Ministry of Human Resource Development
Department of Higher Education

MOOCs Costing Committee, Report
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Draft Report of the Costing Committee towards assessment of costing form re-appropriation, design, development and operations of MOOCs.

Report by Prof. K. Mangala Sunder, IIT Madras, Chairman of the Committee.

The Committee was constituted by the Ministry of HRD vide Ref. F. No. 8-1/2015-TEL dated Jan 12, 2015 and the order was communicated to the members on Jan 22, 2015. Subsequently the Committee met on three days, Jan 2, 2015, Feb 5, 2015 and March 10, 2015. The summary of observations and recommendations of the Committee are given below.

The Terms of Reference of the committee have been stated in the MHRD communication. The Committee reviewed the processes and the cost for content that can be re-purposed out of the existing digital courses, design and development by some of the agencies. The Committee also proposed revised estimates for new MOOCs.

1. Prof. Rajbir Singh informed that CEC has developed more than 7000 e-content modules in 20 Subjects at the UG level, which would be converted into MOOC's. Other resources from CEC can also be used to supplement them as is necessary.

2. Prof. Mangala Sunder mentioned that while 890 science, engineering, technology and humanities course contents have been made available through the NPTEL website, thanks to support by MHRD through two phases of content development, about half of them have full, recorded videos for about 450 courses as 18000 plus 45 min-60 min videos and can be used within a short time for redesigning and repurposing learning using MOOC.

3. The Committee was briefed that a meeting was held on February 19, 2015, under chairpersonship of Dr. Satbir Bedi, JS (SE-II) at MHRD, to discuss preparation of Massive Open On-line Courses (MOOCs) for IX to XII Classes under Arts, Science, Commerce and Vocational Streams in School sector. It was agreed that the budget requirement can be made specific subject to the broad recommendations of this sub-Committee. The same was agreed upon by the NCERT Director.

4. Prof. Sadhana Parashar, CBSE informed that 800 videos have been prepared in Mathematics, Physics and Chemistry under UDAAN program meant exclusively for girls. CBSE has established around 60 virtual classrooms across the country for delivery of live lectures on Saturdays and Sundays. CBSE has released the list of all videos they have recorded so far and also have agreed to make them accessible by adding assessment and online quiz/examination under SWAYAM platform.

5. Prof. Rajaram Sharma, informed that NCERT has developed 3000 videos/modules of 15 to 45 minute duration in 12 subject areas for Class XI and XII meant for students and teachers in recent past spanning science, humanities and commerce. These are to be examined from the point of view of repurposing the content by the members towards effort-assessment and also looking into areas of overlapping of contents of CBSE and NCERT. For this purpose additional modules developed by NCERT and published already under NROER (National Repository of Open Educational Resources) would be used.

6. Prof. T. V. Prabhakar, IIT Kanpur explained the concepts and details of MOOCs programme. He identified the basic components of MOOCs as:
   a. Meta Component (course & learning objectives and the outcomes expected)
   b. Open Educational Resources (OERs) created for the courses or adopted from existing resources
   c. Discussion forums and active participation by learners during the course period (leading to partially synchronized learning process) and
   d. Assessment & certification either through proctored means (preferred) or honour code.

   Thus all MOOCs must strive to achieve a balanced learning process based on the above.

7. The Committee also agreed that these components must be required and integrated for every course submitted for public use under SWAYAM. The Committee therefore deliberated and recommended as under:

   a. The Project Advisory Board (PAB) under the National Mission on Education through Information and Communication Technology (NMEICT) has previously approved cost of e-content production (in four quadrants & with text transcription) of about one course of 40-hour duration at an approximate cost of Rs. 12.4 Lakhs. NPTEL team has been conducting 30 MOOCs courses so far, and has given a detailed budget for each course containing about twenty hours of video contents inclusive of additional and supplementary learning materials. The budget for NPTEL is Rs. 12 lakhs currently, requiring a slight revision, for each MOOC with an active student registration of 1000 students and participation in discussion forums by about 10 percent of them. The Committee felt that these figures are sustainable, cost effective and can be used as initial guidelines for institutions offering 100 or more courses within the next one or two years. If more students register, more teaching assistants and mentor faculties would be involved and the cost would go up due to payment of honoraria to them. Pro-rating is possible for increased enrollment at about Rs. 2 lakhs for every 1000 additional students with about 300-400 students associated with two TAs and one mentor. A marginally higher allocation can be considered per course for institutions offering fewer courses (up to about 25 percent more) upon justification by the PIs and recommended by the Domain Experts Committee (DEC).

   b. For rerunning MOOCs courses in subsequent semesters the cost would merely include TA and faculty support for three months each time the course is rerun. The cost for running the course shall be Rs. 3.5 lakhs; it includes an honorarium of Rs. 1.0 lakh for one faculty member and Rs. 1.5 lakhs for five TAs (Rs. 10,000 per TA per month). The other cost includes staff support for running the programme for a period of four months from registration to issue of certificates, and contingent expenses.

   c. The budget proposed for repurposing of existing content of for hours per course into MOOCs format of 20 hours for each course varies depending upon the efforts involved. However, in comparison with development of new MOOCs, repurposing of existing e-content to MOOCs could be between Rs. 5.0 – Rs. 7.0 lakhs per course Based on the costing details available, Rs. 6.0 lakhs per course in its first offering is recommended. Subsequent re-runs will be as per item b immediately above. Detailed budget estimates indicated by IIT Bombay, IIM Bangalore, IIT Delhi and IIT Kanpur, have been used in arriving at this number.

   d. Repurposing costs are estimated to be about half of that of one MOOC. Thus about Rs. 12 lakhs would be expected to be the maximum required for each NPTEL course of forty one

hour lectures being redesigned to create two MOOCs courses with additional assignments and TAs and Mentor participation. Similarly, CEC e-content courseware may be repurposed at the rate of Rs. 6 lakhs per MOOC as a maximum. (CEC courses have a video recording of thirty minutes each). The cost of hardware and software tools for development of MOOCs content has already been included in the budget of MOOC content development provided earlier and are within the purview of the overall MOOCs committee constituted by MHRD already.

e. Besides content repurposing, honorarium proposed for TAs at the rate of 300-400 registrants that requires work for a period of 2 to 3 months is recommended at Rs. 10,000/- per month per TA. This is included in the cost per course as above.

f. Honorarium for faculty towards a new MOOC course development and one-time delivery would be Rs. 3.5 lakhs. This is the PAB approved amount as in item 7. This includes Rs. 2.0 lakhs for content preparation nd final submission to MOOC platform. It was estimated that course assessment normally requires about three months of work by a faculty member per course. If faculty members run MOOC courses for which detailed contents were developed earlier and run earlier, the honorarium for running courses shall be Rs. 1.5 lakh per course. The faculty would be required to provide new assignments, tests and other support materials for their versions and also manage the discussion forum each time they run the MOOC.

g. Recently, MHRD has sanctioned and released the first installment of Rs. 50 crore as part of an approved budget to IIT Madras for setting up of 200+ Teaching Ends (that include multimedia studios) under DTH Program; these are likely to be ready in the next 6 to 8 months. The same infrastructure may then be used for development of MOOCs. Hence no additional investments on studio and other physical infrastructure need to be included in the present estimate.

h. Currently around 40 studios have been set up under NPTEL and CEC and the same may be used for MOOCs content preparation and delivery until the DTH approved studios are set up. Besides these studios there are also about 10 fully equipped studios under CBSE, NCERT and its State counterparts that may also be used for development of school and teacher MOOCs education content.

i. For peer reviewing of one MOOC course content completely, two reviewers would be assigned and it is suggested that their honoraria be fixed at Rs. 15,000/- for a full review of the course per reviewer.

j. Awareness through the conduct of a large number of workshops for coverage of courses and levels through SWAYAM and its potential through various media and web-enabled services is considered necessary. An estimate has been provided by NPTEL earlier and approved by the Ministry for three-day workshops for about 50 faculty members and the same figures may be adopted to start with. The budgetary requirement depends on the number of workshops that are required to be conducted. The average cost of the workshop for the proposed format is approximately Rs. 5 lakhs per workshop, including travel, boarding and lodging for 50 participants and is 25% upward from the cost proposed and approved in 2009.

8. The cost for final online, proctored examination varies from agency to agency and is also a function of the number of students taking the exam at any given time. **Online exams in centres supervised by faculty and technical staff of the centre are minimally needed for ensuring credibility of examinations. For a concurrent online enrollment in over 100 centres**

throughout the country with a minimum of 200 examinees per centre, a student fee of Rs. 600 per candidate per MOOC exam is estimated based on market rates for CBSE JEE Main and GATE online. The centre cost is usually fixed at this rate. Any decrease in the number of students will not change the center cost.

The Committee recommends that the PAB consider the process of an open tender for empaneling online evaluation service providers for a fixed time and for a minimum number of MOOC registrants. A list of such providers contacted by IIT Madras earlier for running its exams is given in an annexure.

9. The Committee recommends that between three to five workshops be held immediately in different regions for faculty and content developers and that a suitable budget be provided by the NMEICT. (Approximate estimate in Para 7. j). Mission ICT Director and Mission Senior Consultants may be involved in the conduct of these workshops.

10. The honorarium for faculty in CBSE and NCERT initiated programme must follow the norms set by them; however, in the discussion it was learnt that a sum of Rs. 1500 and a TA/DA Rs. 1000 are paid to faculty teachers who prepare content videos for 15 minutes, edit and provide and final version. Thus for a MOOC with about 30 – 40 minutes for each lesson, a sum of Rs. 4000 and a TA of Rs. 1000 shall be paid as a single component to the faculty team that develops a 30 minute MOOC video and that the edited and final versions of videos with quizzes and online exam papers (2 per each course by the faculty team for the course) be obtained as the final deliverable. CBSE and NCERT will determine the length and duration of each such course.

What are required outside of the content creation efforts?
1. **A server with adequate capacity to handle large number of concurrent users** and scalable with the number of users and number of course. Bandwidth cost is excluded; it is assumed that NKN would support network bandwidth.

Example: 1. IIT Madras running the MOOC on a cloud. Technical staff members and admin provide official response to non-subject queries (runs into thousands of them in any short period of two weeks before the course starts and till the course ends). Registration period is one month before the start of the course. End of the course is one month after the examination for enabling transfer of certificates and student data and analytics to the project team.

2. IIT Bombay is running its own cloud and with technical staff to protect the hardware and software integrity of the cloud. Other expenses include project staff support for uploading the content, responding to e-mail queries, requirements of online assessment details from students.

3. IIT Kanpur running both its own software development for the MOOCs and hardware for online course delivery.
The activities will be formally transferred to the SWAYAM once the hardware / software components are installed and tested for scalability.

Estimates based on current experience:

1. IITM needs 5-6 technical and admin staff team for four months and a lab for a concurrent launch of 20 to 25 MOOC courses. The human resource assistance will be at the rate of Rs. 2 lakhs per month for four months in terms of salaries. The total number of registrants IIT had for these courses was 95000 and now active learners are around 8-10 percent per course. This works out to about 3000 active learners on an average per course with about 300 per course appearing in the proctored examination.

For a larger number of concurrent active learners for a given course, admin and support staff will have to be scaled proportionately.

3. IIT Kanpur has its own servers and its own platform. Their admin cost is similar to the 10 percent per course experienced by the other Institutes.

Cost of examination proctoring is not included.

Course coordinator for a specific course will have to be available throughout the duration of the course.

Studio recording, technical and other support services will remain at the same level (Rs. 23,000 per half hour video with integrated frames for text, quiz, supplementary and all animations) as that of CEC, New Delhi, which the NMEICT PAB has earlier approved. This has already been used in arriving at the cost of Rs. 12. 4 lakhs for a new course.

TA Honorarium examples are:

1. 30 courses, 3000 active learners per course (300 per course writing final exam) (2 TAs per course, Rs. 15000 per month per TA Rs. 9 lakhs per month, Rs. 18 lakh per offering of 30 MOOC Courses.
2. 30 courses, 30,000 active learners per course (3000 per course writing final exam) 5 TAs per course, Rs. 15000 per month per TA, Rs. 22.5 lakhs per month, Rs. 45 lakhs per offering of the courses;
3. TAs do not necessarily scale linearly with the number of registrants.

The Committee noted that the MOOCs programme comprises of generation, conduct, delivery, assessment etc., wherein the following elements are required:

a. Development of e-content in 4 quadrants by the course oordinators.
b. To conduct interaction, seek feedback and engage in discussion forums with the learners on regular basis to be performed by the teaching assistants and mentors.
c. Lab simulations
d. Engage learners with a number of assignments & its evaluation by the teaching assistants.
e. To examine and assess learning progress of registered leaners by conducting proctored examinations at various locations.
f. Award of certificates issued by recognized Institution(s).

In the first instance the Committee recommends to use & re-purpose e-content produced in 4 quadrants under NMEICT programme for MOOCs. However, in some cases new content may also be required to be developed. For development of fresh content for the MOOCs the Committee recommends to follow rate on content development approved by the 27th Project Advisory Board (PAB) under the National Mission on Education through Information and Communication Technology (NMEICT) in its meeting held on 19th March 2014, as recommended in Para 7a above.

Executive Summery of the recommendations:

The Committee observed that on an average, a MOOC comprises of 20 Hours, applying the PAB approved rate a new MOOCs content of 20 Hours may be sanctioned content development charges of Rs.12.4 Lakhs.

P. Mangalasundy

The Committee recommends for repurposing e-Content already developed under NMEICT, into 20 hours of MOOCs, a sum of Rs. 6.0 lakhs may be sanctioned to an institution.

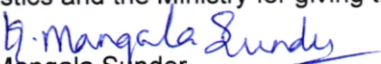A coordinator may be invited give no more than two MOOCs in any given academic year.

It is assumed that about 300-500 students will be associated with one TA and one Mentor during conduct of MOOCs. Honorarium proposed for TAs for interacting with 300-400 registrants that requires work for a period of 2 months is recommended Rs. 15,000/- per month per TA.

Mentor Honorarium (as per UGC NET qualified) shall be at half the rate of the fulltime NET fellowship (monthly salary, 3 months maximum per course for the duration of the course and not more than two courses per year, not exceeding Rs. 1.5 lakhs per course).

An institute launching 20 to 25 MOOC courses concurrently shall further need 5-6 technical and admin staff team for four months; for this, a sanction of Rs. 2 lakhs per month for four months is required as human resource cost in terms of their salaries.

Besides the above it is necessary to provide a MOOCs platform, server access and cloud network for effective handling of massive number of concurrent users likely to view content (that may comprising of Multimedia etc.). Viewers may like to benefit from such courses and the conduct of proctored examination for the registrants; the budget required for such services has not been included in the report, but needs to be kept in mind by the NMEICT Bureau.

The Chairman and the members thank the Secretarial staff of NMEICT for assisting and providing logistics and the Ministry for giving the opportunity to deliberate on online learning through MOOCs.

K. Mangala Sunder

Annexure 1

Tabular Summary of the Cost proposed**

Cost of a new course (with videos totaling 20 hours) + all quizzes, problem sets, solutions, text of the video in English	Rs 9.0 lakh	Cost includes video recording, editing, quizzes, answer keys, subject additional links, additional notes and transcript of the text of all videos.	
Coordinator honorarium for preparation	Rs. 2.0 lakh	One-time payment	
Cost for repurposing an existing course to provide a 20-hour summary for a MOOC offering	Rs. 6.0 lakhs	Cost covers re-recording, additional recording, aligning contents to chosen course deliverables and course outcomes, and adding quizzes and assignments	An existing NPTEL /UGC or other 40-hour course can be usually offered as two MOOC courses connected back-to-back for credit transfer with institutions.
Coordinator Honorarium	Rs. 1.0 lakh, one-time, or less depending on the extent of repurposing. (full payment for more than 40 percent restructuring)	Adhere to copyrights provisions (CC BY SA) if course contents of other faculty are used. Extent of revision must be approved by a committee constituted for subject revision assessment.	Course will be run under the name of content creator with the faculty offering the course as additional faculty.
Coordinator Honorarium for active running of course for three months	Rs. 1.5. lakh	Recurring cost. Every MOOC offering by the same or other faculty members who use course contents already available.	Teacher presence and monitoring of active learning needed until exams are conducted and certificates issues. Three-month participation.
TA / mentor hono-rarium (500 active registrants, one TA for two months), 5000-10,000 active registrants, 5 TAs	Rs. 0.3 lakh Rs. 1.5 lakh	TA numbers do not scale linearly. For a course having 10,000 to 20,000 registrants effective monitoring of website and discussion forums is the main job	Assumption: less than 10 percent of active learners participate in discussion and raise questions, doubts, request additional learning material etc.
Course Examination fee	Rs. 1000 per candidate per course unless tenders are floated.	Tendering possible for identification of centres where simultaneously more than one exam can be conducted.	GATE model is working model- tender for a limited period of time is used to award contract for online exam services and scanning and storing of answer sheets

			for evaluation by humans if necessary.
Course Reviewer Honorarium	Rs. 15000 per course.	Two reviewers, both of whom peers and academic faculty with reputation and with experience in the area	Reviewer panel will be nominated by the subject-specific committees constituted for MOOC.
Human Resource support for Course	Rs. 2.0 lakhs per institute offering 20 or more MOOC courses at a given time.	Not more than 5 technical project staff for supporting the course management	It is an administrative expense and must be approved each time by the national committee recommending MOOC programmes.
Workshops About 5-10 workshops are immediately needed for updating faculty with tools and technologies for certification on-line	Rs. 5 lakhs per workshop, or pro rata	60 to seventy five participants, restricted to those who travel from within 200 -300 km radius of the site for workshop	Three days, including travel, honoraria for organizing team (Faculty, mission staff and mission consultants who are involved in the organization) and contingent expenses.

** Subject to the provision./ceiling of Honorarium mentioned in Para 11 above.

G. Manjula Sundy

Annexure 2

A preliminary list of proctored exam service providers contacted by NPTEL for its tender:

1) Tata Consultancy Services Ltd. iON
TCS House, Raveline Street
21 D. S. Marg, Fort
Mumbai 400 001
Tel: 1800 209 6030

2) Eduquity Career Technologies (P) Ltd
#433,1st CMain,7th Block Extension,
Koramangala,
Bangalore - 560095
Tel : +91-80-43436000

3) Pearson VUE
Ground Floor, S. B. Tower
1A/1, Sector 16A, Noida
Uttar Pradesh 201 301
Tel: +91-120-4001600

4) MeritTrac Services Pvt. Ltd.
Sy. No. 12/5, Kaikondarahalli, Varthur Hobli
Sarjapura Main Road
Bangalore- 560 011
Ph: +91 (80) 4013 0200

5) Aptech Assessment & Testing Solutions Ltd.
Aptech House
A-65, MIDC
Marol, Andheri (E)
Mumbai - 400093, Maharashtra, India
Tel (Direct): +91 22 28272308

Annexure 3

Members who attended the meetings:

1. Prof. Mangala Sunder, IIT Madras, Chairman
2. Prof. Rajbir Singh, Director, CEC, UGC, New Delhi
3. Prof. Manoj Singh, AIIMS, New Delhi, Member
4. Prof. T. V. Prabhakar, IIT Kanpur
5. Prof. Kannan Moudgalya, IIT Bombay
6. Mr. Pradeep Kaul, Sr. Consultant, NMEICT
7. Dr. C. S. Arora, Sr. Consultant, NMEICT
8. Dr. V. V. S. Murty, Sr. Consultant, NMEICT
9. Prof. Rajaram Sharma, Joint Director, CIET, NCERT
10. Prof. Sadhana Parashar, Director (ART & I), CBSE
11. Prof. A. P. Behera, CIET, NCERT, New Delhi
12. Dr. Yash Paul Sharma, CIET, NCERT, New Delhi
13. Shri Jaiprakash Chaturvedi, Assistant Secretary, CBSE
14. Dr. Kshipra Verma, Education Officer, CBSE
15. Shri Nageshwar Nath, CEC, New Delhi