3: Open Knowledge Initiative (O.K.I.)

- Technical Framework (Service Oriented Architecture) for Educational Technology Applications
  - Interoperability
  - Integration
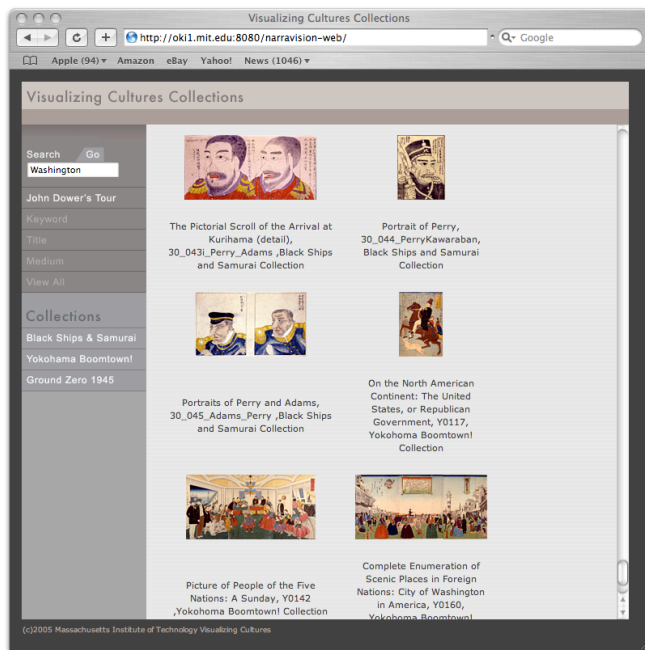- Interface specification ("Plug-In")
  - Enabling Choice (Independence from specific technology implementations)
  - Future-proof against changing technologies
  - Increase opportunities for Sharing and Collaboration
  - Increase Mobility of applications among enterprise infrastructures
  - Reduce cost and effort for custom integration
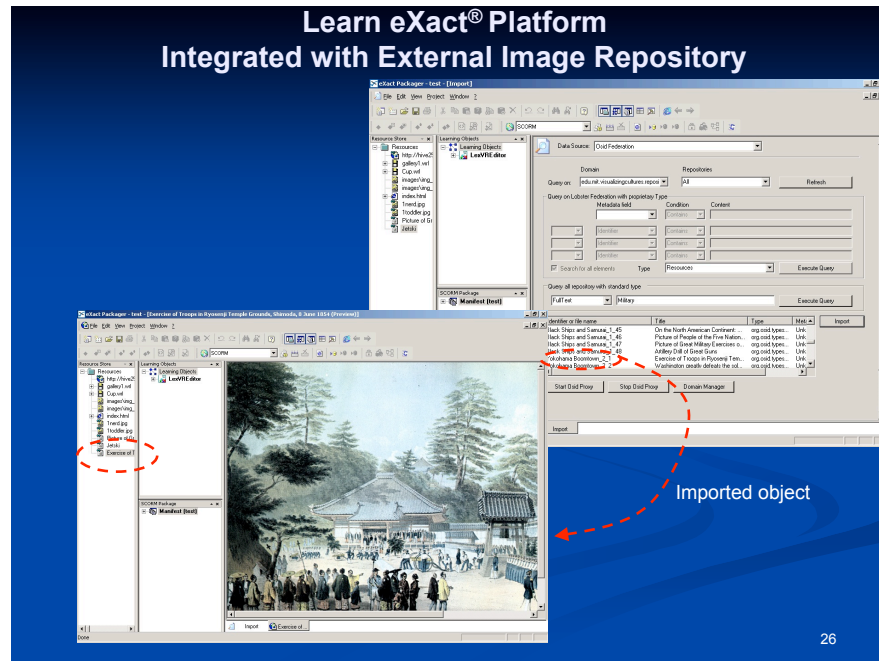

Many Applications/Tools

Many Repositories

Learn eXact® Platform
Integrated with External Image Repository

Imported object

Hive Explorer
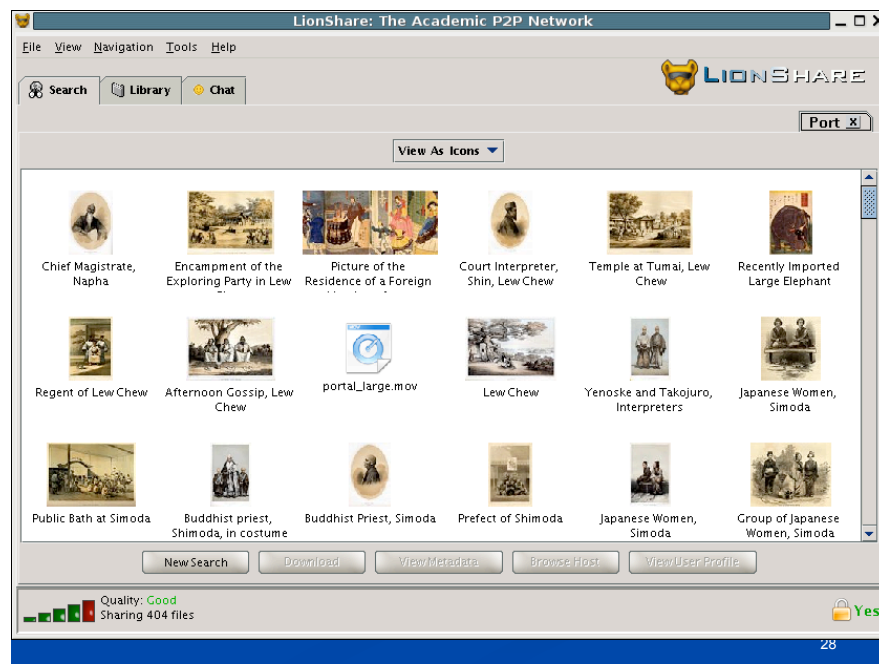## Integrating with MIT Visualizing Cultures

HarvestRoad.

Value Proposition:
Quality and *Sustainability*

- *Proximity*: Content-Learner, Teacher-Student, Research-Teaching

- *Visibility and Boundarilessness*

- *Adaptability*: Common infrastructure to deliver quality digital content in different sectors.

- *Flexibility*: Learners structure the reality of their educational experience.)

- *Interactivity*: Virtual learning environments facilitate peer interaction, which is invaluable.

MIT Council on Educational Technology
Strategic Thrust

| Promote Active Learning | Bolster Commons of the Mind | New Modes: Inter-Institutional Collaboration | Extended University Community |

CET Strategy

| Innovative Learning Environments | Intellectual Commons | Inter-Institutional Collaboration | Extended University Community |

- **Innovative Learning Environments**
  Move away from large passive lectures

- **Intellectual Commons**
  Demonstrate intellectual and educational leadership by making materials freely available to the world

- **Inter-Institutional Collaboration**
  Explore new ways to collaborate with other universities and private industry

- **Extended University Community**
  Use technology to enhance on-campus education and engage members of the community, both alumni and the public

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India: Capacity Building for Education
Net Enabled Open education

- Increasing capabilities of **open educational resources** and **high bandwidth networks** and offer unprecedented opportunities to
  - Serve the knowledge needs of diverse communities
  - Amplify interaction among students and teachers
  - Introduce innovative and interactive educational experiences

. Overall aim to develop ecology for sustainable transformation of education and research in India.

India: Scaling Excellence

- Network-based delivery needs to become a **central modality** for delivering quality education.

- A blended process – intelligent combinations of physical and virtual elements.
  - Distributed Repositories, Domain-specific Grids and Portals, Interaction facilities, Robust connectivity – key components of NeO-Ed.

India: Capacity Building for Education
Net Enabled Open education

- **Faculty and Institutional Development Program**
  - Promote distance and network based delivery techniques
  - Develop domain competencies and teaching skills for quality education using quality faculty and high quality materials

- **National Portal for Open Education**
  - Enabling resources for faculty and resource development
  - Clearinghouse function and an interaction environment

Towards Action

- Large-scale pilot, 2-3 years, to work out modalities of implementation on national scale.

- Public-Private Partnerships (PPP) to implement connectivity infrastructure and service-oriented architecture; content and application production

- Independent organisation, based on consortium model, for launch and monitoring of pilot.

Is Higher Education Ready for Opening Up Education?

- Inertial Frames
  - Scarcity vs. Abundance
  - Pundit-Pupil vs. Peer-Peer
  - Prepared for the Passive
    - Are net-gen Learners ready?
- Enabling Structures
  - Sense Making
    - Ordering the digital disorder
      - (Dave Weinberger - Everything is Miscellaneous)
  - Accountability and Accreditation