

converter toolkits, digitization of books and journals, open source software creation and enhancement, spreading digital literacy, development of ERP system, etc. The administrative, managerial, financial aspects and future directions are also covered under this head.

In order to relate the recommendations to the Terms of Reference of the Evaluation Committee, a mapping table is shown below.

Terms of Reference	Evaluation Committee Recommendations
(a) To evaluate the extent to which the following objectives of the ongoing NMEICT scheme have been met so far: (i) Content Generation under NPTEL for Under Graduate and Post Graduate courses;	5.1 Content
(ii) Provision of e-books and e-journals free to learners;	5.1 Content
(iii) Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning;	5.4 General and Other services
(iv) Development of language converter and translation tool kit;	5.4 General and Other services
(v) Development and realization of Virtual Reality Laboratories and supporting facilities for e-learning;	5.1 Content
(vi) Spread digital literacy for Teacher Empowerment;	5.4 General and Other services
(vii) Experimentation and development of ultra low cost access devices for wider coverage of learners and their field trials;	5.3 Access device
(viii) 'Talk to Teacher' as a substitute for coaching for the economically deprived students;	5.4 General and Other services

(ix) Adaptation and deployment of open source simulation packages equivalent to MATLAB, ORCAD, etc;	5.4 General and Other services
(x) Development of unified ERP system for Educational Institutions;	5.4 General and Other services
(xi) Development of Vocational Educational modules and use of hepatic devices for education & training;	5.1 Content
(xii) Connectivity to Universities and Colleges.	5.2 Connectivity
(b) To ascertain whether there has been or could be commensurate social impact due to implementation of NMEICT Scheme;	5.4 General and Other services
(c) To assess the adequacy of e-contents for science and technology sector and social sciences sector. While doing so, clearly distinguish between recommendation for these sectors;	5.1 Content
(d) To assess financial and other requirements for the second phase of the Scheme keeping in mind the objectives;	5.4.3 Financial requirements projection
(e) To assess whether the norms provided under the NMEICT scheme need revision;	5.4.2 A New Structure for NMEICT Mission Operation
(f) To suggest improvements, if any, in the NMEICT scheme;	5.4.2 A New Structure for NMEICT Mission Operation
(g) To suggest measurable criteria for the NMEICT's success and future course of action;	5.5 Road Ahead
(h) To ascertain whether the projects undertaken so far as (i) in the right direction (ii) are progressing at the right pace and (iii) whether the funds allocated for them are commensurate with the tasks to be accomplished;	5.4.2 A New Structure for NMEICT Mission Operation
(i) To evaluate the processes and transparency followed in sanctioning of projects;	5.4.2 A New Structure for NMEICT Mission Operation

(j) To identify constraints in utilization of resources made available for the teaching learning community under NMEICT; and	5.4 General and Other services
(k) To see whether the scope of NMEICT should be extended to include school education also, and if so, how?	5.4 General and Other services

Table 1.1: Comparison of TOR with the recommendations of Evaluation Committee.

What follows are category wise recommendations of the Evaluation Committee.

Content

Contents in various forms, namely, audio/video lectures, lecture notes, tutorials, e-books/e-journals, etc. are being created and/or provisioned under various content generation projects. Besides this, opportunities for virtual experimentations have been initiated and newer avenues in this arena are being explored. Following are the recommendations in this regard:

- **Comprehensive 4-Quadrant Based Content Creation:** The Committee observes that most of the e-content generated in the present form is not fully compliant with the *four-quadrant* approach. It is therefore suggested that all content generation activities should be measured and benchmarked in full consonance with *four quadrant* approach.

It may be recalled that the *four quadrant* approach has been proposed by one of the major NMEICT project, namely, NPTEL as part of its Phase-II activity. This approach envisages that content be prepared in the following four dimensions:-

Quadrant 1: Content web based lecture notes / video lectures in an organized form.

Quadrant 2: Animations / visuals / illustrations, Video demonstrations / documentaries and interactive simulations wherever required.

Quadrant 3: Supplementary reading/Wiki Development on the course, other resources /open content in the internet, Case studies, anecdotal information, historical development of the subject.

Quadrant 4: Problems, Quizzes, Assignments and Solutions, Online feedback through discussion forums and Setting up of FAQs.

This is an appropriate model to be adopted for all content generation projects.

- **Connecting video Content with Real Life Situations:** An attempt should be made to take the video-graphic content of presentation beyond the studios in diverse locational settings and sources and also capture the real life situations. Simultaneously, attempt should also be made to embed small strips of ~~specialized situations~~ in video-graphic content presentation.
- **Integration of Content:** The Committee emphasizes the importance and urgent need for the integration of generated content at a common portal. At present, content creation projects in different forms are being independently pursued at different institutions. For example, NPTEL coordinated at IIT, Madras is focusing upon creating of video lectures, etc., OSCAR++ at IIT, Mumbai is focusing on creation of animations and Virtual Labs programme at IIT, Delhi is focusing on creating virtual lab experiments. However, if one views from a learner's perspective, he/she would require all these forms of content in one common place (SAKSHAT portal) as an 'integrated whole'. Therefore, it is recommended that there should be a built-in mechanism to ensure coordination and synergy in all forms of content creation so that they can be integrated and bundled together for effective use by the learners.
- **Remotely Triggered Virtual Labs:** While considerable progress has been achieved in virtually simulated experiments, more projects directed towards establishment and operation of remotely triggered labs should be supported to enable access to high end experimentation by learners in less endowed environment.
- **Quality Assurance of Content:** Being a Mission of national importance, any content uploaded as part of NMEICT should be reflective of high academic quality, measuring in standards to the best available anywhere. Therefore, it is recommended that content be uploaded on SAKSHAT portal after due scrutiny and diligence and should be of highest standards. In order to accomplish this, the Mission needs to have a rigorous and stringent

quality assurance policy on the content generation. Some recommendations to strengthen the existing mechanisms are given below:

- It should be ensured that QA testing procedures, guidelines and mechanisms are clearly defined and are made available to content developers so as to ensure quality content. To facilitate and strengthen QA capabilities, more relevant projects in this area need to be initiated.
- Evaluation Committee recommends strengthening of the present review mechanism for the content generated under the Mission both at *pre-launch* and *post-launch stage*. It should be ensured that no content is uploaded on the portal without going through a well defined review process for which a checklist should be put in place. The NMEICT needs to devise a mechanism to identify a pool of domain specific expert faculty within India and/or abroad with no conflict of interests whatsoever, who could be entrusted upon the task of reviewing the content at different stages. On the one-stop portal SAKSHAT, contents which are still under review process needs to be categorized separately and marked as "*Under Review*", whereas those which have been reviewed, the names of reviewers should appear as "*Reviewed By ...*" along with the content. This would instill further confidence in the learner community that the content uploaded is indeed of high quality and validated by independent reviewers.
- In view of the fast changing landscape of learning paradigms and to maintain topical relevance, the Committee proposes that there should be a well defined strategy in place for periodic maintenance (like corrections, addition / deletion of exercises, tutorial contents, case studies, animations, etc.) and for upgrading the content (like adding latest developments in the domain knowledge, emergent topics related to a course, etc.) so that the contents on SAKSHAT portal are always up to date. In addition to the above, suitable mechanisms need to be crafted for a periodic review of the content in the post-launch stage so that obsolescence and redundancy are minimized and the material on the portal always remains relevant and topical.
- A set of guidelines for standardization of audio, video and other types of content to be loaded on SAKSHAT should be generated and followed.

➤ All contents posted on the SAKSHAT portal should be vetted by anti-piracy software to eliminate possibilities of plagiarism and a suitable disclaimer in this regard should be displayed.

- **Engage with the very best from anywhere and everywhere:** The Committee feels that it is essential to widen the net of content creators by engaging many more competent contributors from a wide range of institutions. It is recognized that there are vast body of scholars who are outside the formal system of education but constitute a rich resource for enriching the contents on SAKSHAT portal. It is strongly felt that scholar outside the formal system should also be involved in content development particularly in areas of creative endeavors like art, music, etc. Therefore, a massive pan-India (and even abroad) outreach exercise for identifying the available talent pool of content creators should be undertaken.

A call for participation by experts towards content creation may be displayed on SAKSHAT. Minimal eligibility criterion and a screening mechanism for identifying content creators and reviewers may be prescribed.

It is also recommended that orientation programme in both online and offline formats for content creators should be devised and implemented.

- **Ownership of Content and Usage Rights:** The Committee recognizes the importance for a clear policy with regard to ownership and user rights of contents generated and uploaded as part of the Mission. Committee recommends that ownership of the content be rested with the original contributor/s. All content uploaded on the SAKSHAT portal should have a suitable disclaimer clarifying that individual author/s is/are responsible for the content uploaded and that portal or MHRD is not responsible for the content posted. Since the usage rights and ownership rests with original contributor/s, a policy with regard to their use rights by individuals and organizations should be formulated.
- **Stated Deliverables for Content Generation:** The Committee is of the view that the Mission develops and mandates a strict deliverable policy on all the projects under the category of content generation. The deliverable policy must categorically outline the

compliance guidelines with respect to the 4-quadrant approach with integration processes, QA procedures, content format standardization and ownership rights.

- **R&D in Content Generation/Authoring Tools:** The Committee has observed that activity in this area is at a modest level and needs considerable strengthening. Hence, R&D efforts using open source tools for creating high quality video content, animations, e-based self learning and evaluation resources, simulators and interactive communications, etc., should be initiated / augmented.
- **Virtual Programmes in Andragogy:** Programmes in teacher certification in andragogy issues and better teaching practices needs to be created with the help of communication and instructional designs experts.
- **Special Initiatives in Humanities, Social Sciences, Arts and Other such Disciplines:** As content creation activity in some of the areas related to Humanities, Social Sciences and Arts, etc., has been deficient, there is need for launching a special drive to create quality content in these areas to enrich the SAKSHAT portal. In this regard, considerable scholarly resources which are available in the non-formal systems should also be tapped in an imaginative manner.
- **Concurrent Focus on Self Learning:** To harness the full potential of SAKSHAT as a national learning platform for all, the content creation should also concurrently serve as an enabler of self learning along with self evaluation to reach out diverse constituencies irrespective of age, time, place and pace of learning.
- **INFLIBNET-INDEST Activities:** The present practice of providing support for subscription to e-journals/e-resources through the INFLIBNET-INDEST activities should not only be continued but their budgetary should be enhanced to keep up with the present and expected future requirements. In addition, the coverage of institutions needs to be augmented and may include private institutions also. Automated framework for collecting user feedback and the use patterns needs to be put in place and should form part of overall decision making process.

Connectivity

Based upon the statistics provided in Chapter 4, the Committee is of the view that considerable progress has been made in this major endeavor. A very significant portion of the resources have been utilized for this purpose to build basic infrastructure which would find many possible uses in the future.

The Committee would like to make the following recommendations with regard to connectivity:

- **Coordination amongst NKN and NMEICT:** There are two major national networking initiatives through NKN and NMEICT and there is a need for better synergy and coordination between them on connectivity issues in order to improve efficiency and to avoid duplication.
- **Limited connectivity usage:** Even though connectivity has been provided by the national networking initiatives, the Committee's feedback indicates that the use of this connectivity by students and faculty of institutions in general is limited. Therefore, the Committee recommends that wherever the limited usage can be traced to maintenance and running cost issues, adequate support be provided to such institutions.
- **Focus on bandwidth:** While 1Gbps and 10 Mbps bandwidth connectivity has been provided to the universities and colleges, respectively, in practice, the available bandwidth is much lower. Keeping in view the future requirement of educational institutions in the light of high bandwidth demands of various e-learning contents, the Committee recommends provisioning for need based augmentation of bandwidth.
- **Diversification of Connectivity Provisioning:** Committee recommends the contention of providing e-content access to all users through all possible connectivity mechanisms including EduSAT or narrowcasting TV signals or Direct to Home platforms in the all

regions of the country. Since TV and mobile phones have high penetration, cost of access through them should be weighed against accessibility through Internet.

- **Cloud based Computing and Connectivity Environment:** Considering the objective of the Mission, the bandwidth requirements, last mile connectivity solutions and BPO type of requirement for management of the e-content delivery, a Cloud based Computing Environment appears to be an appropriate type of platform.

To implement cloud computing platform, the Committee suggests a following possible architecture (Figure 5.1) and a few details of the same.

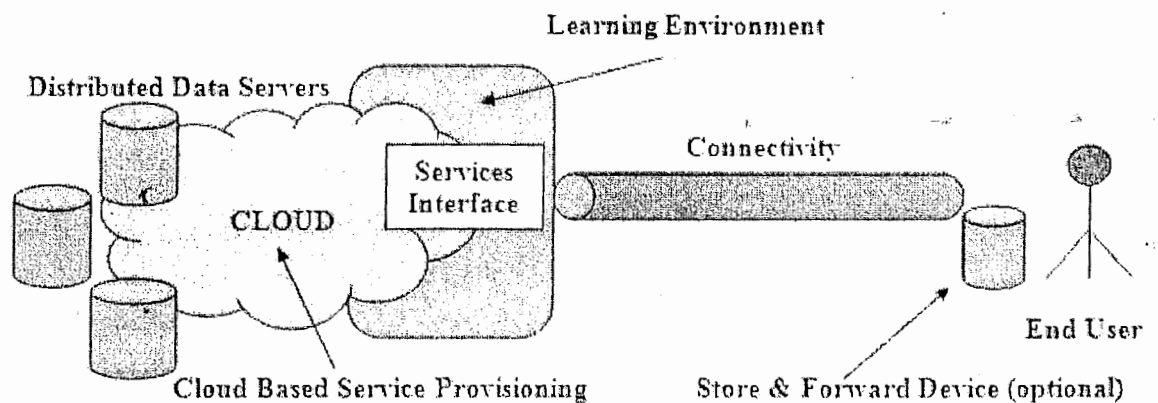


Figure 5.1: Cloud based Learning Architecture

- A Cloud Services Based Architecture is proposed (Figure 5.1) for providing all the services required under NMEICT projects. The proposed architecture connects all the broad themes of NMEICT together. The generated content in active form (virtual labs) and passive form (videos) reside on distributed data servers spread across the cloud. SAKSHAT portal is to be upgraded to provide a *learning environment* that brings students and teachers together. Connectivity ensures that end users are always connected to the cloud services through various end devices. Optionally, to provide a seamless service, a store and forward device can be deployed at the end user premises which buffers information about the most recently used services from the cloud, so that in an event of connectivity failure, these services can be provided to the end user.

- Above architecture ensures that learning can happen in anytime – anywhere paradigm. It would also minimize the need for a technical expertise at the end user premise since all the infrastructure resides in cloud. Operation and maintenance of the above architecture can be either done by the NMEICT Mission itself or transferred to any other public/private organization. The above architecture only requires maintenance of the cloud. As end user premises require a store and forward device, a provision for minimal training can be provided by the Mission to the local administrators. Efforts can be undertaken at local and cloud level to prevent misuse of connectivity bandwidth for purposes other than learning.
- **Last Mile Connectivity Provisioning:** In regard to provisioning of connectivity to the end users, two main options are available namely DTH and Wireless/Wired based IP network. Although both types of connectivity have their pros and cons, the Committee recommends provisioning of both the options to address the diverse usage patterns of the end users in the country.

Access Device

The success of NMIECT Mission strongly hinges around a low cost device through which the content created can reach the learner. The concept of creating a \$35.00 Low Cost Access Device (LCAD) is a game changer. The widespread talk of LCAD has actually generated a lot of interest and competition in the industry towards low cost solutions (in the form of low cost tablets) for addressing computing/accessing needs of a wide range of users.

- **Professional Approach:** The Committee recommends that a project of LCAD magnitude and importance should follow a professional approach in respect of design, components selection, layouts, prototyping, manufacturing and testing, etc. from the very inception. Appropriate documentation in this regard should be available at an appropriate repository or as an Intellectual Property portfolio.
- **Futuristic LCAD design:** It is recommended that LCAD be designed keeping in view the requirements and availability of bandwidth, quality of content to be displayed, availability of 24X7 connectivity and electrical power conditions. In addition, the design must be scalable and futuristic enough so that users can upgrade their requirements. The LCAD has to be

robust and of high quality to take care of heat, dust, moisture, rough handling, etc. LCAD has to be also designed progressively with increased indigenization of both hardware and software, with solar energy as a possible power source.

- **LCAD Availability in Multiple Models:** Keeping in view the increasing user requirements and buying capacities, the Committee feels that it would be a good option to bring out 2 or 3 models (good, better, best) of LCAD.
- **Provisioning of Back Office:** Along with the availability of LCAD, efficient after sales services both for hardware and software as well as contact facilities for helpline are essential components in the chain for utilization. Possibilities of creating Public-Private Partnership (PPP) based models could be considered for providing these services. A Back Office or Call Centre type structure could also be considered for providing support services to users of LCAD, connectivity and content.

5.3 General and Other Services

In regard to the General and Other Services, the Evaluation Committee makes following recommendations.

- **Massive Teacher Empowerment Programme:** Increasing penetration of ICT is changing the learning landscape rapidly. Conventional methods of teaching are giving way to newer avenues for dissemination of knowledge. In this changing paradigm, there is growing need to bridge the gap between the learners (students) who are always enthusiastic about ICT usage and the teachers who either lack familiarity or are less enthusiastic towards adopting ICT in teaching learning process. Hence, a massive programme ought to be initiated under the aegis of NMEICT for teacher's empowerment in order to fully benefit from the changing ICT based education scenario. Besides providing digital awareness and literacy, these programmes should also be structured to include training in ICT based pedagogy.
- **Breaking Language Barriers:** India being a country with a rich multi-lingual diversity, it is commonly observed that a large percentage of Indian population is more comfortable with

their regional language rather than English as far as learning processes are concerned. Therefore, it is important that the content in English language is also made available in regional languages through translation/transliteration so as to have wider impact of the content generated through the Mission. This would require a lot of imaginative effort to strengthen the existing mechanisms (automated or otherwise) and advances in natural language processing and machine translation tools. It is therefore suggested that research and development activity in this area be augmented.

- **Virtual University:** With the advent of ICT, a lot of non-conventional approaches to teaching and outreach have emerged like virtual classrooms, online exams, etc. One of the objectives of expanding higher education in India is to enhance access and improve quality. However, lack of availability of high quality faculty, supporting resources and infrastructure is a major impediment. One possible way to address this problem using ICT is to explore the possibility of establishing a full-fledged university in a virtual mode. Evaluation Committee recommends that the concept and feasibility of virtual universities needs experimentation through a prototype (pilot level) initiative.
- **Digitization of Books and Journals:** It has already become clear that LCAD (tablet) shall not only be used as an access device for content but also as an e-book/e-journal reader as it has the capability of storing hundreds of e-books/e-journals which the learner can read anytime, anywhere. Therefore, widespread penetration of LCAD should be synchronized with a massive digitization programme involving books, manuscripts, journals and archival materials available in various libraries and institutions across the country. Any copyright issues arising out of this initiative need to be addressed appropriately.
- **Outreach Programme:** Evaluation Committee observes that the National Mission has not attained a desirable level of visibility and has not penetrated throughout the country. It is therefore suggested that mechanisms must be devised to enhance outreach through publicity in all forms of media, develop presentation modules (DVD, ppt, posters, etc.) to be distributed to all educational institutions of higher learning. In addition, a group of experts should be commissioned to visit and conduct orientation programmes to inform learners and

teachers about the Mission and its activities. This activity should also be an enabler for drawing talented and interested teachers to participate in the Mission activities particularly in content development.

- **Facilitation of Entrepreneurship and Socio-Economic Development:** Although the key goal of the Mission is to create a knowledge enabled society in the country, Evaluation Committee recommends that the ambit of Mission be amplified to include socio-economic development related activities through content creation in areas like entrepreneurship (including social entrepreneurship), e-commerce, e-marketing, networking and mentoring, etc. This should be an enabler for self employment generation, new startups and women empowerment.
- **Private-Public Partnership:** In the present enrollment scenario in higher education, nearly 85% of students are in the private institutions which also command substantial faculty resources. In addition, there are many private players who are engaged in the field of e-learning. It is well known that many industries, in particular IT sector have developed learning resources (which are used for in-house training, as well as in 'finishing schools') which might be useful for more widespread use. It is imperative, therefore, that a way should be found to involve and engage them in the Mission's vision and activities. Avenues for engagement with leading industry bodies like CII, FICCI, ASSOCHAM, etc. in furthering the cause of the Mission also need to be explored.
- **Establishment of Certification Mechanisms:** With the increasing availability of content and corresponding enhancement of user profile, there will be aspirations on the part of the users to get a certification for the acquired knowledge. The Committee recommends that the Mission may examine the possibilities of creating a suitable mechanism (like an Academy) to facilitate such certifications.

5.4.2 Revamp of SAKSHAT Portal

The one stop portal named SAKSHAT is the face of the Mission to the outside world. Hence, it is imperative that state of the art technology and experts need to be employed to design, develop,

operate and maintain the portal, commensurate with its importance. In respect to the delivery of e-content throughout the country, a well defined protocol must be put in place so that all the e-content hosted in the portal is leveraged in the best possible way by the learners. In this regard, the Committee makes the following recommendations in addition to the content related recommendations indicated earlier.

- **Distributed Services and Mirroring of Content:** Several regional mirror sites distributed across regions in India be created and be networked using the cloud based learning environment as given in Figure 5.1. Distributed storage and mirroring of e-content would reduce the load over the cloud.
- **Frequent Updates:** SAKSHAT portal shall have daily updates appropriately highlighting the new activities of NMEICT. Such updating will encourage more frequent views by visitors.
- **Online Management:** It will be helpful for overall management of the Mission as well as for those participating in its activities if a DASHBOARD based activity management services be installed on the SAKSHAT portal with appropriate access control for an online communications and for viewing the status of the project such as sanction, project reports, budgetary positions, etc.
- **Dedicated Qualified Staff:** SAKSHAT portal should have a dedicated Webmaster who will be responsible for the operation and maintenance of the portal. If required, services of a dedicated group of experts and professionals (private players may be involved) may also be utilized.
- **Navigation Facilities:** SAKSHAT portal is likely to be visited by learners with various degrees of proficiency for its optimal use. Hence, the navigation tools and the facilitation provided on the portal have to be user friendly and elegant and address the needs and requirements of users from different age groups, proficiency levels and motivation. Advanced search options based on keywords, authors, subject area, etc. should also be a part of the navigation facilities on the portal.

- **Detailed Analytics and Monitoring:** SAKSHAT portal must display a detailed account of usage statistics in terms of number of page hits, number of download, user browsing patterns, etc. SAKSHAT portal needs to provide a tool to facilitate regular monitoring and peer surveillance (vigilance) of the portal so that it gets improved and upgraded from time to time.
- **Feedback and Engagement Forum:** SAKSHAT portal should provide windows for feedback, discussion forums, chat boxes, etc. so that it remains a vibrant and networked forum for users and peers. The portal should also provide a window for eliciting "Expression of Interest" from prospective experts who are willing to be engaged to contribute to the Mission.
- **SAKSHAT – A National Repository:** In the long run, SAKSHAT portal should be positioned as a National Repository for all scholarly and creative output from the country, thereby considerably amplifying its scope, utility and visibility.

5.4.2 A New Structure for the NMEICT Mission Management

The Evaluation Committee deliberated at length on the present structure of the NMEICT Mission and has come to a firm conclusion that a new structure (Figure 5.2) for its management and operations is necessary in order to fully deliver on its objectives and ambitions.

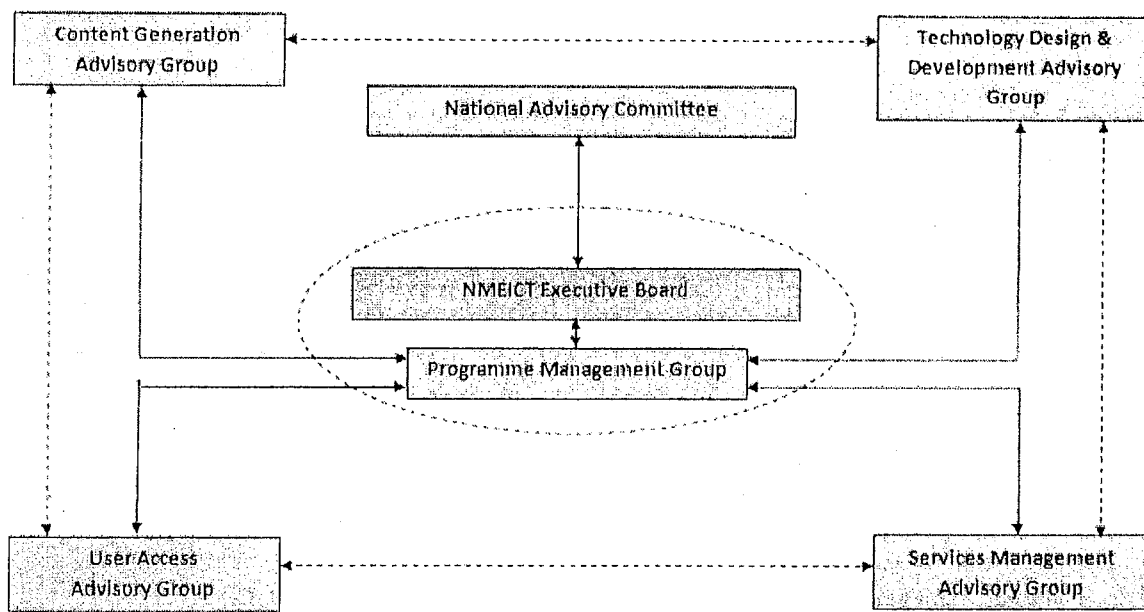


Figure 5.2: A New Structure for NMEICT Mission Operation

Salient features of the new structure for NMEICT Mission operation are:

- Appropriate connect between Expert Groups, Management of the Mission and the Government is the cornerstone of the proposed structure.
- While the new structure envisages an independent Mission Directorate outside the Ministry, it also provides for a robust linkage with the Government at the Apex Level.
- The new three tier structure attempts to blend the weightage given to independent peer opinion with accountability and renders the overall process more participative and transparent.

Given below are the composition and functions for each of the three tiers of the new structure for NMEICT Mission management and operation.

Composition:

National Advisory Committee (NAC)	
Chair	Minister, MHRD
Members	All Members of NMEICT Executive Board Chairman
	Additional Secretary (TEL)
	IFD Additional Secretary, MHRD
	Secretaries of DOT, IT, DST, Health, Agriculture and Law
	Chairman AICTE
	Chairman UGC
	Two leading industrialists
	Four members from amongst the Directors of IITs, NITs, IIITs and VCs of Central Universities
	Four VCs from Universities
	VC IGNOU
Member Secretary	Secretary, Higher Education, MHRD

Figure 5.3: Constitution of National Advisory Committee (NAC)

NMEICT Executive Board (EB)	
Co-Chairs	A Distinguished Academician
	Secretary, Higher Education, MHRD
Members	Three ex-Officio members (one each from Planning Commission, Finance Dept. of MHRD and MCIT, not below the rank of Joint Secretary)
	Five independent domain experts to be nominated by NAC.
Member Secretary	Executive Director (full time)

Figure 5.4: Constitution of NMEICT Executive Board (EB)

Programme Management Group (PMG)	
Chair	
	One out of the five independent domain experts
Members	
	Chairs of all four Advisory Groups (<i>ex-Officio</i>)
	Four independent domain experts to be nominated by the Executive Board (EB) from the areas of engineering, science, technology, management, law, medicine, agriculture, vocational training, etc.,
Invitees	
	Director MHRD
	Director Higher Education (NMEICT)
	Director IFD
Member Secretary	
	Executive Director, EB (<i>ex-Officio</i>)

Figure 5.5: Constitution of Programme Management Group (PMG)

Functions:

1. National Advisory Committee (NAC)

National Advisory Committee (NAC) will be chaired by Minister, HRD and its membership is indicated in Figure 5.3.

- i) Broad policy framework of NMEICT.
- ii) Ratifying proposals that are screened and approved by the Executive Board (EB). However, project proposals beyond a budget of Rs. 10 Crores will be sanctioned by the National Advisory Committee (NAC) on the recommendation of EB.
- iii) Monitoring of activities and progress of the Mission.
- iv) Budget approval and allocations as recommended by EB.

The NAC will meet at least two times in a year.

2. Executive Board (EB)

The Executive Board (EB) will be co-chaired by a Distinguished Academician (nominated by the Minister, MHRD) and Secretary, Higher Education from MHRD. The membership of EB is indicated in Figure 5.4.

There shall be a full time Executive Director (ED) who shall be the Member Secretary and will not be below the rank of Additional Secretary in the Government. The ED, having professional and administrative experience, shall be appointed through an open advertisement process and Search-cum-Selection Committee constituted by Minister, MHRD.

Executive Board shall have a dedicated office hosted in one of the centrally funded Government Institution. A suitable Memorandum of Agreement (MoA) shall be signed between the Institution and MHRD.

- i) The EB will be responsible for all the activities under the NMEICT Mission.
- ii) The EB is empowered to create suitable governance and operational mechanisms in all activities of the Mission for efficient and smooth functioning.
- iii) The EB will prepare a blueprint for invitation, processing and reviewing of project proposals by Programme Management Group (PMG).
- iv) The EB will have financial powers to approve all projects and expenditure up to Rs. 10 Crores. However, all approved projects and activities will have to be reported to the NAC for ratification. In case of projects and activities exceeding Rs. 10 Crores, its recommendations will be placed before NAC for approval.
- v) The EB will prepare the annual budget of the Mission to be placed for approval before the NAC.
- vi) The EB will be responsible for all matters related to SAKSHAT portal.

The EB will meet at least four times a year.

3. Programme Management Group (PMG)

The Programme Management Group (PMG) will be chaired by one of the five independent domain experts of EB and its membership is indicated in Figure 5.5.

- i) PMG shall formulate guidelines for inviting proposals and scrutinizing them through a robust peer review system. To facilitate this process, PMG shall take advice from various advisory groups (in areas like content, technology design and development, user access, services management etc.) which may be constituted with the approval of EB.
- ii) All recommendations of PMG should be submitted to EB for approval.
- iii) PMG shall be responsible for monitoring and review including on-site assessment, etc. as per the directions set by the EB.

The PMG will meet at least four times in a year.

6.4 Financial requirements projection

Looking at the financial allocations and expenses incurred during the 11th Five Year Plan and assessing the future activities and requirements, the Evaluation Committee suggests the following budget estimates.

Category	Estimated Budget Amount Required (in Crores)
Content generation, Virtual labs	1500
Pedagogy, content related R&D and operations & maintenance of SAKSHAT portal	1000
All types of Connectivity including DTH.	3000
Low cost access device	5000
Other Services including administrative expenditures and Host Institution expenditure	1500
Total	12,000

Table 5.2: Financial Estimates for NMEICT in future

Road Ahead

NMEICT Mission has been an ambitious enterprise with the potential of a game changer in the higher education arena. It has met with modest success and has some achievements to its credit particularly in establishing widespread connectivity and supporting availability of e-resources. It has also been able to inculcate the culture of ICT in education and create a network of experts in a limited way.

In order to ensure that optimal value and outcomes are derived from the investments already made, it is important to undertake an in-depth and rigorous independent peer review of top few high-investment projects and decide if incremental funds can result in completion (within a clearly define time frame), full documentation and appropriate distribution/dissemination of these projects. All large projects will need to be monitored closely, till completion. Without this, the large amount of intellectual and financial investment made in these projects will go waste, without any major benefit to the education system in the country.

(Note: A total approved funding of 442 Cr (90% of total approved funding of 488 Cr) has gone into 11 projects(13% of total of 86 projects). Yet only 4 of these projects indicate "Completed" status.)"*

However, the future agenda should be to provide a completely seamless ICT infrastructure for anytime-anywhere-anything educational resource in an equitable fashion across the vast geographical areas and the enormous learners spread over it. This ICT based knowledge revolution would reflect in terms of socio-economic dividends and enable India to emerge as a super power. The Committee has endeavored to provide a slew of recommendations which will provide a roadmap for re-engineering the NMEICT Mission and fulfillment of a great national ambition. In addition, integration of efforts of different Ministries such as MHRD, MCIT, DOS, etc. related to ICT in education leading to greater convergence is essential.

Concluding Remarks

- NMEICT Mission has in a limited way addressed the issues related to access, equity and quality which are at the vanguard during the current expansion phase of higher education. However, the full potential of ICT as a powerful tool to effectively address the key

challenges involving access, equity and quality in Indian higher education remains to be fully harnessed. Availability of LCAD, amplification and diversity of offerings and ease of navigation on SAKSHAT portal, availability of content in multiple languages, increasing Internet penetration in educational institutions and access to digital resources, etc. offer great hope and opportunity for making a digital transition to a seamless world of knowledge in an inclusive manner. A reinvented NMEICT Mission can play a pivotal role in this endeavor.

- The increasing high demand for higher education has stimulated significant growth in both private and public provision. Open universities which depend on technology integrated learning are also expanding and multiplying. Many conventional higher educational institutions are adopting dual mode or blended programme delivery systems, thereby creating a new dynamic, flexible lifelong learning environment. In this context, the experimentation in the form of establishment of Virtual Universities has not yet proved its viability. Therefore, introduction of ICT in a systematic manner with a clearly defined outreach strategy in both public and private higher educational institutions in our country is an important objective. It is suggested that NMEICT Mission should contemplate generating new idea based models and initiatives for ICT enabled learning on a sustainable basis.
- It is important to devise strategies that will strongly relate digital learning processes to socio-economic development issues. In particular, digital outreach should be an enabler for self employment, skill development, women empowerment, etc. A roadmap specifically targeted to this objective needs to be crafted.
- Avenues of partnership with private and foreign entities involved in digital learning space needs to be explored.
- NMEICT Mission needs to factor-in the emerging international challenges and competitions from other similar initiatives elsewhere such as MIT's Open Courseware.

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