



Rs. 30.00
ISSN 0566-2257

UNIVERSITY NEWS

A Weekly Journal of Higher Education

Association of Indian Universities

Vol. 58 • No. 44 • November 02-08, 2020

Pankaj Mittal

From the Desk of Secretary General

K K Aggarwal and Avinash C Sharma

Towards More Effective Research in India:
Re-envisioning Ph.D. Programme

**Madhusudan Chakraborty and
Avijit Gangopadhyay**

Higher Education: The Way Forward with
COVID-19

Sistla Rama Devi Pani and Youdvir Singh

Archiving Bibliography of Doctoral Dissertations
at AIU (1857—2020): A Recount

Amita Pandey Bhardwaj

Promoting Wellness Lifestyle through Stress
Management in Education

M Venkaiah Naidu

Let's Build a New and Resurgent India

Convocation Address

*Celebrating
90
Years of
University News*

#Let'sBeatCoronaTogether

ANNOUNCEMENT

Special Number of the University News on

‘Implementing National Education Policy–2020 to Transform Higher Education in India’

A Special Number of the University News on the theme ‘Implementing National Education Policy -2020 to Transform Higher Education in India’ is being brought on **30th November, 2020**. The **Special Issue** will cover articles of experienced and eminent educationists, higher education practitioners and policy makers. Readers of the University News are also invited to contribute to the Special Number by submitting papers/articles on below mentioned themes:

1. Innovative Implementation Strategies for Recommendations on Various Components of the Policy.
2. Implementation Strategies for Different Dimensions viz., Teaching, Research and Community Engagement.
3. Issues and Challenges in Implementation of the Policy.
4. Practicability, Suitability and Ease of Implementation of the Policy.
5. Roadmap for Holistic Implementation of the Policy.
6. Actionable Points on the Part of Government, HEIs and other Stakeholders.
7. Any Other Subtheme Relevant to the Topic.

Following are the essential guidelines to be followed:

- Articles submitted for the Journal should be original contributions and should not be under consideration for any other publication at the same time. A declaration is to be made by the author in the covering letter that the paper is original and has not been published or submitted for publication elsewhere.
- Manuscripts including tables, figures and references should be around 3000-4000 words for articles and 600 words for Communications.
- The manuscripts should be typed in MS Word double-space with 12 point font and ample margin on all sides on A 4 size paper.
- The cover page should contain the title of the paper, author’s name, designation, official address, address for correspondence, contact phone/fax numbers and e-mail address.
- The main text should not contain footnotes. References should be given at the end of the manuscript and should contain only those cited in the text of the manuscript. The full reference should be listed at the end in alphabetical order running the following style:

Books

Miles, M., and Huberman, M.,(1994). *Qualitative Data Analysis*. London : Sage.

Articles

Over, R.(1982). Does research productivity decline with age? *Higher Education*, 11, 511-20.

Chapter in a Book

Rendel, M. (1986). How many women academics 1912-1977? In R. Deem (ed.), *Schooling for Women’s Work*. London: Routledge.

Article Retrieved from Website

Mazumdar, T (Year, Month, Date Published). *Article Title*. Retrieved from URL.

- No fees is payable to submit or publish in this Journal.
- Authors are responsible for any copyright clearance, factual inaccuracies and opinions expressed in their paper.

For full Guidelines for Contributors browse AIU Website: www.aiu.ac.in.

The papers will be published in the Issue subject to the approval of the Editorial Committee of the University News. Manuscripts may be emailed to the Editor, University News, Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg (Kotla Marg), New Delhi-110 002. E-mail: unaiu89@gmail.com /universitynews@aiu.ac.in/rama.pani2013@gmail.com, Fax: 011– 23232131 **on or before November 20, 2020**. For Further details contact **Dr. S Rama Devi Pani**, Editor, University News, Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg (Kotla Marg) New Delhi-110 002, Ph No 011- 23233553, 23230059 Ext.240 Mobile: 9582573719

In This Issue		
ITEMS		PAGE
Articles		
From the Desk of Secretary General		3
Towards More Effective Research in India: Re-envisioning Ph.D. Programme		5
Higher Education: The Way Forward with COVID-19 [#]		16
Archiving Bibliography of Doctoral Dissertations at AIU (1857—2020): A Recount		20
Promoting Wellness Lifestyle through Stress Management in Education		24
Convocation		
Goa University, Goa		31
Campus News		
Theses of the Month		
(Science & Technology)		37
Advertisement		Cover Back

New Subscription Tariff
(Effective April 01, 2020)

	Inland		Foreign	
	Institutions	Academics/ Students (at residential address only)	Airmail	Surface Mail
	Rs.	Rs.	US\$	US\$
1 year	1250.00	500.00	210.00	170.00
2 years	2200.00	900.00	400.00	300.00

Subscription is payable in advance by Bank Draft/MO only in favour of Association of Indian Universities, New Delhi.

Opinions expressed in the articles are those of the contributors and do not necessarily reflect the views and policies of the Association.

Editorial Committee Chairperson:

Dr (Ms) Pankaj Mittal

Editorial Committee:

Dr Baljit Singh Sekhon

Dr Amarendra Pani

Dr Youd Vir Singh

Editor:

Dr Sistla Rama Devi Pani

#Let'sBeatCoronaTogether

From the Desk of Secretary General.....

Crisis is composed of two characters, said John F Kennedy, one represents danger and the other represents opportunity. Never let a serious crisis go to waste, said Rahm Emanuel, an American Politician. Our Prime Minister Shri Narendra Modi while interacting with Village Sarpanchs across the country via video conferencing on the occasion of the National Panchayati Raj Divas on 24th April, 2020 said that the biggest lesson learnt from Coronavirus pandemic is that we have to become self dependent and self-reliant. So this is the time to exploit the component of opportunity from this crisis and work towards creating more self reliant and sustainable institutions.

COVID-19 has made every organization realize its limitations and potentials. It has again proved that only those organizations or institutions which are resilient, adaptable and future-ready can survive the crisis. COVID -19 has also shown the significance of decision making and how delay in decision making for one day can lead to irreparable damages and innumerable disruptions. Throughout the history, crises of different forms have challenged humanity. But the crises created by the Corona Virus in this increasingly interconnected global village where collective vulnerability is a reality, throw up a profound question for us all – as individuals, communities, institutions, organizations, societies, nations, --- what is the model that we want to set for our future generations ? Because, what we do during this crisis, the way we interpret it, react to it and bounce back from this crises today will define the life of our youngsters tomorrow.

We are fortunate to have born in this period of time when Information and Communication Technologies (ICT) has come as a panacea for many of the problems we are facing today. Imagine how the lockdown period would have been without a mobile or television, or for that matter, without a radio. We are at peace because the News telecasts which are products of ICT operations are creating awareness and sensitizing us to take care of ourselves from coming into the grasp of corona. ICT has become vital in almost all aspects of our life. ICT has fundamentally changed the practices and procedures of nearly all endeavours including Higher Education Institutions. Accelerated innovations in ICT are giving rise to new learning technologies which are deciding the rate of learning in HEIs. It is therefore very obvious that we can create our sustainable and future ready institutions with the help of ICT. Technology-fueled innovations will provide the much needed respite to all our higher education institutions in this hour of crisis.

Association of Indian Universities, as you all know is a ninety five year old organization which has withstood many a crisis, but came out successfully every time with much brighter colours. This time also we are making all efforts to showcase AIU in much brighter colours after this grim period of lock down. As a matter of fact, we have never let AIU to get into lock down in real sense of term. We were continuously active continuing many of the routine activities of AIU. Officers and staff were working from home. We also initiated many new activities to keep the spirit of AIU vibrant.

We have organized several webinars and collaborated in the webinars organized by several national and international organizations. We have made a historic landmark of organizing the AIU Annual Vice Chancellors' Conference on 'Reimagining Indian Universities' and AIU Foundation

Day Lecture through online mode. The Conference was inaugurated by Hon'ble Minister of Education Dr Ramesh Pokhriyal Nishank. Nobel Peace Laureate Shri Kailash Satyarthi delivered the Foundation Day Lecture. Stalwarts like Padma Vibhushan Prof Kasturirangan, Chairman, NEP Draft Committee delivered the Special Address. Dr Vinay Sahsrabudhe, Member of Parliament, Rajyasabha delivered the Valedictory Address. The Conference was also graced by Former Governor of Chattisgarh, Shri Shekhar Dutt. Prof D P Singh, Chairman, UGC; Prof Anil Sahasrabudhe, Chairman, AICTE; Prof K K Aggarwal, Chairman, NBA, Ms. Juthika Patankar, Additional Secretary, Ministry of Skill Development and Entrepreneurship; and many acclaimed Vice Chancellors from Indian Universities were the Speakers and Session Chairs in the Conference. In the Inaugural Session Hon'ble Minister released two books: *'Reimagining Indian Universities'* and *'Protecting Academic Interests of Students during Corona Pandemic: Sharing Best Practices'*, and launched AIU Activities Web Portal. In the Valedictory Session a Guide Book titled *'COVID-19 Response Tool KIT'* published by AIU in collaboration with O P Jindal Global University was released by the Chief Guest Shri Vinay Sahsrabudhe. Another historic event titled *'Vice Chancellors Interact'* on theme *'Indian Universities in Challenging Times'* was organized with Sadhguru Jaggi Vasudev as key speaker. AIU collaborated with Sri Sri University, Cuttack to organise an interactive live session on *'Higher Education Post Corona'* with Gurudev Sri Sri Ravi Shankar as key speaker.

To equip the faculty members with the skills of transacting online curriculum, Live-storm Webinars using a special Learning Management System (LMS) on *'Online Learning for Faculty: what you need to know and prepare for a successful transition of your curriculum'* was organized in collaboration with Quality Assurance Strategic Planning Institutional Research (QASPIR). QASPIR is an International Consultancy Specializing in Quality Assurance, Program Accreditation, and Student Success based in United Kingdom. About 1000 participants from Indian universities benefited out of it. A Webinar on *'Fostering Social Responsibility by Higher Education: COVID 19 and Beyond'* was conducted in collaboration with PRIA International Academy.

A blog and a WhatsApp group of Vice Chancellors was created to enable them to share the experiences, strategies and innovations adopted by them to minimize the academic loss of the students during the Corona pandemic. Many such activities which were initiated during lockdown period are in pipeline and we are hopeful that we shall be able to organize many more activities which shall be guiding light for the future.

As luck would have it, about ten months before the outbreak of COVID-19, we, at AIU have initiated several activities most of which were IT interventions and we are enjoying the fruits of it now during this lockdown period. First thing which we did was redesigning the AIU Website making it more comprehensive and user-friendly. Thereafter, we initiated digitization of different activities involved in Evaluation, Sports and Youth Affairs, Vice Chancellors' Seniority etc. We have launched new portals for submitting details of the member universities which can be provided online as ready reference to all the universities. We have created online platforms for correspondence and Integrated payment gateway with newly developed AIU portal to receive the payments from clients, which was earlier done manually. MoUs were signed with INFLIBNET for digitisation of AIU Library. A project of creating QR Codes was initiated for the theses in Bibliography of Doctoral Dissertations published by AIU so that the users can have access to whole thesis if they want.

Bringing out E-version of the University News is one of the important activities in the pipeline. Before we could realise it, we were confronted with this Corona crisis. As already mentioned, many of the routine activities of AIU are being continued during this lockdown period. That includes bringing out the weekly Issues of University News. But due to compelled lockdown, we were unable to send physical copies all these days. In the meantime, we have received requests from several corners to send E copies of it. Since, the duration of lockdown was uncertain, we started uploading the issues of the University News on the AIU website. Those who want to have the pleasure of reading those Issues can access them on AIU Website. From now onwards we will be sending the printed copies of the regular weekly Issues. I am sure you all will enjoy reading the University News!

Dear Readers, as you all know the crisis of COVID-19 is not over as yet. Now we have bigger challenges to face in this unlock regime. With great concern, I appeal you all to stay alert and cooperate with the Government in adhering to the health advisories issued from time to time. By being careful and cautious we can definitely beat the virus.

Wish you all a very happy Festival Season !

Pankaj Mittal

Towards More Effective Research in India: Re-envisioning Ph.D. Programme

K K Aggarwal* and Avinash C Sharma*

The term ‘Research’ undoubtedly is among the top drivers of societal transformations simply because it originates from the very basic instincts of human mind namely, curiosity, observing and analyzing; and wherever possible, leading to manipulating the surroundings and the nature around itself leading to an improved quality of life apart from drawing the ‘intellectual satisfaction’. Within the formal higher education ecosystem the highest research qualification is the title of Doctorate of Philosophy (formally referred to as Ph.D.).

The doctorate as a degree, has certainly come of age, and it sits proudly at the top of the ladder of academic qualifications in almost all countries in the world. The rhetoric used to describe the doctorate - for example as “the pinnacle of academic success” (Nyquist 2002), “the zenith of learning” (Lovat, Monfries and Morrison 2004), and “the pinnacle of university scholarship” (Gilbert 2004) - is often colorful. Undoubtedly, for most people in most countries, the doctorate is the research degree of choice.

The doctorate takes several different forms in different countries (Noble 1994). In the USA, for example, a doctorate programme usually includes both taking advanced-level taught courses and undertaking academic research, with access to a range of academic advisors and supervisors along the way. In India, so far Ph.D. is an in-depth study of a given topic done in research mode under the guidance of a principal supervisor. However, since 2016, advanced level course work worth 8 to 12 credits has been made mandatory for all scholars admitted to the program. In most of countries, the primary emphasis within the doctorate is on developing disciplinary knowledge, in preference to applied research and knowledge transfer. A strong emphasis on preparing students for any roles (within or beyond the academy) they might

expect to fill after completing their doctorate remains rare and largely unclear.

Variability in doctoral degrees has developed over time between disciplines, institutions and countries. But, logically, there should be something identifiable and widely accepted as ‘doctorateness’ in all the forms. A central question, therefore, is “what is the essence of ‘doctorateness’?” Put another way, “what factors must be present for any particular degree to fit into the category?”. What factors allow us to distinguish between a doctorate and other degrees? And subsequently what is expected from a Ph.D. degree holder different than other degree holders. And at the end, how to utilize the expertise and skills of the scholars – so groomed, for the benefit of the society.

The literature is peppered with commentaries on how the doctorate is viewed, both within and beyond universities, and again the rhetoric is often quite colorful, but also quite revealing. In the UK the Winfield Report noted two decades back that “there is an inherent tension within the degree” and “the absence of a research-based literature on doctoral study may have contributed to the apparent uncertainty about the nature, form and purpose of the degree” (Winfield 1987). In recent times, many a stakeholders have started questioning the fitness of the purpose of the doctorate.

Nevertheless, the confusion around the role and purpose of doctorate is far from clear. In view of this the time is right to deliberate upon the very nature of the doctorate, given the multiple drivers for change, multiple agendas at work, and the multiple stakeholders with a keen interest in both the debate and the outcome.

This present discussion paper is aimed and designed to help frame and initiate such a debate, makes an attempt to identify the issues and make suggestions to redress and possibly reduce the confusion. The paper is organized as follows: Section 2 discusses the very basics regarding the concept of Ph.D. in the backdrop of its historical and its recent evolution/ development. In section 3 we try

* *Chairman, National Board of Accreditation, New Delhi & Former Founder Vice Chancellor, GGS Indraprastha University, Dwarka, New Delhi-110078; E-mail: kkaggarwal48@gmail.com*

** *Director (Research & Consultancy) & Professor of Physics, GGS Indraprastha University, Dwarka, New Delhi-110078 E-mail: acsharmal956@gmail.com*

to identify and analyze the drivers of change; mainly three sets of factors that necessitate the conceptual as well as the structural change in doctorate programme world over, namely,

- *Sustaining the Supply Chain of Researchers:* Important issues include recruitment, funding, efficiency and cost-effectiveness, the status of researchers, and the growth of interdisciplinary and applied research
- *Preparation for Employment:* Important issues include the doctorate as a labour market qualification, expectations of doctoral candidates, expectations and requirements of employers, transition and mobility
- *Internationalization:* Important issues include global competition for doctoral students, the need to have internationally competitive doctoral programmes, and harmonization with Europe, particularly through the Bologna Process.

In section 4 we try to identify various aspect, linkages and spinoffs of the doctorate degree – that in-totally perhaps defines the Ph.D. ecosystem. Section 5 discusses the Indian scenario, our strengths and identifies some of the critical challenges, particularly in the context of emerging fourth industrial revolution leading to so called the Higher Education 4.0. Section 6 summarizes the analysis done in the earlier sections and layouts some of the implementable recommendations.

The Degree: Doctor of Philosophy (Ph.D.)

The most common form of doctorate, indeed in many countries still the only recognized form of doctorate, is the Doctor of Philosophy (PhD, from the Latin *Philosophice Doctor*), a postgraduate research degree. Whilst the title is derived from the Greek, meaning “Teacher of Philosophy”, and the degree was originally awarded only for studies in philosophy, it has long been possible to study for a PhD in most if not all academic disciplines.

The word “philosophy” comes from two Greek words, meaning “love of wisdom”. *philos* (philos) adj. “beloved” + *sophia* (sophia) fem. noun “wisdom”. There are different types of philosophy from different times and places. Nevertheless, the term ‘philosophy’ in the degree, perhaps finds its relevance and meaning as:

- i. The rational investigation of the truths and principles of being, knowledge, or conduct.

- ii. Any of the three branches, namely
 - natural philosophy,
 - moral philosophy, and
 - metaphysical philosophy, that are accepted as composing this study.
- iii. A particular system of thought based on such study or investigation: *the philosophy of Spinoza*.
- iv. The critical study of the basic principles and concepts of a particular branch of knowledge, especially with a view to improving or reconstituting them: *the philosophy of science*.
- v. A system of principles for guidance in practical affairs.
- vi. An attitude of rationality, patience, composure, and calm in the presence of troubles or annoyances.

The doctorate has a fairly long and interesting history (Park 2005a); some distinctive key landmarks in its evolution being as: birth in medieval Europe as a licence to teach in universities, its rebirth as a research degree in Germany in the early 1800s, its redefinition in the USA from the 1860s, and its subsequent diffusion to Europe and elsewhere. The formal degree was first introduced in the UK in 1917, by the University of Oxford. Within a decade or so, the PhD has established itself as a qualification recognized internationally, as the standard qualification for entry into the research and academic professions, and as an important qualification for other labour markets.

India had its first doctorate in the year 1904 when University of Allahabad awarded D Sc to Annoda Prasad Sircar (by paper), about half a century after the establishment of the three premier Indian universities. Surprisingly, among the premier universities, University of Calcutta was the first to produce a doctorate in 1909, when the famous medical practitioner Upendranath Brahmachari was awarded PhD. Till 1920, there were 13 doctorates awardees in India, one from Allahabad and the remaining 12 from the University of Calcutta. The subject-wise breakdown was as follows: Mathematics - 2; Physics - 3; Chemistry - 6; Earth sciences - 1; Medical sciences - 1; and Agriculture-1. (Sen 2015). As of 2018 over 77800 students are enrolled in research programs in variety of disciplines spread-over universities and institutions of higher learning all across India.

Types of Ph.D.

The traditional ‘Doctor of Philosophy’ referred to as Ph.D. is the best-known advanced research qualification, but several other varieties of doctoral degree exist. Some of these are academic qualifications in specific subject areas. Others are professional doctorates with a slightly different format.

The way in which candidates study for a PhD is also becoming more varied. The table-1 gives an overview of the most common types of PhD. The table doesn’t include *every* type of doctorate. The doctorates so listed can be broadly categorized as:

- **Academic Doctorates** (such as the standard PhD) are usually awarded for original research and scholarship in traditional academic subjects. They can prepare a student for various careers, but their main focus is on broadening theoretical understanding of a subject, rather than improving professional practice.
- **Professional Doctorates** are awarded for work that contributes directly to knowledge or practice in a specific vocational field. This still involve original research and analysis, however, also incorporate more practical training and instruction. Candidates may require appropriate experience.

- **Higher Doctorates** are usually awarded later in one’s career, as a means of recognizing esteemed researchers or practitioners. Students do not normally enroll for these doctorates as traditional university degrees.
- **Honorary Doctorates** are awarded to acknowledge an individual’s achievements. They do not require any specific track record of academic or professional work and can be granted at the discretion of a university. Students do not enroll for these doctorates. Universities also award these to particular outsiders on the basis of distinguished service or wider contributions to society, and many also award so-called higher doctorates such as the Doctor of Science (DSc) or Doctor of Letters (DLitt) to individuals who have excelled in academic research careers

Stakeholders of Ph.D.

In order to identify and have better appreciation of the issues concerning the Ph.D we first take a look at the various stakeholders linked/ connected with the doctorate degree:

- **Students:** For the student a doctorate can mean many things, including an “academic passport with international reciprocity” (Noble 1994), a licence to teach at degree level, and an apprenticeship in

Table -1 Common Type of PhDs

PhD Types			
Qualification	Full Title	Subjects	Type
PhD / DPhil	Doctor of Philosophy	All	Academic
DBA	Doctor of Business Administration	Business and Management	Professional
EngD / PhD (Eng)	Doctor of Engineering	Engineering	Professional
EdD / D.Ed	Doctor of Education	Education	Professional
DSocSci	Doctor of Social Science	Social Sciences	Professional
DProf	Doctor of Professional Studies	All	Professional
DArch	Doctor of Architecture	Architecture	Professional
MD	Doctor of Medicine	Medicine and Health Sciences	Professional / Higher
Th.D	Doctor of Theology	Theology and Religious Studies	Academic
DD / DDiv	Doctor of Divinity	Theology and Religious Studies	Higher / Honorary
Dsc / ScD	Doctor of Science	Science, Technology Engineering and Mathematics (STEM)	Higher / Honorary
DLitt / LitD	Doctor of Literature	Arts and Humanities	Higher / Honorary

Source: <https://www.findaphd.com/advice/phd-types/>

‘proper’ academic research (Armstrong 1994); and many a times to earn social respectability.

- **Supervisors:** For the supervisor, there is the satisfaction of training apprentice researchers, a route to career progression as an all-round academic practitioner, and a supply of inexpensive research assistants.
- **Academic Departments within an Institution:** For departments, having doctoral scholars is a mark of research status and credibility, a valuable source of income and contributor to research critical mass and a supply of teaching assistants to help in undergraduate teaching.
- **Institutions:** For an institution, doctoral students are what Mitchell (2002) calls “the army of research ‘ants’” which helps to keep the research mission moving forward while many academics/ educational institutions struggle with heavy workloads and multiple responsibilities. Being a *research degree awarding* authority is also an indicator of the status and academic credibility of an institution/university.
- **Disciplines of Study:** For Disciplines, Doctoral Scholars serve as important manciples with an implicit responsibility to keep the discipline alive, intellectually vibrant; and ensure a supply chain of future academicians and researchers.
- **Funding Agencies:** For Funding Bodies, such as DST/ DAE/ CSIR/ DBT and other similar research councils, investment in doctoral programmes supports capacity-building future academicians and researchers, the growth of critical mass in research teams, and a sustained of high quality research that brings both academic and applied benefits for the nation.
- **Employers:** For employers, doctoral graduates are creative high-skilled and human capital, that is a gateway to innovative thinking and knowledge transfer.
- **The Nation:** For the nation, the obvious benefits of an active and vibrant community of scholars engaged in doctoral level research include enhanced creativity and innovation, and the development of a skilled workforce and of intellectual capital and knowledge creating/ transfer, which are engines of the growth of cultural capital and the prosperous knowledge economy.

The Ph.D. Ecosystem

Productive doctoral scholars is vital and an absolute necessity for the higher education ecosystem and for the health of specific academic disciplines. Some of the parameters that goes into defining of Ph.D. ecosystem are presenting here

Sustaining the Supply Chain of Researchers

From a national perspective, maintaining a steady and reliable supply chain of researchers is crucial, particularly in today’s knowledge economy wherein researchers are key players for knowledge transfer. Doctorate scholars are, in fact, custodians of the disciplines and also a source of development of newer multidisciplinary areas. A sustained supply of doctoral student, is essential to grow the next generation of academics but to maintain vitality and research momentum in disciplines.

Recruitment

Several factors affect the recruitment of doctoral students. There can be several reasons and motives for choosing to invest time in doctoral research. Most do it because they see it as the passport to a particular career, (mostly an academic), some as part of their professional development, and a few do it out of simple curiosity and for personal intellectual satisfaction.

Funding

A key determinant of the sustainability of the supply chain of researchers is funding to support both research and researchers. In some countries doctoral candidates are, strictly speaking, not students but members of staff and research assistants who are paid salaries. But most doctoral candidates in India are students, and they can access funding from many different sources, usually on a competitive basis. Around a third of full-time doctoral students are funded by the research councils, and this remains the largest single external source of doctoral funding. It is not just the availability of funding that matters, it is the form in which the funding is released; unfortunately, is quite unsystematic and irregular.

Efficiency and Cost-effectiveness

Those who fund research naturally have a vested interest in the efficiency of doctoral education, in order to ensure that financial support is used appropriately and that resources are deployed to optimum advantage.

Considerations of the cost-effectiveness of doctoral study arise at two scales, that of the individual researcher and that of the institution. Over the years, the cost of carrying-out quality research had increased manifold. In India, this is particularly true for higher-end scientific fields like Bio-Technology, Nano-Technology, medicines, pharmaceutical sciences, etc. mainly because of the increased level of sophistication and the higher-end high precision technology infrastructural requirements. In the last few decades, our country had experimented with many concepts like Inter-University centres (like IUAC, IUCAA, CAT, etc.), research and innovation clusters, encouraging collaborative research programmes in the niche areas. The centres have established all possible centralized technical infrastructure and support facilities for the use of researchers spread all over the country.

Status of Researchers

Funding also has a major impact on the status of researchers. Traditionally, it is linked with who pays tuition fees and who receives a stipend. Status of researchers is impacted by their perceived role in the society in general, apart from the earning capacity. In India, in the last two decades, the status of the Ph.D. scholars have gotten diluted mainly because of the emergence of private players and secondly, because of the way the credit of research works has been inducted in the A.P.I, of the faculty promotion. This has although increased the number of Ph.Ds (and also number of research publications) but the quality of research has been seriously impacted leading to a steady deterioration in the status and acceptance level of the Ph. Ds. so produced in the job market.

Growth of Interdisciplinary and Applied Research

The changing nature of academic research has a relatively minor impact on the supply chain of researchers. Relatively little attention has yet been devoted to the challenge to doctoral programmes posed by the growth of interdisciplinary research - which Metz (2001) characterizes as “intellectual border crossing” and Gilbert (2004) views as “most productive in innovation and discovery” - and of applied research which has an emphasis on relevance to society and knowledge transfer. This underlying trend will inevitably necessitate changes in doctoral programmes in the years ahead.

In recent time in India this got huge push and support from the state. The Biotechnology mission,

Nano Mission and very recent quantum mission of GOI being a few examples.

Preparation for Employment

The challenge for doctoral education is not simply a matter of the quantity of doctoral students passing through the supply chain of researchers; it is also a matter of quality, in the sense of fitness for purpose. How well suited are doctoral graduates for the sort of careers they want or end up in? Key issues relating to the doctorate as preparation for employment include the doctorate as a labour market qualification, the expectations of doctoral candidates, expectations and requirements of employers, and transition and mobility.

Alternatively, can we redesign doctoral training (atleast in certain identified areas) so that the Ph.D. holders thus produced may turn out to be employment generators and entrepreneurs instead of job seekers. This has already started happening in some of the developed countries, such as USA.

Doctorate as a Work Force Market Qualification

The premise to prepare doctoral students for careers beyond the academy and for wider economy, is already at work in the USA. The need is to recognize that the core competencies expected of doctoral graduates is the *ability to see oneself as a scholar-citizen who will connect his or her expertise to the needs of society*. The challenge of adequately preparing doctoral students for careers beyond the academy by developing their transferable skills lies at the heart of the new skills agenda for research policy planners. Surely, similar scenario is fast emerging in India as well.

Fine-tuning the supply of doctoral graduates with the appropriate skills and competencies will require much better tracking of career paths, and better understanding of the links between skills, other attributes, and employability. The USA is perhaps far ahead on this thought process.

Expectations of Doctoral Candidates

Critical to the employability and career development student's motives vary a great deal. Most of the PhD students want to be in academics and in fact, are expectably the best at.

Some of the career motivations and expectations of doctoral researchers are as to pursue a career in

research, to research their field in greater depth, to enhance their career prospects outside the academy, and to enhance their career prospects within the academy. This perhaps, aims at the possible career options they are actually considering as a non-academic career linked to their field of research, a post in the academy, a non-academic career unrelated to their area or field of research.

Expectations and Requirements of Employers

Employers outside universities have particular expectations of what doctoral graduates should be able to offer. Industrial employers are usually prefer people with multidisciplinary and international exposure, a flexible approach, and a fair business knack.

It is a double-edged sword, because while doctoral graduates usually do bring added value to an enterprise - including specialist knowledge, research and analytical skills, future potential, maturity - realising this potential is often constrained by a series of potential barriers which employers must confront and find effective ways of dealing with. Doctoral students invariably lack commercial awareness, are generally over-specialised, face difficulties in adapting to non-academic work cultures, and often have unrealistic expectations (McCarthy and Souter 2006)

Transition and Mobility

There are two other important themes relating to preparation of doctoral students for employment (i) these are the time they take transition from being a student into being a productive employee, and (ii) the degree of mobility they are likely to enjoy between different sectors as their careers progress.

Greater flexibility of career paths for researchers, including the possibility of moving freely in both directions between the academy and the world beyond it, would be widely welcomed. It would bring a number of benefits, including helping to foster effective knowledge transfer and disseminate creativity and good practice, and making the prospects of a research career look more attractive (thus boosting recruitment onto doctoral programmes). Increasing the geographical mobility of researchers, by making it easier for them to develop careers across national boundaries, must be a key objective.

Internationalization

Many a countries, are facing major challenges relating to internationalization. In Indian context this is

practically one way traffic. In the absence of sufficient academic positions, a large number of Ph.D. holders move to countries like European Union, Japan, US, UK for post-doctoral positions. Many of them return to India and get frustrated due to lack of the conducive environment (and attitude) and go back again to settle abroad. There is hardly any encouraging environment for Ph.D. holders from foreign universities, to look forward and get attracted to the Indian job market. Although in recent times, there is a steady increase in foreign experts availing short-term assignments in India.

Institutional Regulations and Definitions

Although, no one stakeholder has overall responsibility for defining what a doctorate is and what form it should take, institutions deliver the doctoral programmes and award the degrees so they have a major stake in such decisions. Because of this discretion, the diversity of ways in which university regulations define the doctorate is not really surprising. In essence, a doctorate is what the regulations of a particular university say it is. Little wonder, then, that *considerable variations in statutes and practices exist, for example, in relation to: the period of study (minima and maxima); the requirements to be met for award of the degree; and whether there is a specified length for the thesis (although most universities which do specify this put the maximum length at 100,000 words)*. Nevertheless, several common threads appear in most university regulations for the doctorate, like *the need for original research as a contribution to knowledge*.

While universities throughout India continue to enjoy a great deal of autonomy, they are increasingly being subject to external scrutiny and finding themselves accountable to external agencies such as the funding councils, research councils, regulatory bodies like UGC, AICTE, BCI, MCI, etc. A key element in this scrutiny and accountability is the extent to which the institution has embraced both in spirit and letter their guidelines.

Supervision

Traditionally, most supervision was based on the 'secret garden' model (Park 2006), wherein student and supervisor worked closely together with very nominal external scrutiny or accountability.

In recent times the changing expectations and requirements of supervisors, is the need for appropriate

personal and professional development of those who supervise. Most institutions face major challenges in encouraging or incentivizing supervisors to make use of the supervisor development opportunities that are now fairly widely available.

In the emerging era of HE 4.0, supervision must now be more transparent and more accountable, and institutions are expected to have clearly defined roles and responsibilities of both supervisors and research scholars, and clear criteria for defining who is eligible to act as a supervisor.

Integration

Fully integrating appropriate skills development activities within research degree programmes, so that they are not viewed and treated as an add-on or a separate stream which can be ignored, is a major challenge in most institutions. Particular challenges surround the development of skills in 'knowledge leadership', knowledge transfer, and the commercialization of the research outputs if doctoral programmes are to produce graduates who can make a real difference in the wider economy, well beyond the academy.

Assessment

Traditionally the examination has focused almost exclusively on the thesis submitted by the student, through an evaluation by internal committee followed by external examiner and finally an oral defence of thesis (conventionally referred to as the *viva voce*). *Perhaps examiners need to remind that it's a PhD, not merely a casual evaluation.*

As doctoral programmes broaden to encompass skills development and research training, as well as actually doing the research and writing it up in the form of the thesis, questions are being asked about how best to accommodate this broader remit into the examination process. The time is appropriate to initiate a debate on the assessment of the PhD.

Some of obvious issues that needs to be addressed are listed below

- a. Should the primary emphasis in examining the doctorate be on the thesis or the process (developing the researcher), or what is an appropriate mix of the two?
- b. Should the examination process be adjusted keeping in view the special circumstances of work-based professional doctorate. If so, how?

- c. Is the traditional closed examination (open only to the two or at most three examiners and the scholar, many a times with the supervisor present as a silent witness) still appropriate, given the much more open process favoured through most of Europe, which involves an 'examination' to which outsiders (sometimes even including members of the public) are invited?
- d. Should the focus rest on the *thesis* as sole evidence of scholarly output, without even requiring evidence of other scholarly outputs such as publications in peer-reviewed journals? Mostly, the scholar is expected to publish at least one or two research papers in peer reviewed academic journals.

Diversity of Awards

One way in which doctoral education in the UK has adapted to changing market conditions is by developing a range of new doctoral degrees tailored to niche markets. This approach, based on diversification and differentiation, is proving quite successful. It does pose some challenges for the sector in terms of ensuring comparability of quality and standards, particularly because some of the new doctoral models incorporate elements such as taught modules, work-based learning, and novel forms of output rather than relying solely on the traditional thesis.

Drivers of Change

World-over the key drivers that necessitate the interventions in Ph.D. ecosystem include a new emphasis on skills and training, submission rates and quality of supervision, changes in the evaluation of the thesis, and may be the introduction of national benchmarking. In recent years, in many a countries, various stakeholder groups have been questioning the fitness for purpose of the doctorate.

Two international reviews of the different models of the doctorate adopted in different countries provide a global overview. Noble (1994) described wide variations in practice between different countries, and concluded that doctoral programmes would be improved by accepting fewer students, paying salaries to doctoral students, and removing the viva as a form of examination. More recently, Powell and Green (2007) have examined the doctorate in 17 countries, and noted significant variations in the declared purpose of the doctorate,

and a general tendency to concentrate delivery of the degree in a limited number of institutions. A few interesting examples are in order as following:

Australia

In Australia, Gilbert (2004) asks whether the time is right to assess the capacity of the doctorate to respond to a long list of challenges, which include stronger links between academic research and real-world challenges; the growth of interdisciplinary and multi-disciplinary research; changing conceptions of knowledge and expertise; the increasing pace and spread of knowledge production and transfer; increasing emphasis on development of generic or transferable skills; changing roles of academics and experts “derived from ideas of entrepreneurship, knowledge work, the public intellectual and advocacy for science and research”; and diversification of doctoral awards and models (including professional doctorates).

USA

Reflection on the doctorate has been most persistent and most intense in the USA. Cude, way-back in 1987 had noted that many North American doctoral programmes as inflexible, cumbersome, restrictive and wasteful. Several commentaries on doctoral education in the USA identify an over-supply of doctoral graduates for the academic job market, lack of preparation and skills development for careers beyond the university and for careers as teachers in universities; lack of appropriate supervision, particularly for career development; a learning experience that is too deep and narrow, too specialized and academic, and too campus-based; inability to work effectively in an interdisciplinary environment; and recurrent difficulties in securing funding.

While India has much to learn from how the US has reflected on the nature of doctoral education, and there are lessons in how the US has sought to address many of the issues. Some typical major well-funded national projects designed to tackle challenges peculiar to doctorate in USA are:

- **Preparing Future Faculty** launched in 1993
- **Responsive PhD Initiative** (Anon 2006b)
- **Carnegie Initiative on the Doctorate** and have provided vital inputs for the policy planners.

Europe

Doctoral education has also come under scrutiny in Europe. In the Nordic countries (Denmark, Finland, Norway, Sweden), for example, drop-out rates are high, completion times tend to be long, and graduates are viewed as too specialized and poorly prepared for work outside universities (Steinwall 2006).

Change is already underway all across Europe. It is evidenced, for example, in the emergence of subject-specific training, transferable skills training, support and quality assurance in many countries, and the development of doctoral programmes and Graduate Schools (Ritter 2006). Increasing harmonization of the higher education landscape across Europe, driven by the Bologna Agenda (van der Wende 2000), is inevitably promoting further convergence of national systems of doctoral education in European union countries.

India

In India the Ph.D. as a degree has also come to an age. In last decade there have emerged serious concerns mainly emerging from the diversity, quality and the employability of the Ph.D. holders. The three immediate key drivers of change to the doctorate world over including India are: sustaining the supply chain of researchers, preparation for employment, and internationalization.

Indian Scenario and Global Integration

India’s higher education system is the third largest in the world, next to the United States and China. The Indian higher education system has expanded at a phenomenal rate during the 21st Century -and it shows no sign of stopping. This rapid growth in the number of universities and institutions is also providing a range of PhD research opportunities, ranging from cutting-edge science and engineering projects to unique programmes exploring the country’s own diverse history and culture. In fact India does provide a wide and diverse range of opportunities for Ph.D. level scholarly works.

In the Indian context, the requirement of doctorates is much more, not only in terms of numbers but also in terms of variety and diversity of applicability. This is particularly true, in view of the recent push/ thrust towards manufacturing of products, several large scale national projects like ‘Make in India’, smart cities projects, multinational *mega-science* projects like INO, LIGO-India, ITER, etc. wherein there is going

to be a huge requirement of high-skilled and highly specialized experts with vision of future.

India's rich culture, cultural wisdom, stunning geography or diverse anthropology need little introduction and are a universal part of its appeal as a visitor destination. When it comes to international study, however, there's arguably never been a better time to consider a longer-term stay as a PhD student in India.

Some of the reasons to consider joining PhD at an Indian university may be listed as follows:

- *Diversity and specialization*-Whether one wants to research Business Management, Bombay Cinema or Buddhist Philosophy, the scope and options for PhD study in India exists in abundance.
- *Affordability and accessibility* - PhD fees in India vary a lot widely, but are often surprisingly low. Further, English is widely understood and is adopted as the language of instruction all across institutions of higher learning.
- *Increasing global recognition*-University rankings have taken some time to catch up with the speed of India's higher education expansion, but this is beginning to change. A few of India's leading universities and institutes now feature in international league tables for 2019.
- *Youth and dynamism* - India's current population is one of the youngest in the world. This fresh and dynamic outlook helps drive a culture of innovation and entrepreneurialism. One will fit right in as a PhD researcher looking to develop new ideas and approaches.

Universities in India are overseen by the University Grants Commission. This is an official body ensuring that higher education including the Ph.D., in India is properly supported and meets appropriate standards. The sheer size of India's university system means that opportunities for PhD study exist right across the country. However, there are a number of key 'hubs' for study and research. These include major cities such as Mumbai, Delhi, Bangalore, Hyderabad, Kanpur and Pune.

Indian Universities and Institutions of Higher Learning

Global rankings are beginning to reflect the growth of India's university system and its increasing research experience in key subject areas. India's

higher education system is one of the world's biggest, with Approximately 900 different universities. It's also one of the most diverse, as these institutions fall into a range of different categories.

There are different varieties of universities with the potential to offer PhD programmes in India; namely Central universities (47), State Universities (390), Private Universities (307), Deemed Universities (124); *Institutions of National Importance* (INIs) includes IITs(23), NITs (31), IIMs (7), IISERs (7), NIPERs(7), AIIMS (7), SPAs (3) and are the most prestigious higher education institutions, tasked with strategic academic and professional objectives. The distinction between different groups lies in the way they are established and administered.

This has the potential to seem confusing, but, for prospective PhD students, the differences between individual universities (or groupings) won't generally be as important as the specific research projects and programmes they offer.

Many a faculty in colleges carry out research activities, conduct research projects, although in limited way and mostly in collaboration with faculty and researchers in the associated university's departments.

The PhD Programmes

It's common for Indian universities to establish *doctoral programmes* within which their postgraduate students receive additional training and support as they carry out their research. PhD programmes often commence with a *coursework phase*. This provides specialist subject knowledge and research skills a student needs in order to carry out their own independent research. Thereafter one prepares a synopsis of the work to be pursued and is assigned an appropriate supervisor to guide. From this point onward one works more independently, carrying out research and culminating in new findings and results and compiles into thesis. In most cases one spends at least *three years* on PhD.

Some Concerns

In recent past there are signs of widespread concern across India about the quality of doctoral degree, either in terms of the academic quality of the finished product (the thesis, which is judged by peer review) or the research degree programmes that underpin it, which have recently been indirectly

evaluated in the accreditation process of the various institutions and universities.

But there are clouds on the horizon about some key aspects of doctoral education in India, particularly now that there are concerns regarding the quality of thesis, the way research is being conducted and the researcher trained thereof, and high quality research and almost absence of front-line/cutting-edge research. Concerns have also been voiced about how the Indian doctorate is viewed abroad about the ability of Indian universities to compete effectively in the global market and about the challenges of meeting international expectations.

There are several domestic concerns, too, including the impact of inadequate training of student at UG and PG degrees prior to Ph.D., their attitudes towards continuing onto research based further study, and the employability of doctoral graduates.

Stakeholder Perspectives

The key stakeholder groups directly linked with the doctorate studies in India are:

- a. The funding Agencies, MHRD, DST, DAE, CSIR, etc.
- b. The Quality Assurance Agency (QAA) NAAC ,NBA
- c. Regularity bodies: UGC, AICTE, MCI, BCI, etc.
- d. Universities (Central/state/private)
- e. Higher education institutions (HEIs)
- f. Employers

“Who owns the doctorate?” is an interesting and perhaps most pertinent question, because while universities are *custodians of academic standards and have the responsibility to award the degree*, no one group has complete responsibility for defining what a doctorate is and what form it should take. As Nyquist (2002) noted for the USA, but is equally true for other countries, ‘although research institutions have tended to believe that they ‘own the PhD’ because they design the programs, recruit the students, and confer the degree, it has become abundantly clear that a PhD is the product of multiple owners or stakeholders, not the least of which are the doctoral students themselves”.

The question “Who cares?” is also vitally important, because any significant change to the doctorate will inevitably have impacts on many different groups or stakeholders. Within doctoral education there are multiple stakeholders with different

interests, expectations and agendas. Inevitably, therefore, a doctoral degree when viewed through different lenses can mean different things. Surely there is a serious lack of communication between different groups of stakeholders and also within the group as well. The lack of co-ordination is more felt (and evident) at research-degree level.

Conclusive Observations and Recommendations

To summarize, a Ph.D. program is a specialized training that requires very different kind of attitude and capabilities. Some of the essentials or core attributes of a Ph.D. scholar and the qualities those get strengthened during the process of Ph.D. may be listed as follows:

- ***Intelligence:*** Most people are ‘brainy’ enough to pursue a Ph.D. in general.
- ***Intellectual Curiosity:*** One must have the intellectual curiosity to care about why something is true or false.
- ***Perseverance:*** One should have the fortitude to investigate a problem with irrational ambition. When one is pushing the boundaries of knowledge, things often look ‘impossible.’
- ***Patience:*** In research, things take time, things break, collaborators flake. If one is impatient. The process of Ph.D. therefore surely tests one’s patience.
- ***Creativity:*** One need to be able to think of ways to solve a problem that has not already been tried.
- ***Enjoy Academia:*** If one is going to spend another five years or so after undergrad, one better like all of the cultural aspects of academia.
- ***Money not an Issue:*** At best, one get paid a simple stipend. So better either love the simple life, or be independently wealthy.
- ***Comfortable with ambiguity:*** No one will micromanage the scholar. One better love being independent.
- ***Can Work Late:*** While some manage a 9-5 schedule. This is not typical. There will be times that you will be working late, even for simple reasons like having to switch a sample if you are doing an experiment.
- ***One is always ‘Plugged In’:*** A PhD is a continuous five years devoted to a field. One just can’t ‘turn it off’ even if one is out of lab or at home. Not

many people are good at doing so. So the scholar enjoys the idea of always having work to do. It doesn't mean always working, it just means the work doesn't 'end.'

- **Can work Alone:** Most PhDs are an independent process, so if one wants to be interacting with people all the time, a PhD is likely not for you. This is just a 'starting' list of things that MUST be true for one to be *capable researcher*. Not necessarily to 'succeed' that list is both much longer AND highly field/situation dependent.

The time has come when we need to have a relook at the entire Doctorate degree program not only to adopt/adapt to our own emerging academic, industrial and societal changes and evolving requirements (particularly in the light of IR 4.0 already at India's doorsteps) but also to stay competitive with the rest of the world. Some of the recommendations are as follows :

- Push for reform citing need to put *philosophy* back into the *Doctor of Philosophy*.
- Train Ph.D. students to be thinkers, not just specialists.
- Nurture big thinkers and creative problem-solvers that society needs.
- Scholars needs to be taught to recognize how errors can and do occur. Trainees should evaluate case studies desired from flawed real research, or use interdisciplinary detectives games to find logical fallacies in the literature.
- Students must be shown the scientific process as it is its limitations and potential pitfalls as well as its funside, such as serendipitous discoveries and hilarious blunders.
- Push for interdisciplinary and multi-disciplinary research work.
- The actions necessitates new and flexible governance structures for co-supervision and resource-sharing.
- More autonomy to credible pool of Supervisors for evaluation of doctorate thesis so as to ensure the quality of P.D. program.
- Financial assistance/ stipend/ maintenance allowance to EVERYBODY enrolled into the Ph.D. program.
- At the end, it is the ability to see one-self as an enlightened scholar - citizen and capable

of connecting his/ her expertise to the needs of society; that should define a doctorate awardee.

- Ph.D. holders are to be treated as national resource.

To conclude, it is hoped that the present work shall initiate engagement of stakeholders at national and international forums on transforming doctoral education to meet the needs of the 21st century”.

Note

The article is based upon several informal discussions and is an outcome of various formal debates and deliberations platforms. The main contents in the present article is an extract / sequel of the “*VIF Task Force Report : Towards more effective Education: Emergence of STEM Education In India*”, March 2019 prepared under the Chairmanship of author Professor KK Aggarwal.

References

1. Aggarwal, KK and Sharma, Avinash C., (2019). *Higher Education Preparedness for IR4.0: An Indian perspective*, National Security, Vivekananda International Foundation Vol II(2) ISSN 2581-9658, p 205-229.
2. Anon (2006). Woodrow Wilson Responsive Ph.D. Initiative. www.woodrow.org/responsivephd/viewed 6 June 2006 and references therein.
3. Armstrong, JA (1994). Rethinking the PhD. *Issues in Science and Technology* Summer :19-22.
4. Cude,W. (1987). *The PhD trap*. Nova Scotia: Educational Resources Information Center (ERIC) ED31183. 136 p.
5. Gilbert, R. (2004). A framework for evaluating the doctoral curriculum. *Assessment and Evaluation in Higher Education* 29 (3); 299309; and references therein.
6. Green, H. and Powell, S. (2005). *Doctoral study in contemporary higher education*. Buckingham: Open University Press
7. Lovat, T., Monfries,M., and Morrison, K.,(2004). Ways of knowing and power discourse in doctoral examination. *International J of Educational Res.* 41(2):163-177.
8. McCarthy, M and Souter, C (2006). ‘*Barriers and benefit exploring employer perceptions of PhDs and contract research staff*’. Workshop presentations at Profiting from Postgraduate Talent, UK GRAD Fifth Annual Conf. London 7 September 2006.
9. Metz, M.H. (2001). Intellectual border crossing in graduate education: a report from the field. *Educational Researcher* 30 (5); 1218
10. Mitchell, N (2002) *Surviving the PhD*. All in the mind (radio program). Australian Broadcasting Corp. Transcript available at www.abc.net.au/rn/science/mind/s668358.htm

(contd. on pg 19)

Higher Education: The Way Forward with COVID-19[#]

Madhusudan Chakraborty* and Avijit Gangopadhyay**

Most world leaders have opted for a complete lockdown in their resolve to address the Novel Coronavirus crisis. Consequently, universities had no option but to switch over to online teaching to continue academic programmes in an effort to minimize the suffering of the students. The sudden change in the mode of teaching-learning process caught both the students and the faculty members unprepared.

What the post-pandemic world will look like is unclear. The Coronavirus has come to stay and we have to learn to live with it. The fear of infection generated over the past five months might also not go away even if the vaccine is discovered in next 12-18 months. At the same time the students cannot afford to lose valuable time in learning the skills that build their careers and the universities have to spell out plans to help complete their degree programmes.

In this article, we shall first discuss the pros and cons of on-site versus on-line learning in a COVID-19 world from our experience in the last few months. We will then provide a number of suggestions for solutions in the short and long term. Finally, we will touch upon the issue of those students who aspire to go abroad for higher studies, but will now seek opportunities here in India.

Online and Onsite –One of Them or a Thoughtful Mix?

Although the universities are keeping the students engaged online, it is difficult to predict what to expect in the near and distant future. Perhaps some of the degree programmes could be pursued through online-only education. But life science, basic science, engineering and similar programmes cannot

be covered through online-only. For example, the students and researchers pursuing higher degrees have no alternative but to work in the laboratories and workshops and will have to go back to their place of study.

The online teaching-learning process is now continuing for the past few months and many have begun to opine that the online education could be a viable alternative to on site education. The advocates of the virtual world would be emphatic on offering degree programmes through online only. Perhaps the current situation could be seized as an opportunity to develop new technologies and new businesses to support fully online education. The outcome of such teaching-learning process, however, is not beyond questions and needs a thorough review.

The universities need to recognize that the teaching-learning process has to be participative and not merely a service. The regulatory authorities have to concede that while offering degree programmes the universities are playing with the lives of students. Accordingly the choice of the mode of education should not be influenced by the business opportunities and market forces alone. The efficacy of online education needs to be debated at appropriate forums, the problems should be addressed and the most effective modes be chosen so that the quality of education does not suffer.

The online education involves the students, the teachers and the medium that connects them. A major problem for the economically weaker sections of the students and those from the villages in India is the access to virtual classrooms. Such students may not be able to afford expensive equipment and bandwidth to access and download the gigabytes of the video or power point materials from their small phones and then try to understand those by themselves without someone to interact with. Connectivity also depends on locality where the residence of the students is situated. Moreover the residence of such students may not be able to provide an ambience to attend virtual classes without distractions. While suggesting online education as an alternative, we cannot overlook the problems of the economically weaker section of the society.

**Reprinted from University News, Vol 58 (24) June 15-21, 2020*

**Former founding Director, IIT Bhubaneswar and Former Professor of Metallurgical and Materials Engineering, IIT Kharagpur. Res: Flat 1A Devangan Chsl, BF80 Street No 165 AAI, New Town Kolkata-700156 West Bengal. E-mail: madhu@metal.iitkgp.ac.in*

***Professor of Oceanography, Department. of Estuarine and Ocean Sciences, School for Marine Science & Technology, University of Massachusetts Dartmouth, 836, S. Rodney French Blvd., New Bedford, MA 02744 USA, E-mail: avijit.gangopadhyay@gmail.com*

The problem is not much different for the teachers of the universities in India. While they may be able to afford some of the equipment, the connectivity may be a problem depending upon where they reside. Moreover, the expenses involved in setting up proper infrastructure for conducting classes from home require adequate compensation.

The teachers of most of the universities gathered experience and gained expertise in delivering lectures in regular class rooms. The students were together and everyone had face to face contacts in the teaching-learning process. It would be interesting to review how the teachers are performing while delivering lectures in a virtual class rooms. What are the advantages and what are the distractions? Are they able to cover the same amount of teaching material as they did in physical class room? Are they able to complete the syllabus in time? Are the students participating in the virtual class rooms and to what extent? Are the teachers able to update their knowledge base or create new knowledge through research? How will the online education impact the career of the teachers of the universities? Do the teachers feel more motivated in conducting classes on a digital platform? It will be worthwhile collecting such information through a survey before forming an opinion on the efficacy of online education.

Survey Results

A recent poll by Axios (www.axios.com) and College Reaction (www.collegereaction.com) in the US shows just how students feel about online learning, which has now become the norm across the country because of the corona virus pandemic. A great majority of the students held negative views of online classes. More than three out of four students said “distance learning” is ‘worse or much worse’ than traditional in-person learning, and 13 percent of students said they would take gap time from higher education if online learning continues next year.

A private conversation by the authors with some of the teachers engaged in online teaching in India revealed that the teaching –learning process indeed suffers from poor network connection and poor infrastructure at home of the teachers (camera, microphone, white board). Although the teachers have been asked to work from home, there was no opportunity to upgrade the infrastructure. Further, the lecture is restricted to prepared presentation with

no scope for impromptu drawing, plot, equations etc. to elaborate a concept. The online teaching is more like enacting a script acceptable in a seminar. But in a classroom it is the duty of a teacher to get the concept across to the student with as much clarity as possible. The lectures are more of a one way delivery and less interactive. With few exceptions, questions are not forthcoming from the students. In a physical classroom one can gauge lingering doubts in students’ mind, which is not possible in a virtual class room. There certainly is a need to provide better infrastructure (including net connectivity) at the disposal of the instructor and the students to make online teaching more effective.

In summary, as experienced by the students and faculty in US and in Indian universities, On-line education is not a real substitute for on-site education. In universities, students learn from face-to-face interactions with faculty, fellow students and staff and in hostels/dorms. It is a learning of a lifestyle with education. Some of the materials can be covered and taught online. Some concepts with visual aids, animations, simulations are good to do on-line. Deep concepts can be broken up in video modules and distributed on-line. But, laboratory (physics, chemistry, biology) and field work and internship experience and hands-on technology cannot be done virtually. These components cannot and should not be substituted for showing simulations! At least not yet! Not without trying to be flexible and wait for the vaccines to be out when those courses can be done.

Solutions: Short-term and Long-term

In view of the current situation, we have to think of short term solutions as well as long term solutions. The short term could be defined for the current batch of graduating students in the universities all over the world and for the pre-vaccine/on-going pandemic period while the long term could be for the post-vaccine or post pandemic period.

Short-term solutions for the current batch of graduating students are extremely critical and are the need of the hour. The first problem is how to graduate the students who are in the process of completing the final semester of the session 2019-20. How to compensate the students in universities who are completing their final semester online without being exposed to the practical classes? How to conduct final semester examinations? What would be the process of awarding grades to the graduating students?

Every attempt should be made to compensate the loss of practical classes by the science and engineering students graduating this year before the commencement of the academic session 2020-2021 by facilitating their visit to the universities in small batches. The duration of the practical classes could be reduced as the related theory could be explained on line prior to conducting the real time experiments. Such compensation would help the students to fulfil the academic requirements for the award of the degrees they have been admitted to and no one would raise any question in future.

The second issue is that of the final examinations for the end of the semester. The purpose of examination is to measure the extent of learning irrespective the mode of imparting education. The universities have to be innovative in deciding the process of making such measurements. It is presumed that before the onset of the pandemic the students have already appeared in mid-semester examination. Moreover they have appeared in number of tests prior to the lockdown and submitted assignments for internal assessments. Their performances so far could be utilised to grade the students for the final semester without conducting end-semester examination under the current situation. Some educational institutions appear to have taken decision in this direction. But such decision is likely to raise questions as the outcome of the education imparted online in the lockdown period would not be measured.

The universities could conduct online examination so that the students could appear on the same from home. But that will also be a problem for those facing difficulties in accessing internet. Moreover, it would be a challenge to ensure that the students do not avail unfair means while appearing at the examination. The other problem relates to the university teachers setting questions for taking tests online. We need to train the teachers all over India to conduct online examination. Perhaps the teachers could ask the students to solve a difficult problem within a given time individually and they may be allowed to consult their class notes and books like an open book examination. Students should be assured of part marking based on the steps followed rather than on the final answer to the problem. Opinion has been expressed by many that online examinations should not be a problem as such examinations are being conducted by many. Typical examples are GRE, TOEFEL, Advanced JEE and son.

Unfortunately the subject wise examination at the end of a semester cannot be compared with such online examinations.

Be Flexible, Be Innovative !

The universities have the option of conducting physical examination in batches (may be year wise) maintaining social distancing over a longer period at an appropriate time. The best solution would be to conduct examinations in large halls where the students would sit maintaining social distancing and with mask and gloves on. The universities may facilitate the travel of the students to appear at the examination. However, the academic councils of the universities should be empowered to take a final decision in this regard keeping the ground reality in mind.

The question still remains regarding the forthcoming academic session 2020-21. The academic councils of the universities should be flexible in modifying the course curriculum within the overall four-year course structure for the university students. The idea would be to modify the course syllabi to reshuffle and reschedule courses in a four year program to offer those courses which are more suitable for on-line mode in 2020-2021 and reserve the others for a post-vaccine offering in 2021-2022 and 2022-2023 academic years.

In case the vaccine is delayed, then we need to stagger offering of on-site courses and offer them multiple times to shorter groups of students. Create modules with mixed mode (blended) modules; part of a course could be done on-line, part on-site. We should start with the above and prepare and strategize to use on-line as a supplement to on-site education.

It would be interesting to note that six of the Graduate Schools of Harvard University will be moving to fully on-line programmes for the next semester (Fall 2020). The State of Massachusetts's reopening plan is calling for colleges and universities to develop their own restart strategies for summer and fall courses. Boston University has decided to offer both on-line and on-site courses during the next semester (Fall 2020) perhaps with different tuition structure; the students have to choose the mode by July 2020 so that the university can prepare adequate social distancing. Some students have already requested Professors not to offer on-line courses for their laboratory sections.

Going Abroad or Staying Home ?

The academic year 2020-21 is fast approaching closure and the new session is expected to commence in July – August 2021. A large number of Indian students are preparing for admission to universities for higher education. The number of seats for higher education in the top notch universities/institutions, both in public and private sector, in India is limited. The number seats are more for the next level of institutions. Many students travel abroad for higher education while others settle for the upcoming universities in the private sectors. But the students, particularly those aspiring to travel abroad, would be in a dilemma in the forthcoming academic session. Even if they are assured of admissions, the hassles of visa, travel, accommodation in foreign land are likely to pose serious problems this year. At the moment the scenario looks hazy. Obviously such students are expected to crowd around the universities in India. The question is whether the universities in India will be able to provide access to a comparatively large

number of students. This phenomenon is also a great opportunity for Indian Universities to increase their stature with more investment possibilities for better faculty, better students and better infrastructure.

In view of the constraints and hesitations, the Indian universities could expect a better quality of admissions this year. The upcoming universities must seize this opportunity to welcome such students by augmenting their infrastructure, both physical and intellectual, and make sure the students get the treatment they deserve.

The regulatory authorities of higher educations too must consider this to be an opportunity to fill up many vacant seats by offering attractive programmes and direct the educational institutions accordingly.

Acknowledgement:

Authors gratefully acknowledge the information provided by a numbers of faculty members in government and private institutions. □

(contd. from pg 15)

11. Noble, K.A. (1994) *Changing doctoral degrees: an international perspective*. Buckingham: Society for Research into Higher Education
12. Nyquist, J. (2002) The PhD.A tapestry of change for the 21st Century. *Change* (Nov/Dec); 1220
13. Park C (2006). *The end of the secret garden: reframing postgraduate supervision*. <http://luvle.lancs.ac.uk/celt/supervision.nsf/p/30BA11ABFD7C18B802571DE006F0139?openandcat=online+jpurnal>
14. Powell, S. and Green, H. (eds) (2007). *The doctorate worldwide*. Buckingham: Open Univ. Press
15. Ritter M (2006) *Summary of Themes*, UK GRAD Fifth annual Conf. London 7 September 2006.
16. Sen, BK, *Doctorate Degree from India: 1877(first award) to 1920*, Ind J of History of Sc. 50, 3 (2015) 533-534.
17. Steinwall, A (2006). *Delivering high quality doctoral programmes- a Scandinavian perspective*. Presentation at UKCGE European Summer Conf. 'New Dimensions for Doctoral programme in Europe: Training, Employability and the European Knowledge Agenda', Florence, Italy. van der Wende, M.C. (2000) The Bologna Declaration: enhancing the transparency and competitiveness of European Higher Education. *Higher Education in Europe* 25 (3); 305310.
18. Winfield Report (1987). *The Social Science PhD: the ESRC enquiry on submission rates*. London: Economic and Social Research Council.
19. 'Vice Chancellor's Roundtable Meet on STEM Education', Organized by Association of Indian Universities (AIU) and Vivekanand International Foundation (VIF), February 5, 2020, New Delhi.
20. "India Country Summary of Higher Education" http://siteresources.worldbank.org/EDUCATION/Resources/278200-1121703274255/1439264-1193249163062/India_Country_Summary.pdf World Bank; and references therein
21. http://www.ugc.ac.in/pdfnews/2465555_Annual-Report-2014-15.pdf and references therein
22. <https://www.findaphd.com/advice/phd-types/and> references therein
23. https://data.gov.in/catalog/enrolment-phd-mphil-and-post-graduate-level-major-disciplines-subjects-based-actual-response?filters%5Bfield_catalog_reference%5D=104114andformat=jsonandoffset=0andlimit=6andsort%5Bcreated%5D=desc □

Archiving Bibliography of Doctoral Dissertations at AIU (1857—2020): A Recount

Sistla Rama Devi Pani* and Youdivir Singh**

Bibliography of Doctoral Dissertations are the annual publications of Association of Indian Universities containing comprehensive information on Doctoral Theses submitted/accepted/awarded by the Indian Universities. These volumes seek to provide structured bibliographies categorised by discipline, year on year basis. They cover the bibliographic details of doctoral dissertations of all the subjects in three broad disciplines namely Humanities, Social Sciences, and Science and Technology.

Apart from annual volumes, a weekly listings of bibliographic information is given in the University News, A Weekly Journal of Higher Education published by AIU in which bibliographic details of Ph.D degrees conferred or the Doctoral Dissertations accepted by the Indian universities in the preceding month are published. Whereas, the Theses of the Month provides almost real time information on the theses submitted in Indian Universities, the yearly volumes of the Bibliographies of the Doctoral Theses, with a much longer shelf life, facilitate the researchers a great deal in their literature review. They also save time and hassles in finding the research studies already undertaken in the areas in which the researcher is working. Ready availability of a comprehensive source of information on research studies already undertaken also help the researchers in identifying and formulating the topic of their research and avoiding duplication of research studies which have already been undertaken. Moreover, availability of such bibliographies in an apex body like AIU also enables wider dissemination of the information leading to improved referral and citation across the country. These Bibliographies therefore, are considered as the most valuable resource by the researchers in India and abroad. In 1935, ie 85 years back, the Association of Indian Universities came out with its first copy of Bibliography of Doctoral

Dissertations. But the life span of Bibliographies is about 165 years as AIU has brought out retrospective volumes of bibliographies starting from 1857 since the three first universities, Bombay, Madras and Calcutta started in India. Here, it is also important to mention that the “first Ph.d in India was awarded in 1904,” (Sen, 2015). Thus, actual archives of Bibliography is exactly of 115 years. It is therefore, worthwhile to recount the fascinating journey of Bibliography of Doctoral Dissertations and their significance on this momentous occasion.

Significance of Bibliographies for Research

Bibliographies assume a great significance in the process of Research. Research is best conceived as the process of arriving at dependable solutions to problems through planned and systematic collection, analysis and interpretation of data. It is a most important tool for advancing knowledge, for promoting progress and for enabling man to relate more effectively to his environment, to accomplish his purposes and to resolve his conflicts (Mouly, 1978). The particular value of research is that it will enable researchers to develop sound knowledge and strengthen the subject. Research therefore, has the important responsibility of strengthening the subject ie. adding to already existing knowledge base. For a researcher to succeed in research; find new conclusions and establish facts, the research should be built on existing data. Evidently, review of literature is an inevitable step in any research process. This may sound extreme but it is true that research without fact checking is worthless. It forms the core of all research. It involves locating, reading and evaluating reports of research as well as reports of casual observations and opinions that are related to the individual’s planned research project. Through review a researcher can draw millions of ideas, insights and arguments published by other writers who have spent years in researching and writing. Precise awareness on the extent of knowledge on a topic is essential to build on the existing knowledge and add worth to the sphere. It is a means of getting to the frontier in a particular field of knowledge and forms the foundation upon which all future work must be built (Borg and Gall 1979). But the moot question is -- how a researcher will go about the

**Editor, University News Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg, New Delhi-110002. E-mail:rama.pani2013@gmail.com*

***Head, Library and Documentation Division, Association of Indian Universities, AIU House, 16 Comrade Indrajit Gupta Marg, New Delhi-110002. E-mail:youdvirsingh@gmail.com*

literature review keeping the availability of vast and scattered *terra incognita* of literature in his or her arena of research.

Indeed, it is a cumbersome and tedious task for the researchers to go to the libraries; hunt for the literature in the stacks; find a relevant thesis, book or journal pertaining to his or her research. It is for this purpose that bibliographies came into existence. Availability of bibliographies make the review of literature very easy for the researchers. Bibliography is a list of the books of a specific author or publisher, or on a specific subject. It is systematic description of books, their authorship, printing, publication, editions, etc. Subject bibliographies are lists of materials that relate to a particular discipline or subject scope. They are often attempts to select, “the most worthwhile books on a particular subject” (Gardener 1981). Subject bibliographies are a good place to start when collecting in a specific area. They give a valuable overview of a discipline, and are very useful in collection development. These tools are important when building retrospectively, and allow the researcher to see what has been considered historically worthwhile in a field.

One more question raised by young tech savvy researchers these days is on relevance of published bibliographies in present times when so much of material is available on search engines, online catalogues, internet, etc. While it is true that online searches can gather together a pool of relevant resources, they cannot be replaced in the research process for a number of reasons such as:

- Bringing out bibliographies involves scientific process which is undertaken by experienced scholars and researchers who can judge the significance of the citations included in it. This is an indication of authenticity and quality which prevents readers from substandard materials.
- Bibliographies can organize citations in a helpful manner and make it possible to find relevant information quickly. The best bibliographies provide subject grouping to give some indication of the schema of the discipline with a keyword index for quick access.
- They may include valuable information from sources not covered by databases (eg. chapters in books, government documents, conference proceedings, dissertations, primary sources,

etc.).

- Even seasoned researchers don't always use search engines effectively and miss relevant resources.
- Bibliographies save the need to repeat a search in many different databases and indexes (Mann, 1998).

Entry of Bibliographies to Public Domain

In olden days compiling bibliography was considered to be an individualistic task of a researcher and each researcher compiled the footprints of his predecessor in his own way. With emergence of research industry and evolution of information sciences, this process of compilation of bibliography entered the public domain and further to market place. Now bibliographies are available in many forms in libraries, bookstores etc. With emergence of ICT, the bibliographies are now available even in the personal laptop of a researcher on click of a button. Online availability of electronic theses through digital repositories, not only ensure easy access and archiving of doctoral theses but will also help in raising the standard and quality of research. This would overcome serious problem of duplication of research and poor quality resulting from the ‘poor visibility’ and the ‘unseen’ factor in research output (INFLIBNET). In many countries there is a national or central databank of research studies. In India too, a centrally-maintained database called ‘Bibliography of Doctoral Dissertations’ containing bibliographic details of the theses accepted by Indian Universities is being compiled by Association of Indian Universities (AIU) since 1935. Apart from this, an open access Electronic Theses and Dissertation (ETD) Repository of Indian Electronic Theses has been created by INFLIBNET.

A Recount of AIU Bibliographies

Sir Richard Gregory, Editor of Nature, during his visit to India in 1933 made a valuable suggestion to the Government of India that it should publish periodic lists of scientific theses on research work carried out in various Indian universities and make them available to the scientific world. Following the suggestion, AIU, erstwhile Inter University Board (IUB), initiated publishing the Bibliography of doctoral dissertations in Science and Arts disciplines. Since then, bringing out cumulative Bibliography of doctoral dissertations every five years has become one of mandated activities of AIU.

The landmark point in the history of Bibliographies started in 1970 when as Inter-University Board of India, AIU brought out two volumes of retrospective bibliography titled as Physical Sciences – A bibliography of doctoral dissertations accepted by Indian universities 1857-1970 and Biological sciences – A bibliography of doctoral dissertations accepted by Indian universities 1857-1970 (Inter University Board of India, 1975). These two volumes have exhaustively listed the doctoral dissertations accepted by Indian universities till 1970. Later, retrospective Bibliographies containing details of theses from 1857 to 1970 were brought out in Social Sciences, and Humanities. This was followed up by five-yearly cumulative volumes covering the period 1970-75 in three disciplines namely Physical Sciences, Biological Sciences, and Social Sciences and Humanities in 1975. Since 1975-76, AIU was publishing Annual Volumes of the Bibliographies of the Doctoral Thesis accepted by Indian Universities in the broad discipline categories of Humanities, Social Sciences and Sciences & Technology. Sadly the last such volumes were published till 1995 when the publication was discontinued due to a variety of reasons. However, the AIU never ceased to preserve the documents in its archives. In the mean time, the universities and libraries not only in India but internationally kept on urging AIU to revive the publication of its annual volumes. Honouring the demand in 2014, AIU revived the publication .

Thus, the project which was paused for a while in 1995 started again in 2014 with renewed enthusiasm. Catching up the long years of backlog was proving to be a tedious task. To make the task somewhat easier and more manageable, it was decided to bring out the past volumes by working backward. In the first phase, it was decided to bring out five volumes each in the broad discipline categories of Humanities, Social Sciences and Science & Technology covering Doctoral Thesis accepted/awarded by Indian universities. Accordingly in 2015, 15 volumes of the Bibliography of Doctoral Dissertations in the field of Humanities, Social Sciences and Science & Technology from 2010 to 2014 were published. Thereafter, every year annual Bibliographies are being published every year in the disciplines of Humanities, Social Sciences and Science & Technology.

Conspectus in AIU Bibliography

It is classified according to subjects and in addition to the normal bibliographical details

such as the name of the research scholar, title of the thesis, name of the university to which the thesis was submitted, the years when research was begun and completed. The bibliography also gives the name and complete address of the supervising teacher, an availability note that seeks to inform the readers as to whether a copy of the thesis is available in the University Library/Department or the University Office for consultation and use. For example particular Bibliography of Doctoral Dissertations accepted for the award of the PhD or equivalent degrees by Indian Universities in the discipline of Humanities during the year 2015 contain Bibliographies of Humanities dissertations encompassing Geography (00), History (00), Language & Literature (00), Linguistics (00) Performing Art (00), Philosophy (00), Religion (00). While it is not claimed that represents all the Doctoral Dissertation accepted for the award of the PhD or equivalent Degree in all the Universities in the country, it is indeed impressed that these represents the most comprehensive bibliographic source on Doctoral Dissertation accepted by our Universities for the award of doctoral degrees.

Other Modes of Archiving

In these 90 odd years while the project of Bibliography was continuing in different spells, AIU has initiated two more projects related to it. Firstly, a project, namely Research in Progress which was initiated 1958 and secondly Theses of the Month initiated in 1973.

Research in Progress

Research in Progress : A Record of Subjects taken up for Research by Scholars Registered for Doctoral Degrees with the Indian Universities was executed in 1958 which continued till 1966. It comprised of four volume classified bibliography with a volume each devoted to Physical Sciences, Biological Sciences, Social Sciences, and Humanities. In addition to the normal bibliographical details like the name of the research scholar, title of the proposed thesis, name of the university and the department with which registered, inclusive years as to when the research was begun and likely to be completed, the bibliography mentioned the name and address of the supervising teacher as also listed details of the research articles published in learned journals based on their interim findings. This made the publication out of date as soon as it was published. So the project Research in Progress ceased abruptly in 1966.

Theses of the Month

In view of demand of real time bibliographies, a column called 'Theses of the Month' was initiated in 1973 in the University News Weekly published by AIU. This column is based on Ph.D degrees conferred or the Doctoral Dissertations accepted by the Indian universities in the preceding month. The column contains the bibliographic details of the theses accepted by the Indian Universities. These weekly listings compiled every week updates the readers and researchers in almost real time. Bibliographies so published are regarded as the most valuable resource to the researchers in India and abroad and to this date is considered the only and the most comprehensive state of art source of information on Doctoral Thesis awarded by the Indian Universities. Along with the university news the theses of the month column also carved a niche for its unhindered regularity. Efforts are there not only to continue this column but also make new innovations ICT and information sciences to make it more useful to the future generations .

Annotated Bibliographies

One more activity undertaken by the AIU was to bring out Annotated Bibliographies on different topics. In these Bibliographies annotations of one paragraph were added to each citation which gave the readers an idea of content the article or thesis included in it.

Latest Innovations and Initiatives in AIU Bibliographies

21st century is recognized as century of Information and Communication Technology (ICT). Developments in ICT have transformed almost all the systems on this planet, most importantly, the dissemination of information, communication entertainment, mass media etc. by providing a means of exchanging information anytime, anywhere. One of the very useful inventions of ICT is Quick Response (QR) Code Technology. QR code is very simple to use and is becoming indispensable to use for quick retrieval of reading materials. While use of the QR Code spread globally, new types of QR Code to meet more sophisticated needs were created one after another which include a type of QR Code that can help easy access and retrieval of large material. AIU too has applied QR Code technology to the

bibliographies to link them to the theses uploaded by INFLIBNET on its Shodhganga site to make them more useful to the users. Use of QR Codes are given at each citation will help the readers to decode and access the whole thesis.

Another initiative taken in this regard is to develop customized Bibliographies on various topics compiled on demand from the research scholars on the status of research in their respective topics based on dissertations accepted by the Indian universities.

Conclusion

Bibliographies of Doctoral Dissertations published by AIU provide authentic citations on the theses accepted by Indian universities. These Bibliographies are not only a source material for the researchers and writers but also an adornment of AIU. Bringing out Bibliographies is one of the activities which elevates the usefulness of AIU as an academic institution. I am sure that the bibliographies brought out so far and the other volumes to follow shall be received by the academic community and the community of research scholars and the researchers within the country and outside with appreciation.

References

1. Borg, W. R., & Gall, M. (1979). *Educational Research: An Introduction* (3rd ed.). New York: Longman.
2. IUB(1975)– A Bibliography of Doctoral Dissertations accepted by Indian universities 1857-1970: Physical Sciences. Inter-University Board of India. New Delhi
3. IUB(1975). A Bibliography of Doctoral Dissertations accepted by Indian universities 1857-1970 : Biological Sciences Inter, University Board of India, New Delhi
4. Mann, Thomas(1998). *The Oxford Guide to Library Research*. Oxford: Oxford University Press,
5. Mouly G J (2012). *The Science of Educational Research*, Ally and Bacon, Boston
6. Sen, B K (2015). Doctorate Degrees from India: 1877 (first award) to 1920, *Indian Journal of History of Science*, 50.3 Indian National Science Academy, New Delhi
7. AIU Bibliographies
8. Shodhganga Website □

Promoting Wellness Lifestyle through Stress Management in Education

Amita Pandey Bhardwaj*

In the rapidly changing context of growing concern for health and wellness in the global world as at present, it has become imperative to revisit Teacher Education Programs and the courses of studies, their content, methodology and approaches to ensure optimum development of the power and potential to realize self-fulfillment and developing new relationships. It may be mentioned at the very outset that competency-based teacher education courses although necessary, have not delivered results in respect of making available competent and effective teachers needed to man our schools, colleges and universities. It sounds natural that revisit of teacher education programs at this juncture has to be undertaken mandatorily in order to ensure the effectiveness and efficacy of both the content and process of education.

In the present paper an attempt has been made to highlight the concern for stress management as a useful concept for promoting wellness and via that augmenting a sense of happiness and quality of life and living so essential for our present day society. It is in fitness of things to underscore the role of stress and stressors in the spectrum of life as also in the manifest professional ethos and culture. One stress expert has rightly pointed out that, “the most elementary acquaintance with history, with anthropology and above all with literature reveals the rarity of tranquility in human existence.” This is rather a gloomy opinion about wellness and possibility of human peace.

Life is changing fast and it requires adjustment in view of the fact that stressors are ever present. In this frame of reference adaptation is a continuous process and a person responds to the demands arising therefrom with ease and familiarity. In other words, stressors remain facts of life with no ill effects but as pointed out by Walt Schafer ‘adjustment can exact a toll in wear and tear on mind and body’. Physical upset or emotional turmoil often result when this happens. Stressors become dis-stressors. Keeping in view the importance of stress and stress management

* Professor, Faculty of Education, Project Head-Teaching Learning Centre Under PMMMNMTT Scheme, MHRD, GOI Shri Lal Bahadur Shastri National Sanskrit University, New Delhi-16. E-mail: amitapb2017@gmail.com

in life and educational setup as of today, at all levels of education primary, secondary and tertiary, the courses prescribed therein and being followed have to be redesigned with an eye on promoting wellness through effective stress management. In this perspective it is deemed desirable to clarify the conceptual foundation of stress and stress management and the concept of wellness as being advocated and as also articulated long back in our Upanishads and ancient literature.

Defining Stress

Although definitions are neither right nor wrong, an attempt to do so brings clarity and specificity in understanding the various dimensions of the concepts and their indicators.

Lazardus & Folkman (1984) have defined stress, “as a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his/her resources and endangering his/her wellness”. This definition has focused on only the negative side of stress. Hans Selye a pioneer in the stress field observed as far back as in the year 1974 that “the stress is the non-specific response of the field of any particular demand made upon it”. Imparting a new perspective Walt Schafer (2000) asserted that, “stress is the arousal of mind and body both in response to the demand made on them”. According to this averment stress is ever present, a universal feature of life and is multi-faceted in nature. In this framework it is obviously neutral but it tends to emphasize that stress can become positive or negative. There are three type of stress which are as follows:

- (a) **Neutral or Neu-Stress** which is neither particularly helpful nor harmful.
- (b) **Distress**-when arousal is too high or too low and usually leads to physical and psychological disorders.
- (c) **Eustress**—is a positive stress and is useful in performing well under pressure. This type of stress helps realize potential of a person over a period of years in his/her career and it brings zeal and variety in daily life.

In this formulation Walt Schafer has focused on an integrated ‘whole person’ life style approach and

has observed that the point of stress is to enhance, help well-being of self and for others. In this enunciation, managing stress effectively will avowedly benefit the self by improving quality of life and decreasing risk of illness; benefit those in our-immediate environment by improving our relationship and generating care. In nutshell, the whole point of managing stress effectively is to promote wellness for the self and for others.

Wellness Lifestyle and its Dimensionalities

The question then arises what is wellness. In our own land the attitude of '*Sarve Bhavantu Sukhinah, Sarve Santu Niramayah*' exemplifies the concern for well-being, self-fulfillment and wellness of all and sundry. In the west now an attempt is being made to define wellness in terms of a whole person and promoting the chain for others (Schafer, 2000). In this frame of reference there are four aspects which need attention. First, wellness is not a state that is achieved but is an ongoing, dynamic fluid process through time. Its main feature is relatively continuous high-level living over the long run. In this sense, it involves continuing challenge rather than something attained and forgotten. Second, wellness also denotes a person's highest possible level of living related to thoughts, beliefs, attitudes and behaviors. Third, the emphasis is on the "whole" person which is interconnected inherently with the environment. Fourth, wellness as pointed out earlier, in the Indian visioning it relates to the concern for promoting the same for others. It implies paying attention to the effects of one's moods and behavior on those in the immediate micro environment such as family, friends, associates, room-mates, neighbors, fellow students and co-workers. In this way, wellness also means getting involved in broader, local, regional, state, national or global efforts (Vasudhaev Kutumbkum) to improve and ameliorate social conditions in macro environment.

From the close perusal of these key features it may appear that wellness and normal health are not to be treated as synonymous. For abundant clarity it may be noted that wellness includes more than simply "being normal" or "non-sick". In other words, it signalizes "optimal" health. The term wellness was introduced first by Halbert Dunn (1961) through his rather obscure book captioned, "High level wellness". According to him, 'High Level Wellness for the Individual is defined as an integrated method of functioning which is oriented towards maximizing the potential for which the individual is capable. It

requires that individual maintain a continuum of balance and purposive direction with the environment in which he/she is functioning.

There is a considerable resemblance in Dunn's definition of wellness and that of Walt Schafer in so far as both emphasize a continuing process, the whole person's and the person's linkage with the surrounding social environment. In the former definition the focus is on personal well-being only whereas in the latter (that of Schafer) promotion of both personal as well as social well-being gets stressed. In the final analysis it may be observed that striving to live at one's highest possible level may result in decreasing chances of illness but it does not assure that a person will never get sick, to cap it all. It may be pointed out that a wellness lifestyle is a set of mutually reinforcing positive habits in the seven areas as identified by Walt Schafer. These are:

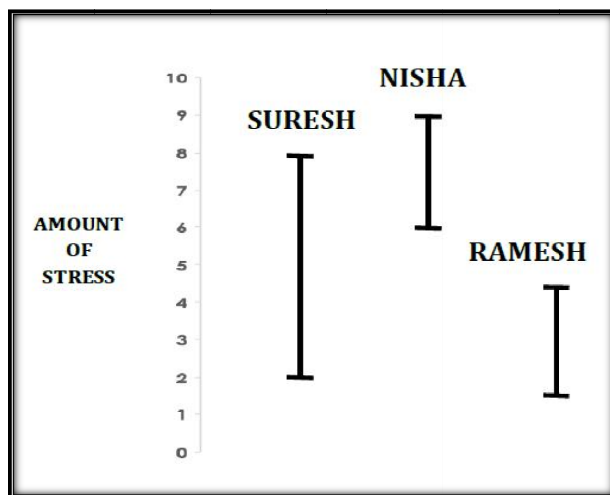
- (a) Intellectual Wellness Habits which encompass the abilities to engage in clear thinking and recall with minimal interference from emotionality; to think independently and critically; to possess basic skills of reasoning and to open new ideas.
- (b) Emotional Wellness Habits which comprise a person's awareness of one's emotions at any given time; the ability to maintain a relatively even emotional state and preponderance of control over emotional state.
- (c) Spiritual Wellness Habits which is concerned with the issues of meaning, value and purpose.
- (d) Physical Wellness Habits which consist of sound nutritional practices, regular exercise and non-use of alcohol, drugs and tobacco.
- (e) Social Wellness Habits which indicate sharing intimacy, friendship and group membership and group mentorships; commitment to the common good of the community, state and nation.
- (f) Time Wellness Habits which ensure maintaining a pace of life within one's comfort zone most of the time; minimizing chronic hurry and hassles on the one hand and boredom and stagnation on the other. It also implies relative control over one's time and balancing activity and rest, work and play, solitude and relationship.
- (g) Environmental Wellness Habits which implies both an awareness of the critical condition of the global environment and maintain a way of life that minimizes harm to the environment leading to a

strong drive and incessant pursuits for protecting the environment.

Relating Wellness to Zones of Stress

With a view to ensure a desired level of wellness it is necessary to understand the concept of zones of stress. Each person possesses a distinctive zone of positive stress. A very important part of managing stress is to understand and learn the range and limits of that zone. Schafer has indicated a range of stress tolerance which may be measured by physical indicators such as Blood pressure, heart rate, muscle tension or brain waves as indicators of emotional anxiety. In Figure-1, this concept has been adopted with reference to three students namely Suresh, Nisha and Ramesh.

Fig. 1: Range of Stress Tolerance



The Fig.-1 which has been adopted from Schafer's example of range of stress tolerance shows Suresh with a zone of positive stress ranging from 8 to 2, while Nisha's range of stress is narrower but at a relatively high level. She generates a high activity level at home and in the college to keep her stress level high when her outside environment does not do it for her. The range of stress tolerance for Ramesh shows that he is a low energy person with a narrow zone near the lower zone of the scale. He avoids challenge and unfamiliar situations, yet he is dependable and effective in his study.

Schafer has pointed out that a key challenge for managers, supervisors and teachers is to achieve an optimal job-personality fit with a view to ensure compatible tolerance zone whenever possible. It has been indicated through studies that everyone's zone is changeable to some degree and each person has limits

of adaptability. A person's ill health and unhappiness results from efforts to push one's own limits too far at either the upper and lower end of the scale.

Wellness Lifestyle and Managing Common Stress Difficulties

Schafer has mentioned six ways of identifying difficulties which may be appropriately addressed with a view to promote various types of wellness dimensions explained earlier.

Stress Seeking or Stress Avoiding

Comprising two modalities- (i) in which stress seekers strive on challenge, risk and sensation and (ii) stress avoiders where one seeks security and familiarity, avoiding challenge and risk.

Distress Seeking or Distress Avoiding

In which (i) distress seekers strive on misery, illness, crises and martyrdom and (ii) Distress avoiders who strive on issues related to contentment and environment.

Distress Provoking or Distress Reducing

In which (i) Distress provokers strive intentionally or unintentionally on creating misery, disharmony, illness or upset for others and (ii) distress reducers who strive on doing everything possible to promote health, happiness and growth in those whose lives they are concerned with.

Schafer has observed that these patterns of thought and action often are set in motion during childhood through one's life script, and blue print for living developed through earlier internalized messages from significant others. It will be evident from a close perusal of research findings that the wellness lifestyle is dependent on most of these patterns of thought and action and has a direct bearing on promoting self-esteem, self-actualization and self-fulfillment characterized by competence and commitment in addressing tasks expected to be accomplished.

Wellness Lifestyle in the Context of Personal Distress and Social Influences

It has been noted that the social circumstances and personal experiences play an important role in setting up the parameters for determining wellness. In this context Alvin Toffler through his popular book "Future Shock" brought out a very apt social analysis. His thesis was that social change impacts

the person in three ways: through population growth, through technology and through new knowledge. It has been a global concern now that population growth has to be curbed as an increase will mean more mouths to feed, more bodies to be clothed, more houses to be built, more goods and services to be produced and more crowding. Needless to mention, that all this has already happened without there being an effective control in respect of explosion of population. Likewise, increasing use of sophisticated, mechanical and electronic devices to solve problems and produce goods has resulted in unprecedented negative consequences. Toffler rightly points out that if we think of technology as an engine of change, then knowledge is the fuel on which that engine runs. It goes without saying that computer is partly responsible for this increase in knowledge especially in the sciences. C.P. Snow the novelist and the scientist has aptly remarked that until the 20th century social change was so slow that it would go unnoticed in one person's lifetime. That is no longer so. The rate of change has increased so much that our imagination cannot keep up (Toffler, 1970).

Accelerating social change has registered four major trends that bear on personal stress and via that on wellness lifestyle. These are visible shifts from rural living to urban living, from stationery to mobile, from self-sufficient to consuming and from physically active to sedentary. It may be averred that as these social changes have occurred and continue so, a speed up in personal change has also taken pace. It hardly needs stressing that this social change has contributed considerably to personal distress and has adversely affected the wellness life style particularly those related to physical, social and spiritual dimensions of wellness.

Schlbsbrg (2000) indicated that there are four potential resources which are vital for managing change whether personal or social and which have a direct and indirect bearing on various dimensions of wellness. These are: a person's overall situation, his/her self, support and the strategies used for coping. These directly relate to clustering of life events and imply high risk to health, life satisfaction and productivity of the accumulation of too many life changes in too short a time. Many studies have now documented the contribution of individual life changes to physical and psychological distress which directly affect wellness. The researches have revealed that greater the number, clustering and intensity of life changes, the greater the chances of

illness, injury or psychological problems resulting into worseness of lifestyle.

The other powerful factors associated with wellness are social inequality. Williams (1995) has summarized health related influences and the impact of social inequality by stating that socio-economic status is itself a contributor to and determinant of the development of psycho-social characteristics that lead via bio-behavioral processes to ill health which affects wellness and personal well-being.

The importance of the environmental influence on people's decision about wellness has given rise to a concept called 'Cultures' of wellness which means those features of a group or organization that encourage, reward and support wellness choices. As opposed to this a culture of worseness comprises those features of the social environment that discourage healthy choices and encourage reward and support unhealthy, unwholesome choices. Thus, like individual wellness and worseness cultures may be seen along a wellness/worseness continuum, from cultures of high-level wellness at one extreme to cultures of low-level worseness on the other. (Schafer, 2004).

From this angle every group or organization carries a culture of wellness/ worseness. Thus, cultures of wellness are found in one degree or another in peer/ friendship groups, family, work groups and work sites, school campuses, campus organization, neighborhood, apartments and apartment complexes, communities, regions and nations.

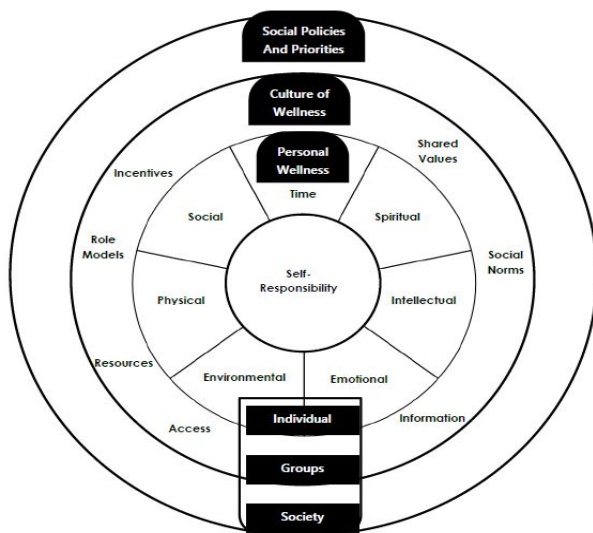
According to Willis Harmon (1994), it makes little sense to ignore the social context especially if it is thoroughly incompatible with health enhancement. He further assets that in normal development, favorable experiences from childhood onwards slowly build up salutogenic (healthy) personality orientations. But people growing up in poor urban area may not experience such salutogenic milieu. In 1987 Robert Allan, developed a useful framework for understanding, assessing and providing cultures of wellness in the workplace. This according to him consists of three components: a sense of community, shared vision and positive culture. He asserted that to the degree these ingredients of a culture of wellness are present, individuals will be more productive, satisfied and healthy showing a high wellness style.

On the basis of these evidences Walt Schafer has developed a comprehensive model of wellness which functions at the level of individual, group and societies.

Thus, the earlier reference to wellness dimension has been labeled as personal wellness and consists of social wellness, physical wellness, environmental wellness, emotional wellness, intellectual wellness, spiritual wellness and time wellness which are centered on self-responsibilities. The second level of wellness has been identified and called cultures of wellness which functions at levels of group and is exemplified through shared values, social norms, information access, resources, role models and incentives. The third level of wellness has been identified as social policies and priorities reflected in concern for environmental protection such as those articulated through ‘Swachata Abhiyan’ and ‘Yoga Divas’ floated recently.

To conclude, it may be observed that the above provides a highly useful framework because it directs attention not just to the individual but also to social environment influencing the individuals. This is in keeping with the recent approaches to health promotion and disease prevention, personal well-being and fulfillment ensuring a whole person approach to wellness rooted in our ancient values of ‘Sarv Jan Hitai and Sarv Jan Sukhayai’. The multi-level model of wellness as described here is depicted through Fig-2.

Fig-2: Multi Level Model of Wellness



Using Wellness Model in Educational Context

The three-level model of wellness presented here has a great relevance for improving the meaningfulness of education in the global context in general and in the Indian context in particular. The new policy of education which is going to be

shortly introduced in our country should provide adequate support and scope for updating the content and process of education at elementary, secondary and higher education levels. In so far as the inclusion of appropriate stage specific content is concerned, it is pertinent to point out that wellness lifestyle component has to be integrated with various types of subjects taught at present. Each subject has to have a constituent which addresses the aspect of wellness considered germane for a particular level of education. It is obvious that the knowledge and skill component along with the attitude and value should be derived from the seven types of wellness as indicated in this model. At the early stages of education, the emphasis should be laid on promoting awareness, concern and expected meaningfulness of the concept of wellness at individual level and it should gradually move on to group levels and eventually to the macro level i.e. society as a whole.

In this visioning an effort should be made to identify and define the areas of personal, social, emotional, spiritual and environmental dimensions of wellness. These dimensions may be interlinked with the eight-fold steps of Patanjali and its exemplification through methods and techniques congruent with the developmental stage of the learner. It needs stressing that the approach to curriculum design and the transactional methods to be employed should be identified in a new framework obtainable through the various new policies and programs of education being contemplated for action. The components of knowledge, skill and attitude should be adequately reflected in the new curriculum designs. Thus, the focus in the core content of curriculum should be on various aspects of the concept of wellness as related to stress management such as concept of stress, health, relationship between stress and health and coping devices.

Promoting Wellness in Curriculum Transaction by Focusing on 10 ‘Cs’ Model

The 10‘Cs’ model has been proposed by Schafer with a view to achieve effective management of stress and wellness. Its formulation is very closely connected with Indian view of wellness in which ‘Jan hit’ becomes a driving principle. This model is intended to ensure not only the power of a person to counteract and survive in the untoward and critical moments in life but also to thrive by creating an

environment of trust, mutuality, interdependence, caring and sharing. Thus, the new education policy should aim at promoting and nurturing the power to strive and thrive in the context of immediate and remote situation

The components of 10 ‘Cs’ model for thriving under pressure are briefly discussed below:

1. **Conditioning**-which means good nutritional and sleep habits with regular exercises.
2. **Caring**- which refers to participating in supportive, caring relationship with family, friends and associates. It includes both giving and receiving.

It may be noted that when these two ingredients are present then the four keys ‘Cs’ of this expanded version of wellness become more likely which are:

3. **Challenge**-which is the ability to interpret difficulties and change as a positive challenge or opportunity.
4. **Confidence**- which is the belief in one’s ability to master whatever difficulties and challenge come along in one’s ways.
5. **Commitment**-which is the positive involvement in one’s activities and strong beliefs in one’s ideals, giving one’s best shot.
6. **Control**-which is the belief in one’s ability to influence events and one’s reactions to events.

Given the presence of these four core ingredients of a thriving perspective to ensure wellness another ‘C’ becomes more likely which is

7. **Coping**- This is one’s ability to respond constructively to challenging events and one’s own temporary distress.

When a person copes constructively, the model suggests that the three other ‘Cs’ follow which are:

8. **Calmness**- which is the ability to maintain a moderate level of physical and emotional arousal in the face of difficulty resulting into an appropriate level of wellness.
9. **Creativity**- which refers to the ability to generate innovations and situationally specific solutions to difficulties and dilemma.
10. **Competence**- which is a person’s ability to handle the demands of job and tasks effectively.

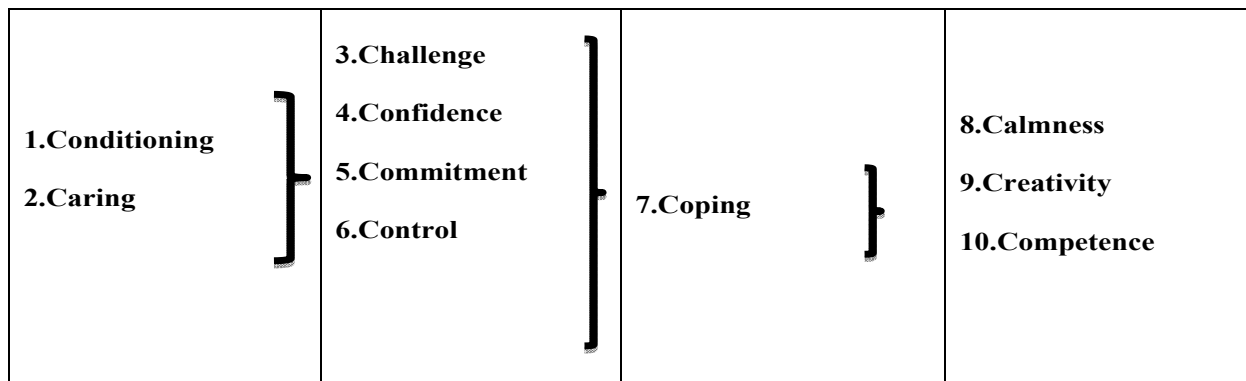
These 10 ‘Cs’ of thriving under pressure as explained above is shown in Fig.-3 also.

These components when suitably integrated in the curriculum structures and effectively implemented using situation specific strategies of teaching, learning and evaluation are sure to substantially enhance the potential of the curriculum for minimizing stress and distress conditions and maximizing good health and wellness lifestyles at the individual and group levels and contributing immensely towards accomplishing cultural wellness as discussed earlier.

Implications for Educational Policy Making, Educational Administration and Teachers

There is a persistent demand for eradicating distress symptoms from our lifescrpts. As such, there has to be a manifest concern for adopting strategies for assuring wellness lifestyle through renewed content and processes of holistic approach to education. In a bid to realize significant results in this regard, teacher education programs in our country have to be revamped and have to be reoriented to ensure the goals

Figure-3: 10 Cs to Promote Wellness



of wellness and holistic education. The following suggestions are offered:

- (a) Curriculum at elementary, secondary and higher level of education should be completely restructured with emphasis on wellness concept and its meaningful integration with various knowledge structures.
- (b) The teaching-learning systems should be rendered need based and the culture of wellness should be reflected in the activities and programs being organized.
- (c) The teaching strategies should be suitably diversified and reoriented suitably to reflect wellness related concerns.
- (d) A sizeable number of appropriate interventions in the form of Action Research strategies should be contemplated at various levels of education.
- (e) Cooperative learning projects should be encouraged at individual and group levels for undertaking value-based wellness projects.
- (f) The teacher-parent associations should be actively involved in wellness lifestyle projects to promote cultural wellness.
- (g) Evaluation of the impact of wellness should be made an integral part of teaching-learning systems.
- (h) The management of education should be made participatory by promoting a sense of ownership.
- (i) The leadership concerns should articulate both transactional as well as transformational styles so as to make them vision driven and value-based.
- (j) Wellness life style should be assimilated with both

core as well as specialized subjects particularly in higher level education.

In sum, it may be worthwhile to mention that education as a transformative tool has a tremendous potential for promoting and ensuring effective stress management and via that wellness lifestyle. Effective strategies of stress management and wellness have, therefore, to be envisioned with the intent to improve the present scenario of education. It sounds but natural that suggestions offered here have to be considered broad based. A further explication and elaboration in terms of exploring suitable content strategies have to be carefully considered to render our programs wellness friendly.

References

1. Antonovsky, A. (1994). A Sociological Critique of the "Well-being" Movement. *Advances*. 10,6-12.
2. Cassel, J. (1974). Psychological Processes and Stress: Theoretical Formulation. *International Journal of Health Services*, 4,471-484.
3. Green, L.W., & Krueter, M.W. (1991). *Health Promotion Planning: An Educational and Environmental Approach*, Mountain View, CA: Mayfield Publishing.
4. Lazarus, R.S., & Folkman, S. (1984). *Stress, Appraisal & Coping*. New York: Springer Publishing.
5. Pandey, K.P., (2008). *Advanced Educational Psychology*; Vishvidyalaya Prakashan, Varanasi,.
6. Pareek,Udai.(2004).*UnderstandingOrganizational Behavior*. Oxford University Press, New Delhi.
7. Schafer, Walt. (2000). *Stress Management*. Wadsworth Cengage learning, New Delhi □

Let's Build a New and Resurgent India

M Venkaiah Naidu, Hon'ble Vice President of India delivered the Convocation Address at the 32nd Convocation of Goa University, Goa on February 24, 2020. He said," We have to empower each and every citizen of the nation with education and skills and create opportunities for them to realize their true potential. We have to create good living conditions and provide affordable, quality healthcare and housing to all. We have to tackle the formidable challenges of hunger and malnutrition and at the same time, strive to control the increasing incidence of non-communicable diseases in the nation." Excerpts

"I am delighted to be here today with all of you at this picturesque campus spread over 402 acres with state-of-the-art infrastructure, located on Taleigao Plateau overlooking Zuari estuary in Panjim for the 32nd Annual Convocation Ceremony of the Goa University.

Let me begin by appreciating Goa University for steadily expanding its reach, both in terms of the number of affiliated colleges, as well as in terms of the diversity of courses offered,. I am told that the University, on its campus, has 1 Centre, 20 Departments and 3 schools.

I am glad to learn that 12 colleges in the University have also been recognized as research centres that offer Ph.D. programmes.

I am also very happy to learn that out of 30,000 students enrolled in the University, 60 per cent are women. I have always maintained that no nation can progress until its women are educated and given opportunities on par with that of men.

Goa is located in an ecologically sensitive region along the Western Ghats and the Arabian Sea.

I am happy that Goa University has appropriately emerged as an important resource centre for research in the field of flora and fauna endemic to this region, as well as the marine environment.

I am told that, the Ministry of Earth Sciences, in recognition of Goa University's significant contribution in this domain, has established a Centre of Excellence in Marine Microbiology at the University.

I am glad to learn that in addition to the conventional graduate and postgraduate programmes, Goa University has also taken initiatives to visualize and implement some truly innovative programmes like the National Resource

Centre in Marine Science for the professional development of higher education using the MOOCs platform SWAYAM, the State Resource Centre for Women, the Study India Programme with Nihon University of Japan, etc.

The Visiting Research Professors Programme started during 2013-14 to bring luminaries in the field of liberal arts & literature, social and natural sciences, and other fields is also a laudable initiative. Interactions with visiting professors would surely add to the diversity of this University and generate a creative environment with their intellectual and aesthetic endeavours.

I am happy to know that the University that is accredited to the National Assessment and Accreditation Council (NAAC) in India with A Grade has also been placed at the 93rd position in the ranking of Indian Universities by the National Institutional Ranking Framework (NIRF).

What is even more impressive is that in the QS World University Rankings for 'BRICS countries 2019', that ranks 9000 Universities in BRICS Nations, Goa University has been placed in the first 250. However, you must strive to find place in the first hundred.

Dear Students,

A convocation is not a mere ceremonial occasion, but a milestone marking the beginning of a new chapter in your life - a new chapter full of hopes, dreams and expectations of a bright and fulfilling career and life ahead.

So let me extend my heartiest congratulations to each and every one of the graduating students, to those devoted teachers who painstakingly nurtured these bright young minds, to those parents who made many sacrifices to provide the best to their

children, the family and friends of these students who supported them through thick and thin and finally this institution for instilling in these children the confidence to conquer all odds in life. This is a moment of great pride for all of you. My best wishes to you for your future endeavors!

My Dear Students, While today is the culmination of the years of hard work you had put in as a student, do not for a moment think that this is the end of your education. Learning is a life-long process and every experience, good or bad, teaches you something new. However, what is important is to set new goals and targets and remain committed to achieving them. The strength of your commitment to excellence will determine the future of this great nation. As you are all aware, with the GDP of \$2.9 Trillion, India is now the fifth largest economy of the world. It is expected to grow at 6 per cent to 6.5 per cent in the next financial year.

Fundamentals of the economy are strong and that has ensured macroeconomic stability. During 2014-19, our government brought in a paradigm shift in governance. This shift was characterised by a twin focus: fundamental structural reform and inclusive growth. From Goods and Service Tax to Direct Benefit Transfer, from Digital Governance to Ayushman Bharat, we have managed to implement several programs to successfully strike a balance between these two aspects.

Last month, we celebrated the 70th Republic Day. Our constitution continues to be our guiding light and our moral compass, our democracy is stable and our polity is as vibrant and as robust as ever. Guided by the motto of '*Sabka Saath, Sabka Vikas, Sabka Vishwas*', our government has scaled up the implementation of schemes and programmes that directly benefitted the poor and the disadvantaged. As per Budget 2020, India was able to raise 271 million people out of poverty, between 2006-16. But much more needs to be done.

I am also happy that in recent times people are talking about the importance of the Constitution. It indeed is a positive sign and every citizen must follow the Constitution in letter and spirit. Also, everyone should follow constitutional methods to achieve his/ her goals. We should not only be concerned about fundamental rights but also about duties. Rights and responsibilities must go together. The need of the hour is to channelize the energies of

the youth in constructive, nation-building activities. My advice to youth is to shun negativism and not to encourage violence. There is no place for violence in a democracy. Be constructive and not obstructive or disruptive. Develop a positive outlook. Join the forces of growth as India is passing through a critical phase.

Let me place a few challenges before these bright young minds of the nation. We have to both create wealth and ensure its equitable distribution. We have to ensure that every single child goes to school.

We have to empower each and every citizen of the nation with education and skills and create opportunities for them to realize their true potential. We have to create good living conditions and provide affordable, quality healthcare and housing to all. We have to tackle the formidable challenges of hunger and malnutrition and at the same time, strive to control the increasing incidence of non-communicable diseases in the nation.

Climate change and global warming are two of the biggest challenges the world is facing today and all nations have to step up their efforts to protect the environment and reduce carbon footprint. We need to ensure that man does not tamper with nature but learns to co-exist in harmony with nature for a greener, life-enhancing future. Illiteracy, diseases, challenges in farm sector and social evils like atrocities on women and weaker sections, child labour, terrorism, communalism and corruption have to be eradicated to build a New and Resurgent India.

It is true that these challenges have to be combated in a concerted manner by all conscientious citizens but I expect the youth of the country to be in the forefront of this noble mission. This is the time for all sections, particularly the youth to be at the forefront of making India stronger on all fronts. Please remember that discipline, honesty and total commitment to hard work are essential prerequisites for success in any field, including public life. Always select and elect leaders on the basis of 4 Cs—Good Conduct, Character, Capacity and Calibre and not on the basis of other 4Cs--Caste, Community, Cash and Criminality.

Perhaps, it will be apt to recall the words of Swami Vivekananda, who had said: "My hope of

the future lies in the youths of character, intelligent, renouncing all for the services of others, and obedient – good to themselves and the country at large”. I urge all the engineers and students of Science to take a closer look at the collective needs of the populace and come up with innovative, cost-effective solutions, especially in areas such as healthcare and education. Young engineers like you need to play a catalytic role in accelerating the wheels of progress. In the present era of globalization, you not only have to be tech-savvy, but highly motivated, competent, innovative and push the boundaries of performance. I urge the students of Social Science and Humanities to closely analyze and understand in great detail, the social evils that we face, such as casteism and gender discrimination and find ways and means to eradicate them from the psyche of the society. Behavioural change is key, whether it be *Swachh Bharat* or protection of the girl child.

I urge the students of arts to strive to promote our rich culture and myriad art forms. Our composite culture and rich heritage is what makes us unique. Therefore they must form an integral part of our development agenda for the future.

More importantly, let me stress that working in silos; independent of each other will not yield the desired results. You must work as a team, complementing and fortifying each other’s initiatives, each one doing their best, inculcating much needed synergy in your efforts.

My Dear Young Students,

As you embark on a new and exciting journey, never look for short-cuts or quick fixes to scale new heights.

Perseverance, honesty, empathy, patience and self-belief will enable you to realize your dreams.

Nothing is impossible to achieve but the path you choose has to be a righteous one. Never yield to temptations for short term or selfish gains. Always remain committed to highest moral and ethical values.

You are on the threshold of a new life. As you step out into the bigger world, take an oath to work for the good of the society and the country. Education is not only for employment. It is meant to empower, enlighten, widen the perspective of the students and develop them into global citizens.

At the same time, you have to remember one important aspect-- the Indian value system is based on the principles of universalism, peace and prosperity for all, or you may say, ‘*Vasudhaiva Kutumbakam*’ - the whole world is one family.

The life beyond this institution is vast and complex. Wherever you go, please do not forget your obligation towards the society and the nation. I, once again, congratulate all the degree recipients. Today is your day.

The years which you have spent as students in the company of your peers and facilitators, would always be cherished by all of you. Intertwined with these good memories, you are now embarking on a new journey to explore new vistas. The road ahead may be rough and tough, but continue with perseverance and passion. I am sure you will make the nation and your alma mater proud.

All the Best for a Bright and Rewarding Career!

Jai Hind!

National Webinar on National Education Policy—2020

A One-day National Webinar on ‘National Education Policy—2020’, coinciding with the World Teachers’ Day was organized by NCC Unit, Rajiv Gandhi University (RGU) in collaboration with NCC Group Headquarter, Tezpur and 1 APBN, NCC, Arunachal Pradesh, recently.

During Inaugural Session, Col. Kushal Kar, CO, 1 APBN NCC delivered his welcome address. The Vice Chancellor, Prof. Saket Kushwaha spoke about the NEP—2020 and its process of making and requested the participants to read this document. He appreciated the NEP for aiming to promote all-round development of youth by inculcating values and skills. The session was also graced by Prof. A Mitra, Pro Vice Chancellor who appreciated the NCC activities in the University. He said that NEP—2020 is for developing 21st Century skills among students. Registrar, Dr. N T Rikam highlighted the patriotic sentiments of people of North-Eastern Region (NER) and their contribution in national building. He said that a Regiment should be made in the name of ‘North-Eastern Regiment’/ ‘Arunachal Regiment’. This will motivate the youth of north-eastern states to join Armed Forces, he added.

The first speaker of the event was Prof. Elizabeth Hangsing from Rajiv Gandhi University who presented a detailed and comprehensive highlight of NPE—2020. She explained the proposed structure of education 3+5+3+4, provision of Early Childhood Care and Education (ECCE), bridging the gap between the curriculum and co-curriculum activities, attaining functional literacy and numeracy, introduction of 360 degree assessment for learning.

The Second speaker, Prof. S K Yadav, National Council of Educational Research and Training (NCERT), New Delhi emphasized on the National Education Policy in the light of youth development and said, “Youth as connecting link between past and future” and a society cannot be developed without motivated youth. He explained about process of policy making based on inputs from different educational Committees and Commissions. He also appreciated NEP—2020 for

making provisions for youth development, expansion of NCC, life skill and vocational education.

Prof. Saroj Pandey, School of Education, Indira Gandhi National Open University (IGNOU), New Delhi discussed the impact of NEP on Present Education System and way ahead. She said that seamless and time bound implementation of the policy would require greater synergy among all the stakeholders. She highlighted the removal of disciplinary barriers and promoting interdisciplinary approach, multiple entry and exit in higher education, revision of curriculum, and sharing of resources. She also suggested that RGU in collaboration with state government should make a plan for its implementation and identify the requirement of resources for it.

After the technical sessions, Major General Bhuyan, Additional Director General (ADG), NCC, NER stressed upon the need for mutual cooperation among all agencies towards successful implementation of the event and the NCC would be required to play more significant and collaborative role towards implementation of various guidelines enunciated in the policy. The Vote of Thanks was proposed by Dr. Vivek Singh, Assistant Professors Cum NCC Officer and Convenor of the event.

Online University Education and English Language Teaching

A two-day Online University Education and English Language Teaching: Scope and Challenges is being organized by the Department of English, School of Social Sciences and Languages, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu during November 13-14, 2020. The event may bring together researchers, teachers and professionals of English Literature and Language in India and abroad to come up with innovative teaching-learning methodologies, evaluation and assessment techniques, effective and holistic student-teacher learning experience and policy guidelines for online education of English Literature and Language across Universities.

The COVID-19 pandemic has affected and disrupted all aspects of life globally. Along with other sectors, higher education sector has also

been severely impacted. Due to this, the traditional Teaching-Learning methodologies and student-teacher interactive experience has been replaced with online education. Though not a permanent replacement to the traditional classroom teaching, online education will be the mode of teaching and learning until the vaccine is invented. Governments and health experts have advised Universities, Colleges and Schools to commence classes with a combination of online and tradition teaching. Further, virtual and online education is being advocated and to some extent made mandatory at least by some higher education institutes for the next academic year. With the lack of any foreseeable medical solution in the immediate future for this pandemic, the higher education institutes are left with no other option but to shift to online education to minimize health risk of students and staff. Two decades ago, technology was not optimal for online education, however, the latest technology of internet, telecommunications, etc., have paved the way for online education and virtual classrooms connecting student –teacher across the globe with a few limitations. Since, there is a sudden shift from traditional education to online education, there is a need to understand online education methodologies, to measure its effectiveness, as well as to prepare a shift to a new system. There is a need to examine Teaching-learning approaches, evaluation and assessment methodologies and educational experience for students and attitude change among teachers.

Unlike other disciplines, online English Teaching and Learning poses serious challenges and needs a paradigm shift. The focus of research till now has been in a traditional classroom, but online classroom has opened a new chapter in the field of English Literature and Language research. Furthermore, motivating students to learn English through online is another challenge. In spite of these challenges and issues, online education can provide learning opportunities due to effective teaching methodologies of English Literature and Language optimizing the audio-visual aids, Internet technologies, social media and other virtual platforms when compared to traditional classroom teaching.

Though online learning of English Literature and Language has better scope and development, it is important to understand the issues like teaching-learning methodologies, specific approaches and

adaptations for various courses like teaching text, prose, poetry, drama, novel for literature and communication skills and language skills. Further, there is also a need to come up with novel evaluation assessment procedures and motivate student-teacher to prepare for online education ecosystem. The onus is on English Literature and Language Teachers to take up this challenge of online education due to the COVID-19 pandemic for effective and holistic learning experience for both teachers and students. There is an urgent need to address these issues especially for engineering and management education. The themes and Subthemes of the event are:

1. Online Education for English Literature: Methodologies and Innovative Teaching Practices.
2. Online Education for English Language Teaching: Methods, Approaches and Techniques.
3. Online Education: Assessment and Evaluation for Literature and Language Courses.
4. Online Education for Innovative Technologies, Audio-visual aids Social Media for Literature and Language Teaching.
5. Online Education Effective and Holistic Teaching-learning Experience: Teacher-Student Motivation, Engagement and Satisfaction.

For further details, contact Organising Secretary, Dr. S Rukmini, Assistant Professor (Sr.), Department of English, School of Social Sciences and Languages, Vellore Institute of Technology (VIT), Vellore, Tamil Nadu-632 014, Mobile:+91-8790984172,+91-7981247113, E-mail: onlineng.edu@gmail.com. For updates, log on to: www.vit.ac.in.

International Conference on Recent Trends in Developments of Thermo-fluids and Renewable Energy

A three-day International Conference on ‘Recent Trends in Developments of Thermo-fluids and Renewable Energy’ is being organized by the National Institute of Technology Arunachal Pradesh during November 26-28, 2020.

This conference intends to have deliberations on Thermo-fluids and Renewable Energy, also focusing on the applications of heat and work to engineering problems, fluid behavior under the influence of thermal/pressure gradients and energy systems. The conference also intends to discuss the role of engineers in the field of medical healthcare such as effect of blood flow on

external heating during radiation therapy, etc. The exhaustive work being done by various achievers in the field of thermo-fluids and Energy systems is intended to draw established as well as young researchers, providing them an exposure to the recent developments in thermo-fluids and Renewable Energy. The theoretical topics together with real time examples from various thermo-fluids' problems and generation and storage of Renewable Energy are planned for presentations and discussions. Speakers from premier institutions in India and abroad with a vast knowledge and experience in the field of thermo-fluids and Renewable Energy, who have been quite active in the field for a long time, will be delivering the keynote address and invited talks. The conference thus provides a platform for mutual dissemination of ideas on thermo-fluids and Renewable Energy between researchers and industrialist. The themes of the event are:

- Aerodynamics.
- Alternate Energy.
- Bio Fuel.

- Bio Heat Transfer.
- Combustion.
- Computational Fluid Dynamics.
- Control Mechanism for Constant Power.
- Generation Distributed Generation.
- Electric Vehicle.
- Hybrid Power System.
- Energy Storage.
- Hydro Power System.
- Refrigeration and Air Conditioning.
- Solar and Renewable Energy.
- Stability and Transient Analysis Using Soft.
- Computing Techniques.

For further details, contact Convenor, National Institute of Technology Arunachal Pradesh- 791112, Mobile:+91-9954905307/+91-9485231981/+91 9485230670, E-mail: tfre20@nitap.ac.in. For updates, log on to: www.iitg.ac.in/ceer/tfre2020. □

ATTENTION : SUBSCRIBERS UNIVERSITY NEWS

The NEW RATES of Subscriptions effective April 01, 2020 shall be as per following:

	Institutions Rs.	Teachers/Students/Individuals* Rs.	
1 year	1,250.00	500.00	*AT RESIDENTIAL ADDRESS ONLY
2 years	2,200.00	900.00	

The payable amount is required to be remitted **in advance** by any of the following modes of payments:

- a) AIU WEB Portal (b) Cash Deposit (c) Demand Draft, and (d) NEFT/RTGS/Net Banking/G-Pay/BHIM APP, etc.

1	Bank Account No.	0158101000975 (Saving)
2	Beneficiary Name and Address	ASSOCIATION OF INDIAN UNIVERSITIES 16, Comrade Indrajit Gupta Marg, New Delhi – 110 002
3	Bank & Branch Name	CANARA BANK, DDU MARG
4	Bank's Address	“URDU GHAR”, 212, Deen Dayal Upadhyaya Marg, New Delhi – 110 002
5	Branch Code	0158
6	IFSC Code	CNRB 0000158
7	Contact No. & E-mail ID	(011) 23230059 Extn. 208/213 (M) 09818621761

THE NEFT/RTGS/ONLINE PAYMENT TRANSACTION/UTR NUMBER MUST BE SENT BY MAIL IMMEDIATELY WITH COMPLETE MAILING ADDRESS & PIN CODE FOR LINKING AND ITS SETTLEMENT AT OUR END.

*For further information/enquiries, send Mail at : subsun@aiu.ac.in / publicationsales@aiu.ac.in
Website : <https://www.aiu.ac.in>*

THESES OF THE MONTH

SCIENCE & TECHNOLOGY

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

AGRICULTURAL & VETERINARY SCIENCES

Agriculture Engineering

1. Supekar, Sanjay Janardhanrao. **Impact of irrigation and fertigation levels on growth, yield and quality of summer chilli (*Capsicum annuum* L).** (Dr. A S Kadale), Department of Agricultural Engineering, Vasantrya Naik Marathwada Agricultural University, Parbhani.

Plant Pathology

1. Golakiya, Bhargavkumar Bhimajibhai. **Pomegranate leaf and fruit spot (*Colletotrichum gloeosporioides* (Penz) Penz and sacc and *Alternaria alternata* (Fr) Keissler) and their management.** (Dr. L F Akbari), Department of Plant Pathology, Junagadh Agricultural University, Junagadh.

BIOLOGICAL SCIENCES

Biochemistry

1. Kapil Dev. **Biosafety evaluation of nanomaterial using caprine germ cell as a unique model system.** (Dr. Suman Dhanda and Dr. Gautam Kaul), Department of Biochemistry, Kurukshetra University, Kurukshetra.

Biotechnology

1. Ravivarma, Aithabathula. **A study on screening, isolation and molecular characterization of actinomycetes streptomyces rochei JRS-27 with antimicrobial and cytotoxic potency.** (Dr. P Sudhakar), Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar.

2. Sharma, Preeti. **Micropropagation, secondary metabolite profiling and molecular diversity analysis of *Lawsonia inermis*.** (Dr. Bindu Battan and Dr. Anil Sindhu), Department of Biotechnology, Kurukshetra University, Kurukshetra.

3. Vimala. **Molecular and biochemical characterization of cotton leafhopper *Amrasca biguttula biguttula* (ISHIDA) population from South India.** (Dr. R Srinivasa and Dr. M Bheemanna), Department of Biotechnology, Koneru Lakshmaiah Education Foundation, Guntur.

4. Yadav, Bharti. **In vitro studies on protective effects of phytochemicals (Morin and Naringenin) on lead induced genotoxicity in cultured human cells and effect of gene polymorphisms.** (Dr. Anita Yadav), Department of Biotechnology, Kurukshetra University, Kurukshetra.

Botany

1. Marbaniang, Jean Valrie. **Analyses of genetic diversity and phylogenetic relationship in *Malaxis* spp (Orchidaceae) using suitable DNA-based markers.** (Prof. Suman Khatri Kumaria and Prof. Pramod Tandon), Department of Botany, North Eastern Hill University, Shillong.

2. Mondal, Sujit. **Taxonomy, phenology and ethnobotany of palms in West Bengal.** (Dr. M chowdhury), Department of Botany, University of North Bengal, Darjeeling.

3. Patel, Dharmeshbhai Chandubhai. **An ethnobotanical survey of medicinal plants used by traditional healers of Kaprada Forest (Valsad District) Gujarat, India.** (Dr. Bhanwar Lal Jat), Department of Botany, Bhagwant University, Ajmer.

Marine Science

1. Khan, Injeela. **Growth performance and meat quality of pangasid catfish (*Pangasianodon Hypophthalmus*) fed on fish silage and linseed oil supplemented diets.** Department of Aquaculture, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

2. Namburu, Praveen Kumar. **A study on some beneficial aspects of better management practices (BMP'S) in penaeus monodon (Black tiger prawn) culture in Andhra Pradesh, India.** (Dr. K Sumanth Kumar), Department of Aquaculture, Acharya Nagarjuna University, Nagarjuna Nagar.

Microbiology

1. Pudota, Sunila Rani. **Phytochemical, biological and cytotoxic efficiency of silver nano-particles (AgNPs) synthesised from selected Mangrove plants.** (Prof. G Rosaiah), Department of Microbiology, Acharya Nagarjuna University, Nagarjuna Nagar.

Wild Life Science

1. Bisht, Shikha. **Population dynamics and resource selection by tigers (*Panthera Tigris*) in Corbett Tiger Reserve.** (Dr. Y V Jhala), Department of Wild Life Science, Saurashtra University, Rajkot.

2. Kumar Ujjwal. **Tiger and leopard: Population ecology and resource partitioning of sympatric carnivores in Kanha Tiger Reserve M P.** (Dr. Y V Jhala), Department of Wild Life Science, Saurashtra University, Rajkot.

Zoology

1. Dasari, Vijayakumari. **A study on role of probiotics in *litopenaeus vannamei* (Boon, 1931) cultured grow-out ponds of Prakasam District of Andhra Pradesh, India.** (Dr. K Sumanth Kumar), Department of Zoology, Acharya Nagarjuna University, Nagarjuna Nagar.

2. Indraganti, Anjaneyulu. **A study on effect of water quality and feed management practices in *litopenaeus vannamei* (Boon, 1931) cultured grow-out ponds of West Godavari and Krishna Districts of Andhra, India.** (Dr. Sumanth Kumar Kunda), Department of Zoology, Acharya Nagarjuna University, Nagarjuna Nagar.

3. Prathap Kumar, S J M. **A study on knowledge and extent of adoption polyculture fish practices in Krishna District of Andhra Pradesh, India.** (Dr. K Sumath Kumar), Department of Zoology, Acharya Nagarjuna University, Nagarjuna Nagar.

4. Rajeswari, Gunti. **λ cyhalothrin (5% EC induced toxicity and biochemical aspects in freshwater fish *ctenopharyngodon idella*.** (Dr. V Venkata Rathnamma), Department of Zoology, Acharya Nagarjuna University, Nagarjuna Nagar.

5. Sathyavani, K Glory. **Studies on some aspects of ecology and assessment of heavy metals in the water, sediments and food fish *lates calcarifer* from interu Mangrove Swamp East Coast of India.** (Dr. P V Krishna), Department of Zoology, Acharya Nagarjuna University, Nagarjuna Nagar.

EARTH SYSTEM SCIENCES

Environmental Science

1. Panda, Bibhu Prasad. **Biomonitoring of heavy metals in wetland ecosystem by taking cattle EGRET (*Bubulcus ibis*, linnaeus) as bioindicator.** (Dr. Abanti Pradhan and Dr. Siba Prasad Parida), Department of Environmental Science, Siksha O Anusandhan University, Bhubaneswar..

Geology

1. Nazia Sultana. **Chemistry of gemstones from**

Vemireddipalle Area, Krishna District, Andhra Pradesh, India. (Prof. P Sankara Pitchaiah), Department of Geology, Acharya Nagarjuna University, Nagarjuna Nagar.

Geophysics

1. Yadav, Jairam Singh. **Glacier mass fluctuations and meteorological parameters: Implications for regional climate change scenarios.** (Dr. R B S Yadav and Dr. D P Dobhal), Department of Applied Geophysics, Kurukshetra University, Kurukshetra.

ENGINEERING SCIENCES

Computer Science & Engineering

1. Atri, Jaideep. **Optimizing routing mechanism in ad hoc networks.** (Dr. Shuchita Upadhyaya), Department of Computer Science, Kurukshetra University, Kurukshetra.

2. Jain, Neha. **Analysis and design of intelligent digital image processing techniques for real-time applications.** Department of Computer Science & Engineering, Jaypee University of Engineering and Technology, Guna.

3. Kalidasu, Harish Babu. **Visual data mining of biological networks: A medical diagnosis of cancer threats.** (Dr. G Murali), Department of Computer Science & Engineering, Acharya Nagarjuna University, Nagarjuna Nagar.

4. Panda, Monalisa. **Multi-criteria decision making using machine learning techniques.** (Dr. Alok Kumar Jagadev and Dr. Satchidananda Dehuri), Department of Computer Science & Engineering, Siksha O Anusandhan University, Bhubaneswar.

5. Ranpara, Ripal Dilipbhai. **Design and development of contextual information retrieval algorithm using ontology and semantics.** (Dr. C K Kumbharana), Department of Computer Science & Engineering, Saurashtra University, Rajkot.

6. Rodda, Vijaya Kumari. **Strengthening of shoulder-surfing resistant graphical password authentication schemes for cloud services.** (Prof. K Gangadhara Rao), Department of Computer Science & Engineering, Acharya Nagarjuna University, Nagarjuna Nagar.

7. Sultana, G Nazia. **A long term defense mechanism against distributed denial of service.** (Dr. V K Sharma), Department of Computer Science & Engineering, Bhagwant University, Ajmer.

8. Tamma, Lakshmi Naga Divya. **A quantum chaotic hash based attribute based encryption on data stroing in cloud.** (Dr. Shaik Shakeel Ahamad), Department of Computer Science & Engineering, Koneru Lakshmaiah Education Foundation, Guntur.

9. Tiwari, Rajesh. **Optimization of single programme multiple data virtualization in parallel environment.** (Dr. Manisha Sharma Dr. Kamal K Mehta), Department of Computer Science & Engineering, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

10. Vamsi Mohan, V. **User centric security models for improving the cyber security using from SQL injections and cross sites scripting technologies.** (Dr. Sandeep Malik), School of Engineering and Technology, Raffles University, Neemrana.

Electrical & Electronics Engineering

1. Agrawal, Ritu. **An improved electronic patient record embedding scheme using M-ary modulation in region of non interest of medical images.** (Dr. Manisha Sharma), Faculty of Electrical, Electronics Telecommunication Engineering and Instrumentation, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

2. Bangari, Naresh. **Design and fabrication of wearable hybrid energy harvesting system.** (Dr. V K Singh and Dr. V K Sharma), Department of Electrical & Engineering, Bhagwant University, Ajmer.

3. Bharti, Puja. **Computer aided diagnosis of liver diseases using ultrasound images.** (Dr. Deepti Mittal), Department of Electrical and Instrumentation Engineering, Thapar Institute of Engineering and Technology, Patiala.

4. Bharti, Satyadharma. **Performance analysis of 1200 kV ultra high voltage transmission system.** (Dr. S P Dubey), Faculty of Electrical, Electronics Telecommunication Engineering and Instrumentation, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

5. Dey, Amar Kumar. **An automatic cognitive vision approach for determination of growth and quality of betel leaves (Piper betle L).** (Dr. M R Meshram), Faculty of Electrical, Electronics Telecommunication Engineering and Instrumentation, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

6. Gera, Kalidas Babu. **Optimal DG placement in radial distribution systems using meta-heuristic techniques.** (Dr. P V Ramana Rao), Department of Electrical & Electronics Engineering, Acharya Nagarjuna University, Nagarjuna Nagar.

7. Patel, Harshadkumar Chaturbhai. **Design and development of cylindrical wire cut electrical discharge machine.** (Dr. Dhaval M Patel), Faculty of Engineering and Technology, Ganpat University, Mehsana.

8. Reddy, B S Raghunatha. **Adaptive and interactive methods for 3D video streaming.** (Dr. P Ramana Reddy), Department of Electronics and Communication Engineering, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

9. Supriya, P Lakshmi. **GPRS technology for remote monitoring of incipient fault in power transformers.** (Dr. P Sujatha), Department of Electrical & Engineering, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

Electronics & Communication Engineering

1. Potteti, Dhanalakshmi. **Performance evaluation of proposed spectrum sensing techniques in green cognitive radio communications.** (Dr. N Venkateswara Rao), Department of Electronics & Communication Engineering, Acharya Nagarjuna University, Nagarjuna Nagar.

2. Rajasekhar, B. **Implementation and analysis of emotion recognition system for speech signals.** (Dr. M Kamaraju and Dr. V Sumalatha), Department of Electronics and Communication Engineering, Jawaharlal Nehru Technological University Anantapur, Ananthapuramu.

3. Ramudu, Kama. **Optimized segmentation of biomedical images using level set methods.** (Dr. T Ranga Babu), Department of Electronics & Communication Engineering, Acharya Nagarjuna University, Nagarjuna Nagar.

4. Rao, Manikonda Venkateswara. **Design and analysis of metamaterial inspired planar and flexible antennas for wireless communication applications.** (Dr. B T P Madhav), Department of Electronics & Communication Engineering, Koneru Lakshmaiah Education Foundation, Guntur.

5. Sahoo, Girija Shankar. **GaSb: An approach to boost the efficiency of third generation solar cells.** (Dr. Guru Prasad Subas Chandra Mishra), Department of Electronics & Electrical Communication Engineering, Siksha O Anusandhan University, Bhubaneswar.

Mechanical Engineering

1. Choudhury, Sasanka. **Fault diagnosis of beam structure using multiple regression models.** (Prof. Dharendra nath Thatoi and Dr. Mohan D Rao), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

2. Jain, Achala. **Development of a new hybrid optimization techniques for unit commitment and economic dispatch problem.** (Dr. Anupama P Huddar and Dr. D S Raghuwanshi), Faculty of Electrical, Electronics

Telecommunication Engineering and Instrumentation, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

3. Mishra, Bibhuti Bhusan. **Efficient shear deformation theories for laminated elastic and smart composite plates.** (Dr. Jayanta Kumar Nath), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

4. Patel, Hiteshkumar Ranchhodbhai. **Synthesis of double loop four bar mechanism for function generation task using genetic optimization techniques.** (Dr. Mitesh Mungla), Department of Mechanical Engineering, Indus University, Ahmedabad.

5. Rajesh Kumar. **A framework development of green supply chain management in steel industry (Chhattisgarh) using interpretive structural modeling under fuzzy environment.** (Dr. Shiena Shekhar), Department of Mechanical Engineering, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

6. Sukhdeve, Vikas Kumar. **Optimization of process parameters of boring machine through modelling and simulation techniques.** (Dr. S K Ganguly), Faculty of Mechanical, Production and Industrial Engineering, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

7. Verma, Ajay Kumar. **Optimization of lamination parameters of a hybrid composite plate subjected to thermo-mechanical loading.** (Dr. P B Deshmukh and Dr. M L Verma), Faculty of Mechanical, Production and Industrial Engineering, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

Physical Engineering

1. Mann, Kusum Lata. **Terahertz radiation generation in laser plasma interaction.** Department of Physics and Materials Science and Engineering, Jaypee Institute of Information Technology, Noida.

MATHEMATICAL SCIENCES

Mathematics

1. Maganti, V V N L Sudha Rani. **Numerical exploration of heat transfer on hydromagnetic particle suspension flows.** (Dr. M Gnaneswara Reddy), Department of Mathematics, Acharya Nagarjuna University, Nagarjuna Nagar.

2. Pandey, Poonam. **A study on variational inequalities.** (Dr. Shailesh Dhar Diwan), Department of Applied Mathematics, Chhattisgarh Swami Vivekanand Technical University, Bilhailai.

3. Prashar, Ajay. **Medical image analysis using moments and transforms.** (Dr. Rahul Upneja), Department

of Mathematics, Sri Guru Granth Sahib World University, Fatehgarh Sahib.

4. Vadlamudi, Arundhati. **Effect of thermal radiation on convective heat and mass transfer flow in channels/ducts with heat sources.** (Dr. K V Chandra Sekhar and Prof.D R V Prasada Rao), Department of Mathematics, Koneru Lakshmaiah Education Foundation, Guntur.

Statistics

1. Devireddi, C U Siva Kumar. **Odds generalized exponential log logistic distribution: Study on some acceptance sampling techniques.** (Dr. K Rosaiah), Department of Statistics, Acharya Nagarjuna University, Nagarjuna Nagar.

MEDICAL SCIENCES

Dentistry

1. Jodalli, Praveen. **A study among 18-24 year old students in colleges of Mangaluru Taluka, South India for tobacco surveillance.** (Dr. Ganesh Shenoy), Department of Public Health Dentistry, Yenepoya (Deemed to be University), Mangaluru.

Medicine

1. Pagala, Sravanthi Reddy. **Phenotypic methods to detect carbapenem resistance in gram negative bacilli isolated from various clinical specimens.** (Dr. Mina Kadam), Department of Medicine, Gujarat University, Ahmedabad.

Ophthalmology

1. Agarkhedkar, Shalaka Sharad. **To rationalize informed consent (Content, process and documentation) in the field of ophthalmology by assessing the knowledge, attitude and practice of ophthalmologist in present clinical practices and research settings, in the light of changing relationship of patients and doctor: A qualitative research in four cities of Maharashtra having \geq (more than or equal to) 5 (Five) lakhs population.** (Dr. Renu Magdum), Faculty of Medicine, Dr D Y Patil Vidyapeeth, Pune.

Pharmaceutical Science

1. Abbas, Sahil. **Screening of actinomycetes producing antibacterial compounds from different river sediments.** (Dr. Girendra Gautam and Dr. Pawan Kumar Gautam), Department of Pharmacy, Bhagwant University, Ajmer.

2. Dangar, Dineshkumar Kanabhai. **Phytopharmacological investigation of neuracanthus sphaerostachyus for various inflammatory disorders.** (Dr. Nilesh J Patel), Faculty of Pharmacy, Ganpat University, Mehsana.

3. Kare, Sarita. **Design characterization and formulation of novel hepatoprotective drug delivery system from natural origin.** (Dr. Girendra Gautam and Dr. Shailesh Gupta), Department of Pharmacy, Bhagwant University, Ajmer.

4. Sonti, Madhavi. **Development and validation of bioanalytical and analytical methods for the estimation of new chemical entities using hyphenated techniques.** (Prof. A Prameela Rani), Department of Pharmacy, Acharya Nagarjuna University, Nagarjuna Nagar.

5. Suresh Kumar. **Synthesis and biological evaluation of some natural cyclopeptides.** (Dr. Sukhbir Lal Khokra and Dr. Rajiv Dahiya), Department of Pharmaceutical Science, Kurukshetra University, Kurukshetra.

6. Thakur, Poonam Singh. **Development and evaluation of nanocrystalline solid dispersion of fenofibrate using nanocrySP™ technology.** (Dr. Arvind K Bansal), Department of Pharmaceutics, National Institute of Pharmaceutical Education and Research, Mohali.

Physiology

1. Thakkar, Diptibahen Vinodchandra. **Comparative study of nerve conduction velocity in different age group.** (Dr. N J Shah), Department of Physiology, Gujarat University, Ahmedabad.

PHYSICAL SCIENCES

Chemistry

1. Done, Ravikumar. **Greener approaches, design and synthesis of new bioactive organophosphorus compounds.** (Dr. K Prasada Rao), Department of Chemistry, Acharya Nagarjuna University, Nagarjuna Nagar.

2. Jadeja, Juvansinh Jashubha. **Studies on transition metal complexes containing various organic ligands.** (Dr. M K Shah), Department of Chemistry, Saurashtra University, Rajkot.

3. Kukkar, Preeti. **Lanthanides and transition metal based metal organic framework for detection of toxic metal ions and organophosphate pesticides.** (Dr. Pritpal Singh and Dr. Soumen Basu), Department of Chemistry, Sri Guru Granth Sahib World University, Fatehgarh Sahib.

4. Nekkala, Kalpana. **Development and validation of stability indicating RP-HPLC method for the simultaneous determination of selective pharmaceutical**

drugs. (Dr. J V Shanmukh Kumar and Dr. D Ramachandran), Department of Chemistry, Koneru Lakshmaiah Education Foundation, Guntur.

5. Purushothama, H T. **Electrochemical studies on cardiovascular drugs and antidepressants using modified electrodes.** (Dr. Y Arthoba Nayaka), Department of Chemistry, Kuvempu University, Shankaraghatta.

6. Swain, Gayatri. **Studies on two dimensional (2D) molybdenum disulfide (MoS₂) based p-n heterojunction photocatalytic materials towards energy and environmental application.** (Prof. Kulamani Parida), Department of Chemistry, Siksha O Anusandhan University, Bhubaneswar.

7. Upadhyay, Juhi Bhanubhai. **Synthesis of novel schiff base cavitands for extraction of toxic species.** (Dr. Hitesh Parekh), Department of Chemistry, Gujarat University, Ahmedabad.

8. Valavala, Sriram. **Analytical method development and validation for the quantification of residual solvents and impurities of pharmaceutical products using appropriate chromatographic techniques.** (Dr. Naresh Varma Seelam), Department of Chemistry, Koneru Lakshmaiah Education Foundation, Guntur.

Physics

1. Behera, Dillip Kumar. **Studies on conducting polymers and their nanocomposites: Morphological, mechanical electrical and optical properties.** (Dr. P L Nayak and Prof. Kampal Mishra), Department of Physics, Siksha O Anusandhan University, Bhubaneswar.

2. Jalli, Ramesh Babu. **Preparation and characterization of nano Sm₂O₃/Pr₂O₃/Dy₂O₃ doped PVA+Na₃ C₆H₅O₇-solid polymer electrolyte films and their adoptability in electrochemical cell applications.** (Dr. K Ravindhranath), Department of Physics, Koneru Lakshmaiah Education Foundation, Guntur.

3. Pattanaik, Shreenu. **Investigation of structural, optical and magnetic properties of ZnO and ZrO₂ based semiconductor.** (Dr. Dillip Kumar Mishra), Department of Physics, Siksha O Anusandhan University, Bhubaneswar.

4. Thota, Kalyani. **Synthesis and characterization of some hydrogen bonded liquid crystals constructed by p-n-alkoxy benzoic acids through image analysis.** (Prof. S Sreehari Sastry), Department of Physics, Acharya Nagarjuna University, Nagarjuna Nagar. □

**ASSOCIATION OF INDIAN UNIVERSITIES
ADVERTISEMENT TARIFF
UNIVERSITY NEWS JOURNAL**

**GST AT PRESENT RATE OF 5% IS PAYABLE FOR PUBLICATION OF ALL TYPES OF
ADVERTISEMENT IN UNIVERSITY NEWS W.E.F. APRIL 01, 2020 IN ADDITION
TO THE PAYABLE CHARGE FOR EACH CATEGORY AS GIVEN BELOW**

**A. FOR EDUCATIONAL INSTITUTIONS, GOVT. ORGANIZATIONS, PUBLISHERS, BOOK
SELLERS & DISTRIBUTORS DISPLAY**

(Amount in Rupees)

Categories of Advertisement	1 Insertion	4 Insertions	8 Insertions	12 Insertions
Full Page	15000	45000	85000	120000
Half Page	8000	28000	50000	68000
Quarter Page	5000	16000	28000	40000
Cover (Inside)	16000	55000	100000	144000
Cover (Back)	20000	65000	120000	165000

B. TARIFF FOR SPECIAL NATURE OF MATTERS/ITEMS (DOUBLE THE RATES)

TARIFF FOR SUPPLIERS OF COMPUTERS, COMPUTER STATIONERY & PERIPHERALS, SCIENTIFIC & SURGICAL INSTRUMENTS, SPORTS GOODS AND OTHERS (*NOT COVERED IN ANY FORM OF THE TARIFF*) WILL BE AT DOUBLE THE RATES AND TARIFF CAN BE HAD ON REQUEST.

C. CONCESSIONAL TARIFF (For Publishers/Book Distributors- Exclusively for Books)

Per Square Cm (Display)	1 Insertion	4 Insertions	8 Insertions	12 Insertions
	30.00	28.00	26.00	24.00

MECHANICAL DATA OF JOURNAL

Size of Page 21 cms x 27 cms

PRINT AREA

Full Page 23 cms (Height) x 16.5 cms (Width)

Half Page 12 cms (Height) x 16.5 cms (Width)

Quarter Page 11 cms (Height) x 8 cms (Width)

The Art Work/CRC IN PDF as per above Print Area (in BLACK & WHITE ONLY) or the OPEN FILE IN MS WORD may be sent accordingly. The text is required to be sent positively on E-Mail IDs as shown below. ***MATTER FOR ADVERTISEMENT MUST REACH SEVEN (07) DAYS IN ADVANCE FROM THE DATE PUBLICATION OF EACH ISSUE OF UNIVERSITY NEWS, WHICH IS EVERY MONDAY.***

ADVERTISEMENT AGENCIES (INS ACCREDITED) ARE ALLOWED 15% DISCOUNT.

Full advance payment could be sent by Demand Draft/At Par Cheque favouring "ASSOCIATION OF INDIAN UNIVERSITIES", payable at New Delhi. Also, the details for payment via NEFT/RTGS are available in AIU Website. Also, the required data could be provided on request.

For further information write to :-

**Publication & Sales Division
Association of Indian Universities
AIU House, 16, Comrade Indrajit Gupta Marg, New Delhi - 110 002
EPABX : 011-23230059 (Extn. 208/213), FAX : 011-23232131
E-mail IDs : advtun@aiu.ac.in /publicationsales@aiu.ac.in
Website : <http://www.aiu.ac.in>**

ASSOCIATION OF INDIAN UNIVERSITIES

AIU House, 16, Comrade Indrajit Gupta Marg

New Delhi 110 002

EPABX : 011-23230059, FAX : 011-23232131

E-mail IDs : publicationsales@aiu.ac.in / advtn@aiu.ac.in / subsun@aiu.ac.in

Website : <http://www.aiu.ac.in>

The payment to Association of Indian Universities may be made using any of the following modes :

- A. IN CASH :** The required amount could be remitted directly to our Saving Account in any branches of Canara Bank.
- B. DEMAND DRAFT ONLY :** Such instrument is required to be prepared be in the name of “ASSOCIATION OF INDIAN UNIVERSITIES” (payable at New Delhi), preferably from the Nationalised Banks ONLY.
- C. CHEQUES OF ANY KIND ARE NOT ACCEPTABLE.**
- D. Also, the Demand Drafts of Banks falling under the categories of “Grameen”, ‘Sahakari’, Co-operative and alike are NOT ACCEPTABLE. Hence, Colleges/ Institutions/ Universities may send the requisite amount by NEFT/RTGS through these banks for crediting the amount directly to our Account.**
- E. NEFT/RTGS/Net Banking/BHIM/G-pay/UPI, AIU Web Portal, etc.:** The requisite amount could be transferred for its direct remittance to our Saving Account by NEFT/RTGS/Net Banking/BHIM/G-Pay/UPI, etc. using the following data:

1	Bank Account No.	0158101000975 (Saving)
2	Beneficiary Name	Association of Indian Universities
3	Address	16, Comrade Indrajit Gupta Marg New Delhi – 110 002
4	Bank & Branch Name	CANARA BANK DDU MARG
5	Bank's Address	“URDU GHAR” 212, Deen Dayal Upadhyaya Marg New Delhi – 110 002
6	MICR Code	110015005
7	Branch Code	0158
8	IFSC Code	CNRB 0000158
9	PAN NO.	AAATA0407F
10	GST Regn. No.	07AAATA0407F1ZG
11	Contact No.& E-mail ID	(011) 23230059 Extn. 208/213 Mob : 9818621761 E-Mail IDs : advtn@aiu.ac.in (Advertisement), subsun@aiu.ac.in (Subscription) & publicationsales@aiu.ac.in

NOTE : In case of **Cash Deposit** and **Transfer via NEFT/RTGS**, the proof of payment as **Cash Deposit Slip** and the **UTR Number for NEFT/RTGS** may be communicated **IMMEDIATELY BY MAIL** for its linking and settlement at our end including the Complete Name & Address of the University/ Institute/Organization, etc please.



The Maharaja Sayajirao University of Baroda

Multidisciplinary Education & Research University (MERU)

Accredited 'A' Grade by National Assessment & Accreditation Council with CGPA 3.16 in the year 2016

Times Higher Education World University Ranking (Band)

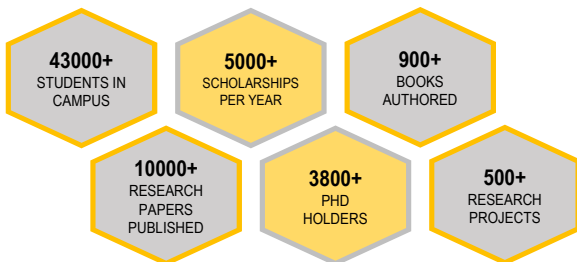
2016	801+
2017	1001+
2018	1001+
2019	1001+
2020	1001+



QS Ranking

Asian University Ranking (Band)	
2019	401-450
2020	401-450
Indian University Rank	
2019	69
2020	78

The Maharaja Sayajirao University of Baroda (MSUB) is recognized as one of the premier institutions of higher learning and research in the country. Educational institution which preceded the Maharaja Sayajirao University of Baroda forming a part of its foundational legacy, included the "Baroda College", one of the oldest centers of learning in Western India, founded in the year 1881 by His Highness Maharaja Sayajirao Gaekwad-III. His Highness Maharaja Pratapsinhrao Gaekwad pursued the idea of establishing a University which became a reality in the year 1949 and came into existence on 30th April, 1949.



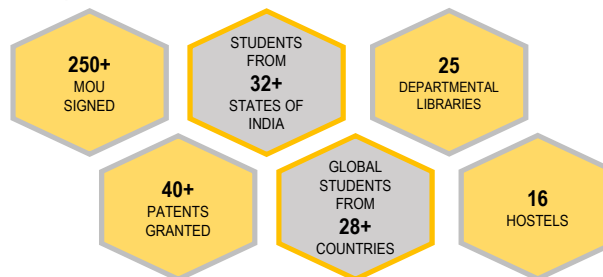
Notable alumni of the University includes Shri Vinobha Bhave (Bharat Ratna), Shri Aurbindo, Dr. Bhimrao Ambedkar, Shri Dadasaheb Phalke, Shri K m Munshi, Kakasaheb Kalelkar, Shri. Rajendra Shah (Gyanpith), Dr. Venkatraman Ramkrishnan (Nobel laureate), Dr. I. G. Patel, and many others.

Academic exchange programs are funded by some of the well known and prestigious funding agencies like German Academic Exchange Service, British Council, European Union, Max Planck, and Fulbright to name a few. The university has been accorded the prestigious membership of the United Nations Academic Impact (UNAI).

The University has signed more than 50 MoUs in the last three years with international Universities/Institutes which includes University of Cambridge, University of Laval, University of Stuttgart, University of Cornell, Ithaca, University of South Carolina, Keio University etc. for academic and research exchange programmes for students and teachers.

University has established specialised institutes like: Institute of Leadership and Governance (ILG), Dr. Vikram Sarabhai Institute of Cell and Molecular Biology, Atal Bihari Vajpayee Institute of Policy Research and International Studies, Oriental Institute, Institute of Fashion Technology, The Maharaja Ranjitsinh Gaekwad Institute of Design (MRID), Institute of Interdisciplinary studies. It has dedicated offices like Office of International Affairs, Office of Corporate Affairs, Office of Alumni Affairs and Donors Relations, Office of Career Advancement for Students. The University has developed exclusive cells like Internal Quality Assurance Cell, Research and Consultancy Cell, Directorate of Students' Welfare, Communication Cell, Career & Counselling Cell, Placement Cell, Human Resource Development Cell,, MSU Start-Up and Entrepreneurship Cell.

The University has set up distinctive centers like: Centre for Biotechnology, Prof. Bharat Chattoo Genome Research Centre, Centre for Molecular Genetics, Cluster Innovation Centre, Management Development Centre, Siemens Centre of Excellence for industry automation, Urban Studies Centre, Population Research Centre, Women's Studies Research Centre, Centre for Intellectual Property Rights, Centre for Incubation, Shri Sayaji Pratishthan, Centre for Life Long Learning & Extension, All India Civil Services Training Centre etc. The Centre for Life Long Learning and Extension offers short term & long terms Certificate Courses / Diplomas in the area of Ancient Indian Studies, Art and Craft, Language Proficiency, Hotels/ Cookery, Personal Grooming etc. The All India & Central Services Training Centre conducts classes for preparation of UPSC, State PSC & Staff Selection Commission pattern Examinations and provide guidance for Examinations like NDA, CDS, IB, Police, RBI & other banks.



The University offers a wide range of academic programmes from early childhood to Under-Graduate and Post-Graduate levels Degrees and Diplomas as well as Ph.D., with adoption of Choice Based Credit System (CBCS) for UG & PG students enabling them to select value added subjects of their interest.

www.msubaroda.ac.in, <http://msub.digitaluniversity.ac>
Helpline: 91-265-2795555 (10.30 A.M. To 5.30 P.M. on working days)