

Status Report on Select Technology Programs of MHRD

By

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An alumnus of IIT Kharagpur, started his career in TELCO (now Tata Motors) Jamshedpur as a Graduate Trainee. His interest and career in software started with his engagement in Dunlop India Limited and this (software) remained his main focus during his working life in Berger Paints, Page Point Services (a Motorola JV) and Tata Consultancy Services (TCS).

Post his retirement from TCS as Principal Consultant, Sunit re-launched his career as an independent IT consultant and supporting start-ups. He is associated with CESS in technology-driven project.

Preface

In today's world Technology has an impact on all aspects of human endeavours. Technology has brought new opportunities for improving the access and quality of higher education. MHRD has initiated several schemes for including technology to improve higher education in the country. There is great change in the way teachers teach and students learn with technology these days. MHRD's initiatives like MOOCs courses, Inflibnet, National Digital Library have made a big entry in the higher education system.

However, the usage of these are likely to be uneven from region to region, state to state and from institution to institution within our country. In this scenario, we explored the possibility of doing a small study on the status of these technology programs. We are glad that Mr. Sunit Sengupta, formerly Technology Consultant of TCS initiated this study and willingly carried out this work. This study will provide a basis for taking up studies on various technology initiatives of MHRD.

Prof. M. K. Sridhar
President, CESS

27th March 2019

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1 INTRODUCTION

The spread of education is essential to strengthen any civilization in any part of the world. Nelson Mandela said “Education is the most powerful weapon which you can use to change the world”.

The painting in the cave walls may be considered as the earliest “tool” to pass the knowledge / information to the next generation. However, the technology in education evolved with the introduction of educational films in the beginning of the last century. During the World War II – the soldiers (especially in US) were trained by training films and other related material. The nineties saw the growth of the Computer-based-learning (CBL) systems focused on teaching domain-specific subjects. The 2000’s witnessed a big boost in the emergence of multiple media platforms – all over the world – and – India is no exception – providing a new acceleration to the digitized process of learning where distance became irrelevant.

1.1 Overview of technology in education in India

As one of the oldest civilizations in the world, India realized the value of education and the benefits of passing on the education to the next generation very early.

As a dominant player in the software industry of the world, India has been playing a big role in spreading the education – especially technology education – by means of technology tools comprising of audio and video that are accessible across the length and breadth of India to the interested learners to improve their knowledge and marketability.

However, the penetration of technology in the non-technology and core subjects has not been keeping up the pace with the same in the niche subjects that open employment opportunities in the high-end job market in India and abroad.

Ministry of Human Resource Development (MHRD) – that was founded in September 1985 – was entrusted with the task of spreading the education in the ‘core’ subjects through multiple channels across the learning community in India.

This report, prepared after a 6-week study ending 28th Feb 2019, provides an “As-Is” status of some of the technology initiatives of MHRD in the area of higher education – that includes the student community (UG & PG), research scholars, teachers and the academia administrators.

1.2 MHRD initiatives with respect to technology

The digital initiative for the higher education ecosystem in India was formalized by a letter from MHRD to the vice chancellors in a letter of 25th Oct 2017 (<https://mhrd.gov.in/digital-initiatives-higher-education-0>) that covered a 17-point action plan that included:

- SWAYAM
- SWAYAM Prabha FTH Channels
- National Digital Library (NDL)
- National Academic Depository
- Other digital initiatives such as Smart Campus, National Digital Payment Mission etc.
- Planning

The letter from MHRD acknowledged that although the platforms like SWAYAM and others had the opportunity to improve the academic standard – their potential was yet to be fully utilized.

The present study attempts to identify the key features of selected technology platforms, launched by MHRD and to assess the reach of these programs in the higher education ecosystem. This study also presents the key observations and recommends some areas of improvement.

In this context, a study and analysis were undertaken in the following areas:

- MOOC courses by SWAYAM
- National Digital Library (NDL)
- INFLIBNET
- eOffice suite of products by NIC

1.2.1 MOOC (Massive Open Online Course) from Swayam

MOOC – as per wikipedia(https://en.wikipedia.org/wiki/Massive_open_online_course) - is a platform for online courses aimed at unlimited participation and open access.

As per a report from the web (<https://www.class-central.com/providers>) there are more than 40 providers of MOOC courses world-wide.

The present report covers the MOOC courses as offered by MHRD, India through the “Swayam” platform – targeted to the large ecosystem of the higher education comprising of the students (UG and PG), research scholars, teachers and academia administrators.

SWAYAM platform is indigenously developed by All India Council for Technical Education (AICTE) with the final goal of hosting 2000 courses and 80000 hours of learning: covering school, under-graduate, post-graduate, engineering, law and other professional courses.

1.2.2 National Digital Library (NDL)

MHRD under its National Mission on Education through Information and Communication Technology (NMEICT) initiated the National Digital Library of India (NDL India) pilot project to develop a framework of virtual repository of learning resources with a single-window search facility. NDL India is designed to hold content of any language and provides interface support for leading Indian languages.

1.2.3 INFLIBNET

‘INFLIBNET’ is an information and library network centre managed by UGC, University Grants Commission. It is essentially a library system that connects the libraries and information centres of various academic institutions by deploying a uniform standard and to ensure an easy access to interested parties.

There are 3 key sources of information.

One is ShodhSindhu (<https://www.inflibnet.ac.in/ess>). Second one is ShodhGanga (<http://shodhganga.inflibnet.ac.in>) and the other one is e-PGPathshala (<https://epgp.inflibnet.ac.in>).

1.2.4 eOffice suite of product from NIC

National Informatics Centre (NIC) comes under Ministry of Electronics and Information Technology as mentioned in <https://www.meity.gov.in/content/nic>. However, MHRD is closely connected to NIC as per https://mhrd.gov.in/whos_who_nic. The eOffice project was initiated in 2009 and developed and implemented by NIC. This suite of products is available for use by UGC and all the colleges and universities.

The eOffice product aims to support governance by ushering in more effective and transparent inter and intra-government processes. The vision of e-Office is to achieve a simplified, responsive, effective and transparent working of all government offices. The product brings together the independent functions and systems under a single framework.

The objective of the present study was to prepare an “As Is” status of the use and the challenges, if any, of this product (eOffice) in the higher education eco system – i.e., mainly the administrators of the institutions, colleges and universities.

2 METHODOLOGY

The process that was followed in this study comprised of the following steps:

- Study of the technology platforms of the 4 different agencies namely - Swayam, NDL, Inflibnet and eOffice (of NIC)
- Study of the data received from Swayam – as a primary source
- Dipstick survey to capture a high-level view (for MOOC from Swayam)
- Email interaction with the agencies seeking clarifications
- Discussions with experts in Bangalore
- Summarization and analysis of the data

The process of data capture and subsequent analysis encountered some challenges as well. It is captured in one of the subsections below.

2.1 Study of the technology platforms

2.1.1 MOOC from Swayam platform

The data related to MOOC from Swayam platform was captured and studied from three sources. One was the website search. Second was a set of data received from Swayam. Third was a dipstick survey with a cross-section of the teachers.

2.1.1.1 MOOC– web-search

There are two websites – one each for UG and PG students – which contain videos on different subjects.

The websites are: <https://swayam.gov.in/undergraduatefor> UG and <https://swayam.gov.in/postgraduatefor> PG.

2.1.1.2 MOOC – Data received from Swayam

A set of data was received from Swayam and the spreadsheet contained details of 1075 courses launched by Swayam. The data included fields like course title, course length, time of launch of the course, number of students who took up the course and the number of the students who completed the course and an indicator to designate if the course was a ‘credit’ course etc.

2.1.1.3 MOOC – Dipstick survey with teachers

A questionnaire – targeted to the teachers - was formed on two factors – (1) how would the teachers benefit personally if they take up a MOOC course from Swayam platform and (2) what was their perception about the MOOC courses (from Swayam platform) in general.

2.1.2 NDL (National Digital Library)

The primary source of the data is its website <https://ndl.iitkgp.ac.in/>.

The use of the site is accessed by a “Member Log-in”. During the process of search of the relevant data, a number of telephonic conversations and email exchanges were fruitful. The permission to access the link to “Statistics” was helpful to capture relevant data.

2.1.3 INFLIBNET

There are 3 key sources of information.

One is ShodhSindhu (<https://www.inflibnet.ac.in/ess>). Second one is ShodhGanga (<http://shodhganga.inflibnet.ac.in>) and the third one is e-PGPathshala (<https://epgp.inflibnet.ac.in>).

- ShodhSindhu – It is a repository of e-books and e-journals
- ShodhGanga – It is a repository of PhD Thesis papers
- E-PGPathshala – It is a repository of audio and video contents of PG students

2.1.4 eOffice from NIC

eOffice is a suite of products – developed and deployed by NIC (National Informatics Centre). The website is <https://www.nic.in/projects/e-office/> with a link to <https://eoffice.gov.in>.

Some of the key modules listed in the website are:

- **Products** – It covers various features / applications to cater to different functions
- **Downloads** – It contains a range of materials including implementation handbook, product presentation, brochure, documentation etc
- **Implementations** – It provides the contact details and a dashboard
- **Training** – It provides various details like training calendar, courses offered, participant details, facility of feedback etc

2.2 Limitations of data collection process

The limitations (or challenges) encountered in the process of data collection are summarized as follows:

- The data present in the websites were not updated in all cases – leading to challenges to assess the current status (which was required for the study)
- The dipstick survey - that was prepared on Google drive and necessitated the response using a computer / smartphone – was taken by a small number of teachers
- The emails, sent to the various MHRD agencies (including NIC) for clarifications, were unanswered in many instances
- The telephone calls, made to the various MHRD agencies (including NIC) for clarifications, either were unanswered or failed to provide the required clarifications in many instances

3 ANALYSIS OF DATA

The data collected from the multiple data sources from the different MHRD entities were analysed. In this section a summary of each of the study points are presented.

3.1 MOOC from Swayam Platform

The analysis was done in two parts. The first part of the analysis was from the data, captured from the websites as well as from the data sent by Swayam. The second one was from the data, generated from the dipstick survey.

3.1.1 MOOC – Analysis from the data

Following subjects are listed for undergraduate level in <https://swayam.gov.in/undergraduate>:

Biochemistry	Biology	Chemistry	Genetics
Physics	Sericulture	Zoology	Analysis of discrete data
Introduction to R	Biostatistics	Architecture	

The total number of videos, covering the subjects as above, is around 40.

Following subjects are listed for postgraduate level in <https://swayam.gov.in/postgraduate>:

Biochemistry	Biology	Chemistry	Forensic Science
Genetics	Physics	Science	Zoology
Econometrics	Analysis of discrete data	Introduction to R	Distribution Free Methods
Biostatistics	Architecture		

The total number of videos, covering the subjects as above, is around 50.

The data from the Swayam websites was fed into a spreadsheet and the main data points included:

- Subject
- Course title
- Course duration
- Year of the launch of the course
- No. of the students, enrolled for the course
- No. of the active students
- Indicator signifying if the course is a credit course or a non-credit course

The data volume of the spreadsheet, received from Swayam, was larger than what was available directly from the website. Therefore, the major portion of the analysis was based on the data, received from Swayam.

The following data was derived from the basic data:

- No. of the courses launched year-wise (starting from 2016)
 - No. of credit courses
 - No. of non-credit courses
- Enrollment number against each courses in categories – from very low to very high
- Pass % of each course – from very low to very high

Some of the key aspects are represented in the tables below.

Type of courses (Upto 2018)	No. of the students		% of drop-outs / incomplete / failures
	Enrolled	Active / Competed/ Passed	
Non-credit	555,950	105,226	81.07%
Credit	106,783	49,621	53.53%
	662,733	154,847	76.64%

About one-fourth of the enrolled candidates complete the course

Table 1: Enrollment/s success / failure

		# of Courses on offer till 2018					
		Pass - Upto 10%	Pass - Upto 25%	Pass - Upto 45%	Pass – Upto 70%	Pass - > 70%	Grand Total
# of Enrollment	Non-Credit	361	336	111	40	3	851
	V Low - Upto 100	109	57	17	2		185
	Low - Upto 500	169	181	55	13		418
	Avg - 2500	66	89	34	17	2	208
	High - 10,000	14	9	5	6	1	35
	V High >10,000	3			2		5
	Credit	5	3	38	70	4	120
	V Low - Upto 100	1		2	1	1	5
	Low - Upto 500	1	2	14	31	2	50
	Avg - 2500	3	1	21	33	1	59
	High - 10,000			1	5		6
	TOTAL	366	339	149	110	7	971

Table 2: Enrollment vis-à-vis courses

Two key observations from Table 2: (1) Number of Credit courses is significantly less than the non-Credit courses and (2) Number of the candidates, enrolled, is low (or very low) in about one-third of the non-Credit courses where pass % is also low.

		No. of courses launched				
Year of launch -->		2016	2017	2018	Unspecified	Total
Non-Credit Courses		18	302	526	5	851
Enrolment	V Low - Upto 100	4	72	109		185
	Low - Upto 500	8	135	274	1	418
	Avg - 2500	6	79	123		208
	High - 10,000		15	18	2	35
	V High >10,000		1	2	2	5
Credit Courses			26	94		120
Enrolment	V Low - Upto 100			5		5
	Low - Upto 500		15	35		50
	Avg - 2500		9	50		59
	High - 10,000		2	4		6
Grand Total		18	328	620		971
% of credit courses		0.00%	7.93%	15.16%		12.36%

Table 3: Year-wise launch of the courses vis-à-vis enrollment

Table 3 shows that the rate of the launch of the Credit courses is increasing Y-o-Y.

ENROLLMENT	CREDIT POINTS						Grand Total
	1	2	3	4	5	6	
Pass %							
V Low - Upto 100		1	2	1		1	5
Pass - Upto 10%		1					1
Pass - Upto 45%			1	1			2
Pass - Upto 70%						1	1
Pass - >70%			1				1
Low - Upto 500	1	8	10	29		2	50
Pass - Upto 10%				1			1
Pass - Upto 25%				2			2
Pass - Upto 45%		2	4	8			14
Pass - Upto 70%	1	6	6	16		2	31
Pass - >70%				2			2
Avg - 2500		9	12	34	1	3	59
Pass - Upto 10%		1		2			3
Pass - Upto 25%				1			1
Pass - Upto 45%		2	6	13			21
Pass - Upto 70%		6	6	17	1	3	33
Pass - >70%				1			1
High - 10,000			1	3	2		6
Pass - Upto 45%					1		1
Pass - Upto 70%			1	3	1		5
Grand Total	1	18	25	67	3	6	120

of credit courses till 2018

Table 4: Enrollment vis-à-vis pass % in Credit courses

The key observation from Table 4 is that 4-Credit point courses constitute more than half of the Credit courses.

3.1.2 MOOC – Analysis from dipstick survey

As the MOOC courses from Swayam platform are open to all, the teachers may also take up a MOOC course to study any subject of their choice.

- While a large section of teachers feel that a MOOC course would help them to remain updated and to improve the teaching process, only half of the teachers feel that a salary increment (or a promotion) is an incentive to take up a MOOC course to complete.
- The views of the majority of the teachers are:
 - Medium of instruction (English) is a likely barrier to the rural and non-English-speaking students
 - Infrastructural facility of the college is possibly adequate in the colleges to take up a MOOC course – but the awareness is low
 - Students – if they take up MOOC courses – would benefit in the long run
- The opinion – if there is any push and follow-up from the college administration to spread the awareness of the MOOC courses – is divided.
- Inability to clarify personal doubts is considered a challenge.

3.2 NDL (National Digital Library)

The usage data of the available resources is well documented in the NDL website.

Approximately 19,000 institutions have registered with NDL. Out of 5 million registered users, nearly 2 million have activated their accounts.

It is to be noted that activation of accounts – in case of institutional registration – is very low – i.e., between 10 and 20 percent. However, in case of individual registration (which is nearly 2.4 million) – nearly 65% have activated their accounts.

More than 20 million resources, available in 300+ languages, cater to the following categories:

Books	Thesis	Audio lecture	Video lecture	Article	Manuscript
Album	Manual	Technical report	Technical manual	Album	Monograph
Report	Solution	Law judgement	Question paper	Data set	Web course

Table 5: Resource categories in NDL

However, nearly 19 million resource material is in English whereas French and German cover nearly 0.7 million of the material.

The subjects are varied and the approximate number of the resources is:

Technology	~ 10 million	Natural Science and Mathematics	6 million
Social Science	1.9 million	Computer Science, Information & General works	1.8 million
Literature & Rhetoric	0.5+ million	Philosophy & psychology	0.5+ million
History & Geography	< 0.5 million	The arts: fine and decorative arts	< 0.3 million
Religion	0.2 million	Language	< 0.1 million

Table 6: Number of resources in various subjects in NDL

Table 6 shows that the number of resources is highest in the areas of science and technology.

More than 180 academic bodies have contributed to the 20+ million resources and the top 5 sources are:

WORLD eBOOK LIBRARY	4 million
PubMed Central	3.9 million
IEEE Xplore Digital Library	3.3 million
WHO-Global Index Medicus	2.6 million
SpringerLink	2.1 million

Table 7: Top 5 sources of material for NDL

The following data from the NDL website provides an indication of the registered users who have accessed the resources for serious activity.

🕒 Number of sessions where the user stayed in the site more than 60 minutes	18,086
📊 Number of users who visited the site more than 20 times	2,795

Figure 1: Section of usage data from <https://ndl.iitkgp.ac.in/statistics.php>

It may be assumed that there are nearly 3000 users (who visited the site more than 20 times) who could be classified as ‘serious’ users of the NDL facility.

3.3 INFLIBNET

There are 3 main sources of information. However, the usage data is limited.

3.3.1 ShodhSindu

It is a repository of e-books and e-journals. It has more than 31 million e-books and approximately 10,000 e-journals – as at the end of the year 2018. The repository of e-books and e-journals cover 97 subjects as mentioned in <https://www.inflibnet.ac.in/ess/subject.php>.

While it is not possible to classify the e-journals subject-wise (as there may be multiple subjects within a journal), the number of e-books, available in the repository, is not available subject-wise.

The usage data (upto 2018) of e-journals - in terms of the number of download - is provided below.



Figure 2: Data of download of e-journals from <https://infostat.inflibnet.ac.in/>

No similar data (i.e., downloads) on e-books (ShodhSindhu) is available.

3.3.2 ShodhGanga

It is a repository of the PhD thesis in a diverse range of subjects. Nearly 400 universities have contributed to the repository that contains more than 215,000 thesis papers (as at end of Feb 2019). It grew from a modest figure of 1000+ in the year 2010. The subjects included:

Arts & Humanities
Arts and Recreation
Religion
Language
Literature

Clinical Pre Clinical and Health
Clinical Medicine
Psychiatry and Psychology
Pharmacology and Toxicology

Engineering and Technology
Computer Science
Engineering
Material Science

Life Sciences
Agricultural Sciences
Biology and Biochemistry
Ecology and Environment

Physical Sciences
Chemistry
Geosciences
Mathematics

Social Sciences
Social Sciences general
Economics and Business
Philosophy and Psychology

Immunology
Microbiology
Molecular Biology and Genetics
Neuroscience and Behaviour
Plant and animal science

Multidisciplinary
Physics
Space Sciences

History and geography

Table 8: List of subjects of PhD thesis in ShodhGanga

No data of the number of thesis papers - subject-wise - is available.

The usage data of the PhD thesis papers in ShodhGanga is not available. The only data that is available is nearly 2 years old and that was from the annual report of FY 2016-17 ending March 2017. An extract from the annual report (page 45) is reproduced below.

6.2.4. Usage Statistics
 Usage of theses hosted in Shodhganga repository by academic community across the world is monitored by the Centre with an aim to measure usage of this resource. General statistical summary for Shodhganga including page views, theses views, department views, university views and website views are shown below in Figure 22. The usage has considerably increased with hosting of repository on more robust infrastructure. Detailed usage statistics for last nine months (i.e. July 2016 to March 2017) is given in Table g.

Figure 3: Extract from 2016-17 Annual report – Usage Statistics

Views	July '16	Aug '16	Sep'16	Oct '16	Nov '16	Dec '16	Jan '17	Feb '17	Mar '17	Total
Page Views (Bitstream)	325,16,468	254,37,642	215,57,419	156,66,219	189,91,075	184,43,872	192,94,686	247,97,633	216,46,389	1983,51,403
Theses Views (Item)	33,61,716	32,44,782	31,74,055	27,77,998	38,88,299	28,40,883	30,11,470	38,66,627	22,38,349	284,04,179
Department /Colleges/ Centre Views (Collection)	6,01,942	6,99,889	7,71,553	5,83,674	7,33,556	7,32,491	7,41,373	7,58,125	4,03,020	60,25,623
University Views (Community)	2,71,303	2,86,409	3,10,666	2,25,508	2,91,018	2,84,159	3,03,197	3,05,082	1,95,219	24,72,561
Searches Performed	16,49,263	29,16,021	14,42,415	15,89,000	17,02,224	10,04,637	9,74,197	1,05,593	9,53,196	122,30,953

Table g: Month-wise Usage Statistics

Figure 4: Extract from 2016-17 Annual Report – Month-wise usage statistics

It is observed from the published data that the views (page view and theses view) underwent a see-saw movement – mostly downward over a period of 9 months from July 2016 to March 2017.

3.3.3 e-PGPathshala

It contains the audio and video contents for PG students only. There are 27,000 modules (<https://epgp.inflibnet.ac.in/stats/home.php>) that cover 77 subjects.

The usage data of the audio and video contents (e-PGPathshala) is provided below.



Figure 5: Registered users from <https://epgp.inflibnet.ac.in/stats/home.php>
Total number of registered users till June 2018 is estimated to be 5,500.



Figure 6: Subject-wise visitors from <https://epgp.inflibnet.ac.in/stats/home.php>

Top 5 Subjects : Visitor-wise	
Library and Information Science	675,000+
Chemistry	Nearly 340,000
English	Nearly 300,000
Anthropology	Nearly 290,000
Economics	230,000+

Table 9: No. of visitors from <https://epgp.inflibnet.ac.in/stats/home.php>

3.4 eOffice from NIC

The key modules of the eOffice product are:

File Management System
Knowledge Management System
Leave Management System
Tour Management System
Collaboration and Messaging Service
Personnel Information Management System
Smart Performance Appraisal...
Management Information System

As the usage data of the eOffice suite of products – in the higher education sector - is not available, no analysis is possible.

However, the product’s implementation handbook and the overview are well-represented in the website.

The product is available in 4 different versions and the following table provides the details of availability of its various features.

eOffice Product Suite	eOffice Lite (eFile)	eOffice Lite (SPARROW)	eOffice Lite (eLeave-eTour)	eOffice Premium
File Management System (eFile)	✓	-	-	✓
Knowledge Management System (KMS)	✓	-	✓	✓
Collaboration & Messaging Services (CAMS)	✓	-	✓	✓
Leave Management System (eLeave)	-	-	✓	✓
Tour Management System (eTour)	-	-	✓	✓
Personnel Information Management System (PIMS)	✓	✓	✓	✓
Property Return Information System Management (PRISM)	-	✓	-	✓
Smart Performance Appraisal Report Recording Online Window (SPARROW)	-	✓	-	-

Figure 7: Different versions of eOffice from ‘eOffice Implementation Handbook’

4 FINDINGS AND RECOMMENDATIONS

4.1 Key findings

The findings from the study of the four technology platforms - where MHRD is either the owner or the user or both – are summarized below.

4.1.1 MOOC from Swayam platform

- The spread or the awareness of the MOOC courses (from Swayam) in the student community (UG / PG) is very low – considering that less than 700,000 students have registered as against a large number (~ 29 million) of UG and PG students¹.
- Overall only one-fourth (1/4) of the enrolled students complete the course.
- Number of the non-credit courses is nearly 7 times the number of the credit courses although the completion % (by the enrolled students) of the non-credit courses is merely 20%. On the positive side, the number of credit courses is increasing Y-o-Y where nearly half of the enrolled students complete the course.
- About one-third of the non-credit courses have low (or very low) enrollment as well as low pass percentage.
- Among the credit courses, 4-point credit courses are nearly half of the total number of credit courses.
- While the number of high credit point courses (5 & 6 points) is less than 10% of the total, the pass % (in the 5 & 6 credit point courses) is above average in all cases of enrollment.
- There is a scope of improvement in the areas of production, delivery (pronunciation / dictionetc) to ensure the continued attention of the enrolled students.

4.1.2 NDL (National Digital Library)

- The volume of the resource depository is large. While English is the language of nearly 95% of the material, available, and French and German about 4%, the material in Indian languages is low.
- The website is user-friendly. However, the ‘Statistics’ section does not contain any data year-wise and that poses a problem in ascertaining the rate of growth (in terms of registration and related data). The number of 2 million activated registered users is

¹As per https://mhrd.gov.in/sites/upload_files/mhrd/files/statistics/AISHE2011-12P_1.pdf, “Total enrolment in higher education has been estimated to be 28.56 million” in page (i). It is to be noted that this data is nearly 6 years’ old.

certainly very low in the light of the large number of student and teacher population that India has.

4.1.3 INFLIBNET

- As on Feb 2019, the annual report of 2016-17 (Apr 01 2016 – Mar 31 2017) was the only official source of data
- It is not clear if there is any monitoring of the data of availability and usage of the e-books subject-wise
- ShodhGanga website (<http://shodhganga.inflibnet.ac.in>) contains almost no data about its usage
- Latest annual report (FY16-17) shows that the usage of ShodhGangareduced from Jul '16 to Mar '17
- There is no clarity from ePG website (<https://epgp.inflibnet.ac.in/stats/home.php>) if the materials are available in (a) audio only and / or (b) audio + video
- There is no clarity with respect to the key difference between the objectives of Inflibnet and NDL (National Digital Library) as both of these programs are library systems. It is not clear – why these two organisations cannot be merged and brought under one umbrella to avoid duplication, if any.

4.1.4 eOffice from NIC

As no data about the usage of the product is available, no valid observation could be made.

4.1.5 MHRD website

The website of MHRD (https://mhrd.gov.in/documents_reports) which contains the critical documents that would help assessing the current status of the various initiatives is not updated. In some cases,

- The annual reports are as old as 2015-16
- The links provided to connect to an external URL are invalid

4.2 Recommendations

The study of the four technology platforms from the perspective of higher education ecosystem comprising of students (UG and PG), teachers and academia administrators brought to surface some recommendations and the need to clarify some grey areas.

4.2.1 MOOC from Swayam

- Given that the number of non-credit courses is much higher – and – the success / completion rate is very low, it is advisable that a study is conducted to assess the profile of the beneficiaries from such courses. Based on the result of the study, a section of the non-credit courses may either be redesigned or dropped.
- As the awareness of the MOOC courses (from Swayam) is very low, a special awareness program amongst the teachers and the student community needs to be launched.
- A demand capture system must be instituted to identify the high-demand subjects for which the design and development of the MOOC courses (from Swayam) can be taken up on priority. The said demand capture system is also expected to highlight the subjects for which the demand is low and consequently the need to develop any MOOC course (from Swayam) on low-demand subjects can be reviewed.
- There needs to be a regular process of review of the course content after a pre-defined time period post the initial launch. If required, the course content needs to be updated.
- The MOOC courses may be launched in regional languages – may be in a phased manner – to widen the reach.
- As the pass % of the 5 and 6 credit point courses is above average across all levels of enrollment (very low to very high), the inference may be drawn that such courses are in demand by serious learners and consequently the number of such credit courses (5 and 6 credit points) may be increased.
- There needs to be a study to assess the effectiveness of the courses that have very low enrolment as well as very low pass % to decide if those courses can be abolished or revamped.
- As there are courses where the pass / completion % is low – but the enrolment number is average or higher (implying that those courses are in demand), it is important to review and rework the course content so that there is an overall improvement in terms of user-friendliness, understanding, teaching methodology etc so that the completion / pass % increases for such reasonably high-demand courses.
- The stake-holders of SWAYAM development (AICTE) need to be made aware of the software product and the concepts – as presented in the PMMMNMTT award scheme².

² A paper titled “moocIT- The MOOC management system” by Prof Prabhakar of IIT Kanpur, presented in “Select case studies from PMMMNMTT award scheme” talks about a software, developed, that can make MOOC available on multiple platforms including smartphones and can make the delivery mode adaptable to varying bandwidth

- The oversight (by the AICTE) during the development of MOOC courses (from Swayam) needs to be reviewed to improve the process of preparation by engaging a thorough project management methodology.

4.2.2 NDL (National Digital Library)

Special measures need to be taken to spread the awareness of the user-friendly facilities of NDL as the number of 2 million activated registrations is certainly low in the light of the large number of student and teacher population that India has.

4.2.3 INFLIBNET

- As the annual report is one of the key sources of data, it needs to be made available online on time as the current gap of two years is not professional (assuming annual report is a statutory requirement).
- The usage data of the key products such as ShodhSindhu, ShodhGanga and ePGPathshala need to be made available online to assess the effectiveness of the platforms to recommend areas of improvement and also to attract more visitors to the site.

4.2.4 eOffice from NIC

- It is critically important to assess the usage of the various functionalities of the product in the higher education ecosystem.
- The information regarding the data about the implementation of the product in the UGC offices and colleges and universities is required to understand the effectiveness of the product (i.e., to what extent the product can / does meet the ground-level requirements of the colleges, universities and UGC).
- Given that the product is cloud-enabled and that it uses Linux Redhat as the OS (operating system) and Postgre SQL 10 as the database – both of which are open source – it is important to understand the quality of support.

5 REFERENCES

- 1) An article from Techno India University: <http://www.ipedr.com/vol79/002-IC4E2014-1-003.pdf> -
- 2) MHRD website : <https://www.mhrd.gov.in/>
- 3) Swayam website: <https://swayam.gov.in>
- 4) NDL website: <https://ndl.iitkgp.ac.in>
- 5) Inflibnetwebsite:<https://www.inflibnet.ac.in>
- 6) National Informatics:<https://www.nic.in>

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