National Mission on Education through ICT

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Teacher Training Programme
Amravati
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Outline

- Introduction
- National Mission on Education through ICT
  - What is it? How to participate in it?
- IIT Bombay's participation in National Mission on Education
- How Amravati can help spread the mission in Central India
- Conclusion

Objectives

- To give an overview
- To give a feel for the National Mission on Education through ICT
- To give a feel for what is happening at IIT Bombay
- To help bring out new ideas
- To help participate in the national mission

National Mission on Education through ICT

- Launched by the Ministry of Human Resources Development (MHRD), Government of India
- Objective: to raise the levels of education in India
- Outlay: Rs. 4,600 crore over three years
- 40% for content generation
- 60% for bandwidth
  - To give 1 GBPS bandwidth to everyone of 30,000 colleges
  - Out of these, 3,000 are engineering colleges: 5% government run, rest private
- Largest and most ambitious plan
- Likely to continue in the next plan period

Content generation: Line items

1. NPTEL phase II / III
2. PG Classes
3. UG Classes
4. Video content digitization, conversion, chunking and dubbing CEC / IGNOU / NCERT / SIET / OTHERS
5. Provision of e-books and e-journals free to the learners
6. Standardisation of quality assurance of contents & certification / automation of certification
7. Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning
8. Development of language converter and translation tool kit
9. Development and realization of Virtual Reality Laboratories and supporting facilities for e-learning
10. Development of Certification & Testing Modules for Virtual Technological Universities & creation of VTU, multi media research and international programmes

Content generation: Line items - continued

11. Experimentation and Development of ultra low cost access devices for wider coverage of learners & their field trials
12. Talk to a teacher to provide a substitute for coaching for the economically poor students
13. Development of software controlled hardware programming for robotics & other crucial areas
14. Adaptation & deployment of open source simulation packages equivalent to MATLAB, ORCAD etc.
15. Development of unified ERP system for Educational Institutions
16. Publicity & training of motivators & trainers to ensure full utilization of the systems by institutions & students. Teacher Empowerment 'B'
17. Conversion of available content in various regional languages
18. Development of Vocational Educational modules and use of haptic devices for education & training

Minimum requirement for funding

Necessary conditions for a project to be funded by this mission:

- It should be related to education - for research, other funding sources are available
- It should be inter-institutional
- Any material developed through this mission has to be delivered as open source
- It should belong to one of the 18 line items mentioned earlier

Administration of Mission

- Mission Director
  - Mr. N. K. Sinha, Joint Secretary, Distance Learning/training
  - We must be the first country to have such a high level position for distance education
  - Great administrator, also large at heart
- Administrative structure
  - Project approval board, chaired by the Secretary of MHRD
  - Steering committee, chaired by Mission Director. Recommends projects.
  - Review committees
- Internet: project submission, review, etc. online, www.sakshat.ac.in

Procedure to get funding

- Submit a project and also a pilot for 6 months
- Project reviewed
  - Inputs from steering committee members and other experts
  - Pilot project is recommended as stand-alone
  - Asked to participate in one of the already approved missions
  - In the worst case, asked to re-write the proposal
- After a successful completion of the pilot project, the project is approved

National Education Mission at IIT Bombay

- Empowerment of students and teachers through synchronous education
  - Making available IIT Bombay's courses and methodologies to outside world, through CDEEP
  - Empowerment of teachers
- Open source software effort
  - Python, Blender, LaTeX for Indian languages, Scilab
- Robot enhanced teaching of subjects in engineering colleges
- Virtual labs
- National programme on technology enhanced learning (NPTEL)

Talk to a Teacher: Synchronous Education Effort

- IIT Bombay leads this mission
- Partners are
  - Amrita university
  - Dayalbagh Educational Institute, a deemed university
  - IIIT Allahabad

Robotics

- ATmega16 based
- Line sensor, speed sensor, proximity sensor, wireless
- Teach many courses using it
  - Embedded systems
  - Signal processing
  - Instrumentation
  - Control
  - Kinematics, dynamics
  - Real time systems
- Documentation, course material, etc.
- Costs Rs. 15,000. But can be made available to interested colleges, funding from the Mission.

Virtual Labs

- Distance education through satellite, etc. do not cover laboratory
- Establish the labs at select locations
- Web enable these experiments
- Give internet access
- IIT Bombay is in the process of establishing about 10 experiments
  - Student satellite project
  - Bioreactor
  - Power distribution balancing
  - Control experiments

Why Open Source Software?

- Expensive
- Possibly cheap, even free (?) for students
- Students use commercial software in colleges
- Commercial software is not available at small and medium companies - cost
- Use of unauthorised software by commercial establishments result in disasters - companies may even have to close down - jail sentence, etc.
- Most of SME's in India do not use ANY software: commercial software is expensive; they are not aware of open source software
- Puts small companies at a great disadvantage
- There is no alternative to open source software
- What is required is good documentation: spoken tutorials

Spoken tutorials

- It is also known as screencast
- Spoken tutorial refers to explaining a computer based activity, along with a live demonstration of it in parallel.
- The tutorial captures the changes in the screen in the form of a movie, along with a running commentary of it by an expert.
- The spoken tutorial can be used to explain the steps involved in carrying out an activity, such as using some software.
- The spoken tutorial is light weight: it requires about one mega byte per minute of recording. Recently, successful with 0.5 mega byte as well.
- This is much smaller than video recording.

Procedure to create spoken tutorials

- The software that one wants to explain through the tutorial
- Construction of one or more examples or cases that will help demonstrate the above software
- A script that pins down the sequence of activities and the accompanying explanation
- Screencast software: A software that captures the activities on the screen in the form of a video, along with a voice.
- An editing program that can be used to trim and polish up the video file obtained in the previous step
- Software for voice suppression, dubbing in other languages
- See a screencast of video cam studio

Pedagogical benefits

- Combination of cursor movements and clicks, along with spoken explanation helps students understand the steps quickly.
- Changes in display due to a command. The benefits of a picture over words is well known.
- The student can pause, rewind and play again to understand new and difficult concepts.
- If all the items used (software, text files, images, etc.) are available for download, the student can try the target software in parallel.
- Effort is a lot less compared to any other document creation. Calculate: 5 changes per minute will be 50 frames in a 10 minute tutorial
- All steps involved in a process get automatically explained, as the spoken tutorial is the transcript of an actual session.

Socioeconomic benefits of spoken tutorials

- The main advantage of a spoken tutorial over a video recording is the size of the file: about 1 MB per minute. Benefits:
  - small storage - in one CD, can pack ten to twenty hours of spoken tutorial
  - small bandwidth for streaming - e.g. through mobile phones
- The infrastructure required to create a spoken tutorial is inexpensive.
  - Only a head phone with audio input is the additional hardware that is required.
  - We have found that even inexpensive head phones, costing about Rs. 200 give excellent results.
  - Screen capture software is either free or low cost on all three platforms: windows, linux, Mac OS X.
- Low cost of creating the tutorial empowers everyone, including school students to participate in *creation* of spoken tutorials.
- Hear a college student talk about Scilab

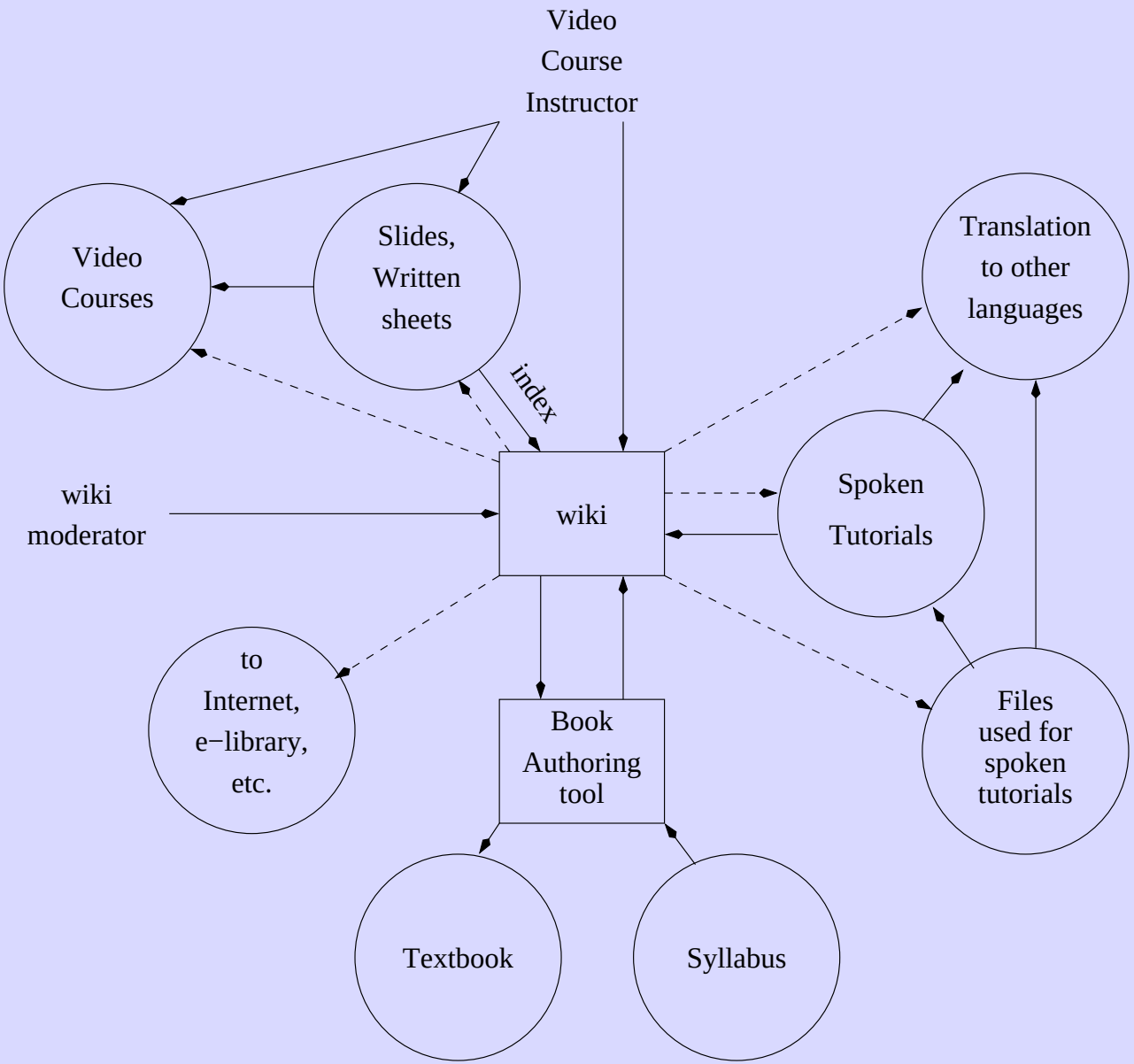
Socioeconomic benefits - Other languages

- Spoken tutorials may be delivered in languages other than English, even if all the communication on the computer screen take place in English: the running commentary can be in a local language.
- Listen to an Excel tutorial in English
- Listen to the same tutorial in Hindi
- It has a capability to empower many people, including students in villages, to participate in content development.
- These could be original content creation or translation of a good tutorial from some other language.
- Thus, this has the potential to reduce the digital divide between people who live in the country side and the residents of cities.

CDEEP

- Centre for Distance Engineering Education Programme
- Formed to disseminate IIT Bombay's courses (live and recorded) to
  - Students/faculty of colleges
  - Working professionals
- CDEEP has been transmitting live IIT Bombay's courses for close to a decade
- CDEEP has a total of more than 100 complete video courses (100x40 = 4,000 hours)
- We have received funds through the talk to a teacher mission to release all the courses as open source

Immediate Plans: Converting IIT Bombay's Video Courses



How can Amravati Participate?

- Write proposals and get funding; carry out independent work
- Participate in all our missions
- Being central, has the potential to spread to the entire central India
- More ideas in the other talks and in panel discussion

Conclusions

- National Mission on Education through ICT is an ambitious effort
- Aims to transform the education system, teachers and students
- The mission invites the faculty members of Sant Gadgebaba Amravati University to participate in it
- IIT Bombay is keen to establish ties, through its missions

Conclusions - Continued

- This approach, coupled with structural changes, will result in the quality of students from all engineering colleges going up
- India will become a hub of education for the entire world
- This will be a growth engine for Indian industry
- Higher quality of engineers will also result in better inputs for R&D institutions, improving the levels of research as well
- Most importantly, our children will have better childhood

Thank you