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Remodeling Open and Distance Learning Institutions through Digital Self Learning Materials: Preparing for Post COVID-19 Era

Nageshwar Rao*

The success of Open and Distance Learning (ODL) system in the higher education scenario of our country is due to its accessibility and flexibility. It is the enormous potential of ODL system that the role of Open Universities and other Distance Education Institutions (DEIs) has become essential towards achieving the goal of 40 Per cent Gross Enrollment Ratio (GER) targeted by Ministry of Human Resource Development for the year 2024. The University Grants Commission (UGC) estimated that by July 2019, a total of 113 Higher Education Institutions (HEIs) including 15 Open Universities were catering to higher education needs of more than 40 lakh students. Indira Gandhi National Open University single handedly contributed towards enrolling over 7.6 Lakhs fresh students in the year 2019. With the outbreak of COVID-19, the ODL will have additional responsibility towards maintaining the continuity of tertiary education. Rather, at present where all the educational institutions are undergoing compelled lockdown, technology enabled ODL is the only alternative. And it is assumed that ODL can become the parallel mainstream education system even after this COVID-19 and the number of students getting enrolled will increase by many times. With the increase in numbers of students enrolling in the ODL system it brings a challenge towards providing quality student support services with overall mandate of ODL system i.e. democratization of education ensuring access and equity.

In this era of Information and Communication Technology, it is in the fitness of purpose for the ODL institutions to integrate technology into all the domains of students support services and make sincere efforts towards providing technology enabled learning environments. With the greater emphasis on cost effective online education which is beyond the limitation of territorial jurisdiction as envisaged under UGC (Online Courses or Programmes) Regulations, 2018, the ODL Institutions have to remodel its support services framework aligning with technology supported learning environment. The four quadrants based student centric technology enabled Online Learning environment emphasizes on e-content, e-tutorial, web resources and self assessment and the first step in this direction is remodeling the existing printed Self Learning Materials (SLMs) into digital self learning materials (SLMs).

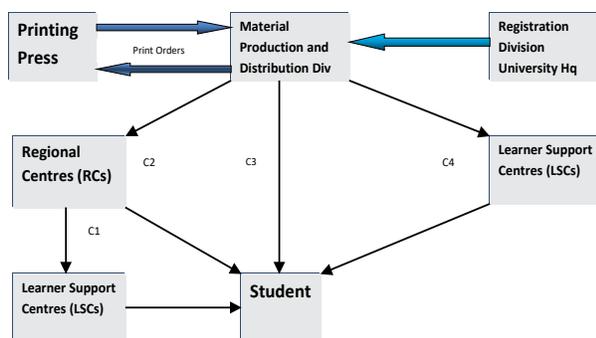
Printed SLMs: Constraints and Challenges

In the ODL mode of education, the printed SLMs is considered as the first step towards providing student centric support services. SLMs

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are so important that inability to provide them on time to the learners defeats the overall purpose of student support services offered by the Open Universities and DEIs. With the increase in number of students enrolled, the time and resources in the printing and distribution of SLMs too has increased. In 2019, the cumulative students enrollment in the university is 12.93 lakhs. Now, one can easily imagine the herculean task as well as the infrastructure and manpower resources utilized by the university to physically distribute the SLMs to over 12.93 lakhs (fresh and re-registered) students in a year. The process flow of material production and its distribution to the students in the traditional ODL system is given in Figure-1.

Figure-1 Flow of Material Production and its Distribution in ODL System



As shown in the Figure-1, the University has following four channels of distribution of the printed materials:

Channel 1: University Hq (MPDD) → Regional Centre (RC) → LSC → Student

Channel 2: University Hq (MPDD) → Regional Centre (RC) → Student

Channel 3: University Hq (MPDD) → Student

Channel 4: University Hq (MPDD) → LSC → Student

For the distribution of the SLMs to the students through above illustrated four channels, the process is itself very intractable. It starts with receipt of the printed material from the printing press after which it is sorted programme and course-wise. In the meantime, address slips of all the students are printed and labeled on dispatch envelopes. The course-wise and programme-wise sorted SLMs are then packed in the dispatch envelopes. The dispatch of the materials is done in three categories: direct dispatch to students; dispatch to Regional Centres; and Dispatch to Learner Support Centers. In the first case i.e. the direct dispatch to students is by post. For the second and third categories, dispatch packets are packed in dispatch

bags and then transported to the Regional Centres and LSCs either by post or road/ rail transport. From the RCs and LSCs, the SLMs are distributed in person during induction meetings/ introductory counseling sessions at the LSCs. Looking at the complexity of the printing and distribution of SLMs, the time taken from printing to final distribution to the students is very high and average time lag for distribution of SLMs is three months to six months subject to satisfactory delivery. The possible reasons for delay in delivery and receipt of SLMs to the students may be as follows:

- Lack of data analytics for real-time assessment of printing quantities and generation of address labels of the students;
- Inordinate delay due to bottlenecks in finalizing tenders for procurement of printing papers;
- Procedural delays in tender finalization for printers and issuing printing orders;
- Receipt and cross verification of quality of papers, printing quality and quantity of printed SLMs;
- Gathering (Sorting) of printed materials course-wise and program-wise and its packing in blocks /sets of the printed study materials;
- Quality related issues;
- Finalization of transporters and distribution through road transport, tax and permit related issues of the transporters;
- Postal transit loss of the SLMs;
- Incomplete addresses and change of addresses of students during the dispatch window; and
- Constraints due to poor Inventory Management System.

The delay and possible reasons for delay in delivery of SLMs to the students can also be understood from the Time-activity Chart for the SLMs Distribution at IGNOU given in table-1 for its students enrolled for the session commencing in July month of the Year.

As evident from the Time-activity Chart of printing and distribution of SLMs for the academic session commencing from July, presented in Table-1, the activities towards assessment of the estimated quantity of SLMs to be printed is commenced from the month of August of the preceding year and it continues till the admissions are over in the month

Table -1 -Time-activity Chart for the SLM Distribution at IGNOU

Major Activities under Printing and Distribution	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
A. Pre-Printing													
Assessment of Quantity	Yellow	Yellow											
Tendering of Paper/Printer		Orange	Orange										
Issuing Printing Orders			Light Green	Light Green	Light Green								
Generation and print of address labels									Blue	Blue	Blue	Blue	
Tendering and Procurement of Dispatch envelopes/ Bags		Dark Blue	Dark Blue	Dark Blue									
B. During Printing													
Progress on Printing				Green	Green	Green	Green	Green	Green	Green			
Collecting Printed Materials				Cyan	Cyan	Cyan	Cyan	Cyan	Cyan	Cyan	Cyan		
Quality and Quantity Check of printed SLMs				Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow		
Gathering and Arranging of Printed Materials				Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue				
Preparation of Course wise and Prog wise Material Sets				Purple	Purple	Purple	Purple	Purple	Purple				
Tendering and Procurement of Transporters			Red	Red	Red								
Packing of SLMs in Dispatch Packets/ Bags					Brown	Brown	Brown	Brown	Brown	Brown	Brown		
Hq-Regional Centre Distribution Matrix for SLMs dispatch			Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple			
Hq-Student Distribution Matrix for SLMs dispatch			Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue		
Hq-LSC Distribution Matrix for SLMs dispatch			Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red		
C. Post Printing and Distribution													
HQ-RC Distribution for SLMs								Yellow	Yellow	Yellow	Yellow	Yellow	
HQ-Student Distribution of SLMs									Green	Green	Green	Green	
RC- LSC Distribution of SLMs												Black	Black
RC-Student Distribution											Orange	Orange	Orange
Return Material and its distribution												Red	Red

of July/August (as the case may be). The aforesaid activity chart itself signifies the complex nature of printing and distribution of SLMs and abundance of manpower and infrastructure resources at the disposal and related expenditures also.

Another significant aspect of printed SLMs is about its distribution process, which is multichannel and pan-India. From Table-1, it is amply clear that the entire distribution process of printed SLMs is time and resource consuming due to involvement of multi-channel distribution system and pan India distribution network of the university. Besides, chances of successful postal delivery of SLMs are also not very high due to heterogeneous student population, their mobility and their non availability at the time of delivery of SLMs (esp. by post). Looking at the mammoth operational framework of printing and distribution of SLMs and operational costs and related expenditures involved, it is imperative for the ODL institutions leadership to think seriously towards alternative of printed SLMs with the advancement of technology and its effective use in creating student centric learning environment.

Digital Self Learning Materials: A Progression towards Student Centric Learning Environment

With respect to the challenges and complexities involved in printing and distribution of SLMs for a heterogeneous student population and with pan India distribution, the ODL institutions now should totally shift towards digital SLMs in the form of e-tutorials/

e-books embedded with audio and video resources, supplemented with Open Education Recourses, interactive web links, discussion/ chat boards, online quiz/ coursework, educational games, animation etc and can be made accessible as per learner's choice of electronic format i.e. desktop, mobile, I-pad, kindle etc.(Figure-2). The Digital SLMs may give following positive outcomes:

- Cost effective and easily accessible;
- Delivery within time and anytime;
- Ease in content correction/ modification and course revision;
- Finest tool for blended learning by combining with multimedia tools (eg. Twitter, Face Book, YouTube, Skype, E-mail, Chats, Blogs, Podcasting etc);
- Delivery through dedicated mobile app;
- Implementation through mobile LSCs;
- Variable and integrated learning resources;
- Convenient and lag free distribution to the students;
- Sharing of SLMs with State Open Universities (SOUs) and Distance Education Institutions (DEIs);
- Contribution to the sustainable development;
- Accessible beyond territorial jurisdiction including international students;
- Collaboration with SOUs for development;

Fig-2-Arena of Digital Self Learning Materials

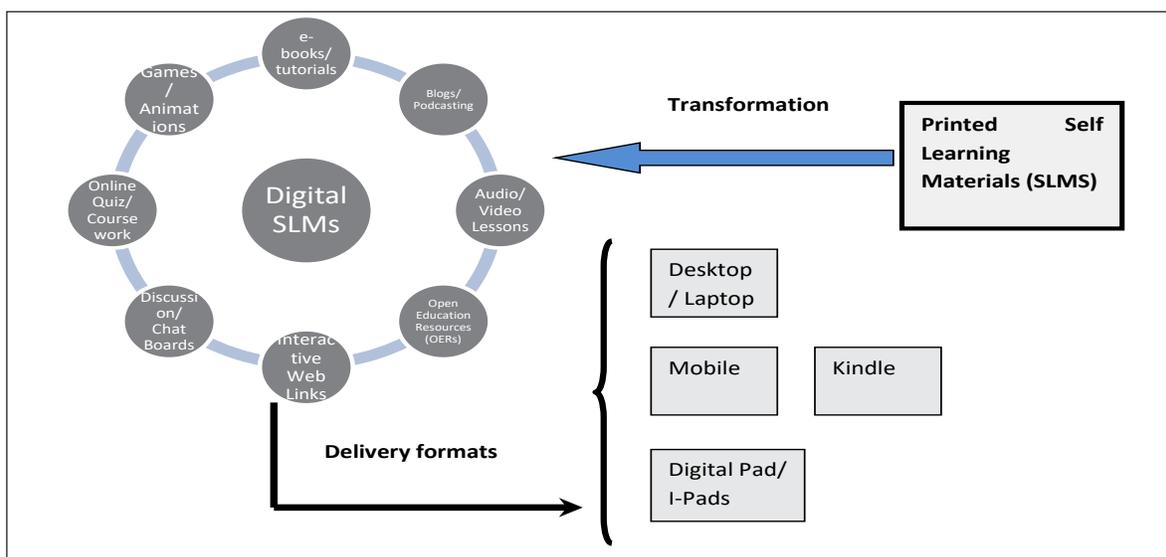
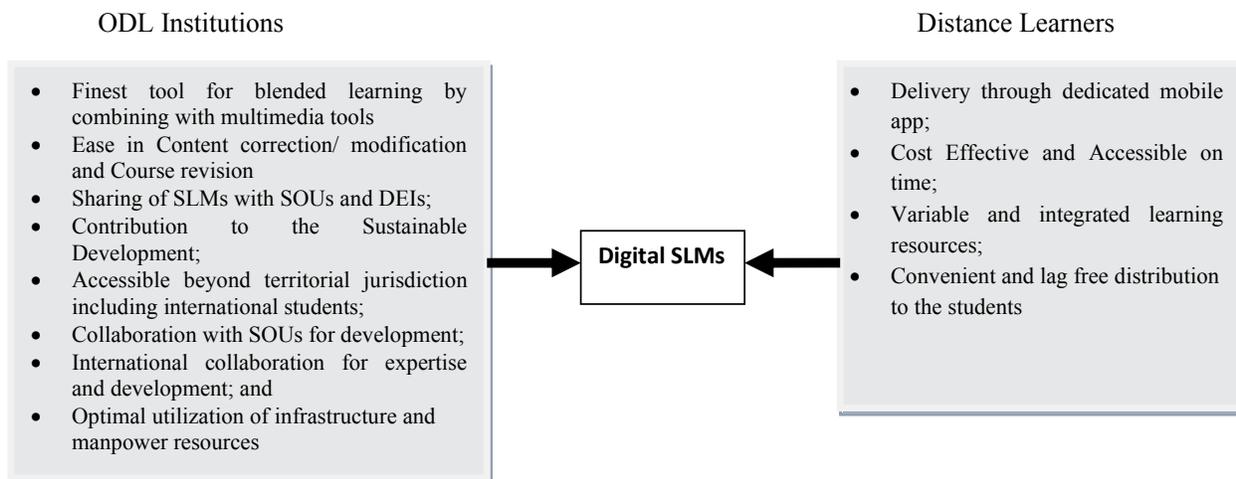


Fig-3: Positive Outcomes of Using Digital SLMs



- International collaboration for expertise and development; and
- Optimal utilization of infrastructure and manpower resources.

The aforesaid positive outcomes of using digital SLMs can further be visualized from two different points of views i.e. ODL Institutions and Distance Learners as given in Figure-3.

Conclusion

From the above deliberations, it is amply clear that the transition towards digital SLMs can overcome the biggest challenge posed by COVID-19 on higher education system. Apart from this technology enabled ODL will help in combating two other challenges of traditional ODL system i.e. huge expenditure in printing and distribution of SLMs and delay in delivery of SLMs to the students. Since the receipt of SLMs is first point of commencement of learning process in the ODL system and hence delays or incomplete receipt of SLMs can hamper the objective of effective and efficient learner support system. Moreover with lockdown phase, the process of printing the material vis a vis delivery will get affected. The digital SLMs can overcome these two challenges

of printed SLMs as well. The second biggest advantage of digital SLMs is developing a culture of collaborative framework of ODL institutions for design, development and sharing of resources for digital SLMs and thus making it cost effective too. The only challenge that one can foresee is its adaptability in the heterogeneous group of learners and accessibility related issues due to connectivity problems. However, these issues could be addressed with the help of different strategies. For example, some of the SOUs have taken a unique initiative of offering 10-15 Per cent fee concession for its students opting digital SLMs through a dedicated e-content app in the year 2019. This initiative was a huge success as more than seventy thousand students opted for digital resources over printed SLMs. For connectivity related issues, it can be addressed by providing digital SLMs in portable devices like cost effective digital pads, mobile devices etc.

Recognizing the need for just-in-time support in the day-to-day adaptation of tertiary education delivery to the impact of the pandemic, the following information depicts a series of considerations and actions institutions can follow as they work through the immediate and long-term adaptation to the changed environment for tertiary. □

A Sustainable Model of Faculty Development Programs for Health Sciences Universities in India

Subahsh Chandra Parija*, Balachandra V. Adkoli**

The Health Sciences universities in India are expected to advance knowledge in health sciences through research, and develop health professionals who can provide effective health care delivery to the people of India and beyond in a migrating world. Imparting health education, promoting research and innovations in the field of health, besides providing quality health care constitute a 'trinity of mission' of most health sciences universities. Out of these, health education, encompassing medical, dental, nursing and allied health sciences education assumes great significance because the training of health workforce is instrumental for effective health care delivery to be in place.

Functioning in a global, competitive environment, the health sciences universities in India today, are facing the challenges of achieving the accreditation and rankings by the regulatory authorities. The accreditation is a hallmark of quality of an institute in terms of its credibility and employability of the products in a global market. The National Assessment and Accreditation Council (NAAC) Manual of Health Sciences Universities has fixed seven criteria for the assessment: curricular aspects; teaching-learning & evaluation; research, innovation and extension; infrastructure and learning resources; student support and progression; governance, leadership and management; institutional values and best practices (NAAC, 2019). All these seven criteria are directly or indirectly impacted by the quality and performance of the faculty. Capacity building, skilling, and competency development are the buzz words. Faculty Development is the instrument for achieving these laudable goals.

In a broad sense, FDP includes all programs such as workshops, seminars, short courses or fellowship programs that are designed to enhance the competence and performance outcome of the faculty. It is a major input in the 'health sciences university

system' that aims to bring desirable outputs, viz., competent and willing health workforce that support effective & efficient health care delivery (Adkoli & Parija 2019). Ideally it should cater to the needs of the faculty in playing their diverse roles such as teachers, clinicians, researchers, administrators and leaders (Harden & Crosby, 2000). On one hand, FDPs are instrumental in promoting career enhancement of the faculty, thus preventing them from stagnation or burnout. On the other hand, they also serve as the vehicles for supporting the successful delivery of the curriculum. It is well known fact that curricular reforms are met with resistance to change. Only a well thought out FDP can facilitate 'buy in' from the faculty who are the impalements of curriculum. The Lancet Commission on Education which deliberated on the 'Health professionals for a new century' emphasizes the need for shifting from informative learning to formative learning, and further to transformative learning (Frenk et al, 2010). The commission recognizes faculty development as a major vehicle for achieving this laudable goal.

Faculty development has received a lot of impetus in medical education globally as evidenced by number of publications in this field during the last decade (Steinert et al, 2006; McLean et al, 2008; Steinert, 2010; Adkoli et al, 2010; Steinert, 2010). It has also been discussed in Indian medical education system with reference to the need, status, and recommendations for further improvement (Bhuiyan et al, 2001; Bansal & Supe, 2007; Adkoli & Sood, 2009; Adkoli et al, 2009; Srinivas & Adkoli, 2009; Sood R, 2015). A reality check across the health profession reveals that FDPs are concentrated on the medical faculty with some exceptions of its utility for other category of staff (Deepak et al 2014). The Medical Council of India has come out with a national faculty development program for medical faculty. This program involves establishment of Medical Education Unit in each college to facilitate organization of Basic Course Workshops and Advanced Courses in Medical Education through a network of regional and nodal centres respectively (MCI, 2017). The initiative taken by the MCI to introduce Competency Based Medical Education,

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emphasis on Attitude, Ethics and Communication in the form of AETCOM modules, introduction of foundation course, early clinical exposure are notable developments which will have far reaching implications on faculty development (MCI, 2018). While medical education has made a beginning in organizing FDPs in a systematic manner, the dental colleges have no mechanisms to organize FDPs in a systematic manner. The nursing colleges have a strong component of pedagogy in their postgraduate training program, though there are not many avenues open for the nursing faculty for regular exposure to FDPs. The colleges of allied health sciences have even lesser opportunities for professional development, except attending conferences or Continuing Medical Education (CME) activities in a sporadic manner.

Deficiencies in the Existing System of FDPs

Though FDPs have made their entry in health sciences universities, there are problems with their quality and outcome. Firstly, the FDPs organized are too few and floating. There is a lack of concerted effort by the various departments, resulting in limited impact at high cost. Secondly, the existing approaches to FDPs are not need based. They focus more on quantity rather than quality. This is partly because of lack of expertise available locally, and the high cost of outsourcing the experts from far-away places. Thirdly, the existing programs are not financially sustainable on a long term basis, as there is no proper mechanism of funding. The funding available from external agencies is done on ad-hoc basis. The continuation of funding is uncertain and often inadequate. The faculty cannot afford or willing to pay and the organizations consider such expenses as luxury and not necessity. Last but not the least, the existing FDPs do not support 'inter-professional approach' to the capacity building which is vital for the successful delivery of health care amidst growing specialization and silos existing among health profession. In this background, we narrate the experience of a health sciences university, in providing a sustainable model of FDP which can show a pathway for future development.

Initiative by Sri Balaji Vidyapeeth, Pondicherry

Sri Balaji Vidyapeeth (SBV) is a Health Sciences Deemed to be University privileged to have medical, dental, nursing and allied health sciences colleges under single campus located in the suburbs of Pondicherry (SBV, 2020). Its mission

is to create an innovative ecosystem that facilitates capacity building in broader perspective by integrating education, patient care and research. For achieving this mission, SBV established a Centre for Health Professions Education (CHPE) in 2015. This Centre has introduced innovative programs in health professions programs such as Post Graduate Diploma in Health Professions Education (PGDHPE) and M Phil programs leading to Ph D in health professions education, open to the working faculty across medicine, dentistry, and nursing profession. The idea is to train a new cadre of health professions educators who can bring inter-professional education which is the dire need of the country to deliver a holistic health care. The second major function of CHPE is to organize faculty development across the university and at a national level. Realizing its potentiality and strength, it was identified as the nodal agency for launching a national faculty development program, under the supervision of a steering committee chaired by the Vice Chancellor. A collaborative approach was used by identifying knowledge partners, such as Academy of Health Professions Educators (AHPE), India, a national organization consisting of leaders in health professions education (AHPE, 2020).

SBV Model of Faculty Development

The three guiding principles behind the SBV model are:

- Relevance and scope of programs; inclusive approach
- Attention to quality
- Sustainability and cost effectiveness

Relevance was achieved by identifying the topics of FDP from the job responsibility and needs of the faculty, rather than what can be offered by the organisers. This was aided by making a grid of the four domains, viz., teaching, clinical/patient care, research and administration. This exercise resulted in identifying 21 programs which were phased out through out the year. (Table 1)

Quality was addressed by collaborating with knowledge partners, especially national associations and experts, for example, Academy of Health Professions Education (AHPE), a national organization with expertise in health professions education and faculty development. Another major step taken by SBV was to introduce credit system for FDPs based on a rational criteria. The credit system advocated by the UGC is a radical reform

Table 1 Faculty Development Programs Identified Under Four Major Domains

Domain - Teaching	Domain – Clinical/Patient Care	Domain – Research	Domain – Administration
E-learning: Storyboarding and Instructional designing Assessment tools in Competency Based Curriculum MCQs & Item Analysis Feedback and Mentoring	Good Clinical Practice Good Clinical Laboratory Practice Update on Osteoporosis Effective teaching in clinical setting	Skills in Scientific Writing Effective presentation of Research Findings Intellectual Property Rights (Copyrights and patents) Planning and conducting Research Plagiarism and Bibliographic management Guidance for applying for Extramural Research (EMR) funds	Industry – Academic Collaboration Leadership, Team building, Conflict Management Safety and Wellness of Hospital staffs Bio hazards, Lab safety and Bio medical waste management Stress management with salutogenic focus Communication Skills

for building flexibility and accountability in enhancing and measuring learning outcomes (UGC, 2020). This step not only brought transparency and credibility to various programs, but also paved way for credit accumulation and credit transfer across the universities in the future. The credits awarded are shown in the certificates awarded to the participants for each FDP. Other steps taken to enhance quality were to sensitize the local faculty through a series of workshops, and their empowerment by developing standard operating procedures, checklists and templates for supporting all programs. The sensitization of coordinators was highly useful to secure a ‘buy in’ and overcoming resistance to change which is inherent in any organization.

The unique features of the SBV model are highlighted in Box 1.

BOX 1. Unique Features of SBV Model of Faculty Development

- The scope of FDPs extended to medical, dental, nursing and allied health science education
- FDPs are need based and addresses all four major domains of functioning of a health professional – Teaching, Clinical, Research and Administration.
- Targeting all levels of faculty from Postgraduate Residents to junior, mid and senior faculty
- Award of credit points, to each program, to be shown in the certificates
- Collaborative arrangements with Knowledge partners within the health profession and beyond.

Methodology and Logistics of FDP Sessions

The FDPs were all grounded on the principles of adult learning with emphasis on interactive sessions, and group work by participants besides Skype sessions by experienced national and international speakers. The plethora of activities included: presentations by the speakers (virtual and physical), individual assignments, group work, hands on, case studies, buzz sessions, Think -Pair - Share, brainstorming, affinity mapping, panel discussions, symposia, quiz, SWOT Analysis and Appreciative Inquiry.

Evaluation of FDPs

Evaluation is the most important component of an FDP. While several models of evaluation are available, the SBV Model of faculty development follows the evaluation pattern based on Kirkpatrick Model, which is one of the most popular models used in program evaluation (Kirkpatrick, 1994). According to this model, an educational program should be evaluated at following four levels:

Evaluation of Reaction

This is done immediately after each program by administering a program evaluation questionnaire administered to the participants. It can be done efficiently by using either a Google Form or tool such as survey monkey which enables the organizers to analyse the perception of participants regarding the usefulness of the program.

Evaluation of Learning

This is done by pre-test and post-test method, by direct or online administration. It is also possible

to conduct pre-test and post-test online to save a lot of time and energy.

Evaluation of Behaviour

This is done by observing the behaviour or practice of the participants when they go back to their workplaces.

Evaluation of Impact

The impact of the program can be judged by collecting evidences such as how the participants of the program are able to bring about discernible changes in the system. We need to identify certain key indicators for this purpose and capture the changes that have occurred which have positively contributed to improvement in health care delivery of the people. Impact evaluation can be carried out only after 4-5 years of running the program.

Lessons Learnt and Reflection

So far, we have completed many programs. We are in the process of analysing the outcomes of each of these workshops following the model mentioned earlier. We have completed evaluation of participant's reaction and learning. We have a plan in place to monitor the outcome of these workshops in changing their behaviour and practices in their workplaces through appropriate tools, which will provide a vital evidence to demonstrate our success or failure. Nevertheless, we can share our initial impressions culled out from our interactions with the participants, faculty and the organizing team.

From the interactions with the participants we get a feeling that the topics addressed by us are highly relevant and useful for their day today practices. However, they expressed further need for handholding them to transfer their skills learnt to their workplaces.

As regards the quality of proceedings, both the participants and the speakers (who interacted virtually) were highly impressed. The participants expressed that they would recommend such workshops to their colleagues. The Skype sessions were all running smoothly and the participants found them useful and motivating.

The local faculty found the programs as a great opportunity for their academic growth. For them it opened a new door of collaborative activity, networking and teamwork. We believe, this interaction would trigger further networking and professional growth of both the faculty and the participants.

We noticed some variation in the motivation and preparedness of the individual coordinators. No doubt, we tried to handhold and support the needy teams, who were somewhat hesitant in seeking help. To what extent we can entrust and empower the groups without enforcing too much of centralization is an enigma for us to contemplate further. \

Conclusions

Subject to collection of additional evaluative data, we can conclude that the FDP model which we tried out in SBV, Pondicherry, helped us in deriving multiple benefits. It emerged as a sustainable model of faculty development based on the principles of relevance, quality, and sustainability. For the first time in the history of our institute, there is a conviction that it is possible to organize FDP a sustainable activity, provided we engage in a team work, and collaboration with people of different skill sets and experience.

It has also helped SBV in local capacity building by empowering coordinators to pursue FDP in a synergic manner. The way forward appears to be working towards the effective implementation of the skills in the participants practice. Considering the large volume of faculty those need to be trained, our model should be supplemented with MOOC kind of programs with blended learning opportunities. We plan to work further to upscale the model which can be implemented at a national level by appropriate networking with all health sciences universities and riding on the technologies developed by the technology partners. Nevertheless, ours is now a small beginning to start a chain reaction to promote faculty development in a holistic manner.

Acknowledgments

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Conflict of Interest

The views expressed in this article are that of the Authors and do not necessarily reflect the official policies and views of the SBV and its statutory committees.

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Internationalization of Medical Education: Dilemma between Domestic Requirements, Policies and Global Objectives

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Foreign participation in the health care sector has gathered momentum in the recent years due to growing importance to internationalization at policy level though their participation in diversified areas is evident from many decades back. Nonetheless, the medical education sector can't be segregated from the health care industry and thus from the interests of foreign providers. As pointed out by the WHO (2011) educational institutions must implement reforms that allow them to recruit from the communities they serve, teach to the local disease burden, and educate students to practice within the care delivery models that are likely to best serve the local population health needs. In this context, the participation of the foreign providers should address the local needs of the region concerned. But, the multiple problems faced by the Indian health sector demand a well formulated policy framework to address these problems keeping into consideration the rising interests for Indian medical education market. Post GATS agreements of WTO, has encouraged more foreign participation in the education sector simultaneously raising the issues of regulations of foreign collaborations regarding the standards and quality of services provided by them.

In the context of the kind of training provided in the health care sector in India the National Knowledge Commission Report (2006) on medical education has described the health oriented education across the board in the country is directionless, unregulated and non-standardized, apart from a few institutions. The quality, quantity and distribution of the health oriented human resources being produced leaves much to be desired when compared to other developed and developing countries. With reference to the quality, there is no accountability, effective monitoring or implementation of laid down standards, by any regulatory body or well-designed need oriented educational programmes. With the existing problems persisting in the medical education system such as, the problems related to the availability of hospitals linked with medical education, medical personnel, quality faculty, curriculum, innovations, technology and skills etc. the possible

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challenges and opportunities and the role of regulatory mechanism in terms of standards and accreditation is vital for a developing country like India.

Internationalization of Medical Education and Challenges

Medical education in general is facing major challenges due to cross border education providers around the globe. The interface between medical education and healthcare delivery is the important aspect that should be taken care of while assessing the challenges and opportunities of such cross border providers. According to the study by Jolly (1997), comparative advantages enjoyed by top most universities because of their rankings (prestigious medical institutions), a wide range of choice, the flexibility of the system, the weight accorded to the degrees conferred by such institutions, and consequent educational linkages to the political and business elites judge the capacity of those institutions to attract foreign providers. The universities in the western system, particularly in the United States and the United Kingdom, are such kind of institutions providing quality medical education.

The proliferation of arrangements between foreign universities and local universities through the establishment of "local branch campuses," or "subsidiaries" as well as through "twinning arrangements" with local universities in the region (i.e., commercial presence) enable the students to undertake their tertiary education at foreign universities. The establishment of local branch campuses accords numerous benefits to receiving nations. Besides the provision of medical education to the labour force it provides the much needed educational resources in terms of skills and modern technology and developed infrastructure in the region. It has been argued that commercial presence can generate additional resources for investment in and upgradation of healthcare infrastructure and technologies, generate employment, reduce underemployment of health personnel besides providing expensive and specialized healthcare services (Chanda, 2002). Commercial arrangements are becoming prominent in Asia-Pacific region mainly through franchising and twinning arrangements

(OECD, 2004). It follows a capacity building approach where the emerging countries try to build up their capacity through policy instruments such as encouraging foreign institutions and programmes to participate and operate private for-profit ventures under government regulations to maintain compatibility with the country's economic policy agendas. India is also in the process of following such kind of approach. To facilitate knowledge transfers there are instances of twinning or partnership arrangements by the local providers of the countries such as South-East and North Asia and Middle East (e.g. Malaysia, Hong Kong, China and Singapore) with the foreign countries. There are instances in Asian countries like Thailand, Indonesia, Malaysia and Singapore where the universities of west seek to penetrate further their educational market by expanding a number of collaborative activities between local universities and foreign service providers.

But, for a developing country like India such benefits are minimised due to the focus of such collaborations in urban and developed areas that are not reachable by the majority of the rural masses. Further, the disease patterns of the interior areas in the country basically require preventive treatments in terms of primary and secondary healthcare rather the specialised tertiary healthcare. Financing of such healthcare services would be a big issue besides training of the manpower. The standards of curriculum and the role of the regulatory mechanism to access the quality and relevance of education imparted would always be a challenging aspect to get the benefits of such internationalisation.

According to Altbach (1991) and others, there are substantial benefits out of the exchange programmes through twinning partnerships where the students of

the host country can make use of their knowledge and networks to build up business linkages with foreign nations e.g., Western Europe, North America and Australia. However, such business motives would again ignore the difficulties of the host country (if, it is a developing country) give stress to the tertiary healthcare only that is again most prominent in developed countries.

There are many positive effects of such internationalization as argued in the literature. They are; creation of new courses and programs, modification of the curricula as per international standards, alternative delivery methods, and expansion of work-study opportunities with the objective of improving international skills and competencies among the students and staff (JRM and Associates, 1998). New delivery methods enable access to medical education services. These changes are argued to put profound impact on policy and practice in medical education sector (Mallea, 1997, 1998; JRM and Associates, 1998; Bennell and Pearce, 1998). But, in the long run, the success in the provision of medical education in the presence of foreign providers is achieved if quality and standards are improved with the help of efficient and effective accreditation agencies. The relevance of courses and programmes and expertise of international standards to the health sector requirement of a country would be an area of concern.

According to the World Health Report (WHO, 2011) while there is a global shortage of health professionals India is amongst the countries experiencing the greatest shortfall in this regard.¹ The data given in table - 1 indicates the shortages in India compared to other countries and Figure-1 gives the picture of India only in this regard.

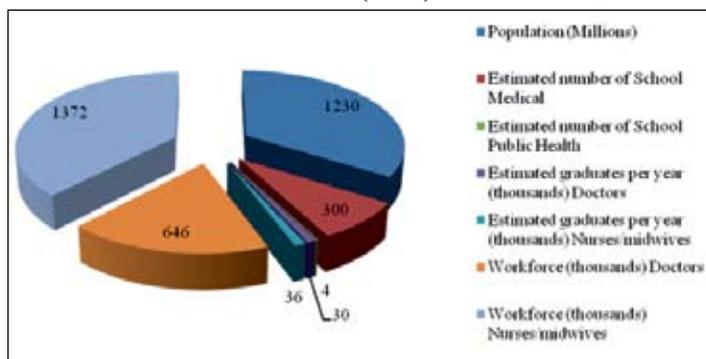
Table 1 Institutions, Graduates, and Workforce by Region (2008)

Countries	Population (Millions)	Estimated number of School		Estimated graduates per year (thousands)		Workforce (thousands)	
		Medical	Public Health	Doctors	Nurses / mid-wives	Doctors	Nurses / midwives
China	1371	188	72	175	29	1861	1259
India	1230	300	4	30	36	646	1372
North America	361	173	65	19	74	793	2997
Latin America / Caribbean	602	513	82	35	33	827	1099

Source: WHO, 2011

¹South and South-east Asia, Bangladesh and Indonesia come under the same category.

Figure 1 Institutions, Graduates, and Workforce in India (2008)



Source: Generated from Table- 1

As table-1 indicates, India has larger number of medical schools compared to China, and North America by the year 2008 though in terms of total population the number may not be sufficient to fulfil the health requirements of the whole population. On the contrary, the figure on the estimated number of public health school is dismal compared to the figures of other countries and also extremely low to address the primary health issues of a population of 1380 millions. This is what shows the inability of a developing country like India which health system has failed to generate enough human resources for health to meet the demand of primary health care services. Given these shortfalls the role of foreign providers in aggravating the existing challenges or contributing towards reduction of those challenges is a matter of concern. This is because, the foreign medical education providers specialising in tertiary health care services and new technology would have difficulties to cope with the healthcare needs of local population of India. The study by DGCIS-IIFT (2013) has found that 43 percent of revenue in trade in Education services is coming from Medical education followed by Management education, general education and Engineering. If, such trade is existing in India then, the concern for the contribution of different modes in overall trade and hence, the resulting challenges to the health sector would remain an area to explore.

Perspective Towards Internationalization by Indian Medical Colleges

The medical institutions in India under the collaboration or twinning or franchising method can make use of their strengths in developed countries by establishing their campus outside or encouraging foreign providers to India. But, competitive advantage is the factor that must govern such collaborations to gain out of such partnerships in trade in medical

education services. It has been observed by Bhusan (2004) that, medical education under commercial presence may be beneficial subject to the market access limitations and the public providers in medical education from abroad. The license for entry of foreign medical institutions in India under commercial presence may be provided to selective reputed public medical providers those impart quality medical education that would tackle human resources for Indian health care sector. Otherwise, many number of foreign providers without limitations would create chaos in the healthcare system regarding their quality, curriculum, and pedagogy, service delivery of

the graduates from these institutes and above all their accreditation and regulations. The matter of accreditation and regulations becomes far more complicated with the entry of private foreign providers.

The development of branch campuses under mode 3 is evident from Universities and Institutes like Manipal. Many medical colleges in India have allocated seats for Indian Diaspora particularly for the students in South-East Asian countries. With regard to such higher demand of Indian Diaspora the Manipal University has opened its branches in Malaysia, Dubai and Nepal to impart medical education and skills to residents of such countries. Under a twinning programme, Melaka-Manipal Medical College was set up in 2001 in Malaysia in partnership with the Manipal Academy of Higher Education (Manipal Group, 2013).

The source from Embassy of India (GOI, 2014) has mentioned that, replicating the experience of Manipal, Vinayaka Missions University from Salem in Tamil Nadu, established twinning arrangements with Penang International Dental College (PIDC) in 2005. The Vinakaya Missions University has recently announced further investments in establishing educational institutions in Johor Bahru. Many other Malaysian educational institutions have also entered into twinning arrangements with Indian educational institutions e.g. University Science Malaysia (USM), Penang, has a twinning arrangement with the KLE University, Belgaum, for the MBBS degree course; and the Management Science University (MSU), Shah Alam, has a twinning arrangement with the M.S. Ramaiah Medical College, Bangalore, whereby they have set up a special International Medical School (IMS) in Bangalore specifically for their MBBS twinning course. Many other Malaysian institutions

are also sending their students for short-term clinical practice training to India.

Similarly, the Pravara Institute of Medical Sciences (PIMS – DU) in Maharashtra, a Deemed University have undertaken many numbers of collaborative programmes in the areas of twinning, and franchising since year 2007. The rural hospital RUHSA (Rural Unit for Health and Social Affairs) of Christian Medical College (CMC), Vellore, Tamil Nadu (one of the oldest and most highly regarded hospitals in India) has twinning partnership with the University of Colorado Health Sciences, Denver, Colorado, USA in the discipline of Diploma in Allergy & Asthma (DAA) with subspecialty in Allergy, Asthma and Immunology (Christian Medical College, 2013). Joint degrees are awarded to the students and faculty exchange programmes are in operation. National Institute of Epidemiology (NIE), Chennai, Tamil Nadu with Sri Ramachandra University, Chennai has developed meaningful collaborations with several national and international institutes.

A MoU between ICMR and University of Minnesota, USA was signed in October, 2006 at New Delhi for the development and expansion of medical education and clinical programmes in the areas of medicine and public health (ICMR, 2013). The Post Graduate Institute of Medical Education and Research has a twinning partnership with Virginia Commonwealth University since 2006 in the streams such as; Psychiatry, Genetics, Internal Medicine. It has fostered faculty collaboration and the potential for future student exchange programs (Post graduate institute of Medical education and Research, 2013).

The foreign collaborations should be driven by health needs of population concerned. The WHO (2011) suggest for transformative scale up in medical education that insists for delivering educational reforms that addresses not only the quantity, but also the quality and relevance of health care providers in order to achieve improvements in population health outcomes. Take for example: in the low-income countries communicable diseases, maternal and perinatal conditions and nutritional deficiencies represent 69 percent of the disease burden whereas in high-income countries it is only 8 percent (OECD, 2004). A mere increase in the number of medical graduates (imbued with skills and competencies) through foreign collaborations may not solve the problem of the shortage of professional health workforce unless there is a collaboration between the medical educational institutions (whether of host or

foreign country) and the healthcare needs of the host country concerned. Thus, the local relevance as well as disease specific provision of medical education should be the objective of the foreign providers.

Quality and Regulations

The most difficult challenge is aligning the academic regulations to encompass all individual requirements and ensuring that the essential elements are agreed by all partners. Joint academic regulations should be a minimum regardless of whether it is a joint or dual/multiple degree (Institute of international Education, 2011). As a key goal of Bologna Process, fair and transparent recognition of degrees of the multiple foreign providers in the education process is a matter of major concern of the European higher education system for medical education (Rauhvargers et al. 2003). To keep a track of the multiple providers regarding their ranking in their country of origin and quality and recognition of their degrees under their regulatory agencies concerned is an important affair before entering into any kind of collaborations in medical education. The multiple varieties of education providers from different countries and lack of information about the quality of education provided may end up with low quality providers that are only “degree mills” and poor quality assurance and accreditation agencies as “accreditation mills” (OECD, 2004). Here comes the importance of regulatory and accreditation agencies of the host country to coordinate the process of collaborations that will be helpful to the host country in reaping the benefits of such collaborations in medical education and fulfil the requirements of its health sector.

The strategic partnership between World Health Organization (WHO) and World Federation for Medical Education (WFME) formed in 2004 to improve health of all people through promotion of high-quality medical education considers accreditation as an important parameter of quality (WHO, 2004). WFME Global Standards program, initiated in 1997 now being used in all regions as a basis for improving medical education also stands for facilitation of exchange of medical education programmes between countries (Van Niekerk & De, 2003).

India has to open its education sector as part of its international commitments on the General Agreement on Trade in Services (GATS). The study by the Association of Indian Universities (AIU, p.29, 2012) has stated that there is the need of regulatory

modules to safeguard the interest of traditional institutions as well as traditional knowledge system of India and hence a clear policy should be chalked out to make foreign education providers socially justice-able and culturally viable. Further it stands for the need of strengthening our own position in terms of infrastructure, student support system, placement policies, and management and governance of institutions. It emphasises on the faculties who are coming in with the foreign education providers to be equally qualified as they are in their home campus and competition should be in a healthy environment and under strict regulations. The study of AIU (p.30, 2012) has also identified certain challenges that India would encounter with the foreign education providers. As these foreign education providers come with their own complications and requirements with non-compliance would be costly and lead to loss of reputation and good-will. They do not give complete and correct list in their websites and thus, emerge as a medium of cheap mergers and acquisitions. Therefore, it suggests for a kind of competition in a healthy environment but under strict regulations.

The Foreign Educational Institutions (Regulation of Entry and Operations) Bill, 2010 introduced in the Lok Sabha on May 3, 2010 seeks to regulate the entry and operations of Foreign Educational Institutions, including technical and medical institutions, imparting or intending to impart higher education in India. It states that; “to regulate entry and operation of foreign educational institutions imparting or intending to impart higher education (including technical education and medical education and award of degree, diploma and equivalent qualifications by such institutions) and for matters connected therewith or incidental thereto” (p.1, 2010a).

The diversified health requirements of Indian population where the primary and secondary health care is given greater emphases looking at the types of diseases majority of Indians are suffering, the curriculum of a developed country may not provide the desired solution to the persisting problems. The services provided by such medical graduates who pass out from the institution of such foreign provider may not serve the true purpose of medical education for a country like India. Thus, the syllabus and curriculum of medical education provided by such foreign providers should have connections with Indian health care industry. Take for example: all courses offered by Foreign Educational Institutions in New Zealand have to be approved by its statutory authorities concerned (Parliament of India, 2011).

Since medical education is linked with health care industry and development the training of the graduates must take care of the safety of patients. The norm of MCI for mandatory license of any medical teacher or doctor is suggested to be enforced and monitored for the foreign providers too (Parliament of India, 2011). Similarly, the norms and standards followed by the foreign medical institutions in their home country are suggested to be at par with Indian norms and standards as mandated by Indian regulatory agencies. A clause on the medical ethics of different countries and the level of ethics required in our country is suggested to be included by PSC.

The affiliation of Indian medical institutions engaged in collaborations with foreign medical education providers is a matter of concern too. All those medical education institutions in India mapped to be in some sort of collaborations with foreign education providers are private or government. But, in case of un-aided private medical institutions in India (e.g. KSHEMA, Apollo etc.) in collaborations with foreign education providers may not serve the purpose of medical education that is associated with service domain in the context of Indian health care requirements. Likewise, the ranking of the foreign provider in its own country's statutory body should be taken into account before entering into any kind of collaborations under mode 3.

Conclusion

It is quite evident that, the medical education system in India struggling to build up a linkage with the health care industry may be dragged to accumulating uncertainties for the students, medical personnel as well as the poor patients fighting for free medical care. Besides, the possibility of commercialization by the foreign providers may not be ruled out in medical education sector too. Such happening would further aggravate the existing problems of health care in India. Healthcare education in India seldom addresses topics such as regulatory norms, ethics compliance, and entrepreneur skills and does not focus on creating an innovation-oriented educational environment and research facilities all of which has direct impact on healthcare delivery. The ultimate impact should be on ranking of such institutions by making it a global objective to encourage medical education institutions to enhance quality in the presence of required regulations and therefore meeting the demands for local as well as global requirements for healthcare professionals. A coherent curriculum is a challenge which addresses

the needs of global requirements with existing country centric regulations and policies.

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COMMUNICATION

Higher Education in the Year 2020-21: How Should it Be?

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This is a Communication of the Author presenting her viewpoint on how the forthcoming academic year ie 2020-21 should be conducted in Higher Education Institutions in view of extensive spread of COVID-19 in the country. Since the viewpoint of the author is on very important dimension of higher education, we are initiating a debate on it in the University News. Policymakers, Vice Chancellors, Principals, Faculty Members, Students and Parents who are reading this write-up may send their viewpoints in this regard to the Editor, University News to the E-mail. Id unaiu89@gmail.com for possible publication in the Viewpoint/Communication Column. Your valuable views may help the policy makers in their decision making process.

Editor

The title is specific in its intent. It is limited to just this one year as it has turned out to be a bizarre and uncommon year. If the experiment proves successful, this can be extended to all graduate courses in the coming years. The weird, invisible virus COVID-19 (Corona Virus Disease) has spread its tentacles all through the world and has spiked all forms of human activities. It has pushed a large majority of us into the security and comfort zone of our homes that has come to resemble the womb, our nascent habitat where we had stayed well protected for full nine months before stepping into the world. I hope our foetus like existence may not extend to nine or multiples of nine months. My only fear is having too long and too far waded into a life of timelessness, it may prove difficult for us to return to the pre-pandemic normal. The only unalterable fact is 2020 will remain an abnormal year especially for students in pursuit of their tertiary education.

The unimaginable power of this microcosmic virus has razed down human capability to master the universe and shown the vulnerability of Man's vaunted display of power and arrogance. The wisdom of the ancient Tamil proverb cannot be overestimated. It says, "The knowledge we possess is like a handful of sand; the knowledge we do not have is as vast as the sands on the shore." This epidemic must open our eyes to recognize the abyss between education that had been till now offered and education that needs to be given. We have to revisit our concept of learning at the tertiary level as higher education holds the key to open the mental vista of the future of humanity. If

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humanity is to survive, we have to reappraise where we have gone wrong and reinvent new approaches to higher education that can sustain us during such times of universal crisis that spreads beyond man-made borders which are nothing but shadow lines to divide the human race.

It is axiomatic before we contemplate changes in education to accept the factual reality that even before the onset of the pandemic, our higher education was not in good shape. The shape of chaos that had set in had defeated the idea of higher education. *This fact is not a reflection on the quality of students or teachers, but on the mismatch between the input and the output – in the quality of education offered and the quality of its output.* Our Institutions have also been pawns to divisions arising out of ideological differences where the agenda is set by majoritarian ideologies of the day. They are also caught up in the cleft between education for employment and education for human development. An integrated approach to learning that has the potential to fuse disparate ideas and thoughts among different disciplines has been missing from our institutions resulting in turning out students with half-baked minds, lacking mature judgement and holistic understanding. Paradoxically higher education has adopted the preposterous principle of division in place of unification which is the essence of education. This is best illustrated by the tag lines that every college attaches to its name- such as College of Arts, College of Sciences, College of Applied Sciences, College of Vocational Studies... These tags reveal the compartmentalisation of knowledge which has to be integrated and wholesome. The young minds

who come to these institutions learn only partially --- a minuscular area of the course they have chosen as their major. The present system of education is far removed from the idea of education that is multidisciplinary in its wholesomeness. The web of knowledge which is the inter connectedness of many disciplines is missing from our current system of education. Three years of graduation has proved inadequate for the students to learn anything other than the limited course he has opted for where the course content is divided into smaller units for each semester with no linkage to the courses taught through six semesters. In earlier times when we were graduate students, we had to take all the ten papers in the final year which in many ways helped us to see the discipline in its entirety. Today, only the brightest students find their own niche of excellence through self study. For the large majority, knowledge offered has been nothing but scattered crumbs which cannot be joined to make a slice-leave aside to make a loaf. The total lack of exposure to the world outside the college campus has rendered them unfit for employment after their study. Almost the choric cry of the employers in industry and corporate organizations has been one of disapproval of college education that releases unfit graduates who have to be first unskilled and then re-skilled to be employable. So the graduates are neither here nor there --- neither academically inclined or professionally skilled or research oriented or trained to become integrated human beings to face the challenges of life and become responsible citizens of the state.

The Corona Virus has not only attacked our corporeal existence, it has affected us mentally, psychologically and institutionally. It has called for physical distancing that will make it difficult to hold classes for sizeable number of students to learn together. The Online classes seem to be a preferred solution in place of face to face education that facilitates human bonding. With the prospect of the availability of vaccine in the next few months, the planning has to be for online classes because most students will find it difficult to reach college as public transport will have its limitations. Maintaining physical distancing in the cramped classrooms and college campuses will be a herculean task. It will also be an eerie atmosphere when one walks into college with fear and anxiety and a bewildering thought about college life no longer an inspiring and rejuvenating experience. Opening colleges and Universities have

to factor in the imperative of closing down of an institution even if one student tests positive.

So let 2020 be declared a zero year. But it is not a zero year of learning, but a zero year only for traditional classroom teaching. The Online courses can now be meticulously planned to give lessons that were left out in our previous stereotyped courses. Online courses can be made available both on specific portals and on dedicated TV channels. These courses must be interdisciplinary. We need scholars and academics to deliver lectures on integrating concepts that bring environment and economics, political ideologies and political philosophy, the shaping image of Man in art and literature, the link between modern Physics and fundamental Philosophical questions, the concept of Nationalism in apposition with the concept of patriotism, History of human civilization, the relevance of epics to our modern times, theatre arts, music of the east and the west, appreciation of fine arts and performing arts, history of painting and sculpture, history of human civilization... it will be an exhaustive list. The faculty members, in addition to celebrated scholars and academics should also deliver lectures if the colleges can get their own portals. The assignments, tutorial discussions and evaluations can be done online which will be replication of what the faculty is presently doing in the classroom. Besides the lectures, material will have to be prepared that will provide interdisciplinary links to different allied disciplines.

The zero year is not a waste but a productive year for widening the mental horizon and enhancing the vertical curve of knowledge. The new way of teaching can be done through Great Book Series-readings and analysis of books by great authors, scientists, social scientists, artists, psychologists to give an exposure to the thoughts of great men and women. This will be a kind of mosaic in the criss- cross movement of knowledge along different disciplines. A sample of the Great Book series is as given below:

1. ***Epics and their lessons for our times*** : From classical epics of the West and the East to the new book of Gurcharan Das on 'Difficulty of Being Good'...
2. ***History of Mankind and the future of Human Civilization***: Yuval Noah Harari, *Sapiens, A Brief History of Humankind, Homo Deus, 21 lessons for the 21st century...*
3. ***Environmental Studies and Sustainable Development***: Fritjof Capra, *The Web of Life, the Turning Point, The Systems of life ...*

4. ***Development of Human Potential:*** Amartya Sen on Development as Freedom, Identity and Violence, The Argumentative Indian
5. ***Books on Economics:*** The Great Transformation (Karl Polanyi), History of Economic thought by Landreth Colander(on different thinkers and theories ancient to modern times).
6. ***Books on Sociology :*** Andre Beteille on Society and Politics in India, Democracy and its Institutions.
7. ***Philosophic inquiry from East and West:*** World Philosophy by Gene Blocker
8. ***Concept of Superman from Nietzsche to George Bernard Shaw:*** Nietzsche: Thus Spake Zarathustra, Man and Superman
9. ***Creative Genius:*** Harold Bloom, *Genius : A Mosaic of 100 exemplary creative thinkers*
10. ***Ethics:*** Peter Singer, Applied Ethics, Ethics in the Real World
11. ***Books on Psychology:*** B.F. Skinner. Sigmund Freud, Jean Piaget, Erikson
12. ***Religion and its Relevance:*** Huston Smith on The World Religions, Mahadev Desai on The Gospel of Selfless Action or the Gita according to Gandhi
13. ***Political Thought:*** Jayapalan, Indian Political Thinkers, David Boucher, Political Thinkers from Socrates to the Present.
14. Classics from Hindi/Sanskrit (from ancient to modern times)

These are samples of books that can be discussed and critically explained by Professors. These are not the last hundred books, there are many more that can be considered. Lectures can be scheduled on these books just to broaden the intellectual horizon among students and cultivate in them a love for reading. Tutorials and assignments should be done by faculty members. Students can make a choice of 6 out of 15(3 for the autumn semester and the other three for the spring semester) and accordingly attend the lectures, tutorials and submit assignments on their chosen group. For example, a student of language can choose 1,2,7,8,9 and 15. If they desire to learn more, they can do so. Similarly a student of Sustainable Development will have to take courses that have links with economics and sociology, environmental sciences and biological sciences, earth sciences, study of energy and matter (Physics) and study of chemicals and their interactions with human body

and environment (Chemistry) etc. The faculty will have to work as a team to prepare course material, video and audio. It will be a new and exhilarating experience for the faculty members to be trained in online teaching.

This year all the three year students should attend the online series. They have to clear the examinations/ assignments before getting promoted. 2020 can be made intellectually a stimulating year. This epidemic in some way has given us time to reflect upon the abyss between education that had been till now offered and education that needs to be given. We have at least a six weeks window to revisit the idea of higher education which holds the key to open the mental vista of the future of humanity. University/ college education, intended for civilizing the mind and cultivating humanity among the students can be achieved through adoption of online courses this year. If the experiment is successful, Indian Universities can have four year graduation where the first year is purely through online inter disciplinary learning. All graduate courses can start with these series in the first year and the major discipline courses can follow in the next three years to make it a four year graduation programme as is the case with many universities all over the world. Alternately, credit system can be introduced and students can gain 36 credits for 6 courses which can be added to overall credits to be earned in the next three years. If extra credits are taken, they can be mentioned on the degree certificates.

But for now 2020 need not be wasted by having limited college schedule but it can be made an intellectually stimulating year by substituting online lessons on courses about which every graduate student must possess some knowledge and understanding. Let India show to the world what higher education is meant to be and how it can be achieved. Let us turn the curse of Corona Virus into a boon for mental and intellectual development. For the present those who pass the examinations at the end of this academic year will gain automatic admission to the 2021 academic session. These courses must also be for the second and third year students besides the new admissions to the First year so that the zero year marks the beginning towards scaling newer heights, facilitating acquisition of knowledge, skills, values, beliefs and habits that foster the growth of civilized humanity. Higher education has a unique opportunity to re-map what is worth learning and how to acquire that learning. □

National Webinar on Women in Indian Higher Education

A National Webinar on ‘Women in Indian Higher Education: Challenges and Opportunities’ was jointly organized by the Central University of Odisha, Koraput and Mahatma Gandhi Central University, Bihar on June 17, 2020. More one thousand participants from different provinces of the country as well as other countries participated in the Webinar. The Webinar aimed at reaching fifty thousand people through various social media platforms.

The Webinar was presided over by Prof. Sanjeev Kumar Sharma, Vice Chancellor, Mahatma Gandhi Central University, Bihar. Dr (Mrs) Pankaj Mittal, Secretary General, Association of Indian Universities, New Delhi was the Chief Guest during the occasion. Eminent speakers namely Prof. Shashikala Wanjari, Vice Chancellor, SNDT Women’s University, Mumbai; Prof. Sunaina Singh, Vice Chancellor, Nalanda University, Nalanda and Prof. I Ramabrahmam, Vice Chancellor, Central University of Odisha were the special Guests.

Dr (Mrs) Pankaj Mittal in her address lauded the women today to have come forward in every field. She said that there is an urgent need to change the mental concepts of people towards stereotypical roles. “Despite so many successful women, even today the roles of engineers, scientists, doctors, etc are attributed to men whereas the roles of nurses, receptionist etc are attributed to woman in our thinking,” she said, adding that even today, in rural societies, men take decisions regarding the higher education and opportunities for women in their families. We should also ponder over this trend, she said. Managing family is also a big challenge that women easily does. Women are also becoming self-sufficient by pursuing small skill courses and running small enterprises at home. She emphasized on the need of having women’s colleges and universities. Dr. Mittal concluded her address by saying that there are two types of women in the world, first – those who got molded in the lap of time, and second -- those who changed the role and context. Every woman has to decide what she wants to be.

Prof. I Ramabrahmam, Vice Chancellor, Central University of Odisha reiterated that women are

decision makers and therefore they are successful as administrators, managers and consultants. He applauded the role being played by women as Corona warriors. He lamented on the fact that there are very few women in the field of higher education administration.

Prof. Sunaina Singh, Vice Chancellor, Nalanda University, Nalanda brought to the fore that in the Vedas also there is a mention of education of women. Women have been given the right to education in the *Yajurveda* and *Rigveda* as well. Depriving women from education is like torturing her. Women of India have advanced in every field. There are many challenges facing women even today but there is a need to turn these challenges into opportunities. Women can face every situation and make efficient representation in every field, Prof. Singh added.

Prof. Sashikala Wanjari, Vice Chancellor, SNDT Women’s University, Mumbai, Maharashtra threw light on Swami Vivekananda’s views towards education. Development of a person through education is a shared belief by all. Education should be such that character building and brain development can be done. She said that women should be given first priority in India’s education system, only then will the nation develop. Pride of women is possible only through higher education therefore awareness should be increased among women towards higher education.

Prof. Sanjeev Kumar Sharma, Vice Chancellor, Mahatma Gandhi Central University, Bihar in his presidential address informed that the proportion of women in higher education has increased statistically and this is an encouraging sign. On the basis of the views of four experienced speakers, a new opportunity and path can be created for women, he said.

On behalf of the Central University of Odisha Dr. Kakoli Banerjee, Assistant Professor and Head(I/c), Department of Biodiversity and Conservation of Natural Resources was the nodal officer of the Webinar. Dr. Minati Sahoo, Assistant Professor, Department of Economics, Dr. Rudrani Mohanty, Assistant Professor, Department of Odia, CUO also coordinated the event. The overall coordination of the programme was done by Prof. P. Durgaprasad, Visiting Professor (Sociology).

Prof. Shahana Mazumdar, Mahatma Gandhi Central University, Bihar was the Convener of the event and it was coordinated by Dr. Sapna Sugandha, Associate Professor, Department of Management Sciences, and Dr. Preeti Vajpayee.

Conference on Global Deceleration

A One-day Conference on ‘Global Deceleration: Emergence of New Economy’ is being organized by the Ramaiah Institute of Management (RIM), Bengaluru during August 27, 2020. The conference aims to bring together leading academicians, researchers and scholars to share experiences, opinions, research results on all aspects of global deceleration and the emergence of new economy.

COVID-19, the worst pandemic of our times is affecting global socio-economic systems. Tumbling oil prices, crashing currencies, lower consumptions, tight liquidity and financial instability may become the new normal. Is it the start of the end or is it the beginning of new horizons of global economy? Is it a war too costly or is the global economy about to witness a paradigm shift? The conference is to seek answers and opinions from renowned socio-economic experts on this aspect of COVID-19. Various Tracks of the event are:

- Finance.
- Human Resource.
- Marketing.
- Operations.
- Future of Education.
- Entrepreneurship.
- General Management.
- Other Related Topics.

For further details, contact the Coordinator, Prof. Jeevitha R, Ramaiah Institute of Management (RIM), Bengaluru- 560 054, Karnataka, Mobile: +91 9916089980, E-mail: jeevitha@msrim.org. For updates, log on to: www.msrim.in.

Workshop on Research Methodology

A ten-day Research Methodology Workshop on ‘Econometric Methods for Economic and Business Research for Ph.D. Students’ is being organized by the Department of Humanities and Social Sciences, Indian Institute of Technology Roorkee, Uttarakhand during July 20-29, 2020. The event is sponsored by Indian Council of Social Science Research (ICSSR), New Delhi.

Most popularly, econometrics, as evolved from the discipline of Economics, provides the assortments of tools and techniques to analyze the actual economic and business phenomenon quantitatively. In the past few decades, the subject matter of econometrics has developed beyond testing and forecasting the economic, financial, and business theories and is most suited for decision-making and policy evaluation in economics and business research. It has evolved as an interdisciplinary subject, and knowledge of it enables both practitioners, managers, and social scientists to critically analyze the impact of research on society and vice versa. The Topics of the event to be covered are:

- Introduction to Research Methodology and Methods in Economics and Business Research.
- Methods & Tools for Defining and Collecting Economic Data.
- Sample and Sampling designs, Data visualization, Summarization, and Inferences.
- Classical Linear Regression Analysis: Estimation and Regression Diagnostics.
- Beyond OLS- Robust regression, Logit, Probit, Tobit, Censored Regression Analysis.
- Timeseries models- Stationarity tests, Cointegration in Single & Multiple Equations.
- Program Evaluation Techniques: Difference-in-Difference, Propensity Score Matching, Regression Discontinuity.
- Parametric Approaches to Efficiency and Productivity Measurement: Stochastic Frontier Analysis .
- Nonparametric Methods to Efficiency and Productivity Measurement: Data Envelopment Analysis.
- Technology Heterogeneity and Meta-frontier Analysis in the Frontier Analysis.
- Modeling Bad and Non-discretionary Variables in the Frontier Analysis.
- Mechanics of Writing a Research Report and Research Paper.
- Publishing Research Paper, Handling Plagiarism and Selecting Journals.
- E-library and E-databases.
- Report Presentations by Participants.

For further details, contact Director of the event, Dr. Rachita Gulati, Department of Humanities and Social Sciences, Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand Mobile: +91 9675501888, E-mail: humanities.iitr@gmail.com. For updates, log on to: www.iitr.ac.in □

**North Zone Vice Chancellors' Meet 2019-20
on
Developing Employability and Entrepreneurship
as Cornerstones in Higher Education**

The North Zone Vice-Chancellors Meet (2019-20) of the Association of Indian Universities (AIU) was hosted by Shri Mata Vaishno Devi University (SMVDU), Katra, J&K on 16th -17th November 2019. Lt. Governor of the Union Territory of Jammu and Kashmir, Shri Girish Chandra Murmu graced the Inaugural Session as the Chief Guest. Prof. Ranbir Singh, Vice Chancellor, National Law University, Delhi and former President, AIU was the Guest of Honour in the Inaugural function. Dr Mrs. Pankaj Mittal, Secretary General AIU, presided over Meet. Prof. Ravindra Kumar Sinha, Vice Chancellor, SMVD University convened the Meet. The inaugural function was attended by more than sixty Vice Chancellors of North Zone along with representatives of MHRD, AICTE, NAAC, faculty members and research scholars of the SMVD University. Dr Alok Mishra, Joint Secretary, AIU was the Nodal Officer of the Meet and Mr Vijendra Kumar took care of logistics and coordination. Dr S Rama Devi Pani, Editor University News was the Nodal Officer for Academics. Prof A K Das, Professor, School of Mathematics and Director, Quality Assurance, Shri Mata Vaishno Devi University was the Nodal Officer at the Host University. Main theme of the Meet was: 'Developing Employability and Entrepreneurship as Cornerstones in Higher Education' Under the main theme, following three technical sessions were conducted in the Meet: '*Developing Future Skills & Creating Future Ready Universities*'; '*Learning from International Models for Skilling*'; '*Structural and Regulatory Reforms required to Promote Employment and Entrepreneurship*'. In addition to from Inaugural Session, Valedictory Session and three Technical Sessions, the Meet had AIU Business Session and newly induced Session on Interaction with Apex Bodies. The University had arranged Cultural Evening.

The Chief Guest of the Inaugural function, Lt. Governor of the Union Territory of Jammu and Kashmir, Shri Girish Chandra Murmu emphasized

that the institutions of higher education must focus on sustainable education systems that can create employment and entrepreneurial opportunities. The LG underlined that India is one of the fastest-growing economies and this meet shall deliberate on increasing the employability to fulfil the vision of India to become a \$5 trillion economy under the leadership of Prime Minister Shri Narendra Modi ji. He called for the introspection in the pedagogy and curriculum for making higher education more relevant and responsible. Shri Talat Parvez Rohella, Secretary, Higher Education, Jammu apprised the audience about status of higher education in Jammu and Kashmir including the efforts of the state government to ensure the accessibility of higher education in remote areas. Special Issue of the University News edited by Dr S Rama Devi Pani was released on the occasion.

Prof. Ranbir Singh, Vice Chancellor, National Law University, Delhi and former President, AIU invoked the leaders of higher education to take advantage of the strengths of India, and prepare the youth who is technically sound, professionally competent, and socially relevant. He appealed for more autonomy to the universities with liberal funding by the Government. Dr. Mrs. Pankaj Mittal, Secretary General, AIU in her introductory address, deliberated on the significant initiatives by AIU to create global visibility and imbibe technology enabled working through digitalization of the library, information portals for jobs, admission assistance, academic collaborations, Khelo India, Women Parliament and international youth festival which received participation from 21 countries. She laid emphasis on AIU being continuously working as an enabler to support the institutions of higher education and skilling all stake holders for the futuristic challenges.

In his Welcome Address, Prof. Ravindra Kumar Sinha, Vice Chancellor, SMVD University invited academia for thoughtful provocations and perspectives on developing employability, entrepreneurship, and the role of higher education institutions. Various past achievements and future action plans of the University were highlighted. He

appraised that in NIRF Ranking, SMDV University has risen to 85th rank in 2019 as compared to 94th in 2018 among the Engineering and Management institutions and it is striving to be a University of Excellence. The Inaugural Session concluded with vote of thanks by Dr. A K Das, Director, Quality Assurance and Coordinator of the event.

Session on Interface with Apex Bodies

A Session on Interface with Apex Bodies was conducted in the Meet with a purpose to provide a platform to enable face to face interaction of officers of apex bodies, regulatory authorities with the Vice Chancellors. The session was chaired by Dr. Pankaj Mittal, Secretary General, AIU and Prof. Rajive Kumar, Member Secretary, AICTE. Prof. Kumar informed that the All India Council for Technical Education (AICTE) has been transforming itself from being a regulator to be a facilitator. He informed about some of the unique initiatives of AICTE such as:

- a) Introduction of twenty-one days of induction and orientation program.
- b) Providing online internship support to the students (including some paid scholarships).
- c) Atal Academy for supporting the training of the teachers.
- d) Supporting the institutions with curriculum design under the perspective of planning with the design and availability of modules for various technical programs.
- e) Innovation & Start-up Policy and introduction of a Start-up Cell supported by AICTE- MHRD.
- f) Encouraging Accreditation of the institutions with the scheme of '*Margdarshak*' and '*Marrgdarshan*', where '*Margdarshak*' are the trainers and facilitators who can support the institutions preparing for accreditation, whereas '*Margdarshan*' are the institutions that can mentor the mentee institutions for accreditation.

Prof. Kumar intimated that AICTE has been able to support more than 200 'Faculty Development Programs' in upgrading the knowledge and skills of faculty members. Also, AICTE, after a high level of consultation, can provide suggestive modules for programs under technical education by minimizing the credits to nearly 160. This has been done to

nurture the holistic personality development of the students. In order to strengthen the Industry-Academia collaborations, AICTE is facilitating MOUs with the industry. While stressing on the need for accreditation, he opined that it may become a prerequisite for AICTE approval.

Dr. Renu Batra, Additional Secretary, UGC, presented in detail, the role of UGC, and how it coordinates, determines, and maintains the standards of higher education. She also brought on the floor, the mechanism, and criteria for recognition of universities in India, and disbursements of funds to eligible universities and colleges. She provided quantitative data from various universities across Indian states. Dr. Batra also provided an insight into the ICT initiatives adopted by UGC. She discussed the UGC regulations on credit transfer through SWAYAM and MOOCs and highlighted that the enrolment status of UGC, PG, MOOCs courses till July 2019 was more than 1.20 lac. The audience was apprised of valuable e-governance portals, particularly CARE, STRIDE and PARAMARSH. Information on UAMP portal related to various events, important days to be observed & celebrated, and faculty recruitment was also shared. The focus of the presentation was the Scheme for Trans-disciplinary Research for India's Developing Economy i.e. STRIDE, its salient approach and strategy. Dr. Batra also touched upon faculty development; mentoring of non-accredited institutions; consortium for academic & research ethics (CARE) & its tasks, including a schematic representation of the creation of CARE reference list of quality journals; graded autonomy to universities and their categorization in category 1 & 2. She emphasized on the significance of the progression of a quality university to the Institutions of Eminence; and briefed the audience on numerous reforms undertaken by UGC. During her presentation, she requested all Vice Chancellors to identify a nodal official for MOOC programs and urged them to encourage their faculty members to apply for STRIDE, CARE, and be largely benefitted by these schemes.

Dr. Pratibha Singh, Deputy Advisor, National Assessment and Accreditation Council (NAAC) deliberated on the practices and key features during the last two decades of NAAC's existence and underlined that accreditation process is based

on global best practices and norms. She informed that to date 12,000 plus accreditation visits have been conducted by NAAC teams. She presented a comprehensive and comparable analysis of previous and extant accreditation processes. NAAC in its endeavour to facilitate quality and excellence has introduced many reforms such as data based qualitative indicator evaluation; data validation by external professional agencies, instituting key indicators on alumni engagement and student satisfaction survey. The concluding discussion revolved around Quality Indicator Framework (QIP) components and statistics. The accreditation process combines grade of HEIs wherein 25-35 percent input is received from qualitative metrics using peer assessment and 65-75 percent input is from computer generated score of qualitative metrics including student satisfaction survey. She stressed upon the universities to establish Internal Quality Assurance Cells (IQACs) to spread awareness, implement good practices, quality initiatives and maintain academic records.

Session was on Developing Future Skills & Creating Future Ready Universities

The first technical session was on ‘Developing Future Skills & Creating Future Ready Universities’, chaired by Prof. Ranbir Singh, Vice Chancellor, National Law University, Delhi. Speakers of the Session were Prof. R. Shevgaonkar, Vice Chancellor, Bennet University, Greater Noida Uttar Pradesh; Prof. Raj Nehru Vice Chancellor, Shri Vishwakarma Skill University, Gurugram, Haryana and Prof. Ajay Mohan Goel, Vice Chancellor, BML Munjal University, Sidhrawali Gurugram, Haryana. Salient recommendations of the session are:

1. An imbalance is being created by assigning more importance to professional, particularly Management and technical education, which merely attributes to 20 percent of the mass higher education. To restore balance, higher education should be comprehensive; encompassing equal weightage to all streams such as social sciences, humanities, fine arts, music etc.
2. The futuristic world will be dominated by disruptive interconnected technologies. Therefore, a paradigm shift is needed in academic ecosystem that is student centric, technology enabled, interconnected, multicultural and

- collaborative, with due emphasis on skills, abilities, entrepreneurship and employability.
3. Indian higher education must look inwardly into the ancient system of *Gurukul* for holistic development of learners by developing higher order cognitive skills, critical thinking, challenging prejudices, earning livelihood, nurturing value systems and creating humans of higher ethics and intellect.
4. The education systems must imbibe the rapidly changing scenario, disrupting technological advancements and must reorient and reinvent itself. Then only, it can prepare itself for next generation and envisage the right beginning of the 22nd century. The universities and institutions of higher education need to deliberate and make serious efforts for a significant modular shift towards shaping/ moulding the learners to move to the future.
5. The country as well as the world is facing challenges of well trained and gainfully employable talent as there is sufficient gap in industry requirement and graduate outcomes. The institutions of higher education are slow in adapting to the industry requirements. Universities need to be more proactive and must keep pace with ever-changing needs of the workplace.
6. World will require specific set of skills such as complex problem solving, critical thinking, creativity, people management, coordination, negotiation skills, cognitive skills, flexibility, judgment, and decision-making skills. Therefore, in the paradigm of new challenges, the institutions in higher education need to curate the pedagogies and teaching in view of developing the skills specifically catering to aforesaid attributes.
7. Lifelong learning and capacity-based learning with multiple entry and exit paths should be developed in students as the key characteristics of education catering to different levels of entrepreneurship & innovation; vocation, passion, and aptitude.
8. Universities must be able to contribute to social, cultural, and economic development of their geographical region; fostering relationship building and participation of local communities

towards sustainable development goals of the area and natural resources.

9. The universities should focus on creating courses on sustainable engineering and sciences by integrating modern learning techniques with ancient learning platforms and approaches.
10. Universities should impart education accentuating on human responsibilities towards sustainable development goals and creation of value-based society.
 - a) Astrology, Yoga, and Ayurveda courses may be incorporated in the undergraduate syllabi to enhance the skill development and employability.
 - b) Long term and short term objectives for institutions be well defined. Short-term objectives may cater to employment, entrepreneurship etc. Whereas long term objectives may include inculcation of responsible citizenship, social sensitivity, inclusivity, cultural inclusion etc.
 - c) IOT, block chain technology etc need to be introduced for future ready universities.
 - d) Keeping in mind the dynamism of environment and ever-changing academic landscape, universities need to focus on blended education approach providing liberty to learners to design their own courses as per aptitude, need and desire.

Session on Learning from International Models for Skilling

The session on ‘Learning from International Models for Skilling’ was chaired by Prof. Ashok Aima, Vice Chancellor, Central University of Jammu, Samba, Jammu and Kashmir. Prof. Kathleen Modrowski, Dean, Jindal School of Liberal Arts and Humanities shared her experience based on US and European models of higher education system. Prof. Y.S.R. Murthy, Professor and Registrar, O.P. Jindal Global University discussed the social sciences and humanities perspective in the higher education. Major recommendations of the session are:

1. Requirement of different countries in the area of skills/education/knowledge should be collected by MHRD, AIU or UGC and shared with universities/educational institutes. It will help HEIs in designing courses and imparting

knowledge and skill in those domains and thereby ensuring employability in different countries.

2. India must ensure that our trained human resources serve our own country and contribute to national economy after a serving in low population countries for a stipulated period.
3. India should have commission-based bipartite agreement with countries commensurate with share of contribution made by trained Indian human resources in their economy. This would ensure symbiotic relationship between India and other countries and shared growth of the economies.
4. Provision needs to be created for international exposure of students and faculty at different stages to incorporate international outlook, understanding and country specific sectoral requirements. This may eventually translate in designing courses, training programs and pedagogies.
5. Learning at least one foreign language should be made mandatory for postgraduate students.
6. AIU/UGC should maintain data bank of language experts and assist the universities in identifying and deploying the language experts pool on need basis.
7. AIU should design and conduct multiple workshops in different parts of the country on Internationalization of Higher Education, mobility, and migration.
8. International culture programme should be introduced in the universities wherein students are exposed to different geographies, climatic conditions, culture, and international legal system.
9. Indian universities should adopt and integrate best practices from international academic experiences.
10. Universities should organize mutual exchange programs for faculty, scholars and students among different countries providing international as well as Indian experience to all the stakeholders.

Session on ‘Structural and Regulatory Reforms required to Promote Employment and Entrepreneurship’

The third Technical Session was on ‘Structural and Regulatory Reforms Required to Promote Employment and Entrepreneurship’. The session was

chaired by Prof. Neelima Gupta, Vice Chancellor, Chatrapati Shahuji Maharaj University, Kanpur, Uttar Pradesh. Dr. Sujata Shahi, Vice Chancellor, IILM University, Gurugram, Haryana, Mr. P.K. Madavi, Deputy Advisor, DG&T and Mr. Pradeep Kumar, AGM, SBI were other speakers in the session. The recommendations of the session are:

1. Entrepreneurship activities in the universities ought to be paired with state agencies, international funding organisations and local communities to promote innovation in local skills and traditions.
2. AIU may create a database of Government schemes and upload on its website
3. AIU should create facilitating environment for entrepreneurship development at national level.
4. Entrepreneurship Development Courses be offered among the Choice Based Credit System to students at graduate level.
5. Specialized orientation and training be imparted to the faculty to ensure integration of entrepreneurial component in their teaching.
6. Incubation centres be created in all the universities for hand holding of the budding entrepreneurs.
7. Sectoral studies for the entrepreneurial opportunities should be conducted and sector specific targets can be created. Accordingly, sector specific skill-based learning may be designed for employment and entrepreneurial growth at national and international level.
8. The Universities may collaborate for skill based vocational program with DGT through '*Bharat Skills*' portal, a central repository for skills and provides NSQF curriculum, course material, videos, question banks and mock test.
9. AIU can create a platform for Skill Ministry to connect all its member universities with the Ministry on employment opportunities.
10. Liberal education is required to boost inter-disciplinary learning among students to address problem solving from different perspectives and finding solutions.
11. Continuous upgradation of curriculum involving multi-skilling, upgradation of skills and knowledge, soft skills, and life skills etc. in dynamic work environment are crucial.

12. Skill orientation should be inculcated from primary level of education itself and carried forward to the higher education. For a seamless integration, continuum of educational qualification be created jointly by the Department of School Education and Department of Higher Education. AIU may take lead to pursue with both the Departments, School Education and Higher Education to ensure this. AIU may organise conferences of stakeholders involving the authorities of all levels of education, right from Primary to tertiary level.
13. Skill curriculum be introduced in the universities with flexibility to opt skill set as per individual interest and preference. A mechanism be established in universities to understand strength of individual student and complement his/her interest irrespective of degree (flexible curricular complimenting one's interest).
14. Strong academia-industry linkage and engagement are essential for all universities.

Valedictory Session

The valedictory session was chaired by Prof. Ravindra Kr. Sinha, Vice Chancellor, SMVD University. Prof. V K. Bhat, Registrar, SMVDU University welcomed all the guests and expressed his gratitude for engaging participation. Prof A K Das presented the Report of the Meet. Prof. Sinha raised some significant existential issues and challenges of higher education institutions. Dr. Pankaj Mittal summarized the deliberations of the two-day North Zone Vice Chancellors Meet (2019-20) appealing the HEIs to focus on all aspects of academia and specifically on:

- a) Curriculum
- b) Creativity
- c) Critical Thinking
- d) Collaboration
- e) Communication
- f) Culture
- g) Community Based Learning

She called on for more deliberations on various concerns and committed the support of AIU to all the universities in continuous up-gradation and development. The Meet ended with vote of thanks by Dr Alok Mishra, Joint Secretary, AIU. □

THESES OF THE MONTH

SCIENCE & TECHNOLOGY

A List of doctoral theses accepted by Indian Universities (Notifications received in AIU during the month of Jan-Feb, 2020)

AGRICULTURAL & VETERINARY SCIENCES

Agricultural Economics

1. Bansal, Surbhi. **Economic viability and resource use efficiency of tenant farming in Punjab.** Department of Agricultural Economic, Punjab Agricultural University, Ludhiana.

Food Science & Technology

1. Vaidya, Devashree Nitin. **Development of food safety and quality system for retail poultry shop.** (Dr. Padmini Ghugre), Faculty of Science and Technology, S.N.D.T. Women's University, Mumbai.

Genetics & Plant Breeding

1. Longmei, Ningthaipuilu. **Genome wide association mapping for heat tolerance in maize (*Zea mays* L).** Department of Plant Breeding & Genetics, Punjab Agricultural University, Ludhiana.

Horticulture

1. Abhangrao, Ashwini Kailas. **Studies on mutation breeding in tuberose (*Polianthes tuberosa* L).** (Dr. S S Yadlod), Department of Horticulture, Vasanttrao Naik Marathwada Agricultural University, Parbhani.

2. Alam, Kadari Sayyad Idris Alam Irshad. **Effect of land configuration with different levels of spacings and fertilizers on growth, yield and quality of onion (*Allium cepa* L).** (Dr. S J Shinde), Department of Horticulture, Vasanttrao Naik Marathwada Agricultural University, Parbhani.

Microbiology

1. Sharma, Nishu. **Characterization of stress tolerant microalgae strains for biogas production.** Department of Microbiology, Punjab Agricultural University, Ludhiana.

Soil Science

1. Sukhvair Kaur. **Effect of organic amendments on boron availability in calcareous soils under raya (*Brassica juncea* L) and soybean (*Glycine max* L).** Department of Soil Science, Punjab Agricultural University, Ludhiana.

Veterinary Science

1. Lende, Shweta Ramesh. **Effect of supplementation of bypass protein, bypass fat and their combination on performance of local goats.** (Dr A D Deshmukh), Department of Animal Nutrition, Maharashtra Animal and Fishery Sciences University, Nagpur.

2. Pharande, Rajesh Raghunath. **Molecular characterization of rabies virus and assessment of targeted**

gene expression in rabid dogs. (Dr S B Majee), Department of Veterinary Microbiology, Maharashtra Animal and Fishery Sciences University, Nagpur.

3. Raut, Sachin Uttamrao. **Clinical evaluation of adipose-derived mesenchymal stem cells and porcine skin- biological bandaging for the treatment of wound in dog.** (Dr G S Khandekar), Department of Veterinary Surgery and Radiology, Maharashtra Animal and Fishery Sciences University, Nagpur.

4. Suneet Madhukarrao, Wankhede. **Studies on utilization of roasted guar (*Cyamopsis tetragonoloba* L) korma in broiler chicken.** (Dr A D Deshmukh), Department of Animal Nutrition, Maharashtra Animal and Fishery Sciences University, Nagpur.

5. Thorat, Varsha Devidas. **Molecular characterization and differential identification of *Brucella abortus* from vaccine strain S19.** (Dr A S Bannalikal), Department of Veterinary Microbiology, Maharashtra Animal and Fishery Sciences University, Nagpur.

BIOLOGICAL SCIENCES

Biochemistry

1. Kalita, Parismita. **Molecular, biochemical and biophysical studies of recombinant selenozyme thioredoxin glutathione reductase for the liver fluke *Fasciola gigantica* cobbold.** (Dr Timir Tripathi), Department of Biochemistry, North Eastern Hill University, Shillong.

2. Phukan, Tridip. **Studies on the oxidant and antioxidant homeostatic system in cyanobacteria under UV stress.** (Prof Mayashree B Syiem), Department of Biochemistry, North Eastern Hill University, Shillong.

Food Science & Nutrition

1. Bagle, Namrata Nitin. **Impact of feeding practices of nutritional status and body fat of 12-36 months old children.** (Dr. Shobha Udipi), Faculty of Science and Technology, S.N.D.T. Women's University, Mumbai.

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Life Science

1. Manikandan, K. **Role of cyclic di-AMP in mycobacterial physiology and virulence.** (Dr. Krishana Murari Sinha), Faculty of Integrative Biology, Amity University, Gurgaon.

Marine Science

1. Anita. **Evaluation of selected microbial symbionts from gastrointestinal tract of gift Tilapia (*Oreochromis niloticus*) as potential probiotics in *Litopenaeus vannamei* (Boone, 1931).** (Dr. S I Yusufzai), Department of Fisheries Resource Management, Junagadh Agricultural University, Junagadh.

2. Sandhya, S V. **Phylogenetic diversity significance and future prospects of heterotrophic bacteria associated with marine microalgae.** (Dr. K K Vijayan), Department of Marine Sciences, Cochin University of Science & Technology, Kochi.

Zoology

1. Byrsat, Sanborlang. **Expression of *gnrh-I* and *gnih* genes and their roles in photoperiodic control of seasonal breeding in tree sparrow, *passer montanus* L.** (Prof A S Dixit), Department of Zoology, North Eastern Hill University, Shillong.

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Geology

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ENGINEERING SCIENCES

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Electronics & Communication Engineering

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Information and Communication Technology

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Mechanical Engineering

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Textile & Apparel Design

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MATHEMATICAL SCIENCES

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2. Jagdish. **Retrieval of oceanic and atmospheric parameters using synthetic aperture radar data.** (Dr. Bipasha Paul Shukla), Department of Mathematics, Gujarat University, Ahmedabad.

3. Hari Babu, K. **Characterization of $(-1,1)$ nonassociative rings.** (Dr. K Jayalakshmi), Department of Mathematics, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

4. Pandey, Pradeep Kumar. **Studies on certain classes of analytic functions.** (Dr K K Dixit), Department of Mathematics, Chhatrapati Shahu Ji Maharaj University, Kanpur.

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MEDICAL SCIENCES

Anaesthesia

1. Sharma, Tanavi. **Proteomic approaches in understanding the disease pathology in patients with intracranial aneurysm.** Department of Anaesthesia and Intensive Care, Postgraduate Institute of Medical Education and Research, Chandigarh.

Biotechnology

1. Andy, Adinarayana. **Improved LC-MS/MS methods for the estimation of some important drugs in human blood and plasma.** (Dr. J V L N Seshagiri Rao), Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar.

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Diet & Nutrition

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Medicine

1. Roy, Susmita Bose. **A QRT-polymerase chain reaction for diagnosis and quantitation of herpes simplex virus DNA in patients with suspected herpes encephalitis.** (Dr. Naba Kumar Hazarika), Department of Allopathic Medicine, Srimanta Sankaradeva University of Health Sciences, Guwahati.

Nursing

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Pharmaceutical Science

1. Fulmali, Sushma V. **Development and validation of stability indicating methods for some phytoconstituents.** (Dr Pratima A Tatke), Department of Pharmaceutical Science, S.N.D.T. Women's University, Mumbai.

2. Ojaswi Prashant, Ghadge. **Design, synthesis and evaluation of anticancer activity of heterocyclic compounds.** (Prof. S S Mahajan), Department of Pharmaceutical Chemistry, S.N.D.T. Women's University, Mumbai.

3. Ravikumar, Padmini. **Design and development of novel topical herbal drug delivery systems for chemoprevention of melanoma skin cancer.** (Dr Pratima A Tatke), Department of Pharmaceutical Science, S.N.D.T. Women's University, Mumbai.

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5. Singha, Mahua Bhaumik. **Effect of bauhinia variegata and commiphora Mukul on hypothyroidism: An experimental study.** (Dr. Tikendrajit Sarma), Department of Pharmacy, Srimanta Sankaradeva University of Health Sciences, Guwahati, Assam.

Physiotherapy

1. Shah, Chandni Bhupendrabhai. **Effect of ergonomic training on pain and quality of life in musculoskeletal disorders in traditional small scale industries.** (Dr. Neeta J Vyas), Faculty of Physiotherapy, Gujarat University, Ahmedabad.

PHYSICAL SCIENCES

Chemistry

1. Chhatbar, Pratiksha Vijay. **Synthesis of novel heterocyclic compounds and their characterization by physicochemical and spectromens.** (Prof. Anamik Shah), Department of Chemistry, Saurashtra University, Rajkot.

2. Kongor, Anita Rudolf. **Synthesis characterization and application of calix protected metal nanoparticles.** (Dr V K Jain), Department of Chemistry, Gujarat University, Ahmedabad.

Physics

1. Badwar, Sylvia. **Measurement of high energy (1.7-20) neutron and proton induced reaction cross-sections for materials related to medical isotopes and reactors.** (Prof B M Jyrwa), Department of Physics, North Eastern Hill University, Shillong. □

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