List of Presentations held on 26th June 2014

1. Delivering High Quality Higher Education for Everyman......................................................... 1
2. Centre for Assessment Evaluation And Research................................................................. 12
3. ERNET India (Education and Research Network)................................................................. 22
4. Agenda for 28th meeting of PAB of NMEICT....................................................................... 27
5. Development of National Digital Library of India............................................................... 45
Delivering High Quality Higher Education for Everyman

Ajit Balakrishnan

Committee for use of ICTs at IIMs
The New Learning Architecture

- Learning Mgmt Systems
- Authoring tools
- Machine grading tools
- Content Brokering Tools
- Analytics
- Learning Record Store
- Experience API

2
Every media innovation has led to an attempt to improve education

Most such efforts aimed at solving the “distance problem”
# Multiple learner segments with different “problems-to-solve”¹

<table>
<thead>
<tr>
<th>Jobs-to-be done learner segments</th>
<th>Course Type that gets this job done</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learners who want a good first job in the corporate world</td>
<td>Classical 2 year-fulltime residential MBA</td>
<td>IIM PGP, Harvard MBA...</td>
</tr>
<tr>
<td>Leaners who are in mid-career and want shift of industry or break into management ranks</td>
<td>1 Year residential Executive MBA</td>
<td>IIM PGPEx, European 1 year MBA</td>
</tr>
<tr>
<td>Companies who want to reward promising mid-career executives</td>
<td>Short-term Executive Education Programmes</td>
<td>MDPs and In-company programmes at IIMs, Harvard...</td>
</tr>
<tr>
<td>Learners seeking personal development</td>
<td>MOOCS</td>
<td>Coursera, edX, IIMC LDP</td>
</tr>
</tbody>
</table>

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1: “Customers ...find themselves with a problem that they need to solve. With an understanding of the “job” for which customers find themselves “hiring” a product or service, companies can more accurately develop and market products well-tailored to what customers are already trying to do: www.christenseninstitute.org/key-concepts/jobs-to-be-done
Points where technology is currently being applied at the IIMs

- Infrastructure: Classrooms, hostels, Accounting
- Human Resource: Faculty evaluation, promotion, compensation
- Technology: Curriculum design, class scheduling, sharing
- Procurement: get good students, faculty, administration staff

- Admissions
- Teaching, Socialization
- Research, faculty publishing
- Student placement
- Credentialing

- HR Management Software
- Campus Intranet
- Accounting Software
- Class Scheduling Software
- CAT/ GMAT Online...
- Learning Mgmt, Course Authoring Systems..
- Open access scholarly journals
- Job websites
- Search Engine Marketing, Optimization
IIM Calcutta’s Online Programme

<table>
<thead>
<tr>
<th>Teaching staff</th>
<th>Calcutta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>India</td>
</tr>
<tr>
<td>70 cities, 170 centres, 2000 students</td>
<td></td>
</tr>
<tr>
<td>Annual Revenue</td>
<td>Rs 20 crores</td>
</tr>
</tbody>
</table>
Financial Times, London etc, will soon rank Online Programmes – IIMs should aim to top that as we did this year in some areas.
The New Learning Architecture

- Learning Mgmt Systems
- Authoring tools
- Machine grading tools
- Experience API
- Content Brokering Tools
- Analytics
- Learning Record Store
Members

Ajit Balakrishnan (Chairman & Chairman IIM Calcutta), Dr BK Gairola (Mission Director, National e-Governance Plan), Prof Ashok Jhunjhunwala (IIT Madras), Praveen Prakash (Mission Director, National Mission on Education through ICT ), Pradeep Gupta (Chairman, CyberMedia), Saibal Chattopadhaya (Director IIM Calcutta)

The Committee thanks the following experts for the ideas they contributed:

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DEVELOPING A JOINT ENTRANCE EXAMINATION (Main) (JEE) ONLINE ITEM BANK FOR REMEDIAL TEACHING AND LEARNING OF CANDIDATES

Shri Vineet Joshi – Chairman CBSE and Executive Council CAER
Mrs. Sarita Manuja - Director CAER
CBSE – CAER
CORE PROJECT TEAM

• **Shri Vineet Joshi**, IAS (Chairman, CBSE & Chairman CAER – Executive Council)

• **Ms. Sarita Manuja** (Director, Centre for Assessment, Evaluation & Research)

• **Prof. James Stephen Tognolini** (Senior Vice President, Research and Assessment Pearson and Visiting Professor, University of Oxford)

• **Dr. Sadhana Parashar** (Professor and Director - Training and Academics, CBSE)

• **Mr. Arjun Bahadur** (Deputy Director, Centre for Assessment, Evaluation & Research)

• **Dr. Priyanka** (Research Officer, Centre for Assessment, Evaluation & Research)

• **Dr. Akanksha Bapna** (CEO, Evaldesign)
DEVELOPING A JOINT ENTRANCE EXAMINATION (Main) (JEE) ONLINE ITEM BANK FOR REMEDIAL TEACHING AND LEARNING OF CANDIDATES

Background

• High-stakes examination for which students from across the country spend significant amounts of time practising to maximise their score

• While preparation for examinations is a very useful learning tool, it starts to have a negative impact on broader learning when the focus is purely on “practising for the test”

• The fact that students are paying significant amounts of money to have this tuition is also impacting on the “social fabric” of society

• CBSE - CAER is proposing to develop an item bank of JEE (Main) items which students preparing for the JEE can access online. These items will be linked to learning materials which are designed to help students improve their learning

• Designed to identify areas of potential weakness; promulgate corrective strategies that have been identified through an analysis of the assessment items; and, give further practice examples from similar JEE items which assess the same skill to make sure that the student has understood the concept
Scope and Coverage of Solution

• Online Portal which will allow students to access practice questions which is linked to conceptual subject matter to ensure that learning happens

• Portal will have 501 questions (for 3 subjects) taken from previous years question papers. These questions will be linked to concepts tested in the examination and then mapped to the Table of Specifications developed.

• For each question, there will be Rationale written for the selection of each wrong option (3 incorrect options). A detailed explanation will be provided to the student explaining the error and misconception which led to the selection of that wrong option.

• This will be followed by a Corrective Measure which the student can adopt to arrive at the right answer. The key here is to guide the student to the right answer and not encourage learning by rote. This explanation will then linked to the Key Concept which is being tested by the question to encourage self learning
DEVELOPING A JOINT ENTRANCE EXAMINATION (Main) (JEE) ONLINE ITEM BANK FOR REMEDIAL TEACHING AND LEARNING OF CANDIDATES

Steps Involved

1. Develop Table of Specifications covering the construct of JEE
2. Identifying and Tagging a pool of 501 Questions by Subject Experts and Test Developers of JEE.
3. Identifying, describing and storing the rationales behind the distracters
4. Incorporating corrective learning strategies for each incorrect option chosen
5. Conduct Load trials and carry out pilot study
6. Locate the item bank system on a website to make it accessible world wide 24/7.
7. Develop an online system for item bank including feedback and learning components (with technology partner)
8. Build additional items for practice for each incorrect action to improve learning
## Deliverables and Timelines

<table>
<thead>
<tr>
<th>Key deliverables</th>
<th>Expected time of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception of the Project</td>
<td>1 July 2014</td>
</tr>
<tr>
<td>Development of item bank with 501 items</td>
<td>31 Oct 2014</td>
</tr>
<tr>
<td>Completion of technology Platform along with Hosting</td>
<td>31 Dec 2014</td>
</tr>
<tr>
<td>Pilot run of the Platform</td>
<td>1 Jan 2015 – 31 Dec 2015</td>
</tr>
<tr>
<td>Update of Platform</td>
<td>1 Jan 2016 – 31 Mar 2016</td>
</tr>
<tr>
<td>Release of Updated Version</td>
<td>1 Apr 2016</td>
</tr>
</tbody>
</table>
**Cost of the Content Development**

<table>
<thead>
<tr>
<th>Table of Specifications + Selection of Questions coded with Meta Data + 10 additional similar items</th>
<th>Number of Professors</th>
<th>Number of PhD Scholars</th>
<th>Number of Days</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>12</td>
<td>10</td>
<td>900000</td>
<td></td>
</tr>
<tr>
<td>Development of Rationales, Corrective Measures and tying to Concept tested</td>
<td>9</td>
<td>12</td>
<td>16</td>
<td>2400000</td>
</tr>
<tr>
<td>Cost of Review</td>
<td>9</td>
<td>3</td>
<td>(12 + 8)</td>
<td>1200000</td>
</tr>
<tr>
<td>Program Manager</td>
<td>1</td>
<td>1200000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>5700000</strong></td>
</tr>
</tbody>
</table>

**Per Day Cost of IIT Professor** | **10000**
---|---
**Per Day Cost of PhD Student** | **50000**
DEVELOPING A JOINT ENTRANCE EXAMINATION (Main) (JEE) ONLINE ITEM BANK FOR REMEDIAL TEACHING AND LEARNING OF CANDIDATES

Cost of the Platform Development

Platform Development Financial Details

<table>
<thead>
<tr>
<th>Resource</th>
<th>Salary Per Month</th>
<th>Total Cost for Resource</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
<th>W10</th>
<th>W11</th>
<th>W12</th>
<th>W13</th>
<th>W14</th>
<th>W15</th>
<th>W16</th>
<th>W17</th>
<th>W18</th>
<th>W19</th>
<th>W20</th>
<th>W21</th>
<th>W22</th>
<th>W23</th>
<th>W24</th>
<th>Weeks in Phase 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cost</td>
<td>2942500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
## Cost of the Monitoring and Update Phase

<table>
<thead>
<tr>
<th>Development Heads</th>
<th>Cost (INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Manager</td>
<td>900000</td>
</tr>
<tr>
<td>Data Analyst</td>
<td>600000</td>
</tr>
<tr>
<td>System Upgrade</td>
<td>900000</td>
</tr>
<tr>
<td>Academic Advisors</td>
<td>600000</td>
</tr>
<tr>
<td>Hosting Cost</td>
<td>300000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3300000</strong></td>
</tr>
</tbody>
</table>
Thank You!

Centre for Assessment, Evaluation and Research (CAER)
4th Floor, 17 Rouse Avenue, New Delhi 110 002
Email: contactus@indiacaer.org
Website: www.indiacaer.org
An autonomous scientific society of Department of Electronics & Information Technology Ministry of Communications & Information Technology, GoI
Areas of Core Competency

DIVERSITY OF DISCIPLINES

- Terrestrial and satellite based WAN Connectivity
- Campus LAN
- BASIC IT Solutions (Computing, Digitization, Content/application hosting)
- Collaborative communication (Email/VC/Domain/Website)
- Next generation R&D, consulting and solutions (IPV6/IoT)
- Data Center & Cloud Solutions
- Awareness & Training Programs

HORIZONTALS

- Education Institutions
- Research Institutions
- Health Care.
Optic Fiber based Gigabit Campus LAN and Connectivity
- Wi-Fi enablement of Campus
- Servers storage & Services
- Link Faculties, Academic, Admin, Finance, Library and Hostels
- Facilitate content development including digital library
- EDUROAM Services:
  Free roaming services over shared wi-fi networks across the globe in Eduroam enabled campuses.

Network implemented at:
- Delhi University (4000 nodes)
- IIT Madras (6000 nodes)
- Annamalai University (2400 nodes)
- JNU (1300 nodes)
- Allahabad University (2400 nodes)
- Jamia Millia Islamia (750 nodes)
- Rajasthan university (1600 nodes)
- Kashmir University, Arunachal University
- NIPER, UGC, Manipur University
- IIITMG, NUJS

Under implementation:
- NIFTEM for 1400
LAN Essentials

- Wired LAN
- Gigabit switch redundancy
- CAT6 cabling

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
<th>Cost (In Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Router (Gbps capability)</td>
<td>1</td>
<td>500000</td>
</tr>
<tr>
<td>Gigabit Switch (For HA 1+1 Redundancy)</td>
<td>2</td>
<td>650000</td>
</tr>
<tr>
<td>Switch 24 port with Fiber Uplink</td>
<td>20</td>
<td>2500000</td>
</tr>
<tr>
<td>UTP Cat6</td>
<td>400 Nodes</td>
<td>1400000</td>
</tr>
<tr>
<td>Fiber (7.5 Kms)</td>
<td>7.5 Kms</td>
<td>1500000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>6550000</strong></td>
</tr>
</tbody>
</table>
Thank you
dg@eis.ernet.in
Agenda for 28th meeting of Project Approval Board (PAB) of National Mission on Education through ICT (NMEICT)

Date: 26th June 2014
Proposal to make the BSNL Agreement of 1 Gbps Connectivity Coterminous with NKN.

• The proposal was discussed in the meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the proposal.

• The above proposal to make the BSNL Agreement of 1 Gbps Connectivity Coterminous with NKN is placed before the PAB of NMEICT for consideration and its approval.
Empanelment of Government Undertakings and State IT Organizations for installing LANs at Universities.

• The proposal was discussed in the Meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the proposal.

• The above proposal of Empanelment of Government undertakings and State IT Organizations for installing LANs at Universities is placed before the PAB of NMEICT for consideration and its approval.
Pilot on LAN for Universities.

• The proposal was discussed in the meeting of the Implementation-cum- Monitoring Committee of NMEICT on dated 16.06.2014; the committee has recommended the proposal.

• The above proposal of Pilot on LAN for Universities is placed before the PAB of NMEICT for consideration and its approval and release of Rs. 2.52 Crore to M/s NIC.
LAN Funding to NKN Universities and Institutions

• The proposal was discussed in the meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the proposal.

• The above proposal of providing LAN funding of Rs. 38.1 Crores to 127 Universities and Institutions connected under NKN is placed before the PAB of NMEICT for consideration and its approval.
Creation of Common Computing Infrastructure (Release of 2nd Installment).

The proposal was discussed in the Meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the release of Second Installment of Rs. 12.0 crores for the project. The committee has also recommended that “Rack Space Charges” of Rs. 6.6 crores for three years to NIC should also be paid from the second installment due to the project. Prof. Huzoor Saran, IIT Delhi and PI of the Project has also agreed for the same.

The following are put before PAB for consideration and approval:

Release of Second Instalment of Rs. 12.00 Crores of the Project “Creation of Common Computing Infrastructure”.

Permit BSNL to provide 10 Gbps Connectivity between NMEICT Data Centre and NKN central node from the fund released for providing Connectivity to Universities till Dec, 2019.
Providing 1+1 Redundancy to all Centrally Funded Institutions in North East and J & K States.

• The proposal was discussed in the Meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the proposal.

• The above proposal of providing 1+1 redundancy to all Centrally Funded Institutions in North East and J & K States at a cost of Rs. 13.8 Crores with NIC as Implementing Agency is placed before the PAB of NMEICT for consideration and its approval.
NKN/ NMEICT Direct Peering with Google.

• The proposal was discussed in the meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the committee has recommended the proposal. As recommended by the committee, the proposal has been made coterminous with NKN.

• The above proposal of NKN/ NMEICT Direct Peering with Google at a cost of Rs. 7.272 crores with NIC as implementing agency is placed before the PAB of NMEICT for consideration and its approval.
Special Permission to NIT Sikkim for 1 Gbps Connectivity.

- The proposal was discussed in the meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the Committee has recommended the proposal.

- The above proposal of special permission to make OFC Ring of 1 Gbps Connectivity provided under NMEICT to NIT Sikkim at a cost of Rs. 291.527 lakhs (Rs. Two Crore Ninety One Lakh Fifty Two Thousand Seven Hundred only) is placed before the PAB of NMEICT for consideration and its approval.
1 Gbps Connectivity to the New Private Universities.

• The proposal was discussed in the Meeting of the Implementation-cum-Monitoring Committee of NMEICT on dated 16.06.2014; the committee has recommended the proposal. The committee has also recommended that connectivity to all Government/State Universities and Centrally Funded Institutions may be provided under NKN. The Connectivity to the New Private Universities/University Level Institutions may be provided under NMEICT.

• Accordingly the above proposal of providing 1 Gbps Connectivity to the New Private University/University Level Institutions under NMEICT at a cost of Rs. 91.8 Crores (Rs. Ninety Crore Eighty lakhs only) is placed before the PAB for consideration and its approval.
Develop an Online Joint Entrance Examination (Main)(JEE) Item Bank to Prepare Candidates for Developing the Skills that Underpin Performance on the JEE (Main) Construct.

• PAB may consider approval of the Project for 2 years with a Total Budget of Rs. 1.23 Crore as recommended by KPMG after Financial Due Diligence.
Consulting work for preparing a Project Report for Creation of “Virtual University” in PPP model and draft “Virtual University Bill” for enactment by Parliament.

PAB may consider and approve for award of the Consulting Work for preparing a Detailed Project Report for Creation of Virtual University in PPP model and draft “Virtual University Bill” for enactment by Parliament with 3 deliverables mentioned above within 6 months, to M/s Ernst & Young at the total cost of Rs. 24.9 lakhs (including Out of Pocket Expenses) + Service Tax, with payment schedule agreed as above.
Consulting work for Review and Amendment of applicable UGC/AICTE Regulations for incorporating Technology Enabled Learning in Higher Education.

PAB may consider and approve for award of the Consulting Work for Review and Amendment of applicable UGC/AICTE Regulations for incorporating Technology Enabled Learning in Higher Education, to M/s Abacus Legal Group Advocates at the total cost of Rs. 9 lakhs, with 20% Mobilisation Advance on award of the work and remaining 80% after satisfactory receipt of 2 Deliverables.
Setting up and Providing VPN Connectivity to 200 ITIs under Director General, Employment and Training (DGET) Ministry of Labour and Employment (ML&E) Government of India.

• PAB may consider approval for setting up and providing:

• VPN Connectivity to 200 ITI’s under DGET, ML&E upto March 31, 2017.

• The financial implication of the Project is Rs. 4.00 Crore.
Office Space for Mission Secretariat NMEICT.

- Submitted for perusal and kind consideration of the PAB.
The Budget proposed for the year 2014-15 for the TSG-EdCIL & Mission Secretariat of NMEICT is well within the overall ceiling of 1% of the total outlay fixed for the Project.

The Project Approval Board (PAB) is requested to consider and approve “Budget Estimate” of `399.92 lakhs for the Mission Secretariat for the year 2014-15 and consider to release the 1st installment of `199.96 lakhs (being 50% of the total Budget) after adjusting the unspent amount available with EdCIL.
Table Agenda
Thank You
Development of National Digital Library of India

Towards Building a National Asset

Initial Concept Developed by Indian Institute of Technology Kharagpur. Pilot Phase proposed to be carried out by a Consortium of CFTIs, Central Universities, Colleges and Schools

Presented by
Prof. PARTHA PRATIM CHAKRABARTI
Director
Indian Institute of Technology, Kharagpur
A National Digital Library is a national asset that is a key driving force for its education, research, innovation and knowledge economy.

National Digital Library will cover the gaps that exist in the wide range from literacy to advanced knowledge discovery and development of scientific knowledge.

It will also enable integrated knowledge gathering on diverse topics on core issues from economic, strategic and social sectors.
Growth of Schools & Higher Learning Institutions in India

There are 1,24,500 secondary schools and over 11 Lakh elementary schools
[Source: MHRD – NISG Report]

There are 659 Universities, 33,023 colleges and 11356 Stand Alone Institutions
[Source: FICCI HE Summit 2012]
Education market growth in India

- In India education market growth is estimated to be US$ 135 billion by 2020, of which the e-learning market alone will constitute US$ 7 billion.
  [Source: Ernst & Young]

Drivers of the Growth

- Huge growing student base
- Lack of quality e-content in various digital forms and formats
- Poor quality of connectivity due to lack of infrastructure
Challenges faced by the users or students

1. Users have to visit individual websites to access e-resources

2. Users need to learn retrieval techniques / search techniques separately as different Digital Library (DL) follows different DL software (DL software employs different text retrieval engines like Solr, MGPP, Lucene, Zebra etc)

3. Few e-Learning environments are available for the students and teachers that access information from all available sources

4. Non integration of learner-learner, teacher-teacher and teacher-learner communication tools within learning environment

5. Learning resources are generally outside the integrated learning environment
Challenges faced by the users or students

6. Distance mode of learning in India is helping mainly to increase learner-base not the knowledge base as effectively as needed

7. In most of the cases user interfaces are not interactive, collaborative and participative

8. Single window search facility is not available for accessing all available digital resources

9. For differently abled learners few mechanisms are available

10. Knowledge Repository on various subjects are not yet available for scholars
### Some Digital Library Related Initiatives

<table>
<thead>
<tr>
<th>National</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMEICT, NPTEL</td>
<td>MIT Open Courseware</td>
</tr>
<tr>
<td>NISCAIR</td>
<td>Hathi Trust Digital Library</td>
</tr>
<tr>
<td>Million Book Project (DL of India)</td>
<td>Project Gutenberg</td>
</tr>
<tr>
<td>IG Centre for the Arts</td>
<td>Alexandria DL, California DL</td>
</tr>
<tr>
<td>National Mission on Libraries</td>
<td>Networked DL of Thesis</td>
</tr>
<tr>
<td>INFLIBNET</td>
<td>Library of Congress</td>
</tr>
<tr>
<td>MUKTBODHA</td>
<td>National Science DL</td>
</tr>
<tr>
<td>Traditional Knowledge DL</td>
<td>Digital Public Library of America</td>
</tr>
<tr>
<td>NCERT</td>
<td>Electronic Library of UK</td>
</tr>
<tr>
<td>Other Databases</td>
<td>DL programme of Europe</td>
</tr>
<tr>
<td></td>
<td>Others in Asia &amp; Australia</td>
</tr>
</tbody>
</table>
Major Gaps

1. Total number of classrooms in India - 4Mn, out of which 0.15Mn is having some or little facility of ICT and e-contents.

2. 95% of the colleges still do not have basic amenities
   [Source: Rothin Bhattacharya]

3. Many remote colleges do not have e-Learning contents or access infrastructure

4. Lack of single point of reference for integrated digital contents for variety of user groups

5. Suitable reading contents in Vernacular medium absent.

6. Content needs to be converted to suitable format due to technology shift.

7. Technology needs to be developed for differently abled learners.
Solution: Intensive use of technology

1. The Indian higher education system has undergone massive expansion to become the largest in the world enrolling over 70 million students.

2. Such expansion would have been unimaginable without the extensive use of ICT tools.

3. If India needs to build physical infrastructure then, it would have to build 6 universities and 270 colleges each and every month in the next 20 years.

4. MOOCs model (massive open online courses) makes it possible for the country to provide a quality education to the masses despite less faculty-student ratios.

5. MOOCs is an online course aimed at unlimited participation and open access via the web / Mobile Devices. MOOCs provide interactive user forums that help build a community for students, teachers, and teaching assistants.
Possible ways to address the above Gap

1. ICT and e-contents @Schools, @Universities, @Colleges will help us to minimize this gap.

2. Collaborative e-Learning Framework needs to be implemented where all the stakeholders work together in the learning phase.

3. Self Based Learning Framework (SBLF) will be the next most important learning phenomena therefore Digital Library access is required for self based learning

4. Tablet & mobile devices will also play a major role in SBLF.

5. New apps will be designed and developed for accessing e-contents from proposed National Digital Library

6. Many Entrepreneurs will participate in this project in future to design and develop application software for providing value added services.
NDL – Services to “The Nation & World Wide”

Search Services
- Classified Search
- Subject Based Search
- Full Text Search
- Ranked Based Search
  - Area of R & D

Community Service
- Every reader his [or her] eBook/ Information
- S R Ranganathan 2nd Law of library science
- Research Scholars
- University Students
- College Students
- School Students
- Teachers
- Professionals, etc.
- General Users

Plug & Play Apps
- Apps for Differently abled users
- Mobile Apps
- Search Apps

External Services
- DDS (Document Delivery Service)
- Union Catalog

Integration with E Learning Environment

NDL Content Repository

Storage & Backup Replication
Objectives

1. Integration of access and creation of Digital content across educational institutions of the nation.

2. Creation of a 24X7-enabled Infrastructure for NDL. The Infrastructure will include hardware systems, networks, software tools, applications and interoperability standards.

3. Facilitate select institutes to disseminate existing content and create new content.

4. Provide support for immersive E-learning environments at multiple levels.

5. NDL is envisaged to span across all academic levels, all disciplines and all languages (vernacular) used as medium of instruction. Support for differently abled users will be provided.
Target Users

1. School Children
2. College Students
3. University Library Users
4. Higher technical education Library users
5. Legal Community Users
6. Life-long learners
Target Range of Contents

- PhD Thesis
- DSc Thesis
- M Tech Diss
- B Tech Diss
- Research Projects
- Class Note
- Lecture - PPT - PDF
- Laboratory Experiment
- Faculty Publications
- Open Access Journals & E-Books & Subscribed E Resource
- Annual Reports
- Project Reports
- Convocations
- Working Papers
- Others
- Encyclopedias
- Dictionaries
- Directories Others
- Courseware of Schools / Colleges / Central Universities
- Question Banks, Model Answers, Linkages to Course Material
- Audio & Video Content
- Contributing Institutes Institutional Digital Repository

-IITs / NITs / Central University / Schools KVS, JNV etc
Roles & Responsibilities

1. Host Institute:
   • Principal coordinator of the pilot project
   • Hardware Configuration, Software installation & Configuration
   • Software development, Apps Development for differently abled users
   • Software development for creation of E Learning environment
   • Assistance in Infrastructure Development for the Contributing Institutions for content creations
   • Metadata Harvesting from IDR$s
   • Support Services to the Contributing & Participating institutes
   • Co-ordination for course content creation
Roles & Responsibilities

2. Contributing Institute:
   - Content Contributor and Consumer
   - IDR Development & Maintenance
   - Ensure each faculty member submits or uploads information on preprint / post print article in their IDR within 3 months of its publication
   - Uploading the local content for NDL
   - Reporting to NDL co-ordinator
   - Provide base URL of the IDR Server for Metadata Harvesting

3. Participating Institute:
   - Content Consumer
   - Feedback
Host, Contributing & Participating Institutions

Central Harvesting Server

Co-ordinating Host Institution NDL @IIT Kharagpur

Contributing Institute's
- Existing Contents of IDR Developed by various Institutions / DL Projects
- Contents from Contributing Institute's IDR

Participating Institutions
Host Institution

- NDL IIT Kharagpur

Contributing & Participating Institution List

- INFLIBNET
- Old IITs – 7
- IISc Bangalore – 1
- IIMs – 5
- NIITs – 10
- IISER – 5
- Central Universities – 42
- Law School – 5
- Medical Colleges – 5
- Schools from KVS
- Schools from NVS
- Non-MHRD Institutions (Min of Law, Min of Culture, ISI, etc)
NDL – 3 Tier Architecture

Tier: 1
Infrastructure

Data Center
Firewall
Harvesting Server
Content Delivery Server
Storage

Tier: 2
Applications

Ranking Services
Digital Library Resource Finder
Learning Support Services
Feedback
LMS
Content Delivery Services
Plug-In Services

Content Delivery Portal
E Learning Portal
Digital Library Resource Portal

Tier: 3
End User Application

Browser
Differently Abled User Apps
Protocol for Metadata Harvesting from various IDRs

Higher Learning Institutions
- IDR @ IITs
- IDR @ NITs
- IDR @ CU
- IDR @ Law Schools
- IDR @ Medical Colleges
- IDR @ Managament
- IDR @ KVS
- IDR @ NVS

Navodaya Vidyalaya Samiti
Kendriya Vidyalaya Sangathans
Other School Boards

IDR @ DL Projects

Existing IDR
New Developed IDR

OAI-PMH Protocol
Dublin-Core
Metadata Format

Central Harvesting Server
@NDL IIT KGP

Community Access
- Research Scholars
- University Students
- College Students
- School Students
- Teachers
- Law & Medicine Professionals
- Life-long Learners
- General Users

Device Access
- PC
- Tablets
- Laptops
- Mobiles
- Etc

Content Delivery Server
@NDL IIT KGP
Hardware Architecture for NDL

Host Institute @ IITKGP

Backup Server
Harvesting Server
Content DB
Content Delivery Server
Main Node
Hadoop Nodes
Back Office Server

N/W Cloud & Internet

IDR Server
Contributing Institute

Internet

User PC
Participating Institute
Methodology

1. Identification of learning objects on global scale;

2. Selection of contributing and participating Institutes at various level.

3. Detailing of Hardware Architecture

4. Development of a composite Software Architecture (digital archive to store learning objects, Learning Content Management System (LCMS) to provide teaching-learning-evaluation functionalities, Search and retrieval layer with Indio-script-enabled user interface)

5. Selection and creation of course contents for school and higher education students

6. Selection of learning objects and incorporation of metadata (SCORM-compliant domain-specific metadata schema will be used for the purpose)

7. Testing and debugging of NDL.
Project Plan

The whole project will be divided into 3 phases. Initially a Pilot Project is proposed.

Phase -1: Pilot Project initiated by IIT Kharagpur in collaboration with some other selected CFTIs including IITs, NITs, Central University libraries, Schools libraries, Legal Libraries and INFLIBNET (This Pilot project is estimated to cost Rs 100 crores. The Pilot project will be for three years)

Phase -2: Centrally Initiated implementation, which will cover all CFTI libraries

Phase -3: State Initiated Implementation, which will cover all state funded university, college and school Libraries.
Implementing Phase – 1: The Pilot Project

Step 1: Course contents creation by subject experts for schools and higher education students

Step 2: Metadata Harvesting from Existing Digital Repositories in India

Step 3: Development of New Institutional Digital Repository (IDR)

Step 4: Development of Central Indexing and Resource Discovery Server

Step 5: Development of Access Mechanism

Step 6: Development of Collaborative E-Learning Framework

Step 7: Development of Knowledge Discovery Framework (KDF)

Step 8: Development of differently-abled and Immersive Learning Projects

Step 9: Specialized e-learning Verticals
# Development of National Digital Library of India

## Project Plan (Duration 3 Years)

| SNo | Task                                                                 | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|-----|----------------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1   | Core Team & Staff Recruitment                                       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2   | Workshop and Training                                               |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 3   | Infrastructure Development for Host Institute                       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|     | a) Hardware & Software Purchase                                     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|     | b) Hardware & Software installation                                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|     | c) Software Development, Configuration, Metadata preparation        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|     | d) Testing & Launch                                                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 4   | Infrastructure development for Contributing Institutions            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 5   | Training and Workshop for the Participating Institutes, Rural Schools and Colleges |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 6   | Course Content Development by Contributing Institutes               |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 7   | Uploading Course Content by Contributing Institutes                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 8   | Uploading Course Contents to Access                                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 9   | Live Access                                                         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
## Budget Proposal for NDL

### Nature of Expenditure / Item (Brief Descriptions)

<table>
<thead>
<tr>
<th>Nature of Expenditure / Item (Brief Descriptions)</th>
<th>Budget in Crore</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Equipment at National Digital Library @IIT Kharagpur</strong></td>
<td></td>
</tr>
<tr>
<td>Metadata Harvesting Server</td>
<td>Yr 1</td>
</tr>
<tr>
<td>Content Delivery Server</td>
<td>0.40</td>
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<tr>
<td>Backoffice Server</td>
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<tr>
<td>Backup Server</td>
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<tr>
<td>National Digital Library Center Setup</td>
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<tr>
<td>Office Infrastructure @ Host</td>
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<tr>
<td>Aakash Tablet for Testing &amp; Debugging</td>
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<tr>
<td>Software</td>
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<tr>
<td>Web - Scale Discovery Service</td>
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<tr>
<td><strong>B) Equipment Requirements at Contributing 100 Institutions</strong></td>
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<tr>
<td>IDR Server (for Content Development &amp; Storage)</td>
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<tr>
<td>Office Infrastructure @ Contributing Institute</td>
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<td>Software</td>
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<td><strong>C) Infrastructure Development for Participating Institutions</strong></td>
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<td>Computer Infrastructure</td>
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<td><strong>D) Infrastructure Development for Setting-up of Video Recording Room</strong></td>
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<td>Video Recording &amp; Lecture Room</td>
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<td><strong>E) Manpower Requirement at NDL @IIT Kharagpur</strong></td>
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<tr>
<td>Staff Man-power</td>
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<tr>
<td>Consultants</td>
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<tr>
<td><strong>F) Manpower Requirement at Contributing Institution</strong></td>
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<td>Staff Man-power</td>
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<tr>
<td><strong>G) Open Access E-learning Content Development</strong></td>
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<tr>
<td>600 Course Content Development for Colleges / University</td>
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<tr>
<td>300 Course Content Development for Schools</td>
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<tr>
<td><strong>H) Technical Training for Contributing Institutions</strong></td>
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<td>Technical Training</td>
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<tr>
<td><strong>I) Workshop / Conference (6 Workshops in 3 Yrs)</strong></td>
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<td>Technical Training</td>
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<td><strong>J) Travelling</strong></td>
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<td><strong>K) Consumable Items</strong></td>
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<td><strong>L) Honorarium to Core Team</strong></td>
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<td><strong>M) Contingency</strong></td>
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<td>Technical Training</td>
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<td><strong>N) Fees for Consultants</strong></td>
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<td><strong>O) Subscription to E-Resources based on requirements</strong></td>
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<td>Technical Training</td>
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<tr>
<td><strong>Grand Total</strong></td>
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Thank you