Technology and Educational Transformation
New Connections between Content, Curriculum and Community.

M.S. Vijay Kumar

(...with a little help from my friends)

Chais Conference, OUI, Israel 2010
Making A Difference

“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.”

— Kunle Adejumo, Engineering student at Ahmadu Bello University, Zaria, Nigeria
“I was delighted by the way the material is so coherently presented. It is truly inspiring to see this level of excellence.”

— Prof. Richard Hall, LaTrobe University, Melbourne, Australia
Teaching Information Systems, Beginning Microprocessors, and Advanced Computer-Aided Software Engineering
“... even though I relied heavily on material from [Differential Equations], I had no idea how it was being taught—or what was being taught.

... I’d like to bring more of the technology into the classroom, so that while I was giving a lecture, I could give them a flashback to something they had seen in a previous course... This will create better linkages, and to fully integrate the learning experience.”

— Prof. Karen Willcox, Aeronautics & Astronautics
Teaches required aero/astro course to MIT juniors
MIT OpenCourseware
1900 courses

- Site Highlights
- Syllabus
- Course Calendar
- Lecture Notes
- Exams
- Problem/Solution Sets
- Labs and Projects
- Video Lectures
Accelerating Global Movement

200+ OCWC Institutions
Over 8,000 OCW Courses Online
~2,000,000 visitors/month
Accelerating Global Movement

170+ OCWC Institutions
Over 6,000 OCW Courses Online
~2,000,000 visitors/month
Open Education Resources

Learning Content
Full courses, course materials, content modules, learning objects, collections, journals

Tools
Software to support the creation, delivery, use and improvement of open learning content including searching and organization of content, content and learning management systems, content development tools, and on-line learning communities.

Implementation Resources
Intellectual property licenses to promote open publishing of materials, design-principles, and localization of content.
iLabs:  
“If you can’t come to the lab… the lab will come to you!”

U.S., Australia, China, India, Africa: iLabs Consortium

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
CET Strategy

- 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
Electricity & Magnetism with Studio Physics

- Studio format
- Visualization/simulation
- Desktop lab experiments
- Student teams

Now with Virtual Worlds!
Robot World

Project-Based Collaborative Engineering Design

- Curriculum for design fundamentals
- Simulation tools
- On-line collaboration environments
- Peer-review assessment tools
Bridging Research and Learning

Biology

Protein Visualization (StarBiochem)

Hydrology

Watershed Mapping (StarHydro)

16.00AJ - Fundamentals of Engineering Design: Explore Space, Sea & Earth
Linking Content to the Curriculum

Multimedia and Image Tools

- Bringing close reading to media (xmas)
- Visual narratives (Visualizing Cultures)
- Searching across media repositories

Spoken Lecture Browser

- Leveraging Content across Courses
- Media Notebooks
- Deeper Learning
Deeper Learning and Leveraged Resources
What did we do ifor IIHS in India?

Auto Transcribe → Edit → Translate → Present

SpokenMedia
How do we do it?
Lecture Transcription

- Spoken Lecture: research project
- Speech recognition & automated transcription of lectures
- Why lectures?
  - Conversational, spontaneous, starts/stops
  - Different from broadcast news, other types of speech recognition
  - Specialized vocabularies

http://spokenmedia.mit.edu/demo/iihs/
Process and Platform for Collaborative Course & Curriculum
: Finding ➔ Getting ➔ Building

Discover

For example…
MIT OCW
OCW Consortium
Academic Earth
Wikipedia
NPTEL
iTunesU
YouTube

Collect

Learning Activities
Learning Objectives
Content

Collaborate

Construct
Lifecycle

Curriculum → Course → Activity → Delivery/Use → Assessment

Arrows indicate the flow and feedback loops in the lifecycle process.
Concept Map of a Course Using Visual Understanding Editor (VUE)

Figure 7: Commons Course - Contemporary India
Inclusion and Exclusion: Social, Political, Economic and Cultural

Rural and Urban Livelihoods

Economic Inequality

Possible Resources

Conceptualising Poverty

Conceptualising Inequality

Select Sources

Search
Social Exclusion/ Inclusion: South Asian vis-à-vis Western Discourse

By Mohan Das Manandhar
Rojan Bajracharya

Background

“Social Exclusion” – the term by itself originated in France in 1974 - has lineage to the enormous European literature of 1960’s and 60’s on social division and inequality which emancipate the severity of the poor or dispossessed members of the European society who lacked in the adequate resources to achieve the acceptable standards of well being and the participation in the customary activities of society. Nevertheless, the social exclusion that exists in the South Asian societies since the traditional past before the discourse of Europe exhibits in some respects quite distinct feature from many other societies of the world.

South Asian Context

The distinctiveness is on account of the stratificatory system of caste and undergoing socio-political practices of religion that prevail, in one form or the other, in the South Asian societies for centuries which excluded a community as whole from common facilities or benefits. The religion, caste and ethnicity are the prime politically mobilizing factor and the base of social structure in the South Asian region. The religion, caste and ethnicity has influential role in any sort socio-political activities in the region ranging from: anti-colonial movement against British Rule to hot burning Naxalites and Maoist movement of current days; military take-over to separation of federal state. The crosscutting between the religious caste and ethnic communities gave birth to issues of communal identity politics including regional nationalisms and caste and ethnic based parties.

The South Asian political and socio structure which has great influence of religion, caste and ethnicity has the social exclusion in two lines – Purity/ Impurity and Enslaveable/ Non- Enslaveable. Through religious angle, there is enslavement of majority religious group against religious minority group, indigenous and Tribal. For instance, majority Muslims of Pakistan and Bangladesh dominates the Hindu minorities. Hindu minorities in Nepal dominate Muslims and Indigenous minorities. In term caste, Dalits are regarded as impure and enslaved by high caste group as their manual work (viz. blacksmith, barber, plumber and other) are of low status. The contemporary fact of South Asian state and society is it’s adaptation of division of labor on the basis of caste with Dalits being lowest in this hierarchy. Dalits are spread in every country of South Asia. The South Asian counties have legally made caste system void but it has limited in word but not in practices. So, in many instance, South Asian politic has observed the rising of caste based political parties against such discrimination – viz. Bahujana Samajwadi Party, the ruling party of Uttar Pradesh of India, had evolved against Dalit discrimination in India. In term of ethnicity, the minority ethnic groups are enslaved by majority viz. Balochistan province, reside by deprived ethn...
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Inclusion and Exclusion: Social, Political, Economic and Cultural

Economic Inequality

Rural and Urban Livelihoods

Conceptualising Poverty

Conceptualising Inequality
Inclusion and Exclusion: Social, Political, Economic and Cultural

Economic Inequality

Rural and Urban Livelihoods

Conceptualising Power

Conceptualising Inequality
IIHS Course Description

Poverty and Inequality

This section of the course enables poverty and inequality in India, an measure their extend and aspect historical and current poverty-alle

Activity Description

Measuring Poverty and Inequality experimental data: political and measurement.

VUE Concept Map

Continue
Activity << Poverty and Inequality << IIHS

http://open.iihs.co.in/poverty_and_inequality/activity

Social Exclusion/Inclusion: South Asian vis-à-vis Western Discourse

By Mohan Das Manandhar
Rehan Babarcha

Background

"Social Exclusion — the term is widely used and understood in Western literature — and has been applied by researchers to the study of South Asian societies to understand the process of social exclusion. In the context of South Asian societies, social exclusion refers to the systematic exclusion of individuals or groups from participating in social, economic, and political activities. This exclusion can occur due to various factors, including cultural, linguistic, and religious differences.

Discussion

Aromar: I think this article misses some of the major points...
Kavita: The article does include some of the issues most relevant
Social Exclusion/ Inclusion: South Asian vis-a-vis Western Discourse

By Manish Das Manandhar

Amar Bishwakarma

Background

"Social Exclusion" – the term first used by anthropologists in 1964. It has been frequently used in social sciences and policy circles as a way to describe the plight of certain groups who are marginalized and excluded from the mainstream of society. This concept is based on the idea that exclusion is not just about being physically or geographically separated from others, but also about being socially and economically marginalized.

Comment

Historical origins of the concept of social exclusion:

Social exclusion is often associated with the colonial legacy of the British and the continued impact of this legacy on the development of South Asia.

Discussion

Aromar: I think this article misses some of the major points...

Kavita: The article does include some of the issues most relevant.
Social Exclusion/Inclusion: South Asian vis-à-vis Western Discourse

By Niranjan Das Mansandhar
Rekha Baracharva

Background

Social Isolation

Comment

Historical origin of the phenomenon of social exclusion or what is generally termed as poverty is seen as a result of structural inequalities in access to resources and opportunities. This is particularly evident in the context of South Asia, where the burden of poverty falls disproportionately on the poor, especially the rural poor. The phenomenon of poverty is not only a reflection of the structural inequalities but also a perpetuator of them.

Discussion

Aromar: I think this article misses some of the major points...
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The South Asian politics and socio structure which has great influence of religion, caste and ethnicity has the social exclusion in two lines – Purity/Impurity and Enslaveable/Non-Enslaveable. Through religious angle, there is enslavement of majority religious group against religious minority group, Indigenous and Tribal. For instance, majority Muslims of Pakistan and Bangladesh dominates the Hindu minorities; Hindu majorities of India and Nepal dominate Muslims and indigenous minorities. In term caste, Dalits are regarded as impure and enslaved by high caste group as their manual work (viz. blacksmith, barber, plumber and other) are of low status. The contemporary fact of South Asian state and society is its adoption of division of labor on the basis of caste with Dalits being lowest in this hierarchy. Dalits are spread in every country of South Asia. The South Asian counties have legally made caste system void but it has limited in word but not in practices. So, in many instance, South Asian political has observed the rising of caste based political parties against such discrimination – viz. Bajajana Samajabadi Party, the ruling party of Uttar Pradesh of India, had evolved against Dalit discrimination in India. In term of political the straitification of society has evolved in many countries.
Content Readiness: Technical Development and Implementation

- **Content harvesting**
  - Automate the creation of metadata and other descriptive information, identify and tag conceptual information within content

- **Collective intelligence**
  - Social tagging and social networking tools to help find useful materials more quickly and to share best practice

- **Content federation and re-aggregation**
Transformative Potential: A Pedagogy of Abundance

A Access: Scaling Excellence; Alternate Pathways; Localization; Participative

B Blended Learning

B Boundary-less Education

C Continuous improvement

C Continuous Education
Where are we going?

Visible

Situated

Receiving/Knowing

Limited Term

Enrolled Student

Dropouts

DE Second Class

University

Usable

Anywhere; Virtual, Blended

Affecting

Varying/Lifelong

Registered Lifelong Member

100% of students Finish

Net Enabled

Open Education Central

Modality for delivery

Metaversity
We are seeing the early emergence of a meta-university—a transcendent, accessible, empowering, dynamic, communally constructed framework of open materials and platforms on which much of higher education worldwide can be constructed or enhanced.” --Charles M. Vest, President Emeritus, MIT, (p. 30). (Vest, C. (2006). Enabling Meta University, EDUCAUSE Review, May/June, (41:3), 18-30, http://www.educause.edu/apps/er/erm06/erm0630.asp)
If We Don’t See You in the Future ……..

……..We Will See You in the Pasture
• “How can we advance teaching and learning by taking full advantage of open education?”

• A hardcover book + free online distribution with Creative Commons

• 30 chapters by 38 prominent leaders and visionaries (Foreword by John Seely Brown)

• Lessons learned and visions of the future from: OKI, IMS, CNI, Sakai, Moodle, ETUDES, iCampus, VUE, Mellon Foundation, OCW, Connexions, OLI, MERLOT, OpenLearn, SOFIA, Creative Commons, LAMS, Hewlett Foundation, CASTL, VKP, ISSOTL, Open University, Carnegie Foundation, and more
Open…
a preferred future for learning

“Recasting the role of the university education in light of an open world presents a value proposition far more profound than the free dissemination of educational tools and resources – it allows us to proactively construct new preferred learning.”
Challenge: Recasting Resources, Relationships and Roles

- **Institutional Inertial Frames and Invariants**
  - Scarcity vs. Abundance

- **Recasting roles and values**
  - Sense Making
  - Ordering the digital disorder
  - Pedagogical Shifts
    - Individual learning -> collaborative, social learning
    - Co-development of knowledge with learners

- **Credentialing**
  - Distributed over time and place
  - P2P and Self-Learning
Recommendations

- Investigate the Transformative Potential and ecological transitions
  Systemic Consideration of Programs. Practices and Priorities
- Re-contextualize Invariants
- Build receptivity and support for the use of open educational resources at many levels.
- Make Practice and Knowledge Visible and Shareable.
- Make Open Education Solutions Sustainable.
  - Programmatic and technical integration
  - Synthesis and synergy
  - Governance
Thank You

Dr. M.S. Vijay Kumar

vkumar@mit.edu
Content is King, but Context Rules

“Water, Water, Everywhere, Nor any drop to drink.”

— Coleridge, The Rime of the Ancient Mariner
Platform for Collaborative Course & Curriculum

- Assembly of courses from content from separate physical repositories:
  - MIT OCW Repository
  - Other Sources

- Support the collaborative development of courses among faculty peers.
  - Wiki based authoring; Concept Mapping tools

- Options for Delivery of these courses.
Resource Sites

- web.sls.csail.mit.edu
- spokenmedia.mit.edu
- ocwfinder.org
- www.ocwconsortium.org/use/use-dynamic.html
- www.folksemantic.com
- oeil.mit.edu
- vue.tufts.edu
- nptel.iitm.ac.in
- http://cnx.org/aboutus/technology/cnxml
Enabling Infrastructure: Functional Characteristics

- Flexibility
- Interactivity
- Proximity
- Adaptability
Spoken Lecture Project

- Processor, browser, workflow
- Prototyped with lecture & seminar video
  - MIT OCW (~300 hours, lectures)
  - MIT World (~80 hours, seminar speakers)

Supported with iCampus MIT/Microsoft Alliance funding
How did we do it?

SpokenMedia
Challenges of Planning, Critical Challenges facing Cities of Global South, IIHS, and Challenges within the IIHS Curriculum Framework

I think one central challenge of planning is legitimacy of government as a key institution that should be involved in bringing the change. The legitimacy of the government is under attack in many different parts of the world so that it has to be reestablished as a major planning institution. I think the second challenge for planning at least in the US or the West is that the market is...
Open Framework for Flexible Education

Application Middleware

Educational Software Infrastructure

IIHS Core IT Infrastructure

- Authoring
- Collab.
- Assessment
- Discovery
- Etc...

- Repository Services
- Course Services
- Learning Objective Services
- Etc...
...a possible vision

- Engaged with Peer-to-Peer University developing a platform to test the collaboration
  - Beta platform – January 15
  - Course use – February 1, 3.003 at MIT and P2PU courses

- Starting a consortium, the Campus Project
  - Universidad Oberta de Catlunya
  - Universite de Lyon
...a possible vision

- Open high quality digitized educational content, tools and communities
- Available anytime, anywhere for free; Localizable and re-mixable
- Greatly expanded and accepted pathways to learning: Alternate ways to learn: Accelerated/deeper learning
- Virtual “meta” universities created which offers access to cross-linked educational resources.
- Students keep the record of their own learning that has been validated in a variety of ways by a variety of educators.
- 100% of students finish college who enter college.
Open IIHS is a realization of the WHOLE educational infrastructure.
2 Demos from January 2010

- **SpokenMedia**
  - Video/audio transcription, enabling translation
  - Process and tools
  - “Access to high-quality learning must be open to all”

- **Open IIHS Experience**
  - Course/activity design; student interaction
  - “Make curriculum openly available”
Challenges of Planning, Critical Challenges facing Cities of Global South, IIHS, and Challenges within the IIHS Curriculum Framework

I think one central challenge of planning is legitimacy of government as a key institution that should be involved in bringing the change. The legitimacy of the government is under attack in many different parts of the world so that it has to be reestablished as a major planning institution. I think the second challenge for planning at least in the US or the west is that the market is...
“OpenCourseWare looks counter-intuitive in a market-driven world. It goes against the grain of current material values. But it really is consistent with what I believe is the best about MIT. It is innovative. It expresses our belief in the way education can be advanced – by constantly widening access to information and by inspiring others to participate.”

– Charles M. Vest, President of MIT
Sept. 2001
Meet Garret, Kristen, Aaron and Nick

......from Gen Y
Our friends think that we are rocket scientists and astronauts.
Because we work here
But truthfully, we tend to work just as much here.
Last week, we interacted with people from here …

… friends, family, classmates, colleagues, even strangers.
Utilize "social media"
They all wanted to know more about what we do at NASA.
So we got to thinking...

Why aren’t they connected to NASA?
Why isn’t a whole generation connecting to NASA?
First, **better understand** the audience
Then focus on getting us interested again
So the challenge is to take this and create new ideas.

Because the NASA we want to work for and connect to is like us:

**Creative**  
**Collaborative**  
**Open**  
**Bold**  
**Participatory**  
**Innovative**  
**Timely**  
**Connected**  
**Exciting**  
**Purposeful**
Thank You
vkumar@mit.edu

OPENING UP EDUCATION
The Collective Advancement of Education through Open Technology, Open Content, and Open Knowledge

edited by
Toru Iiyoshi and M.S.Vijay Kumar