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Association of Indian Universities (AIU) organizes *Anveshan*-**Student Research Convention** every year to identify and nurture the young talents and budding researchers in the Indian Universities. In these Conventions, Innovative Research Projects are invited from the students (Undergraduate to Ph. D level), and assessed by a group of experts of the field on a well laid criteria. The best Research Projects are conferred with certificates and awards. The Projects are invited from the disciplines of Basic Sciences and Applied Sciences, Engineering and Technology, Agriculture and Allied Fields, Health Sciences and Allied Fields, Social Sciences; Humanities; Commerce; Business Management; and Law. The Conventions are to be held at two levels i.e. **Zonal and National**. The duration of each convention is of two days. These events are to be conducted in the current Financial Year i.e. before **March 31, 2024**.

AIU invites proposals from member universities/institutions for hosting these Conventions in Five Zones - East, West, North, South, Central and One National Level Convention. Interested Member universities/institutions may send their Expression of Interest (EoI) along with proposal duly endorsed by the Head of the Institutions to AIU at the address given below:

Dr Amarendra Pani
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AIU House, 16 Comd. Indrajit Gupta Marg
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The proposals are required to be submitted latest by May 30, 2023. The Event will be finalized on mutually convenient dates and terms and conditions laid down by AIU. For any further query please contact on: 011-23230059, Extn-202/209, **E-mail:** *researchaiu@ gmail.com*. The details can also be downloaded from AIU Website: *www.aiu.ac.in.*

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Proposal must be sent to AIU with the Approval /Endorsement of Vice Chancellor/ Head of the Institution.

In This Issue

Education 4.0: Revitalising the Future of Higher Education

Amit Jain* and Pallavi Mishra**

With its unprecedented ability industry 4.0 has swiftly infiltrated almost every domain of human activity encapsulating innovation and technology. Industry 4.0 is embedded with cyber-physical systems encompassing computational networks, physical processes, artificial intelligence (AI), robotics, cyber security, cloud computing, nanotechnology, energy storage, and much more. Due to the rapid pace of these discoveries, the fourth industrial revolution reshaped nearly all industries through technology, data science, blockchain, personalised data, open-source content, and global connection. One of the most pronounced effects of Industry 4.0 is discernible in education processes. A whole new domain of Education 4.0 with revolutionary attributes and ramifications has evolved the educational process and aligned it with computer-based learning methods. Education 4.0 is developed around smart-class products fuelled by Artificial Intelligence (AI), extensive information and research, distributed and portable computing systems, online networks, the Internet of Things (IoT), Virtual Reality (VR), Augmented Reality (AR), and Computer Entertainment (Friesen, 2019).

The core focus of Education 4.0 is to build strong learning capabilities with a customised learning approach that demonstrates a prodigious intellect with a thorough scope, responding perceptively to many human challenges and inventing innovative criteria for assessing and improving both ancient and modern problems. The idea aligns with the thoughts of Swami Vivekanand "Education is not the amount of information that is put into your brain and runs riot there, undigested, all your life. We must have life-building, man-making, character-making assimilation of ideas. If you have accumulated five ideas and made them your life and character, you have more education than any man who has got by heart a whole library." Education 4.0 is also focusing on the same rather than rote memorization the focus is on character, creativity, and collaboration. How you build character: by the right curriculum and right pedagogy (Syaza Kamarudin, Karim, Zaidi, Mohd Adnan, & Safwat, 2022).

Education 4.0 has its genesis in Industry 4.0, which encapsulates the integration of man and machine. The way industry is driven by autonomous systems, in the same way, education is going to change with the use of AI, Machine Learning, Cloud, and the blending of man and machine to deliver. Education 4.0 is aimed at aligning the educational process in the new millennium with the industrial

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revolution that focuses on smart technology, artificial intelligence, robotics, and cloud computing, and transforming the future of education through advanced technology and automation.

As Education 4.0 encapsulates a plethora of educational tools the future of education will develop on the framework of e-learning solutions that support remote and self-paced learning make learning available anywhere, at any time. The future of education will witness more personalized learning with a demand-led education system instead of supply-led education, it will focus on competency rather than knowledge to respond to the needs of Industry 4.0 where man and machine align to new possibilities (Hussin, 2022).

Education 4.0: An Overview

Dunwill (2016) defines education 4.0 as the integration of technology into the teaching and learning process. This is because technology is making human-machine contact appear more pervasive, as it is universal which adds to a rapid revolution in creativity. Education 4.0 is the desired approach attributed to several factors such as the immense opportunities offered by cyber-physical systems that enable learning to be integrated with advanced techniques, greater scope for personalization and improved measurability, and most significant of all learning concentrates on pertinent competencies rather than degrees so much (Sherwani, Muhammad Mujtaba Asad, , Prathamesh Churi, & Razali Bi, 2021).

The penetration of digitization and virtualization in education focuses on understanding the needs and expectations of the new generation of learners as they are both the primary beneficiaries and the primary stakeholders in the educational ecosystem. Students can use technology to connect with many other stakeholders in the system and communicate more effectively with instructors, parents, and management. Student learning outcomes are directly proportional to the extent of Education 4.0 adoption. The cornerstone of Education 4.0 is a blend of competence in pedagogy, competence in technology, and competence in the learning ecosystem focusing on designing and putting into practice student-centered learning with technological enhancement and fostering collaboration among communities in industry and education to meet the demands of Industry 4.0.

To keep up with industry 4.0 the ecosystem of Education 4.0 will be reshaped with:

- *Remote Learning*- Education 4.0 encapsulates a plethora of educational tools. The future of education will develop on the framework of making learning available anywhere, anytime with the set of e-learning tools that promote remote and self-paced learning. (Crescent, Mary Louise, Lee, & Doris , 2011) The future of education will witness more personalized learning with a demand-led education system instead of supply-led education. It will focus on competencies rather than knowledge. Remote learning focuses on lifelong learning instead of front-loaded learning. Demand-driven education must replace supply-driven education in our society.

- *Personalized Learning*- The technologies that underpin the developments and applications of the internet has powered the adaptive system wherein every student is valued individually, and each learns at their speed. A more personalised approach to education can help students achieve their goals faster. With artificial intelligence and cloud computing, numerous solutions are now available that can customise the entire teaching process to each learner's needs and rate of learning. Personalized learning entails assigning unique tasks to every learner and offering individualised support. (Ramnath & Kuriakose, 2019) It is designed on the notion that each learner has unique needs, and that a personalised approach will be more successful in meeting those needs. This applies notably to the activities students engage in and the speed at which they go through the curriculum.

- *Innovative Pedagogic Model*- Education 4.0 encompasses an innovative pedagogical model with virtual or remote online laboratories that offer relatively affordable, flexible access to experiential learning. The innovative model is designed to empower learners with skills and competencies to cope with a constantly changing landscape focusing on critical thinking, problem-solving, collaborative skills, innovation, digital literacy, and adaptability. It also facilitates extensive use of technology in teaching and learning, promoting innovation and unconventional ideas along with a myriad of diverse teaching methods and practices. Innovative Pedagogy is designed on various

components like ABL, Flipped classrooms, BYOD, PBL, gamification, and experiential learning (Figure-1).

Active Blended Learning

The conventional classrooms will transform with Active Blended Learning methods that promote inculcating knowledge through student-centred activities underlining independent learning and digital fluency. Blended learning is an established pattern and scheduling the student work while heavily utilising digital resources. By minimising routine chores, this strategy tries to make learning interesting and coherent for students as well as to maximise access to teacher expertise. A pedagogical approach of Active Blended Learning focuses on sense-making activities; with students in the appropriate learning environment to transform it from a merely instructive event into a component of an ABL approach comprising minor projects, field activities, and educational trips. It encourages the active participation of students and makes it feasible to monitor skill development with educational innovations. Active blended learning will be successful and gratifying as it focuses on better test scores, improved problem-solving abilities, improved critical thinking, higher attendance, and learner satisfaction. Additionally, when learners participate in active learning environments, they tend to outshine as compared to traditional classroom settings (Armellini, Virgínia Teixeira Antunes, & Robert Howe, 2021).

Flipped Classrooms

Education 4.0 revamp the pedagogical framework in higher education. In a flipped classroom setting, students may watch pre-recorded films at home before coming to school to do assignments with questions and at least some background knowledge. The flipped classroom method seeks to re-evaluate when students have access to the study material they most require. Flipped classroom module comprises the components of watching an online lecture, reviewing online course materials, reading physical or digital texts, participating in online/offline discussions and debates, performing research, designing presentations, conducting lab experiments, and learning stations with diverse tasks focusing from station to station with a plethora of activities that keep students fresh and engaged. Giving students access to teachers twice- once through the videos they watch at home and again in the classroom, increases the chance for personalisation and more accurate learning guidance. The flipped classroom style allows students to access content independently while still receiving instruction from the teacher with pre-recorded lectures that highlight important concepts. Additionally, it creates a ready-made library for students to review and gives them the option to pause, rewind, Google terms, replay, etc., (Ozdamli & Gulsum Asiksoy, 2016).

Project Based Learning

A teaching strategy known as project-based learning (PBL) encourages students to learn by

Fig-1-Framework of Education 4.0
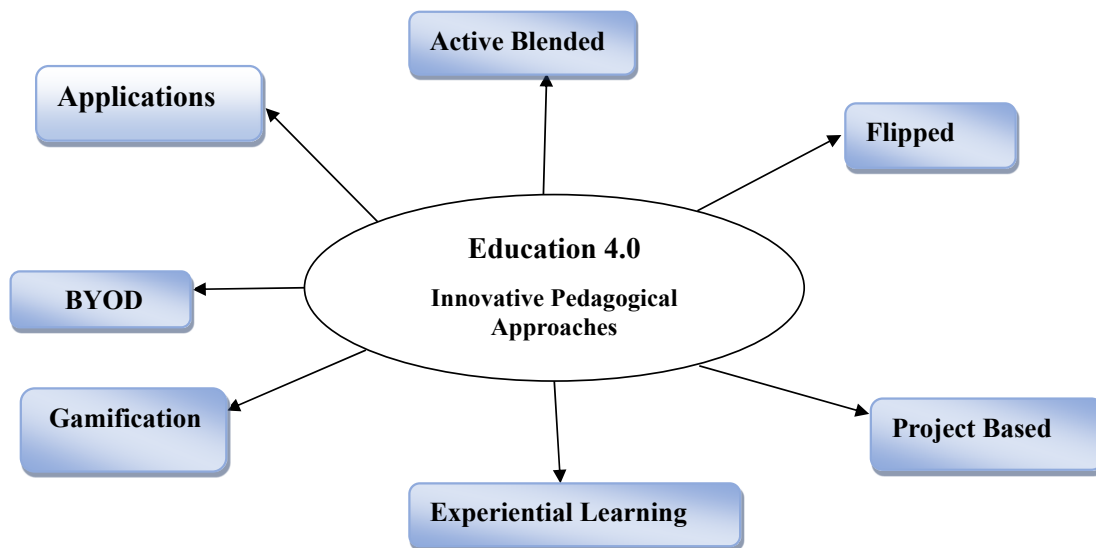
using their existing knowledge and skills in a fun environment. Project-based learning allows for more in-depth, contextualised learning as well as the development of critical college and career ready competencies. Because of the real-world obstacles, the project-based curriculum is meant to expose students to real-world problems using an interdisciplinary approach. As students execute the work, they frequently employ topic knowledge and abilities from several academic areas to accomplish the project. The project-based curriculum is designed for an extended period from a week to a semester wherein the students work on a real-world problem and gain a profound understanding, as well as develop skills in critical thinking, collaboration, creativity, and communication. Through project-based learning, both students and teachers are given the chance to showcase their creativity. In project-based learning, applying knowledge and skills is just as important as memorising or recognising them. Instead of assessing students on their recollection of a fact, PBL analyses how students apply a variety of academic information in diverse contexts. The purpose of project-based learning is to develop critical and analytical thinking in a student.

Application Learning

Over the years, the world has witnessed significant changes in the educational structure because of technological advancements that made it easier for students to easily access more information and, as a result, more knowledge. Higher education is gradually breaking the mold of conventional education with the proliferation of mobile devices and mobile applications. Focussing on digital mode universities are now adopting innovative teaching methods with electronic devices including laptops, desktops, tablets, smartphones, and a plethora of mobile applications that are providing a great advantage in the field of remote learning. Online learning apps have revolutionized the education sector by providing learning content at a click. You can download it and even access it without the internet in some mobile education apps for students. Recent research suggests that mobile applications are suitable tools for learning and teaching in the age of mobile learning. The contemporary education system is witnessing phenomenal global changes in encapsulating mobile applications in the teaching-learning process. Several higher education institutions (HEIs) make use of mobile applications that have

swiftly increased and favourably benefited learners through its mobile app in education. Whatever your background is, whether engineering, science, arts, or commerce, you may locate a wide range of learning content and access it from your smartphone at any time. Janet Mannheimer Zydney and Zachary Warner (2016) in the review article entitled "Mobile apps for science learning: Review of research" found that mobile apps for science learning have a myriad of learning features comprising technology-based scaffolding, location-aware functionality, visual/audio representations, digital knowledge-construction tools, digital knowledge-sharing mechanisms, and distinct roles (Zydney & Zachary, March 2016). Apart from science and engineering, there are applications for language learning applications as Duolingo, Cambly, and LingoDeer are popular free language learning tool that allows you to learn a range of languages. It teaches through the use of visuals, catchy phrases, chatbots, and other methods. (Lieungnapar, Feb 2019) Adriana Reveiu (2019) in a study entitled, "A Novel Mobile-based Assessment App for Higher Education Setting" explored mobile-based assessment applications to comprehend the usage of apps in shaping up assessment tasks (REVEIU, 2019). For instance, the application Kahoot is an application for creating quizzes, debates, and surveys. It is a real-time game-based classroom response system in which the entire class participates as multiple-choice questions are displayed on the screen. Students may respond to the questions using their smartphones, tablets, or PCs. However, mobile-based assessment applications have dual pedagogical perspectives: to set up a framework for formative assessment as well as to get real-time insights into students' knowledge levels.

Another learning application like Nearpod is a user-friendly application for developing interactive lesson plans, presentations, evaluations, and digital material. Teachers can include multiple-choice quizzes and polls as well as upload videos, photos, audio clips, and PDF files. It is learning that occurs in the context of the learning materials. Therefore, it is a kind of situated learning that delivers authentic learning examples that are relevant to the learner's learning context. Jean Lave and Etienne Wenger (1991) described Situated Learning as a process of learning when individuals have the chance to participate in a community of practice and learn through social construction of knowledge. (Lave & Etienne Wenger, 1991) Learners can receive context-

aware learning resources to enhance their learning experience using a mobile situated learning system. Nearpod is a presentation tool that allows you to deliver interactive presentations. It can be utilised in either homework or live mode, giving the teacher a lot of flexibility and control over the speed of the session. Teachers can run the presentation and track progress via the website, or the app. Students use the Nearpod app on their devices to access content and submit comments by entering a code and their names. Another application called Remind is a free, secure, and easy app for educators to text students, parents, and other educators. This is the app that enables teachers to send students frequent information such as daily assignments and reminders of upcoming tests.

Experiential Learning

David A. Kolb, an American psychologist, proposed an experiential method of experience learning (1939) which refers to learning through listening, reading, observing, photographs, experiments, and time spent outside. Learning by experience or doing is referred to as experiential learning. (Nguyen, 2022) Experiential education includes immersing students in an experience before fostering reflection on that experience to develop new abilities, attitudes, or ways of thinking.

To build an efficient workforce through field activities, such as internships, mentorship projects, and team projects, experiential learning offers more hands-on learning. Experiential learning is instrumental in providing opportunities for students to explore, produce projects, engage with their environment, real situations, simulations, and guided exploration. Active experience, inquiry, and reflection are the three main components of experiential learning. Its four basic parts are active experimentation, conceptualization, reflective observation, and tangible experience that may build a profound understanding. The responsibilities of scaffolding and guidance are crucial, and it includes experience-based learning, service learning, outdoor learning, and education for sustainable development. With the use of technology and appropriate pedagogy teachers can simulate the industry environment even in the classroom and provide a hands-on approach to learning.

Gamification

Education 4.0 focus on brainstorming strategies with gamification that encourages student participation in a plethora of activities that methodically makes use of the numerous components and traits of gaming culture. Education 4.0 underlines the pedagogy of gamification for a holistic development of a student that produces a game-like scenario based on the course curriculum and objectives. The goal of these game systems is to encourage student involvement and participation in course activities. The gaming systems are designed to increase student engagement and spur participation in class activities. Employing games to motivate the students will improve course evaluation outcomes and produce more focused, effective students by fostering self-control and the ability to handle complexity and the unfamiliar. This pedagogical strategy specifically focuses on game aspects like quick feedback, badges and goals, participation, and progressive difficulty, as well as on the social elements of rivalry, cooperation, and identity.

BYOD

Education 4.0 is aimed at aligning the educational process with devices where students will have more devices to learn from and will use them according to their skill enhancement requirements. Bring Your Own Device (BYOD) highlight the tools and services of ICT in the classroom for meeting educational targets and improving the learning experience and results of students. Therefore, one of the most prevalent trends in contemporary mobile learning is the incorporation of the Bring Your Own Device (BYOD) which refers to the usage of a mobile device as an additional data source while carrying out various tasks in the classroom. It allows students to bring their mobile devices to class and use them in class for educational purposes. This fosters positive student-teacher interactions and motivates learners to actively participate in the learning process by using their own devices and gadgets for their mental development.

Embodied Learning in Education 4.0

Along with the virtual and digital revolution, Education 4.0 would be a seamless blend of technological literacy and human literacy. Technological literacy possesses the ability to assess, manage and use technology while human literacy encompasses knowledge of the humanities, communication, and design to be innovative, find solutions, communicate, and work together. Therefore, human literacy provides students with the opportunity to experience and apply

what they have learned in class through interpersonal experience, real-world employment, and social interactions. Human literacy is developed through embodied learning that connects to the physical, creative, emotional, and social realms in addition to simply cognitive and content-based learning. Embodied pedagogies stimulate the development of curiosity, sensitivity, risk-taking, and thinking in metaphors and from different perspectives while fostering knowledge acquisition through creativity and expression (Skulmowski & Günter Daniel Rey, 2018). The classroom activities are drawn on real-world experiences, employ constructive criticism to separate students from conventional wisdom, and encourage them to broaden their perspectives in applying their knowledge and skills to solve real-life problems.

Technology is playing a crucial role in the emergence of Education 4.0. Several research studies have reiterated the importance of three key components including diverse pedagogies, fluid and organic curriculum, and technological advancements.

Therefore, Education 4.0 is an educational ecosystem of academic institutions and the workplace, which generates innovations and changes in both pedagogical and technological terms. It implies that when it comes to education, we need to revitalise the educational ecosystem rather than just adapt to changes. Traditional methods of administering education are insufficient in Education 4.0, and we must reimagine learning and education to meet the demands of a changing society. The classroom of the 21st century emphasises a creative, critical, and collaborative approach to learning that shifts away from information acquisition and rote memorization towards the skills and abilities that will serve in the best way to young minds. William Butler Yeat said Education is not filling a bucket but igniting a fire. We need to can ignite the fire by promoting creativity. Student engagement and hands-on interdisciplinary learning are championed over conferring information. Creativity is crucial for Education 4.0 because 70 percent of current jobs will become redundant due to the use of AI, and ML. Perhaps very soon we will have chatbots teaching a class or a metaverse Avatar taking a class at multiple locations. We need to think about how we are going to cope with these changes.

Table-1: Components of Education 4.0

Diverse Pedagogies	Fluid & Organic Curriculum	Technological Advancements
Pedagogy The well-designed pedagogy wherein the prescribed curriculum and planned sequences are pre-defined.	A curriculum that encourages interdisciplinary learning and personalised learning.	*Augmented Reality* Augmented reality in education gives a glimpse of a real-world environment and the application of augmented reality helps in developing the interest of students to engage in physical activities.
Heutagogy The aim is to provide a setting where learners can choose their objectives, learning paths, workflows, and outcomes. Instead of the teacher or the curriculum, the learner is intentionally placed at the centre of the learning process.	The curricular entitlement and choice offer depth of study, personal relevance, and flexible learning approaches.	*Virtual Reality (VR)* Technology helps the student to develop an understanding through visual elements.
Cybergogy The main goal of cybergogy is to support learner-centred autonomous and collaborative learning in a virtual environment.	It is application-based learning founded on the concepts of self-directed learning and engaging students in a virtual environment.	*Cloud Computing* With the aid of cutting-edge technology, students may upload the assignment as well as the notes can be stored.

The substantial change in learning would be that students have a choice in determining how they want to learn. Students should have the choice to alter/update/modify the learning outcomes of a course as presented by the institutions, students should be free to choose the learning tools or techniques they prefer. The teaching would be more hands-on learning through field experience such as internships, mentoring initiatives, and collaborative projects. Technology improvement allows for the successful learning of specific areas, making more room for acquiring skills that include human knowledge and face-to-face engagement. The performance will be determined with both EQ and IQ abilities. Education 4.0 will help to build on Modular Degrees instead of a one-shot straight-jacketed approach.

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Importance of Indian Higher Education Institutions and Developing its International Strategy

Hemanta Panda*

The global landscape of higher education has been changing dramatically over the last 25 years. The major force influencing this is the growing internationalization of higher education, which itself has been driven by rising global student mobility, the expansion of campuses by institutions outside of the home nation (branch campus), and the increased presence of validated and franchised degree provision and joint qualification.

UNESCOs position paper interprets internationalization "as one of the ways in which higher education is responding to the opportunities and challenges of globalization. Internationalization includes a broad range of elements such as curriculum, teaching/learning, research, institutional agreements, students/faculty mobility, development cooperation and many more "(UNESCO 2003). Globalization has opened markets for employment globally and students are eager to grasp such opportunities. In this competitive landscape, there is increasing recognition that the economic and social well-being of a nation and its citizens rests on their ability to participate and engage in a global knowledge economy. Globalization and internationalization of higher education are thus inextricably linked.

The Indian Perspective

From an Indian perspective, the focus should be on how global resources can be utilized to increase access, enhance quality, encourage diversity and less on the commercial opportunities associated with the fast-growing global market in higher education.

To build capacity and raise quality standards, India needs educational institutions that are globally networked. Just as India has benefitted from liberalizing its economy and opening it to the world, the higher education sector too would benefit from strong international partnerships. Only when Indian academics and researchers are collaborating and working with the best in the world, will Indian higher education institutions become more internationally productive and relevant?

Such partnerships would not only help build capacity in meeting student demand but also help develop greater awareness of global issues among students and better prepare them to participate and engage more effectively in an increasingly competitive global economy. International students in Indian higher education institutions will enhance the diversity of Indian campuses and over the years international students would help enhance India's visibility and presence on the world social cultural and education space, notwithstanding the tremendous opportunity for soft diplomacy that goes with overseas students returning home from India.

Internationalization - Soft Power

Whilst the economic contribution of international students to a nation's economy is significant and can often be monetized, what is equally if not more important but not easily quantifiable is the intangible benefits through soft diplomacy, relationship building, human capital resources, etc. that international students help build between nations (Albatch ,1998, De Witt 2008, Adams et al 2011). Highlighting the significance of internationalizing education, a former Australian Higher Education Minister and International Diplomat commented: "There is no powerful instrument for transforming relationships between nations than for the citizens of each to have been educated for a period of time in the country of the other" (Adams et al, 2012).

International students should be seen as an important part of a higher education institution's resource base. As Albtach (1989) highlighted almost a quarter century back they are "one of the most important elements of the international knowledge system. They are the carriers of knowledge across borders. They are the embodiment of the cosmopolitan culture (and they) are one of the most visible and important parts of the worldwide exchange of knowledge." (Albatch 1989).

Such inward mobility would provide opportunities for Indian students who cannot be

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internationally mobile to develop global awareness and intercultural fluency thus promoting – 'Internationalization At Home.'

Opportunities and Challenges of Internationalization

There are both opportunities and challenges in Internationalizing higher education. The opportunities include enhanced capacity, greater access for students, development of joint curriculum, greater diversity of programmes, exposure to a variety of teaching and learning methods, growing comparability of qualifications, exposure to established systems of education administration and management, less brain drain of gifted and bright students to foreign institutions, the fusion of cultures, exchange of research ideas and enhancement of research capacity, the establishment of multinational and cross-disciplinary team and generation of new academic environments.

The challenges and risks concern the quality of provision, high fees leading to an elitist provision, and inequality of access leading to a two-tier system which is inconsistent with the equity and access philosophy of both, institutions, and the national government. Important factors in any collaborative arrangement are issues relating to the award of the degrees and the determination and approval of the quality assurance systems and procedures used to approve and accredit the qualifications. Equally important are also issues of international mobility and credit transfer of the qualifications awarded.

Therein lies the opportunity for Indian higher education institutions and policymakers in addressing issues related to curriculum delivery, quality of teaching, relevance of course content, learning and teaching strategies used and offering programmes that are both globally and locally relevant.

Internationalization Strategy: Some Guidelines

Given this background context, it is important that individual institutions craft their own internationalization strategy to enhance the attractiveness of their institution and programmes on offer. Listed below are a set of guidelines for the successful design and implementation of a university's internationalization strategy.

Formalize the Strategic Process.

The first key to success for an international strategy is having one! It is important to have a systematic approach to strategic management, factoring in within it some flexibility for changing circumstances. It is extremely important that a university is clear about the position it wishes to secure in the world and hence this should guide its efforts in seeking partners, programmes, etc. In doing this it should analyse its own strengths and weaknesses in teaching, research, examine existing relationships and resources at its disposal and work on how to leverage its strengths. It is often useful to have a look at national and global ranking standards to help inform the strategic management process. A three to five-year strategic plan should be the starting point.

Maintain a Focus on the Agreed Outcome of Internationalization

Define the scope of the strategy very clearly. Very often it is easy to get carried away in different directions. One must remain focused on agreed outcomes however exciting alternative directions may seem. This would also include developing a clear path for how the internationalization strategy is going to be implemented.

Maintain a Close Link Between the Institution's Resource Capability and Its External Environment

It is always useful to make a list of the institution's key projects and programmes that can be highlighted when seeking collaboration and partnerships. Comparing strategic initiatives is often an effective way of exploring avenues for cooperation.

Engage All Stakeholder Groups

Consulting and soliciting input from across the university community is essential. Establishing a framework to ask for input from faculty, students, alumni, support staff, corporate partners, the business community, and existing international partners (if any) will be useful in developing a rounded perspective that can be fine-tuned in terms of scope and action plans. Keeping the channels of communication open helps.

Define and Refine Strategic Partnerships

It is important to regularly visit the list of partnerships and assess their engagement and effectiveness. Sometimes it is better to just work on a couple of partnerships which can be sustained over

a long period of time. Equally important in any joint venture is to have in place a transparent system that clearly determines intellectual property ownership and legal jurisdiction.

Establish a Dedicated Professional International Team with Adequate Support from Leadership

Without support from university leadership and adequate funding, the best strategies will remain just that. It is therefore important to have senior leadership with oversight across the institution to champion the efforts.

Communicate, Communicate, Communicate

The importance of engaging in every opportunity available to communicate the new strategy cannot be underestimated. A non-confidential version highlighting the key points should be available for communication with all stakeholders. This is also a very useful document when seeking out new international partners.

Ensure that the Strategy is a Living Document and does not find itself on the Top Bookshelf

Adopt a review system which can monitor, evaluate progress, and revise the strategy. Be patient and resist the temptation to make too many changes in the early stages. Implementation often takes a while, but it is equally important not to be complacent and keep the review process live.

The test of a good strategy would be to build

safeguards and checks that would facilitate an understanding of and align with international quality assurance systems to develop standards that are fit for purpose, context-driven and globally acceptable.

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Mainstreaming the Vocational Education: Issues and Challenges

R T Bedre* and B R Deshmukh**

The National Education Policy 2020 (commonly known as NEP–2020, and hereafter referred to as the Policy) is ambitious of reaping the benefit of the demographic dividend as India is having the largest population of youths in the world. The Policy makers have over the years realized that this dividend can be reaped only if the youths of the country are transformed into a skilled workforce. It makes a good number of provisions for making the learners skilled professionals.

Facts of Vocational Education in India Today

The 12th Five Year Plan (2012-17) as the Policy observes, reported that only 5% of the workforce of the nation is in the age group of 19-24, (almost identical to the higher education age group of 18-23) is exposed to the formal vocational/ technical education. In Germany, it is 75% and, in the USA, it is 52%. The Policy document mentions that it is a small number in comparison to other Asian countries like South Korea where this percentage is 96 of its population in the same age group. This indicates the difference in the progress the latter have made in technology.

The AISHE report (2019-20) affirms the same thing. As per the report, out of 1043 universities and university-like institutes, only 177 are technical universities in the country. Among 11779 stand-alone institutions in the country, only 3805 are offering technical education. The AICTE figures for 2022-23 differ slightly. According to it, 3957 institutes are operational with 10,03,133 intakes and 3,577 colleges/universities have an intake of 13,43,884 at the UG level and 4,786 institutes offer PG programs to 6,57,182 students.

In the total enrolment of higher education, only 12.6% (37.27 lakhs, of which 36, 44,045 are in degree programs and the rest in diploma courses) are in engineering and technology courses. However, at

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the Ph.D. level, engineering, and technology top all with 52,478 students. The official website of the Ministry of Skill Development and Entrepreneurship, Government of India (2022) reports the existence of 14,956 Industrial Training Institutes (ITIs 3248 govt. and 11708 private) in the country with a total intake of 36,13,803 (13,05,314 and 23,08,489) respectively. Out of these only 41.62% of seats are utilized. As a result, only 5% of the workforce, as stated above, received formal technical education in the country.

Reasons for the Low Presence of Technical/ Vocational Education

The Policy investigates the reasons for poor exposure to technical education. It observes that in the past vocational education was focused on grade 8 and above in the most indifferent way. In some schools, some portions of the course requirement, not of the curricula for passing, were introduced, however, it did not work. Some colleges had started the Minimum Competence Vocational Courses (MCVC) at par with +2 courses (inter/ junior college level). But with these courses, the learners did not have any pathway to pursue their further education in vocational courses at the UG level. They had to enter the traditional courses available there for higher education. That too hampered the growth and exposure of the learners to vocational education.

The ITI/GTI certificate/ diploma holders of one or two-year duration, if they want to enter traditional courses like Arts, Commerce & Science, had to enroll themselves into the first year of the junior college, though they had studied some general courses in language and social sciences during those years. The present writer too had to enroll himself in 11th standard (FYJC of Commerce discipline) after completing a one-year certificate course in English Stenography.

In short, the pass outs of the ITI/GTI/MCVC (except those of polytechnics) did not have any provision to pursue their higher education in engineering and technology.

Apart from these, the Policy traces a stereotyped societal approach to the low spread of vocational and technical education in India. It observes that vocational or technical education was considered inferior to other courses like science and commerce and was thought fit for those who were not competent enough to enroll themselves in other courses. The vocational courses offered in ITI/GTI and to some extent in Polytechnics offered jobs in the field and those were considered of less importance as compared to white-collar official jobs in the clerical grade.

The NEP–2020 Plans for Reimagining the Vocational Education

To reap the demographic dividend, the Policy seems to have decided to change the societal approach towards technical/ vocational education at the early stage of learning. It has set the target to offer mandatory exposure to technical /vocational education to at least 50% of learners at school and university/college levels in a phased manner. The policy directs achieving this goal in different ways, some of which are presented here.

Integrating Vocational Courses in the School Education

It speaks of integrating vocational courses in school education in a phased manner. It proposes to introduce vocational courses at the middle and secondary levels. It says, "(e) every child learns at least one vocation and is exposed to several more," (NEP 2020, P. 44). The early learners will develop an interest in vocational education and will have an inclination toward vocational education when they enter higher education. The schools will collaborate with ITIs, Polytechnics, and local industry, and skill labs will be set up in the select schools.

Mainstreaming the Vocational Education in Higher Education

The Policy plans to offer vocational education in colleges and universities either on their own if they have the required infrastructure and human resources or in partnership with the NGOs and local industry. The students will be able to study/learn some vocational skills carrying some credits as skill courses as proposed in the Curriculum and Credit Framework for Undergraduate Programs, (CCFUP, 2022). It speaks of allowing /incorporating up to 9

credits in ¾ year UG programs. The existing B. Voc. The programme will continue to operate.

Exploring the Vocational Courses in ODL Mode

At present, the vocational courses, which require labs/workshops or specific infrastructure for practical works, are not offered in the ODL (Open and Distance Learning) mode. The Policy plans of exploring the possibility of offering these vocational courses in the ODL mode making optimal use of the available infrastructure.

Constitution of National Committee for Integration of Vocational Education

The Ministry of Education will constitute the National Committee for Integration of Vocational Education (NVIVE) with representatives of the concerned ministries and industries. It will identify the focus areas of vocational education considering the skill gaps and local industries. The Policy speaks of identifying and recognizing the lead HEIs for evolving models of higher education and apprenticeship. It will also set up incubation centres in the HEIs. *Lokvidyas* will be made part of vocational education.

Making the Indian Vocational Education at Par with International Standards

Taking cognizance of the global job market, the Policy plans to make the Indian students laced with vocational education relevant in foreign countries as well. As part of internationalizing higher education, it plans of aligning the Indian standards of vocational education with the International Standards of Occupations maintained by the International Labor Organization. The National Skill Qualification Framework will detail the discipline-wise vocations and professions and provide the basis for recognizing prior learning and will reintegrate the practical experiences of the dropouts from formal education into the vocational mode.

Challenges

The ambitious plan of the NEP-2020, of offering exposure to technical education to at least 50% of the GER at school and higher education, looks very nice on paper, but like other plans, it seems to be the Herculean task if one looks at the numbers of the learners in the secondary, higher secondary and higher education level against the present status with

the infrastructure and human resources available in the country.

As per the report on Unified District Information System for Education Plus (UDISE+) 2021-22, there are 38.5 million (3,85, 28,631) learners at the secondary level and 28.6 million (2,86,79,050) at the higher secondary level enrolled in 150452 and 142398 secondary and higher secondary schools respectively.

The AICTE portal for 2022-23 reports that there are 8902 institutes offering diploma, undergraduate, and postgraduate programs with an intake of 30,04,199 seats. To specify it further, there are 3,957 institutes offering diplomas with an intake of 10,03,133 seats, 3,577 institutes offering undergraduate programs with an intake of 13,43,884 seats, and 4,786 institutes offering PG programs with an intake of 657182 seats. The same portal reports the closure of 43 institutes having 1044 programs therein. However, enrolment against the intake is not available.

The official website of the Ministry of Skill Development and Entrepreneurship, Govt. of India reports the existence of 14,956 Industrial Training Institutes (ITIs) in the country out of which 3,248 are government and 11,708 private with 13,05,314 and 23,08,489 intakes respectively. It is again to be noted here that out of the total intake of 3613803 seats, only 15,04,352 seats (41.62%) are utilized and 21, 09,451 seats remained vacant in 2019.

These figures of AICTE and MSDE show that 18,913 institutes (3,957 polytechnics and 14,956 ITIs) have an intake capacity of 46, 16,936 seats available for school-level students as they offer certificate and diploma courses. At the higher education level, a total of 8,363 institutes (3,577 offering UG programs and 4,786 PG programs) have a total intake of 1660315 seats. In a nutshell, the entire intake available for diploma and UG, and PG programs in the country is 62, 77,251 seats for technical education.

At the higher education level, the enrolment in technical programs shown in the AISHE (2019-20) is 37.27 lakhs which is 12.6% of the total enrolment. (The figure for enrolment in technical education and its percentage do not match, maybe in some States the polytechnic institutes are affiliated with universities) at diploma, undergraduate and postgraduate programs together. The MSDE website for 2022-23 shows that only 1504352 seats are utilized in 14956 ITIs which is 41.62% of its entire intake at the diploma level. In short, as per AISHE (2019-20) and MSDE (2022-23) records at present 52, 31,352 are exposed to technical education.

As well known as per the report on AISHE 2019-20, there are 38.5 million students enrolled in 1043 Universities, 4,2343 Colleges, and 1,1779 Stand Alone Institutions. The total sum of the students enrolled in the secondary, higher secondary (as per UDISE 2021-22), and higher education (AISHE 2019-20) arrives at 10,57,07,681 (105.7 million). Even if one subtracts 37.27 lahks (?) students already enrolled in technical/vocational programs and the intake of 36 lakh intake of learners is included, almost 100 million learners are to be given exposure to vocational education as the target of the Policy to be achieved by 2025.

The project of offering vocational exposure to 50% of learners of the secondary and higher secondary level by 2025 seems to be a quite far off possibility as there are only 3957 institutes with the intake of 46, 16,936 seats offering diploma/certificate programs against the enrolment of 6,72,07, 681 (67.2 million) students at the secondary and higher secondary. 50%

Table No. 1. Institutions with Intake Capacity

Institute Types	ITIs	Polytechnics	Institutes offering UG Programs	Institutes offering PG Programs
No. of Institutes	14956	3957	3577	4786
Intake capacity	36,13,803	10,03,133	13,43,884	6,57,182
Intake utilized	1,50,4352	NA	NA	NA
Intake available	21, 09,451	NA	NA	NA

(Sources: The official website of Ministry of Skill Development and Entrepreneurship, Govt. of India and All India Council of Technical Education, 2022)

Table No. 2 Enrolment at Secondary, Higher Secondary and Higher Education Level

Level	Secondary in million	Higher secondary in million	Higher education in million	Sum total in million
Enrolment	38.51 million	28.6 million	38.5 million	105.56 million
50% of enrolment	19.26 million	14.33 million	19.25 million	52.78 million

(Sources: Report of AISHE (2019-20) & UDISE+ Report 2021-22, Dept. of School Education and Literacy 2021-22. Govt. of India

of this arrives at 33.5 million learners. The available intake at the diploma/certificate level (4616936) leaves 28.9 million learners outside the coverage of vocational education.

The challenge of offering exposure to technical education to 50% of learners enrolled in higher education poses the same sort of problem. As per the AISHE report 2019-20, only 12.6% (37.27Lakhs; the figure does not match with the percentage of the enrolment may be in some states the polytechnics are affiliated with universities) are enrolled in the technical programs. It means that as per the target of the NEP-2020, almost 15 million learners of higher education are to be given exposure to technical education even considering those already enrolled in technical education. The gravity of the challenge becomes clearer when one sees that 32.6% of the total 42,343 colleges run only a single program and, 32.68% (96.56 lakh) enrolled in the UG level are in Arts programs that are purely non-technical. Given the availability of the technical institutes offering diploma, undergraduate and postgraduate programs, exposure to technical/ vocational education at school and higher education level seems a distant possibility even after utilizing the entire intake of seats. The possibility of exploring some courses in the ODL mode may help to some extent.

Again, one has to remember that most of these polytechnic institutes exist in urban and semi-urban areas. In this situation, it appears that most expectations will rest on the local industry. Here are the numbers of Government Technical institutes (GTIs) that are not taken into consideration.

In such a situation, the Policymakers must rely either on the local industry which is not formalized in rural areas or has to increase the technical education institutes. The second option also does not seem to be viable when one looks at the expenditure made in the education sector.

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Indian Classical and Spiritual Music for Healing and Healthy Well-being: The Standpoints of the *Naad Yoga* and Modern Science

Arun Dubey*

Indian classical and spiritual music has a rich tradition and long history of use in healing and healthy well-being, and it is an integral component of *Naad yoga*. These effective practices which continue to be of great interest and use today are also based on ancient knowledge and experiences accumulated over thousands of years. A holistic understanding of health considers the physical body as a part of the body system, including other subtle energy layers – *koshas* - and corresponding energy structures. This article introduces the Indian musical system in general and *Raag* as its element, and *Naad Yoga* **-** as an ancient system of knowledge, which can give a new fresh insight into Musical Therapy. It is especially important to comprehend these achievements of Indian civilization from modern scientific perspectives.

It is also essential to understand how spiritual sounds or *Mantras* work and what scientific facts lie at their basis – frequencies and their effects on the human body and mind. What are the benefits and the uniqueness of Indian classical and spiritual music and therefore, how it can be used in healing and curing diseases, and maintaining health and, well-being?

This article is an extract of the teaching content delivered by the Author in the classes of *Naad Yoga* and Indian Classical Vocal Music as part of the assignment during the Indian Council of Cultural Relations (ICCR) sponsored fellowship tenure in Russia. The Author's PhD research work is also on the topic: "Musical, *Naad, Mantra*, *Stuti* and their effects on Human Body, Mind and Soul".

The goal of this article is to recapitulate and reiterate the immensely rich ancient Indian traditions regarding musical therapy. This knowledge was latent for a long time and was transmitted only through musical family generations or from the teacher to the disciple. On the other side, it was counted as non-scientific by the scientific society probably because of

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a lack of understanding and the want of documentation of research.

It is said that everything that is new, is already forgotten knowledge of the past. Nowadays scientists search for inspiration in ancient holistic knowledge, and therefore more and more researchers are rediscovering and reinventing the things already existent in our ancient Indian scriptures thousands of years ago through modern methods and taking credit to themselves as original discoverers and inventors.

Para 4.27 of National Education Policy (NEP) 2020 refers to the traditional knowledge of India that is both sustainable and strives for the welfare of all. To become the Knowledge power in this century, it is imperative that we understand our heritage and teach the world the 'Indian way' of doing things. The author hopes that this article will inspire talented scholars to make further research studies to find new methods of healing and a healthy lifestyle by integrating Indian traditional knowledge into modern healing techniques.

Definition of Health

According to the World Health Organization, health is "a state of complete physical, mental, and social well-being"[1]. In the Indian tradition of Yoga, "health comprises of physical, mental, social, vocational, moral, emotional and spiritual dimensions"[2]. The very word "*Yoga*" came from the Sanskrit word "*yoke*", which means union – the union of body, mind, and soul for health and wellbeing.

Ancient Doctrine of *Naad Yoga*

Concept of Panchkosh or Five Bodies

According to ancient knowledge, the human body is not only what we can see with our eyes. There are five "bodies", and the physical body is only one among them. Other "bodies" are so-called "subtle bodies", which cover the soul. The Russian Matryoshka Souvenir Toy also depicts five bodies. Figure-1 has been designed by the author using the depiction of five bodies as in Matryoshka Souvenir Toy of Russian to indicate the five bodies mentioned in Indian tradition.

Fig.1 The Five Koshas

Five "bodies" are[3]:

- Physical *(Annamaya kosh)* – we can feel it with our five senses;

- Energetic *(Pranamaya kosh)* – Aura and energy movement (Prana);

- Mind *(Manomaya kosh)* – thoughts, emotions, feelings, fears, etc;

- Higher Mind/Wisdom – inner consciousness, inner voice, belief systems, intellect, values;

- Bliss *(Anandamaya kosh)* - the thinnest "body", which is composed of happiness – happiness without any cause. It is associated with the state of dreamless sleep and self-realization.

According to this holistic view, any illness or disorder comes from the subtler bodies down to the solid physical body. We heard from childhood that by word we can kill or heal and that all diseases originate from stress. This knowledge is proven in modern psychosomatic research.

Our different "bodies" or layers are affected by different means, – the subtler layers are affected by subtle means, but when our physical body, which consists of five elements, gets unwell we treat with the same solid means as per the modern allopathic system (medical treatment, chemical therapy, etc.).

Naad Yoga: The Concept

The Sanskrit word *Naad* denotes the ultra-soothing feeling of resonance created by all kinds of sounds or vibrations ---- subtle/tacit and obvious/explicit happening in the universe including one's own body. It is the energy of vibrations, which is also called *cosmic sound*'. *Naad* is a continuous flow of energy, which never stops, like time (it is everywhere - in the human body, in nature, in the universe).

Present research concentrates on a particular field of Yoga –*Naad yoga.* *Naad yoga* is the union of body, mind, and soul, through, and by the need. Everywhere there are energy sources of so many types and we need to charge the bodies as and when it is discharging just as we charge our mobiles. For charging mobiles, we need 3 things--- mobile/equipment; wire/channel of energy flow with the right charger; suitable for the mobile; and power supply/source of energy. Similarly, to keep our life energy charged we need to know the system, and how it works, and master the art to connect with the energy flows.

Everything that never ends, has some supportive vibration, and every flowing movement requires some 'vehicle'. For *Naad* that 'vehicle' is sound. Sound is everywhere, it accompanies every process, and it is the first element of nature. Behind every structure, there is some energy vibration, and every structure comes like three in one: word – image – vibration/energy. According to Vedas,[4] this structure is described as:

1. *Akar Brahman*[5] – structural form
2. *Rup Brahman* – visible form
3. *Naad* – sound/vibration.

How can we feel this? We say any word - for example, "Mamma". Immediately after hearing this word, some image comes to our mind, and some energy vibrations also are felt. If that connection with the energy flow has happened and it is continuing in the body for some time – that is *Naad.* The energy vibration with the frequency of sound which we can hear (speech, singing, etc.), is called *Aahat Naad –* this sound is created by some stroke. Those vibrations, which our listening ability cannot catch, are called *Anahat Naad*. Though we can't hear that, *Anahat Naad* influences our subtle "bodies" – our energy layers, and minds. This *Naad* "journey" starts in *Akar Brahman* – the world of forms and structures, and goes to *Nirakar Brahman,* which has no form.

Five Elements Concept or *Panchbhoot*

The human body is a part of nature and consists of five elements --- earth, water, fire, air, and ether. The first four elements ie. food (earth element) we eat, and it constructs the body; liquids (water) we

drink, and it constitutes our inner waters; some energy process provides digestion (breakdown of large insoluble food molecules into small water-soluble food molecules) – it is fire element in our body; the air we require for breathing. But what is Ether? That is energy and that Is Sound. The Element Ether, Called "Akasha" In Sanskrit Is The First of the Five Great elements (*Pancha Mahabhutus).* It comes first because it is the most subtle of the elements and is often referred to as "space,". It is the essence of emptiness. It is the space the other elements fill. The origin of ether is *shabda. Shabda* is the *tanmatra* of sound, meaning that *shabda i*s sound in its primordial, unmanifested form. *Shabda* is the primordial space from which vibration emerges long before it takes the form of sound in the ear. Sound and ether are, therefore same or inseparable.

The Energy System of the Human Body and *Chakras*

At school, we study anatomy, and we know that there are different systems in our body: digestive, lymphatic, circulatory, respiratory, nervous, and other systems. There is also another system in our body, which we do not study at school because it is very subtle – that is an energetic system. It also has its structure and laws. Like nerves or veins, energy movement in the body goes through some channels, and the places where bigger channels join, form some kind of nodes. In the human body, there are 7 big energetic points, which in the scriptures of Yoga called "*chakras*" (Fig.2). Literally *chakra*[5] means "the wheel", and they are described as spinning disks of energy, which correspond to bundles of nerves, organs and areas of the energetic body that affect our emotional and physical well-being. [1]

According to this knowledge of the energetic system of the human body, each emotion or feeling is located at a particular point. Any disbalance in these main energetic points will lead to some kind of disease. Some Western scientists and psychotherapists have already started to use this knowledge in practice (for example, vegetotherapy or body-oriented psychotherapy, based on Wilhelm Reich's research, successfully uses this) [2, 3].

The sound (ether element) and the *naad* (as its root) affect the whole energetic body and all chakras. By signing all chakras are connected, that's why singing is an effective practice for physical and psychological well-being.

Indian Musical System---RAAG

Now the question is there – is any kind of music and any kind of singing equally effective on the human body? To understand this, we need to appeal to musical science.

In Indian musical tradition, there is a different note system. Each note has a name and some image behind it. Each note will affect some part of the body. Some sets of notes, placed in a typical order, appear in melodies, and characteristic musical motifs form the raag. *Raag i*s "a central feature of the classical Indian music tradition, and being unique, it has no direct translation to concepts in classical western music. In Sanskrit, raag can be translated as "something that colors one's mind", for it has the power to create very specific emotions or moods in one's mind"[6]. Thousands of *ragas* are known, but there are six base *raagas,* out of which all others come. For any kind of emotion, there is some special raag, there are male and female *raagas,* and some *raagas* are associated with a
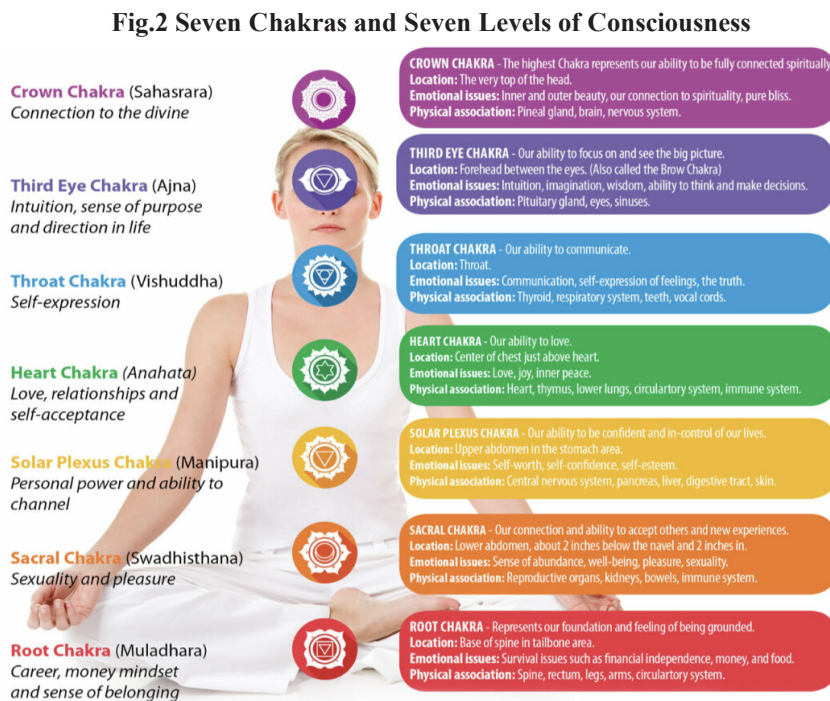
Fig.2 Seven Chakras and Seven Levels of Consciousness

Crown Chakra (Sahasrara)
Connection to the divine

CROWN CHAKRA - The highest Chakra represents our ability to be fully connected spiritually.
Location: The very top of the head.
Emotional issues: Inner and outer beauty, our connection to spirituality, pure bliss.
Physical association: Pineal gland, brain, nervous system.

Third Eye Chakra (Ajna)
Intuition, sense of purpose and direction in life

THIRD EYE CHAKRA - Our ability to focus on and see the big picture.
Location: Forehead between the eyes. (Also called the Brow Chakra)
Emotional issues: Intuition, imagination, wisdom, ability to think and make decisions.
Physical association: Pituitary gland, eyes, sinuses.

Throat Chakra (Vishuddha)
Self-expression

THROAT CHAKRA - Our ability to communicate.
Location: Throat.
Emotional issues: Communication, self-expression of feelings, the truth.
Physical association: Thyroid, respiratory system, teeth, vocal cords.

Heart Chakra (Anahata)
Love, relationships and self-acceptance

HEART CHAKRA - Our ability to love.
Location: Center of chest just above heart.
Emotional issues: Love, joy, inner peace.
Physical association: Heart, thymus, lower lungs, circulartory system, immune system.

Solar Plexus Chakra (Manipura)
Personal power and ability to channel

SOLAR PLEXUS CHAKRA - Our ability to be confident and in-control of our lives.
Location: Upper abdomen in the stomach area.
Emotional issues: Self-worth, self-confidence, self-esteem.
Physical association: Central nervous system, pancreas, liver, digestive tract, skin.

Sacral Chakra (Swadhisthana)
Sexuality and pleasure

SACRAL CHAKRA - Our connection and ability to accept others and new experiences.
Location: Lower abdomen, about 2 inches below the navel and 2 inches in.
Emotional issues: Sense of abundance, well-being, pleasure, sexuality.
Physical association: Reproductive organs, kidneys, bowels, immune system.

Root Chakra (Muladhara)
Career, money mindset and sense of belonging

ROOT CHAKRA - Represents our foundation and feeling of being grounded.
Location: Base of spine in tailbone area.
Emotional issues: Survival issues such as financial independence, money, and food.
Physical association: Spine, rectum, legs, arms, circulartory system.

particular time of the day or of the year. *Raag* involves several important elements:

1. *Naad* – sound vibration, a manifestation of the ether energy;

2. Pitch, relegated into *Swar* (whole or half tone/ note) and **Sruti** (microtones);

3. *Ras* – emotional effects on the performer and listener, "aesthetic delight". A performer with sufficient knowledge and training can create the desired moods and emotions through the combination of shrutis and *swars*. There are nine *rasas*:

    -   *Wonder* (Adbhut),
    -   *Love* (Shringar),
    -   *Heroism* (Veer),
    -   *Disgust, grotesque* (Veebhatsa),
    -   *Anger* (Rudra),
    -   *Humour* (Hasya),
    -   *Terror* (Bhayanak),
    -   *Pathos, tragic* (Karuna),
    -   *Compassion, peace* (Shanta)

4. **Thaat** – scale;

5. **Taal** – rhyme and speed

Raag is based on the principle of a combination of notes selected out of the 22-note intervals of the octave. There are 72 *melas* or parent scales, on which *raagas* are based. Improvisation is an essential feature of Indian music, depending upon the imagination and the creativity of an artist. A great artist can communicate and instill in his listener the mood of the *Raaga.*

Every *raaga* must have at least five notes, starting at Sa, one principal note *Vadi,* compared with a "King", a second important note ("Queen"), and a few helping notes. The ascent and descent of the notes in every *raaga* is very important. Some *raagas* in the same scale differ in ascent and descent.

All *raags* are perfectly balanced, all have healing *effects* and all have deep meaning behind them. It is the art of calling and using some healing energy. By *raag* the whole energy system and *pranic* (vital) body are affected. [4]

Mantra Healing by Spiritual Sound

We can say that *Raag* is the classical instrument of Indian musical therapy, but not the only one. In Indian tradition, sound healing is also associated with another term, which is Mantra. [5] *Mantra* (sanskr., "manas" = mind, "tra" = tool) is "a sound, word or phrase in Sanskrit, that alters consciousness through meaning, tone, rhyme or physical vibration"[7]. It is a "tool of thought", used as a means of harnessing and focusing the mind. *Mantra* can be recited in repetitions or chanted with melody.

Each *mantra* has a meaning behind it, unique vibrational frequency, and distinctive healing effects. When chanting a mantra, the individual begins to vibrate within the frequency of that mantra even on a physical level. When *chanting mantras* aloud, the vibrations and movements of the tongue stimulate some of the key glands of the endocrine system, which are responsible for governing and regulating hormones in the body.

Additionally, the soothing and harmonious combination of sound, breath, and rhythm – an inevitable outcome of mantra chanting – has a profound impact on the parasympathetic nervous system. This, in turn, slows the heart rate and triggers the body's healing response. [6]

Connection of *Mantras* and *Chakras*

As it was said before, there are seven *chakras* (energetic centers) in the body and there are seven notes (and seven colors of rainbow too). Each *chakra,* according to Yoga science, has its own color and a special *mantra* – the so-called "*beej-mantra*" (in Sanskrit., "*beej*" is a seed), which is a simple single-syllable word, that can be chanted alone or attached to a longer mantra to enhance its power and quality. The best-known *beej-mantra* is OM (or AUM). There is a special healing practice, which is based on singing *beej-mantras* of *chakras* on the frequencies of notes. To understand how it works, we must turn our gaze on some special frequencies of musical notes, which magically correspond to the frequencies of *chakras*. By correcting the note, we balance the associated *chakra* and it changes our emotions and mood.

Music is a type of harmonious sound, and sound is a form of energy. Because of its high vibration frequency, we can state that it is a form of positive energy, and everything that resonates with the same vibration increases its positive energy. Healing components of the solfeggio frequencies were used long ago in Indian Sanskrit chants. Ancient Indian Yogis referred to some frequency around the Earth as OM (equal to 7.83Hz). Ivonin & Chang's study defines the relationship between the archetypal sounds, OM, and Solfeggio frequencies and concludes that archetypal sounds are effective in inducing states of meditation and their powerful effect on our subconscious mind and spirit [7].

As we can see in Figure 3, each chakra has its own special frequency.

Fig.3: Chakras and their Frequencies

THE SOLFEGGIO SCALE AND THE CHAKRA SYSTEM

963HZ - THE CROWN CHAKRA
852HZ - THE 3RD EYE CHAKRA
741HZ - THE THROAT CHAKRA
639HZ - THE HEART CHAKRA
528HZ - THE SOLAR PLEXUS CHAKRA
417HZ - THE SACRAL CHAKRA
396HZ - THE ROOT CHAKRA
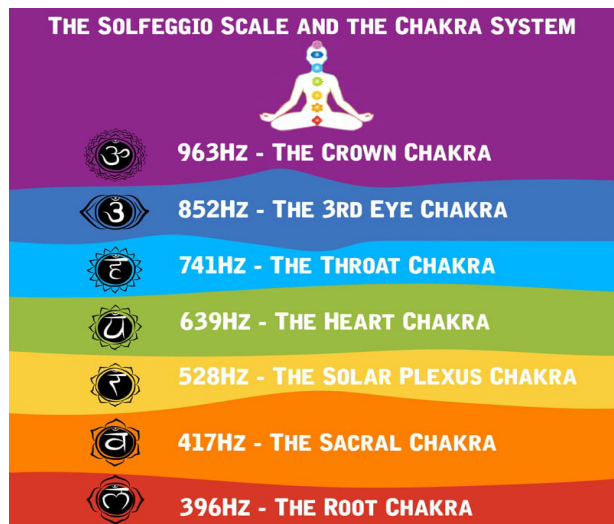
Frequencies of Notes and Their Effects on the Human Mind and Body

David Hulse, a famous sound therapist, in his work on "Soma-Energetics," described the effects of some frequencies on the human body and mind:

UT – 396 Hz - turning grief into joy, liberating guilt and fear by bringing down defense mechanisms. It is located at the Root level ie anal level and is called *Muladhara Chakra*. In the sitting pose, the whole body's weight and gravity concentrate on the anus so it constitutes the root of the meditating body and therefore it is called *Muladhar Chakra*.

RE – 417 Hz - undoing situations, cleanses traumatic experiences and clears destructive influences of past events, puts in touch with an inexhaustible source of energy that allows changing life. It is located in the Sacrum area of the body and is called Swadhisthan *Chakra*.

MI – 528 Hz - transformation, returns human DNA to its original, perfect state, increases the amount of life energy, clarity of mind, awareness, awakened or activated creativity. Tone Mi activates the imagination, intention, and intuition. It is in the Solar Plexus area of the body and is called Manipur Chakra.

FA – 639 Hz - re-connecting with family and balancing, relationships, enhances communication, understanding, tolerance, and love. Located at Heart and is called *Anahata Chakra*.

SOL – 741 Hz - solving problems, cleans the cell from toxins, and gives the power of self-expression,

which results in a pure and stable life. It is located at Throat and is called *Vishuddhi Chakra*.

LA – 852 Hz - awakening intuition, returning to the spiritual order, raising awareness. It is located at Forehead and is called Third Eye or Aajna Chakra [8]. Dr. Horowitz continued that research and added some more healing frequencies:

SI – 963 Hz - awakens any system to its original, perfect state, re-connects the individual with the Spirit, and enables one to experience Oneness – our true nature. Located at the Crown and is called *Sahasrara Chakra*.

174 Hz - appears to be a natural anesthetic, and tends to reduce pain physically and emotionally.

285 Hz - helps return the tissue to its original blueprint or form, influences energy fields, sending them a message to restructure damaged organs, and makes the body rejuvenated and energized [9]. In 1988, biochemist Dr. Glen Rein[8] tested the impact of different music on human DNA and proved that Sanskrit chants have the most positive, healing effects.

Systems of A-440 Hz and A-432 Hz

The Twelve-Tone Equal Temperament System has been the most common tuning system in use for the past 200 years. It divides the octave into 12 equally spaced parts or 12 equal semitones and states musical intervals in cents, where 100¢ is defined as one equal tempered semitone. This system has been tuned relative to a standard pitch of "A" being - 440 Hertz. All the other notes are tuned in standard mathematical ratios leading to and from 440 Hz. Due to this standardisation, a piano in Moscow sounds the same as a piano in Delhi.

Though, in the past, a variety of musical tunings were used. A-432 was frequently used by classical composers and the original Stradivarius was designed to tune to A-432. Many music therapists and musicians claim that a more "natural" frequency for middle "A" is 432 Hz (also known as Verdi's A) because it is in relationship to the "Golden Ratio"[9].

A recent double-blind study from Italy showed that music tuned to 432 Hz slows down the heart rate and reduces blood pressure (both systolic and diastolic) when compared to 440 Hz. This frequency fills the mind with feelings of peace and well-being, making it the perfect accompaniment for yoga, gentle exercise, meditation, or sleep [10].

Frequencies of Indian Notes

In the Indian musical system, notes are not fixed. A musician can choose the base note (Sa) according to his convenience on any frequency, and from this base note, the whole octave will start. In the Indian musical system, there is also a special term – *shruti,* which means a minor tone. There are 22 shrutis, and practically in different *raagas* one and the same note may have different shades or flavors. Due to this reason, we can find only the approximate frequency of Indian notes in Table 1 given below[10], and that too, these frequencies will match, if Sa – the basic note – will be set on C-note frequency. (For example, if we set our Sa-note to A, then all notes' frequencies of our octave will change accordingly [11].

Indian Classical and Spiritual Music as a Healing Instrument

Thus, Indian music gives much freedom and space to be used as a therapeutic instrument for emotional regulation and healing. Knowing healing frequencies, we can set the base note Sa; knowing the *Vadi* (principle, "king" note) of *raaga,* we can understand, which *chakra* it will affect most.

In recent studies, Indian researchers proved that music therapy based on Indian Classical Music and the practice of *Naad yoga* decrease the level of depression and reduce the level of mental disorders [12].

Indian scholars G. Saraswati and S. Mohan studied the effect of Indian music at genetic, cellular, and neurophysiological levels. In their article, they state: "Our brain responds to music by releasing serotonin (a monoamine neurotransmitter), which contributes to the feeling of well-being and happiness. Listening to music also releases mood-enhancing chemicals like dopamine, melatonin, and endorphins. Music may also boost endocannabinoid anandamide (the molecule of bliss), the body's own antidepressant. … Music not only affects our brain but also our DNA and cells. … Our endocrine gland system is interestingly very much responsive to the vibration of musical notes. In fact, our body functions harmoniously as the orchestration of the endocrine system. … We conclude that music therapy offers an effective alternative for regenerative biology and can be used for regeneration of stem cells in vitro or in our body," [13].

In the same research work the frequency of vibrations of the spectrum of emotions was provided, which is given in the picture below[11] (Fig.4). We see that the flow of energy and frequency of vibration increases from the bottom up. The scientists state that "the first musical note Sa has a frequency of 262 Hz and so on; thereby it helps the listener/practitioner to resonate with the corresponding high vibration emotion in the spectrum". Other than pleasure, the effects of music increase the high vibration of emotions like joy, peace, etc., and reduce the low-vibration emotions like anxiety, fear, anger, etc. (Figure-4)[13].

G. Saraswati and S. Mohan declare: "In our observations of behavioural psychology, regular practitioners of music show an observable positive qualitative difference in comparison to non-practitioners. They are less stressed, their anxiety levels are low, calmer, and more grounded. Children who listen to or practice music regularly, have been found to have better learning, memory, and concentration, less aggression, and better anger and stress management in comparison to the ones, who don't. Neurophysiology study shows their brain to be in an Alpha (relaxed) state with slower and deeper breathing, better heart rate, and parasympathetic predominance. They are spiritually more advanced than other beings as they vibrate higher. Music has also been seen to improve quality of life in healthy individuals," [13].

Table 1. Frequencies of Western and Indian Notes

Western Notes	Indian Notes	Frequency Range
A	Dha	215.5 − 226.5
A#	ni	226.6 − 239.9
B	Ni	240.0 − 252.5
C	Sa	252.6 − 269.5
C#	re	269.6 − 285.3
D	Re	285.4 − 302.3
D#	ga	302.4 − 320.3
E	Ga	320.4 − 339.3
F	Ma	339.4 − 359.4
F#	ma	359.5 − 380.9
G	Pa	381.0 − 403.5
G#	dha	403.6 − 427.5

Fig.4 Spectrum of Emotions with Related Frequencies
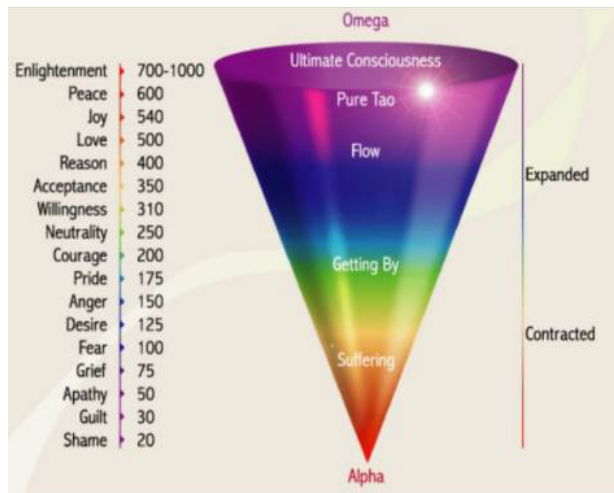
Conclusion

The practice of Indian classical and spiritual music on any level (note practice, chanting of mantras, learning *raagas*) is a pleasurable practice of harmonizing mind, body, and soul. It can never harm anyone, but it gives so many benefits like:

Self-regulation: By singing we control breathing, by note practice (*alankars)* we control the mind and give good exercise to our cognitive system;

Energy Charging: by proper note, we turn the energy in chakra (every chakra is like a lock, and proper note is the key);

Energy Balance: by practicing *raag* we learn to call some specific good energy, we balance our energy, *aura*;

Self-expression: By singing we express all inner emotions (we don't keep them inside, so they don't accumulate and create illness);

Spiritual Growth: by devotional singing, we concentrate our minds on the higher forms and feelings. It's a beautiful and blissful path of spiritual growth;

Creating a Healthy Atmosphere: by listening to *raagas* we can change our mood into a positive one and uplift our energy level etc.

Thus, Indian classical and spiritual music is a deep healing and uplifting spiritual science, a kind of *Yoga,* which can be practiced everywhere and by anyone. It requires more study and further research, which for sure will bring many benefits to humanity as it has already proved its effectiveness through centuries by harmonizing and enriching the life of people.

Endnotes

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11. The picture was taken from *https://www.researchgate.net/publication/331150250_HAVE_YOU_WONDERED_WHY_MUSIC_IS_SO_WONDERFUL#pf2*

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Need to Develop a Passion for Learning to Grow

Rajiv Kumar, Chairman, Pahle India (Former Vice Chairman, Niti Aayog, Govt. of India) delivered the Convocation Address at the 10th Convocation Ceremony of the Hemvati Nandan Bahuguna Garhwal University, Srinagar on December 01, 2022. He said, "I cannot emphasize enough the importance of teachers being true Gurus who not only lecture but inspire and inculcate in their students an unending quest for inquiry, high moral values and a nationalist spirit which drives them to maximize their potential. These qualities will surely bring them kudos but more importantly take our country forward towards becoming once again the most sought after country in the world." Excerpts

Honoured to be invited to address the 10th Convocation, milestone- wishing it all the best towards becoming a globally recognized center of higher education.

Have been a student in three universities-Delhi, Lucknow and Oxford- so know full well the charms of being a student- it is a protective cocoon- where all is taken care of by loving parents and by watchful and caring teachers. Hopefully this protective state of life encouraged learning as that was the only exclusive task at your hand. This will never come again and I am confident that you have made the fullest use of it.

But learning should not and in any case does not stop with being a full time student- it should continue through out ones life. I am sure your years in this prestigious university have prepared you to be a perpetual learner- for me it is a sad day when I don't learn something new. Keeps one alive in a true sense as learning and improving oneself constantly perhaps is the most important distinction between us and other living beings like plants and animals.

We learn from diverse sources- books, daily life, observing nature etc. but perhaps the most effective learning happens by example, by observing others specially those whom we love or respect- like our parents and teachers. And which is why it is so critical that faculty members become exemplars and role models for the students.

This is best reflected in our traditional *Gurukuls* where the Guru not only imparted knowledge and the art of complex reasoning but also set ethical standards and value norms through his own life. I am sure that faculty members in HNBGU are following this lofty model of *Bhartiya Gurukuls* as that make their students far better equipped to handle the challenges which they are about to face as they step out.

I cannot emphasize enough the importance of teachers being true Gurus who not only lecture but inspire and inculcate in their students an unending quest for enquiry, high moral values and a nationalist spirit which drives them to maximize their potential. These qualities will surely bring them kudos but more importantly take our country forward towards becoming once again the most sought after country in the world.

My young friends must realize that India is on the cusp of major historical change that will take it inexorably forwards towards raising its share in the global economy to once again become commensurate with the share of our population in the world population- 17% and will become 19% by 2050.

Our share was 17-20% of the global economy in 1850 less than 200 years ago, in our known history of more than 3000 years. According to Angus Maddison, whose work we should all read, India's share of world GDP was about 27% in the 1st Century AD- that is why Europeans came looking for us- Did they not. Already in the making- over taken UK and will overtake Germany and Japan soon enough- be among the three largest economies in the world by 2047 for sure.

That will also raise our overall stature in the global community and India will be expected to play a far more active and important role in finding the way forward and forging consensus among diverse players- was already seen in the G-20 meeting in Bali- the final communique had India's imprint.

With our participative and perhaps hyper-active democracy, our noteworthy achievements in achieving peaceful social transition and harmony in a country more diverse that whole of Europe and now our economic progress, India will surely become an exemplar to other emerging economies and may be even for advanced economies.

Because our success will be achieved only and only if we are able to successfully address the incredible challenges that face us today. We cannot for even a minute under estimate these challenges. These are:

- Grow exponentially and also become greener exponentially- the only country in the world history so far that will have to resolve this trade-off.

- Grow exponentially but also generate jobs exponentially- in an environment in which technology (AI, Robotics, Singularity) threatens to destroy jobs and not create more than it takes away or destroys.

- Generate jobs to improve our labour participation rates which are currently at a mere 44% and an abysmal 23% for women but also to generate them where people live and not in distant places- we cannot and we do not wish to encourage large scale migration within the country or from here to other countries- that is sub-optimal

- Modernize our agriculture so as to equate productivity levels in this sector to other sectors. Presently, nearly 50% of our workforce engaged in agriculture produces only 18% of the GDP- reflecting its backwardness.

- But to modernize agriculture not by blindly adopting the model of 'industrial agriculture' as practiced in the US, Europe or China but to modernize it in an environmentally friendly way- by adopting 'chemical free or natural farming' It is already being practiced by nearly 3 million farmers across 11 states.

- Eliminate mal-nutrition among children which arrests their mental development and eliminate anemia among women- the latest NFHS puts these as 36% and 50%

- And finally, upgrade our education system by implementing in letter and spirit the National Education Policy, which has the potential to make our education system globally comparable.

The list can be surely enlarged. But addressing the above cited challenges will itself stretch our governance capacities at all levels of the government and amongst all stakeholders.

So we have to create synergies across all stakeholders which is the only possible way to address these formidable challenges. These synergies will generate the energy and dynamism to forge a New India.

We have to achieve 10 X of where we are today in per capita incomes for us to meet the exploding aspirations of our young population over the next 25 years – during the *Amrit Kaal* as our Prime Minister has called it.

Strong foundations have been laid over the last few years for India to surge forward across all fronts with the help of new technologies, our strong traditions of private entrepreneurship, our frugal consumption habits that have respected nature and sought to preserve it rather than plunder and exploit it. These are our strengths. We have to build on them and reinforce them.

Our generation and previous ones have painstakingly laid these foundations, defying the world which did not expect us to succeed across all the dimensions. We have had to fight our own inherited colonized mindset that made us skeptical of our great strengths and glorious traditions. A glaring example of this colonized mindset is the neglect of our traditional medicinal systems for both preventive and curative treatments.

But that is changing- we are now trying to mainstream Ayurveda- the process has started. It is symbolic of the rejuvenation of our mindset which now is tuned increasingly to Swami Vivekananda's call for making India the *Vishwaguru.*

The responsibility for making the 21st century as India's century lies squarely on the students and indeed on the faculty collected here. You are surely liberated from the colonial mindset and have the ambitions and capabilities to build glorious structures on these strong foundations.

We have to give up the practice of constantly trying to copy others or learn from them. We must recognize that India has a unique past and indeed a unique set of current challenges but also a unique set of strengths. We have to connect with our ground realities and devise our own solutions. I am sure years spent in HNBGU will have helped you to recognize and grow your capabilities. Now is the time to go out and use them for serving the national cause and for achieving our ambitious goals.

I wish you all the best for doing so and restoring India's position in the global community of nations.

Jai Hind

CAMPUS NEWS

National Seminar on Future Academic Libraries

The one-day National Seminar on 'Future Academic Libraries: Designing Technological Innovation and Best Practices in Academic Libraries' was organized by the Tararani Vidyapeeth's, Kamala College, Kolhapur in association with Shivaji University College Librarians Association (SUCLA), recently. The event was inaugurated by Shri Ramesh Tawadkar, Speaker, Goa Legislative Assembly and MLA, Conacona. Other dignitaries present were Dr. Gopakumar V., Head, Kerala Digital University, Chairperson, Prin Dr. Krantikumar Patil, Executive President Tararani Vidyapeeth, Kolhapur, Dr. S N Pawar, Vice President TVP, Shri Prajakt Patil, Secretary TVP and Principal of Kamala College, Kolhapur Dr. Tejaswini Mudekar.

Dr. Neeta Dhumal welcomed all the participants. The Convener, Ms Urmila Kadam, Librarian, Kamala College, Kolhapur explained the objective of the event and introduced all the dignitaries. Shri Ramesh Tawadkar, in his inaugural address, indicated that the role of the educational institute in society reforms its importance as a role model in the knowledge society. Dr. Gopakumar V, in his Keynote Address said that we are talking about the future of academic libraries and why not librarians. Dr. Krantikumar Patil, in his Presidential Address, said that all disciplines are similar and important for the knowledge society. He also explained the reason behind organizing the seminar to share knowledge, learn and adopt new things. Dr. Tejaswini Mudekar, Principal in her address gave detailed history and information about the college. Dr. Varsh Maindargi concluded the inaugural session with a vote of thanks to all.

The technical session on 'Libraries of the Future and Librarians of the Future' was started with the Resource Person, Dr. Gopakumar V. The Chairperson of the session was Dr. Asmita Patil, Associate Professor, Shahaji Law College, Kolhapur. Dr. Gopakumar V. In his Keynote Address, he analyzed the different trends in the LIS profession like what is a digital library and library trinity (Books, Readers, and Staff). What Changes has the internet brought to the library e.g. UBC. The session concluded with a vote of thanks by Dr. Sujay Patil, Kamala College, Kolhapur.

The next session was the Paper Presentation session. More than 95 papers were received and selected for publication in UGC approved Peer Review Journal entitled 'Aayushi International Interdisciplinary Research Journal' after the scrutiny of the editorial board. This is an open-access journal with DOI for each research article for indexing in the Google Scholar research database having Impact Factor 7.33 with ISSN 2349-638X. The total deliberations of the seminar were arranged in two technical sessions covering the above theme and subject themes.

Further, the session on 'Future of Academic Libraries: Technological Innovation and Best Practices' was started with the resource person, Dr. Dhananjay Sutar, I/c Director, Deputy Librarian, BBKKRC, SUK. Dr. Shivaji Kamble, Librarian, Kisanveer Mahavidyalay, Wai, Uttar Pradesh was the chairperson of the session. Dr. Dhananjay Sutar, in his expert lecture, analyzed the new technological innovations in LIS, Technology driven best practices in libraries, modern technologies for libraries, and the future of libraries and technological innovations. The session was concluded with a vote of thanks by Dr. Chhaya Mali, Kamala College, Kolhapur.

Dr D B Sutar, I/c, Director, BBKKRC, SUK was the Chief Guest for the valedictory function. Dr Tejaswini Mudekar, Principal, Kamala College, Kolhapur was the Chairperson of the function and she highlighted the challenges before the libraries and librarians in the digital era. Dr. R P Adhav, President, SUCLA and Librarian, New College, Kolhapur explained the detailed information and activities about the SUCLA. Ms. Urmila Kadam, Librarian, Kamala College, Kolhapur read the brief report of the seminar. Shri Avinash Salunkhe, Librarian, N S Law College, Sangli functioned as Rapporteur General for the event.

The outcome of the event brought out on the horizon the trends in practices in libraries and the role of library professionals for sustenance, the role of ICT in library management in the digital era, need for the development of digital libraries, creating of innovative services, identifying best practices in the profession, which is the need of the time. Increasing information literacy among the

users is to be initiated and developed information search skills from the ocean of information.

Conference on Digitalization and Inclusive Banking

A two-day Conference on 'Digitalisation and Inclusive Banking: Vision for the Next 25 Years' is being organized by the Department of Humanities and Social Sciences, Indian Institute of Technology Roorkee, Uttarakhand during August 03-04, 2023. The event is sponsored by Indian Council of Social Science Research (ICSSR), New Delhi.

The new G20 Financial Inclusion Action Plan 2023 focuses on overarching priorities of digitalisation and inclusive practices for expanding the financial services ecosystem to unbanked and underserved areas. Through improved utilisation of e-banking services like internet banking, telephone banking, SMS banking, electronic fund transfers (NEFT, RTGS, IMPS, etc.), ATM and debit cards, etc., the banking system can assist in directly meeting the credit needs of agriculture and small and mediumsized businesses, empowering women, reducing poverty as well as assisting in achieving the goals of inclusive banking and financial inclusion. The themes of the event are :

- Universal Access to Finance and the Role of Banks.

- Digital vs. Traditional Financial Inclusion: Indicators & Measurement Concerns.

- Bank Performance, Responsible Lending & Sustainable Finance.

- Emerging Practices: Digital Revolution, FinTech, and Bank Performance.

- Digitalisation and the Future of Monetary Policy.

- Financial Literacy & Divides (Gender, Regional & Class): Role of Action Plans – Global and National Strategies.

- Implications of COVID-19 on Inclusive Banking.

- Financial Inclusion Schemes/Action Plans – Global and National Strategies.

- World Bank's Findex Database.

- G20 Financial Inclusion Action Plan (FIAP) & SDGs Relevant to Digital Inclusion.

For further details, contact Convener, Dr. Rachita Gulati, Associate Professor (Economics) Department of Humanities and Social Sciences, Indian Institute of Technology Roorkee, Uttarakhand-247667, E-mail: *humanities.iitr@gmail.com.* For updates, log on to: *www.iitr.ac.in.*

Short Term Course on Data Driven Analytics with Machine Learning

A five-day Short Term Course on 'Data Driven Analytics with Machine Learning' is being organized by the Department of Electrical, Mechanical Engineering and Mathematics, MNIT Jaipur in association with the Indian Institution of Industrial Engineering, Jaipur Chapter during June 12-16, 2023.

Data-driven analytics (with machine learning) refers to the process of using data to gain insights and make predictions or decisions with the help of machine learning algorithms. This involves analyzing large sets of data to identify patterns, trends, and relationships, and then using this information to train machine learning models. Machine learning algorithms use statistical techniques to automatically learn from data and improve their performance over time. By applying these algorithms to large amounts of data, data-driven analytics can identify patterns and make predictions that would be difficult or impossible to discover through traditional analysis methods. Examples of applications of data-driven analytics with machine learning include fraud detection, predictive maintenance, recommendation systems, image and speech recognition, and natural language processing. These techniques are used in a wide range of industries, including finance, healthcare, marketing, and manufacturing, to improve decision-making, optimize processes, and drive business outcomes.

Modules

- ***Data Collection***: The process of gathering and organizing relevant data from various sources, such as databases, social media, IoT devices, and other sources.

- ***Data Preprocessing***: This involves cleaning, filtering, transforming, and integrating data to ensure its quality and consistency, as well as to prepare it for analysis.

- ***Data Analysis***: This step involves applying statistical and machine learning techniques to identify patterns, relationships, and trends in the data.

- ***Model Development***: This involves using machine learning algorithms to build predictive models

that can be used to make forecasts or generate insights.

- *Model Evaluation*: This step involves testing and validating the performance of the predictive models against a set of evaluation metrics.

- *Deployment*: The final step involves integrating the predictive models into a production environment, where they can be used to make decisions or generate insights.

- *Visualization*: This step involves presenting the results of the analysis in a visually appealing and intuitive way, such as charts, graphs, dashboards, or reports.

For further details, contact Prof. Rajesh Kumar, Professor, Department of Electrical Engineering, Malaviya National Institute of Technology, Jaipur-302017 (Rajasthan) E-mail: *rkumar.ee@gmail.com*. For updates, log on to: *www.mnit.ac.in*

AIU News

Faculty Development Programme on Innovative Methods, Skills and Eco-Friendly Technologies

A five-day Faculty Development Programme on 'Innovative Methods, Skills and Eco-Friendly Technologies for Quality and Impactful Research' was organised by the Association of Indian Universities, New Delhi in association with Amity University (AU), Gurugram, Haryana, Academic, and Administrative Development Centre, Amity Academic Staff College on January 30-February 03, 2023 through virtual mode.

Dr. Sanjna Vij, Programme Director, AASC, AUH during the address, welcomed everyone to the programme and presented an overview of the event, and also introduced dignitaries. Dr Vij highlighted that the FDP is scheduled, keeping in mind the faculty's professional growth, as they will learn about best practices for writing quality and impactful research papers. She also stated that the faculty will also learn about innovative methods through which one can publish the paper in various reputed national and international journals.

Prof. Vikas Madhurkar during his address highlighted that India has seen an increase in the number of scientific research publications, but the quality of those publications has lagged behind that of the United States, the United Kingdom, and other developed nations. The absence of infrastructure, suitable resources, and incentives was among the primary reasons for the poor quality of research publications. Dr. Madhukar stated that India has one of the largest higher education infrastructures, however, it does not create scholars who are focused on producing excellent research. He explained that for supporting high-quality research, this kind of FDP will assist the participants in getting their problems and concerns addressed.

Prof. P B Sharma, Vice Chancellor, Amity University, during his keynote address said that good times have arrived for India as *Aatmanirbhar Bharat* helped to create a conducive climate for research in our nation. In terms of R&D, India has caught up to the rest of the globe. In order to change lives and the humanities in general, Prof. Sharma underlined the need to rethink research and that our focus should now be on research for development. Quality and relevance should be the main goals of the study. Prof. Sharma stated that quality has no meaning without relevance. He also encouraged the researchers to engage more in collaborative research and also trans-departmental research. According to Prof Sharma, the objective and the outcome of the research should go hand in hand, so the outcome that we are expecting should be well put in our minds before we begin with our research.

The Guest of Honour, Dr. Pankaj Mittal, Secretary General, AIU said that during the covid epidemic, it became very difficult to impart information without physically meeting, and online education ended up being the only option. The only way to overcome this obstacle was by using technology. Teachers all around the world have begun educating their students online, but she noted that there is a significant difference between teaching online and teaching online effectively. Because teachers are increasingly facilitators rather than informers. The future of education, according to Dr. Mittal, will include the integration of Artificial Intelligence (AI) into individualised instruction. She urged the researchers to engage in technologically friendly research because it is urgently needed.

Dr. Amarendra Pani, Director (I/c), and Head, Research Division, AIU said that the purpose of research is to inspire some change and we should not continuously keep on criticizing the Indian research system as we are improving notably. Dr. Pani pointed out some of the basic purposes of research like research should be application-oriented and should add knowledge to our existing knowledge. Dr Pani also highlighted that teachers are working for human development and the focus should be on the impactful learning of the teachers. Dr. Pani reflected on how we must make our teachers future-ready because the future is in their hands. He stated that research has to be improved not only on the individual level but on the collective level.

The Guest of Honour, Prof. Shyam Menon during his address stated that one of the most important factors in the Faculty Development Program is peer learning and he said that creating an ecosystem of research is of utmost importance in conducting qualitative research. According to Prof. Menon research must percolate every cell of the higher education process, research is not confined to Ph.D. programmes only, but it has to be made an important part of the higher education curriculum itself. Prof Menon mentioned that our focus is not to create an elite group of researchers but to develop a research spirit among the masses. Prof Menon said that earlier the teacher was the mediator between the text and the student but now he is the liberator, a teacher has to transcend and generate new knowledge. Dr. Menon ended on this note by saying that abundance of research projects is needed because only the subset of that will have the caliber of percolating into the spectrum of qualitative research.

The Guest of Honour, Prof Narahari Sastry said that we need to be inventors and discoverers rather than followers but that will take time. He emphasized the need for teachers to have a proper understanding and clarity of research. He said that strong minds will discuss research and weak minds will discuss individuals. Dr. Sastry showed belief in the Indian system of research that is improving as a result of which is our very own Chandrayaan and the Indian-origin covid vaccines which are the safest. He also gave credit to the capacity and capability of our Indian research. Dr. Sastry said it is very important as researchers to realize the problems of our country and focus on our strengths and resources which can be employed in the research to be conducted. He pointed out that in this time when the whole world is looking at the ancient Indian scriptures for knowledge, there is a need for Indian researchers to relook at our traditional knowledge. Dr Sastry said that our Indian constitution urges its citizens to develop a scientific temper, which is so progressive thing as a country and hence we should try to achieve that.

The Guest of Honour, Prof Sandeep Sancheti, Provost (Vice Chancellor), Marwadi University, Rajkot, Gujarat said that research is knowing the unknown and it's like hitting in the dark. He says the generation of new knowledge, assimilation, and dissimilation of information is research. He mentioned that research bent of mind is very crucial for research, age doesn't matter in research. Prof Sancheti believes that young minds are less cluttered, so they are the best fit. He quoted, "Catch them Young" should be the mantra as young minds have tremendous potential of showing extraordinary results in the field of research. Prof. Sancheti points out the fear of failure is one of the prime reasons why people don't take up research, but we have failed to understand the importance of failure because he believes failure is the best teacher, if something didn't work, that failure would definitely teach us ways how it would have worked. Prof. Sancheti emphasized the importance of team making, team making makes research more effective and successful and it also cuts down on cost and time. He ended on this note saying that research should be for mind satisfaction.

The Chief Guest of the event, Prof. Manas Kumar Mandal opened his speech by presenting a very well-made PowerPoint Presentation which gave us deeper insight into the topic of discussion. He started by giving a few questions, "What is more important, doing the right project or doing the project right?" His take on this was that both are equally necessary. Prof. Mandal emphasized that the right framework of mind is very essential for research to be carried out. Prof Mandal asked what is to be focused on while setting the framework of the mind, identity, or integrity. Attitude or aptitude? Innovation or Intuition? Agreement or Argument? Context or Content? Mind or mindset? Anything that is not copied is innovation and there is a framework for innovation too and the purpose of research should be to bring new knowledge from none or to challenge existing knowledge, said Prof Mandal. He pointed

out that in a country like India, in our villages where people lack the theoretical knowledge are still doing some kind of research to find out solutions to their problems, the example of which is the manmade double-decker living roots bridge in Cherapunjee which people made when their government failed to do so. He ended by saying that the need of the hour is the create an interface between the top-down researchers and the bottom-level researchers to bring out qualitative results.

Prof. Rajesh Nair proposed his vote of thanks. He gave his heartiest thanks to the esteemed Chief Guest, Guest of Honour, and Panelist for their valuable time and discussion on the main theme.

The Second half of the Plenary Session began with Dr. S N Panda, Professor, and Executive Director (Research), Chitkara University on the topic 'Intellectual Property Protection'. Dr. Panda highlighted the concept of innovation as a new approach, concept, and system, but he added that it is distinct from the invention. He further classified the idea of innovation into further categories, namely management innovations, product innovations, process innovations, and technology innovations. Dr. Panda briefly discussed the four research methodology pillars. He moved on to Convergent and divergent thinking, ideas that arise from psychology, which have been combined with the idea of innovation and how it affects both existing and emerging markets. Dr. Panda, therefore, concluded that there is potential for the adoption of innovative, eco-friendly technologies to support daily activities associated with modern lifestyles.

Dr. Rakesh Kumar Khandal, President of R&D and Business Development at India Glycols Ltd. Delhi, presented a presentation on 'Innovate Talents and Eco-friendly India'. He discussed how research and technology are related, claiming that technology still needs a lot of R & D. He noted that teaching is an uncommon profession and, if selected, is solely viewed as a means of livelihood, not a vocation chosen out of passion. He noted that when the question 'What do you want to be?' is asked to the kids, they will list off every possible profession or job except for that of the teacher. Dr. Khandal discussed the differences between traditional teaching and learning and discussed the ancient and Vedic approaches to education in which the student, not the teacher, was the central role.

Dr. Ambika Devi, Head, Amity School of Science, Engineering, and Technology, Amity University Haryana started by paraphrasing Edward Teller, who once said that the science of today is the technology of tomorrow. Dr. Ambika spoke on 'Connecting the Love of Research and Development Leading to Excellent Life and Career' and she also discussed how academia, industry, and research are all components of the same field. highlighting the importance of research skills for academicians' personal and professional development. She pressed on the notion of the blending of academia and research will progress the country in both the academic and technological spheres. In three sections, she outlined the key components of a research culture.

On the second day, Prof Suresh Kumar Garg, Professor, Delhi Technological University, Delhi began by talking about the objectives of the research which includes comparing two or more theories, or determining the present status of different tools, benefits, difficulties, and so on, or to establish the relationship between two or more attributes, the grouping of variables, etc. He emphasized how developing an appropriate model and hypothesis is important for carrying out research. He also stated that studying the relationship between some parameters like dependent and independent variables is essential so that we can simplify the relations and make more meaningful relations out of those. He ended on the note that understanding and reflecting on your own research work is very important and he urged the research scholars to develop the intuitive sense along with the use of software.

The next session was delivered by Prof. Sanjay Kumar Jha, Director, Liberal Arts and Foreign Languages, Amity University, Haryana. He opened his speech by pointing out the mistakes research scholars generally do while writing their research papers. Beginning with research questions to the introduction and structure, Prof. Jha touched upon all the possible mistakes one can do. He also talked about the various types of knowledge like traditional knowledge, intuition and scientific knowledge. He advocated the use of scientific knowledge in research because it doesn't accept anything at face value, it proven with various experiments. He also gave an interesting statistic that 55% of matter added with 45% manner results in an impactful research paper. By the manner, he meant structure, length and language of the research write-up. Prof. Jha touched

upon every segment of a research paper and how it is to be written.

The next speaker was Dr Anirban Das, Amity Institute of Science Engineering and Technology, Amity University Haryana, Gurugram. Dr. Das began by discussing the myth and fact of the innovation ecosystem, he stated that modern innovators are teams and innovation requires many types of expertise which includes financiers, consultants, designers and many more. He pointed out that the inputs required for innovation are creativity, research, knowledge, and information. According to him, there are certain components of innovation, and they are policy, strategy, process, and insight. He also talked about why ecosystems matter in carrying out impactful research and he laid down the characteristics of ecosystems.

The next Speaker was Prof. Sangnik Dey, Institute Chair Professor, Centre for Atmospheric Sciences, Indian Institute of Technology Idea, New Delhi. He spoke on 'How to Publish in the Research Fields'. He spoke about various research fields and journals such as natural sciences and atmospheric sciences journals, and to the same degree, he regarded nature journals as an interdisciplinary journal. The editorial process was described by Dr. Dey with the assistance of an algorithm as when the author submits a manuscript and it receives a tracking number. The editorial office performs an initial quality check on the manuscript to ensure that the paper is formatted correctly. An Editor in Chief is assigned to the manuscript and decides whether to send the manuscript to a Senior Editor for assessment. Positive, constructive, and even negative criticism is part of this process. He elaborated on the reasons why the manuscripts might be rejected with a help of a bar graph, one of the major reasons was listed as; the submission of inappropriate or off-topic manuscripts.

The next speaker, Dr. Zeeshan Fatima, Amity Institute of Biotechnology, Amity University Haryana started the discussion by giving the participants a brief of the word 'Antibiotic' and its Greek Origin. She ran the thoughts of the participants through the history of antibiotics from the first discovery of the antibiotic, Penicillin by Alexander Fleming in 1928 to the golden era of Antibiotics (1940-62). She moved the discussion to the motif of Drug resistance and its chronology, and how it takes 10,000 compounds to obtain 1 compound that is finalized for manufacturing and commercialization. She gave detailed information on drug resistance and its causes through the means of a graph and a diagram; incorrect dosage, improper infection control, and contaminated equipment may be among the possible causes behind drug resistance.

On the third day, Dr. S Venkata Mohan, Scientist, CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad began his speech by talking about sustainability and why is it important for us to move towards sustainability now. He also addressed the issue of climate change and mentioned that moving towards sustainability is the only way we can deal with it. He also spoke about the ever-rising demands for energy around the globe and this is the time for meeting the energy requirements by switching to renewable energy sources. He also highlighted that India is now the world's third largest renewable energy producer with 40% of the renewable energy mix. Dr. Mohan expressed his concerns about carbon dioxide emissions and the need for the world to change its habits accordingly. He also talked about fossil-based or linear vs circular economy and why we should move towards the circular economy. He also put forward his expert views on sustainable development goals while talking about the challenges and opportunities we face while making a transition towards sustainability. He ended by saying that people around the world are researching sustainable living and with time we will surely get there.

Dr. Ritu Kumar, Amity Business School, Amity University Haryana talked about research tools and why we, as research scholars should use them. She stated that research tools and data play an increasingly important role in research and that it can save our time and add depth to qualitative work. She also believes that using research tools effectively increases the productivity of the research. Dr. Kumar then moved on to talk about some of the software tools of research like statistical software used for social science research which as the Statistical Package for the Social Sciences (SPSS), SAS which also performs these functions and is gaining popularity among the researchers, Consent Forms which is a necessity for anyone doing research with human subjects. She ended her discussion on a note by saying that using software tools or AI tools is neither unethical nor illegal, but it is us, the people who make it so. Hence, she urged the researchers to use all the new tools without losing their honesty.

The next speaker, Dr Varghese began his session by displaying a well-made and informative presentation titled 'Role of Quantitative Software Tools in Quality and Impact Research'. He began with what is quantitative Research and how it is used. He moved on to the 'Steps in conducting survey-based research' which included a 13-step process, which was explained by Dr. Varghese informatively. Some of the quantitative software research tools listed in the presentations were MS Excel and SPSS. He also listed out the essential features of a good software tool, such as being User-friendly, Capable of handling large amounts of data, Supports various data formats. The tools for Data entry were described in detail by Dr. Varghese giving the participants a vivid picture of how can they use tools like spreadsheets and entry software to their benefit.

The session came to an end with an interactive Question and Answer session where participants were more than eager to get their queries solved.

The final speaker, Dr. Ujjaini Dasgupta, Amity Institute of Biotechnology, Amity University Haryana, began her discussion on the theme 'Research Software Tools & Eco-friendly Technology'. She introduced the panelists to the field of her research, which she spoke about with much passion. She then spoke about the research software tools, which are used popularly in the biotechnology field of research. Some of the software tools she listed and gave detailed information about were, GraphPad, which is used to perform T-tests, one-way ANOVA, and two-way ANOVA, ImageJ was regarded by Dr, Dasgupta in high importance, Bio render is used commonly and comes as a way to make a particular model of your work and such. She illustrated various Eco-friendly Biotechnologies that have come into existence in the last few decades. Blue biotechnology was the first one to be touched upon by Dr. Dasgupta, consisting of Aquaculture and immunology. On the topic of Nanotechnology, Dr. Dasgupta detailed some examples for a better understanding of the participants

On the fourth day, Dr Ravinderjit Singh Walia, Head, Production and Industrial Department, Punjab Engineering College, Chandigarh talked about the motivation behind conducting research. He classified the motivation behind the research into two categories: internal drive and external drive. The internal drive is basically the research interest that we have within us coming from a sense of achievement/fulfillment or curiosity or strong ambition. The external drive

includes external factors like degree and diploma, peer pressure, and so on. According to him the main purpose behind conducting any research should be to be better informed and take less biased decisions, in contrast to guessing, hunches, intuition, and other personal experiences. Dr. Walia also gave us guidance on how to choose a research project, he highlighted that good research largely depends on the selected problem. He stated that if it's a good research problem, we will open doors for other people to follow, and if it's not then our research will not be followed by anyone. Dr. Walia ended on a very beautiful note saying it is not possible to make everyone happy at the same time, so it is needed that without losing our heart and patience we carry on with our research.

Prof. P C S Devara, Director and Professor, ASEES and Head, ACOAST/ACESH, Amity University Haryana began his session by talking about the use of technology to meet the bridge of gap in research. He also talked about sustainable development and focused on goal number thirteen of the sustainable development goals. He gave us an insight into oceanic and atmospheric research and talked about modern observational techniques to investigate any atmospheric, oceanic and geographical phenomenon. He also discussed Active and Passive Remote Sensing. Prof. Devara gave a detailed explanation of LIDAR- Light Detection and Ranging, a state-of-the-art technique being used in diversified fields, and also gave us examples of Lidars used for Ocean Research.. Prof. Devara ended his speech by pointing out some important gap areas pertinent to development and mitigation techniques and focused on natural remedies like cloud or rain scavenging.

Prof. Sumit Narula, Director, Journalism and Mass Communication, Amity School of Communication (ASCO), Amity University, Madhya Pradesh. Prof. Narula took an eye-opening session on how to identify predatory and cloned journals. He defined cloned journals as a counterfeit mirror of an authentic journal that exploits the title and ISSN of legitimate journals. In contrast to predatory journals, clone journals are more likely to accept papers from authors since they have developed as the mirror image of reputable journals. He also stated that predatory publishing is an exploitative publishing business model that involves charging publication fees to authors without checking articles for quality and legitimacy and without providing the other editorial and publishing services that legitimate

academic journals provide, whether open access or not. He essentially pointed out that only two impact factors are to be considered – Cite Score by Elsevier (SCOPUS) and Journal Citation Report by Clarivate Analysis (Web of Science). He ended his session by saying that there is an increased need for scholars to be aware today before publishing the paper in a journal

Dr. Anish Gupta started by defining the general term 'research' before moving on to the IMRAD format and reminding the audience that choosing the correct journal is the most crucial step. He advised locating the research area and selecting it with great care. He gave a brief summary of what would be found in a scientific research article before going on to outline the procedure. The first step was picking a suitable title. Dr. Gupta asked the participants how they choose the titles for their research papers, and they enthusiastically responded. According to Dr. Gupta, the drafting of the research paper's content and the procedure of acquiring data are very important. Dr. Gupta provided advice on how to write a good research paper, including the need for the article to be exact and clear, and the need for a thorough description of any novel procedures that are utilised.

Next Session was taken by Dr. Indu Shekhar Thakur, professor and director of the Amity School of Earth and Environmental Sciences at Amity University Haryana, Dr Thakur started by discussing environmental issues like climate stressors and biodegrading and how to solve them. Dr Thakur also explained carbon dioxide sequestration and described the genes and enzymes involved in carboxylation. Dr. Thakur then provided a quick overview of the role of machine learning and its applications as an example of artificial intelligence in microbiomes.

The next Speaker was Dr. Rishi Manrai from Amity Business School, Amity University Haryana.

He started with a presentation on 'How to Prevent Journal Desk Rejection'. Dr. Manrai stated that the goal of writing a research paper can be to give a fresh or original thought, and examine or wrap up a certain field or subject. The title should be intriguing to draw the reader in, according to Dr. Manrai, who also advocated this idea at the start of the plenary session. The title and keywords are significant because they provide the reader with their first impression of the research paper. He discussed the necessity of connecting various parts of the study through

discussion. As sometimes papers are only chosen based on a literature review, a poor literature review might result in a negative gap analysis and rejection by high-end impact journals. To help with this, Dr. Manrai recommended the literature review can be done area-wise and Methodology and experimentation are important aspects of a paper, especially a scientific paper, an author can ideally describe how the problem was studied, describe of lab setup, and discuss which environmental and methodological assumptions were taken. The question of 'What have you found?' can be answered in the results section, in formats of tables or figures.

On fifth day, Dr. A V Senthil Kumar, Director, Department of MCA, Hindusthan College of Arts and Science, Coimbatore began his speech by discussing the basics of a research paper and why is important to publish our research papers, he outlined the reasons to help society with that research, to gain appreciation and publicity for the research, it keeps the researcher alive and motivates others to research too and above all it can be a source of earning. Dr. Kumar discussed that by paying attention to our citations we can learn who is building on our work, depending on the level of engagement we might also get our future collaborators. He highlighted some of the top indices like Web of Science, Scopus, Ei Compendex, and so on. He also discussed ISSN Number and how is to be calculated along with information about ISBN Number and DOI (Digital Object Identifier). Dr. Kumar also talked about Google Scholar Metrics like h-index and h-core and how to find it. He ended his speech by urging researchers to beware of cloned journals and he also suggested that every researcher must have a CV.

Dr Monika Arora, Professor, Amity Business School, Amity University Haryana. Dr. Arora opened her session by discussing research at the very grassroots level. She discussed the prospects of good research which ultimately benefits society. She highlighted the basics of a good research paper as purpose defined thoroughly, consistency, the research process detailed, the research design thoroughly planned, and the conclusions based on research and not own thoughts. She stated that before writing our research papers, we have to study related research papers and take one closely related paper as the base paper for our research. She also talked about deciding on the title of our research paper, she suggested that we should search for at least four to five titles and

then go for refining them until we decide on one. She also suggested keeping broader keywords related to our research in mind before we finalize the title. Dr. Arora gave a good insight into the literature review of research, and what it must include, and she stated that the techniques that we are going to use should also be included in the literature review. She ended on the note by saying that researchers must consider the research as their own baby, take care of it, and nurture it till it is fully grown.

Prof. Surinder Jaswal, Deputy Director (Research) and Pro Vice Chancellor, Tata Institute of Social Sciences (TISS), Mumbai, Guest of Honour for the Valedictory Session, shared her thoughts on the qualitative impact of research. She spoke about Innovative Research and especially reflected upon the term 'Research' that has undergone a great shift from Pure Research to Research as conducted today. She emphasised upon agile mind and body to carry out fruitful qualitative research that should use new age methodologies based on interdisciplinary research carried out by well-rounded and strong scholars who should be able to come up with solutions to problems faced by humanity at large. Her stress was upon Adaptive Innovation Model with its new responsibilities. She motivated researchers to follow a range of methods and techniques that cut across different disciplines and to utilize Knowledge Economy to do away with stagnancy in research.

Prof. P B Sharma, Vice Chancellor, AUH accorded a warm welcome to Guest of Honour, Dr Dhananjay Joshi, Vice Chancellor, Delhi Teachers University. Dr. Joshi spoke at length about his experience as faculty with Amity University. He encouraged all to imbibe noble thoughts from all directions. He highly praised NEP for its emphasis on education that would generate food, cloth, shelter, health, and value base education for the development of India. He praised Kothari Commission which said that the Destiny of the nation is in its classrooms. He lauded the Commission for its outlook that aimed at Universal enrolment and access to State of Arts Infrastructure, Universal Retention at the rural level, and imparting universal quality education. He asked for autonomy for teachers. He elaborated on this by saying that teachers should not be overburdened, and should be given a selection of topics and tools and a choice of research topics. For students, his advice was to retain all that they learn in online mode. He stressed the physical mode of imparting education as it was more lucrative with its physical connection to the heart and soul of a student. Dr. Joshi spoke on the importance of universal quality education and Institutional Culture where ambiance needs to be created as a motivational force for faculty and students.

Dr. Sanjeev Bansal, Dean, Faculty of Management Studies, Director and Head, Amity Business School, AU, Guest of Honour for the Valedictory Session stressed simple research that should be dedicated in nature. He spoke highly about purposeful and controlled research that should be meaningful and outcome-oriented. According to Dr. Bansal, ethical research can benefit society, and people with quality are the ones who can carry out fruitful and beneficial research. Dr. Sanjna Vij proposed the vote of thanks at the end of the Valedictory Session.

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THESES OF THE MONTH

SCIENCE & TECHNOLOGY
A List of doctoral theses accepted by Indian Universities
(Notifications received in AIU during the month of March-April, 2023)

AGRICULTURAL & VETERINARY SCIENCES

Forestry

1. Arora, Sonal. **Characterization of galliformes habitats in the upper catchment of Tons Valley using geospatial technology**. (Dr. Sarnam Singh and Dr. S Sathyakumar), Department of Forest Ecology and Environment, Forest Research Institute, Dehradun.

2. Bandyopadhyay, Meghna. **Response of small-carnivore community to landscape and climate variability along the elevation gradient in the Great Himalayan National Park Conservation Area, the Western Himalaya**. (Dr. K Ramesh), Department of Forest Ecology and Environment, Forest Research Institute, Dehradun.

3. Dabral, Aman. **Analysis of genetics diversity and efficacy of biocontrol agents on growth parameters in *Grevillea robusta* A cunn**. (Dr. M S Bhandari, Dr. Rama Kant and Dr. Shailesh Pandey), Department of Forest Genetics, Forest Research Institute, Dehradun.

4. Mehta, Nidhi. **Molecular phylogeny of selected species of families Meliaceae and Anacardiaceae of Uttarakhand**. (Dr. Anup Chandra and Dr. Ajay Thakur), Department of Forest Biotechnology, Forest Research Institute, Dehradun.

5. Pandey, Shachi. **Soil erosion vulnerability and water quality under different land use in sub watershed of Tons river**. (Dr. V P Panwar, Dr. Raman Nautiyal and Dr. Parmanand Kumar), Department of Forest Ecology and Environment, Forest Research Institute, Dehradun.

6. Ramola, Gaurav Chand. **Bio-ecology of *Xylotrechus basifuliginosus* Heller, (Coleoptera: Cerambycidae: Clytini) on Kharus oak, *Quercus semecarpifolia* Smith, in Chakrata Forest Division, Uttarakhand**. (Dr. Arup Pratap Singh), Department of Forest Entomology, Forest Research Institute, Dehradun.

7. Ravindra Singh. **Contemporary gene flow and analysis of mating system in *Rhododendron arboreum* Sm Using SSR markers**. (Dr. Santan Barthwal, Dr. H S Ginwal and Dr. Manisha Thapliyal), Department of Forest Biotechnology, Forest Research Institute, Dehradun.

8. Sonam Kumari. **Ethno-botanical studies of Baijnath Region of Himachal Pradesh**. (Dr. Sandeep Sharma and Dr. Bhupender Dutt), Department of Non Wood Forest Products, Forest Research Institute, Dehradun.

9. Yadav, Ronak. **Comparative wood anatomy and systematics of family Moraceae**. (Dr. Sangeeta Gupta), Department of Forest Botany, Forest Research Institute, Dehradun.

BIOLOGICAL SCIENCES

Biochemistry

1. Jaswinder Singh. **Genetic polymorphism of ABCA1, INPPL1 and LIPC genes and risk of type 2 diabetes**. (Dr. Jasbir Singh), Department of Biochemistry, Kurukshetra University, Kurukshetra.

2. Vikas Kumar. **Genetic polymorphism of MT1A, UTS2 and RETN genes and risk of Type 2 diabetes**. (Dr. Jasbir Singh), Department of Biochemistry, Kurukshetra University, Kurukshetra.

Botany

1. Ghosh, Sandeep. **Studies on effect of drought, salinity and heavy metals on seed protein fractions of *Cicer arietinum* L.** (Dr. Yogesh Kumar and Dr. N. K. Matta), Department of Botany, Kurukshetra University, Kurukshetra.

Zoology

1. Amit Kumar. **Population status and ecology of greater flamingo (*Phoenicopterus roseus*) in selected wetlands of Haryana, India**. (Dr. Sarita Rana), Department of Zoology, Kurukshetra University, Kurukshetra.

EARTH SYSTEM SCIENCES

Geology

1. Rahman, Tabish. **Lithological control on the estimation of geomechanical properties of lower Gondwana coal measure rocks of India**. (Prof. Kripamoy Sarkar), Department of Applied Geology, Indian Institute of Technology, Dhanbad.

Geophysics

1. Ray, Amit Kumar. **Enhanced seismic characterization of deltaic channel sands using attribute analysis and machine learning**. (Prof. Saumen Maiti), Department of Applied Geophysics, Indian Institute of Technology, Dhanbad.

ENGINEERING SCIENCES

Computer Science & Engineering

1. Prasannababu, Devarapalli. **Energy and coverage aware algorithms for mobile wireless sensor networks**.

(Prof. Tarachand Amgoth), Department of Computer Science & Engineering, Indian Institute of Technology, Dhanbad.

Electrical & Electronics Engineering

1. Bhardwaj, Ravindra. **Modeling and optimal operation of biogas plant for cooking and generation of electricity**. (Prof. A K Saxena and Prof. G S S Babu), Department of Electrical Engineering, Dayalbagh Educational Institute, Agra.

2. Chaudhary, Akash Singh. **Health monitoring of solar PV distributed generation system using soft computing approach**. (Prof. D K Chaturvedi), Department of Electrical Engineering, Dayalbagh Educational Institute, Agra.

3. Dasgupta, Suryendu. **Electric field estimation and optimization of high voltage apparatus**. (Prof.Arijit Baral), Department of Electrical Engineering, Indian Institute of Technology, Dhanbad.

4. Madhab, Snigdha. **Detection of emotional aspects from human EEG signals using mutual information**. (Prof. Debjani Mitra), Department of Electronic Engineering, Indian Institute of Technology, Dhanbad.

5. Prince. **Development of artificial intelligence-based energy efficient control of induction motor drive**. (Prof. Ananda Shankar), Department of Electrical Engineering, Indian Institute of Technology, Dhanbad.

6. Rai, Amit. **Development of a deterministic deep learning model for improving solar power forecasting**. (Prof. Kartick Chandra), Department of Electrical Engineering, Indian Institute of Technology, Dhanbad.

7. Rai, Mritunjay. **Development and comparison of algorithms for real-time applications using thermal images**. (Prof. Tanmoy Maity), Department of Electrical Engineering, Indian Institute of Technology, Dhanbad.

8. Rao, Vartika. **Development of sequential and combinational integrated photonic logic circuit**. (Prof. Sanjoy Mandal), Department of Electrical Engineering, Indian Institute of Technology, Dhanbad.

9. Sharan, Ahna. **Theoretical investigation of the performance of quantum dot-based intermediate band solar cells**. (Prof. Jitendra Kumar), Department of Electronic Engineering, Indian Institute of Technology, Dhanbad.

Environmental Science and Engineering

1. Shweta Kumari. **Evaluating the effects of on-road and off-road heavy metal toxicity due to diesel vehicles on air quality in tier II type city**. (Prof. Manish Kumar Jain and Prof. Suresh Pandian E), Department of Environmental Science & Engineering, Indian Institute of Technology, Dhanbad.

Fuel & Mineral Engineering

1. Bhupendra Singh. **Beneficiation of high sulphur North-East coal**. (Prof. Barun Kumar Nandi), Department of Fuel, Mineral & Metallurgical Engineering, Indian Institute of Technology, Dhanbad.

2. Nanda, Sagarika. **Studies on beneficiation of complex lead - zinc sulphide ore using froth flotation process**. (Prof. Shravan Kumar and Prof.Narayan Rittapa Mandre), Department of Fuel, Mineral & Metallurgical Engineering, Indian Institute of Technology, Dhanbad.

3. Suman, Sanjeet Kumar. **Reverse flotation of iron ore fines using emulsified reagents**. (Prof. Shravan Kumar), Department of Fuel, Minerals & Metallurgical Engineering, Indian Institute of Technology, Dhanbad.

Mechanical Engineering

1. Jain, Ankit. **Engineered surfaces on titanium alloy and functional characterization for clinical applications**. (Prof. Vivek Bajpai), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.

2. Agarwal, Lakhan. **Development of an eco-friendly grain dryer based on desiccant dehumidification**. (Dr. Ashok Yadav), Department of Mechanical Engineering, Dayalbagh Educational Institute, Agra.

3. Dhakry, Nonihal Singh. **Some aspects of policy structuring for strategic planning towards sustainable integrated renewable energy use for rural India**. (Dr. Ashok Yadav and Dr. Sant Kumar Gaur), Department of Mechanical Engineering, Dayalbagh Educational Institute, Agra.

4. Sanjeev Kumar. **Experimental investigation of thermo- hydraulic performance of solar air heater with and without artificial roughness**. (Prof. Randip Kumar Das and Prof. Radhakanta Koner), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.

5. Sawan Kumar. **Energy efficiency improvement and fault isolation of a hydraulic system used in heavy earth moving machinery**. (Prof. Sanjoy K. Ghoshal and Prof. Jayanta Das), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.

6. Yadav, Pushpendra. **Research studies on fused deposition additive manufacturing 3D printer system**. (Prof. Ranul Swarup Sharma and Dr. Ankit Sahai), Department of Mechanical Engineering, Dayalbagh Educational Institute, Agra.

Mining & Machinery Engineering

1. Layek, Shirshendu. **Computer aided 3D reconstruction technique for assessing volumetric change in open-pit and overburden dump stability using UAV imagery**. (Prof.Vasanta Govind Kumar Villuri and Prof. Radhakanta Koner), Department of Mining Engineering, Indian Institute of Technology, Dhanbad.

2. Prasad, M VNS. **Longwall strata behaviour analysis using real-time shield pressure monitoring data for improving equipment utilisation and maintenance**. (Prof.

A. K. Mishra and Prof. Debasis Deb), Department of Mining Engineering, Indian Institute of Technology, Dhanbad.

MATHEMATICAL SCIENCES

Mathematics

1. Bera, Samadrita. **Estimating parameters of lifetime distributions with applications to multicomponent reliability model**. (Prof. Nabakumar Jana), Department of Mathematics and Computing, Indian Institute of Technology, Dhanbad.

2. Dutta, Rachaita. **Wave propagation characteristics and thermo-mechanical interaction in porous structures**. (Prof. Shishir Gupta), Department of Mathematics and Computing, Indian Institute of Technology, Dhanbad.

3. Om Prakash. **A study of some mathematical models of nanofluid flow problems**. (Prof. Pentyala Srinivasa Rao), Department of Mathematics and Computing, Indian Institute of Technology, Dhanbad.

4. Pankaj Kumar. **Modelling and analysis of mucus transport in diseased airways: Effects of constriction of airway diameter**. (Prof. Agam Prasad Tyagi), Department of Mathematics, Dayalbagh Educational Institute, Agra.

5. Pradeep Kumar. **Optimization techniques for the quadratic assignment problems**. (Prof. Shambhu Sharma), Department of Mathematics, Dayalbagh Educational Institute, Agra.

6. Shekhar, Kapil. **Modelling and analysis of the mechanism of human joint function: Effects of accumulation of HA molecules during motion**. (Dr. Agam Prasad Tyagi), Department of Mathematics, Dayalbagh Educational Institute, Agra.

7. Shivangi Kumari. **A study of influence of various flow parameters of bile in human biliary system**. (Prof. Shailendra Pratap Singh), Department of Mathematics, Dayalbagh Educational Institute, Agra.

8. Yadav, Swati. **On the study of fuzzy automata: Algebraic and categorical approaches**. (Prof. Seetala Prasad Tiwari), Department of Mathematics and Computing, Indian Institute of Technology, Dhanbad.

9. Yogendra Singh. **Mathematical models involving mutualism among species**. (Prof. Ravinder Kumar), Department of Mathematics, Dayalbagh Educational Institute, Agra.

PHYSICAL SCIENCES

Chemistry

1. Hooda, Mona. **Functionalized dicarbonyl compounds as versatile synthons in organic transformations**. (Dr. Ranjana Aggarwal), Department of Chemistry, Kurukshetra University, Kurukshetra.

2. Mahour, Sushmita. **Adsorption efficacy of polymerized seed composite for remediation of heavy metals and physico chemical parameters of water**. (Prof. Shalini Srivastava and Dr. Sudhir Kumar Verma), Department of Chemistry, Dayalbagh Educational Institute, Agra.

3. Priya Kumari. **Biophysical and spectroscopic studies of anthraquinone derivatives with G – quadruplex DNAs**. (Prof. Surat Kumar and Prof. Ritu Barthwal), Department of Chemistry, Dayalbagh Educational Institute, Agra.

4. Sen, Tithi. **Enhancing the conductivity of nickel oxide solid thin films through limited doping of transition metal cations**. (Prof. G. Udayabhanu and Prof.Rajalingam Thangavel), Department of Chemistry and Chemical Biology, Indian Institute of Technology, Dhanbad.

5. Sengar, Manish Singh. **Development of nano-electrochemical sensors for the study of selected medicinal compounds**. (Prof. Soami Piara Satsangee and Prof.Rajeev Jain), Department of Chemistry, Dayalbagh Educational Institute, Agra.

6. Sharma, Chanchal. **Green synthesis and characterization of bimetallic and trimetallic nanoparticles using plant extract and evaluation of enhancement in antioxidant bio efficacy**. (Prof. Soami Piara Satsangee), Department of Chemistry, Dayalbagh Educational Institute, Agra.

7. Sharma, Richa. **Biosorbed ferro nano-particles as potential agents for the removal of synthetic food dyes in effluents**. (Dr. Sudhir Kumar Verma and Prof. Soami Piara Satsangee), Department of Chemistry, Dayalbagh Educational Institute, Agra.

8. Singh, Rohini. **A study on measurement distribution and characterization of biochemical constituents of atmospheric aerosol over Semiarid Region of Indo Gangetic Basin**. (Dr. Ranjit Kumar), Department of Chemistry, Dayalbagh Educational Institute, Agra.

9. Sinhababu, Mohua. **Enhancing colour stability of iron oxide pigments for industrial applications**. (Prof. G Udayabhanu), Department of Chemistry and Chemical Biology, Indian Institute of Technology, Dhanbad.

Physics

1. Sahay, Suman. **Mechanical, tribological and corrosion resistive behaviour of electrodeposited nickel incorporated diamond-like carbon nanocomposite thin films**. (Prof. Asit Kumar Kar), Department of Physics, Indian Institute of Technology, Dhanbad.

2. Vandana. **Nanopatterning of semiconductor surface using ion beam irradiation**. (Dr. Rajesh Kharab), Department of Physics, Kurukshetra University, Kurukshetra.

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GOKHALE INSTITUTE OF POLITICS AND ECONOMICS
(Deemed to be University u/s 3 of the UGC Act, 1956), **PUNE – 411 004**

RECRUITMENT OF FACULTY

Gokhale Institute of Politics and Economics is an educational & research Institute established in 1930 under the aegis of Servants of India Society. The Institute is widely recognized in the country as an advanced centre for the study and research in Economics and allied subject fields. The Institute is seeking applications for the following posts:

Sr.	Name of Post	Nature	No. of Posts	Category
Posts sanctioned under Government of Maharashtra:				
1	**Professor**	Regular	1	Open 1
2	**Associate Professor**	Regular	4	SC 1 ST 1 Open 2
3	**Assistant Professor**	Regular	2	SC 1 ST 1
4	**Assistant Librarian**	Regular	1	Open 1
Posts Self-Financed by the Institute:				
5	**Assistant Professor**	Contractual	3	Open 3
6	**Chief Warden (Female)**	Contractual	1	Open 1

For further details on eligibility criteria, pay, application form etc. visit **www.gipe.ac.in.**

Last date for receipt of applications – **May 02, 2023.**

REGISTRAR

March 14, 2023

WANTED

Applications are invited for the **Principal** to be filled in **Manjara Charitable Trust`s Abhinav College of Education, Latur,** Dist. Latur (B.Ed. Permanent Non-Granted). Eligible Candidates should submit their application along with all necessary documents **within 15 days** from date of publication of this Advertisement by Registered Post only.

Sr. No.	Position	No. of Post	Reservation	Nature of Appointment
1	Principal	01	Unreserved	Full Time

- **Educational Qualification: Principal**
1. Postgraduate Digree in Arts/Sciences/Social Sciences/Humanities/Commerce with minimum 55% Marks.
2. M.Ed. with Minimum 55% Marks.
3. Ph.D. In Education or in any Pedagogic Subject offered in the Institution.
4. 10 Years of Teaching Experience in a Secondary Teacher Education Institution.

Desirable: Diploma or Digree in Educational Administration or Educational Leadership.

Scales & Allowances

Scales as per UGC, Maharashtra Govt. and SRTMU, Nanded rules from time to time.

Note:-
1. Prescribed application form is available on the University website : **(www.srtmun.ac.in).**
2. No T.A.&D.A. will be paid to candidates to attend the interview.
3. Eligible Candidates those who are already in service should submit their application through proper channel.
4. All attested Xerox copies of certificates and other relevant Documents should be attached to the Application form.

Address for Correspondence :

Principal
Abhinav College of Education
MIDC, Plot No. P-43, Barshi Road,
Latur - Pin-413512

Nana Vanjare Vidyanagari
New Education Society, Lanja's
ARTS, COMMERCE & SCIENCE COLLEGE, LANJA
Dist. Ratnagiri – 416701

APPLICATIONS ARE INVITED FOR THE FOLLOWING **CLOCK HOUR BASIS** POSTS FOR THE ACADEMIC YEAR 2023-24

AIDED

Sr. No.	Cadre	Subject	Total No. of C.H.B. Posts	Category
1.	Assistant Professor	Marathi	02	2 -OPEN
2.	Assistant Professor	Chemistry	04	4- OPEN
3.	Assistant Professor	Botany	02	2- OPEN
4.	Assistant Professor	Zoology	02	2- OPEN
5.	Assistant Professor	Commerce	01	1- OPEN
6.	Assistant Professor	Mathematics	02	2- OPEN
7	Assistant Professor	Political Science	02	2- OPEN

The above posts are open to all, however, candidates from any category can apply for the post.

Reservation for women will be as per University Circular **No. BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 05th July, 2019.**

Candidates having knowledge of Marathi will be preferred.

"Qualification, Pay Scales and other requirement are as prescribed by the UGC Notification dated 18th July, 2018, Government of Maharashtra Resolution No. Misc-2018/C.R.56/18/UNI-1 dated 8th March, 2019 and University Circular No. TAAS(CT)/ICD/2018-19/1241 dated 26th March, 2019 and revised from time to time". Remuneration of the above post will be as per University Circular No. TAAS (CT) /01/2019-20 dated 02nd April, 2019 and University Circular No. CTAU/23/2021-2022 dated 25th January, 2022.

The Government Resolution & Circular are available on the website **: mu.ac.in**

Application with full details should reach the **PRINCIPAL, Nana Vanjare Vidyanagari, New Education Society, Lanja's, ARTS, COMMERCE & SCIENCE COLLEGE, LANJA, Dist. Ratnagiri - 416701 (Maharashtra) within 15 days** from the date of publication of this advertisement. **This is University approved advertisement.**

Sd/-
PRINCIPAL

R. E. Society's
R. P. GOGATE COLLEGE OF ARTS & SCIENCE
AND R. V. JOGALEKAR COLLEGE OF COMMERCE, RATNAGIRI- 415 612

APPLICATIONS ARE INVITED FOR THE FOLLOWING POSTS FROM THE ACADEMIC YEAR 2023-2024
AIDED

Sr. No.	Cadre	Subject	No. of Posts	Total No. of Posts	Post Reserved for
1	Principal	--	01	01	01 – OPEN
2	Assistant Professor	Economics	01		02 – ST
3	Assistant Professor	Botany	01	05	02 - OBC
4	Assistant Professor	Accountancy	02		01 - EWS
5	Assistant Professor	Physics	01		

The advertisement is approved subject to the final decision in the Writ Petition No. 12051/2015.

The posts for the reserved category candidates will be filled in by the same category candidates (Domicile of State of Maharashtra) belonging to that particular category only.

Reservation for Women will be as per University Circular No. BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 05th July, 2019.

Candidates having knowledge of Marathi will be preferred.

"Qualification, Pay Scales and other requirement are as prescribed by the UGC Notification dated 18th July, 2018, Government of Maharashtra Resolution No. Misc-2018/C.R.56/18/UNI-1 dated 8th March, 2019 and University circular No. TAAS/(CT)/ICD/2018-19/1241 dated 26th March, 2019 and revised from time to time".

The Government Resolution & Circular are available on the website : **mu.ac.in**

Applicants who are already employed must send their application through proper channel. Applicants are required to account for breaks, if any, in their academic career.

Candidates belonging to reserved categories should send two Xerox copies of their application along with the attested copy of the Caste Certificate to the Deputy Registrar, Special Cell, University of Mumbai, Mumbai – 400 032.

Application with full details should reach the **SECRETARY, RATNAGIRI EDUCATION SOCIETY, O. P. JINDAL CHATTRAVAS, NEAR GOGATE-JOGALEKAR COLLEGE, RATNAGIRI - 415 612 within 15 days** from the date of publication of this advertisement.
This is University approved advertisement.

Sd/-
SECRETARY

Barshi Shikshan Prasarak Mandal's
SHRIMAN BHAUSAHEB ZADBUKE MAHAVIDYALAYA, BARSHI
Latur Raod, Zadbuke Marg, Barshi - 413401
Tal. Barshi, Dist. Solapur (Maharashtra State); (Phone No. 02184 – 222566)
NAAC Reaccredited 'B' Grade
(Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)

AIDED (NON-MINORITY)

Applications are invited for the Post of **PRINCIPAL** from the Academic Year 2023-24.

Sr. No.	Subject Designation	Total Vacant Post
1.	Principal	01

Instructions: -

1. The above post is open to all, however, candidates from any category can apply for the post.
2. Educational Qualification and other requirements are as prescribed by the UGC Notification dated 18th July, 2018, Govt. of Maharashtra Resolution No. Misc2018/C.R.56/18 UNI-1 dated 8th March, 2019 and University Circular No. PAHSUS/Estt./7th pay/20192285/dated 25th March, 2019.
3. Candidates should submit their Academic Research Score (Academic Performance Indicator) report with related documents. (Only for the post of Principal).
4. A relaxation of 5% shall be allowed at the Bachelors as well as at the Masters Level for the candidates belonging to SC/ST/OBC (Non-Creamy Layer) Differently-abled for the purpose of eligibility and assessing good academic record for direct recruitment.
5. Reserved candidates, who are domiciled out of Maharashtra State, will be treated as open Category candidates.
6. Reserved candidates should also send a copy of their application to the Deputy Registrar, Special Cell, Punyashlok Ahilyadevi Holkar Solapur University, Solapur.
7. Application received after the last date will not be considered. The College will not be responsible for postal delay, if any.
8. Reservation for women and disable persons will be as per the Govt. norms.
9. Reserved category candidates shall produce the Caste Validity Certificate as per the directives issued by the State Government vide Circular No. BCC-201/Pra.Kra.1064/2011/16B dated 12/12/2011.
10. Reserved category candidates (except SC/ST) shall produce Non-Creamy Layer Certificate at the time of interview.
11. Applicants who are in service must send their application through proper channel.
12. Applications are required to account for breaks, if any, in their academics' career.
13. Incomplete application will not be entertained.
14. T.A., D.A. will not be paid for attending the interview.
15. Application with full details should reach through the proper channel to the Secretary, Barshi Shikshan Prasarak Mandal, Barshi, Tal. Barshi, Dist. Solpur – 413401 **within 30 days** from the date of publication of this advertisement. Incomplete application will not be entertained.
16. All the Terms & Conditions are applicable as mentioned in the NOC letter No. JDHESolapur/NOC/ 2019/ 10 dated 25/03/2013 from Hon. Deputy Secretary, Higher and Technical Education Dept, Govt. of Maharashtra, Mumbai and letter No. DJD/HE/SDS/2023/517 dated 28/03/2023, Hon. Deputy Director of Higher Education, Solapur Division, Solapur.
17. Please note that the recruitment procedure initiated by this advertisement is subject to the decision by Hon. Bombay High-Court, Aurangabad, Bench in Writ Petition No. 12051/2015.
18. **This is University approved advertisement.**

Place: Barshi   **Secretary**
Date :   /05/2023   **Barshi Shisha Prasarak Mandal**
                                                                                         Tal. Barshi. Dist. Solpaur - 413401

Barshi Shikshan Prasarak Mandal's
SHRIMAN BHAUSAHEB ZADBUKE MAHAVIDYALAYA, BARSHI
Latur Raod, Zadbuke Marg, Barshi - 413401
Tal. Barshi, Dist. Solapur (Maharashtra State); (Phone No. 02184 – 222566)
NAAC Reaccredited 'B' Grade
(Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)

AIDED (NON-MINORITY)

Applications are invited from eligible candidates for the following Post of **Assistant Professor.**

Sr. No.	Subject Designation	No-Objection Certificate given by Govt. of Maharashtra Vacant Post	No-Objection Certificate given by Govt. of Maharashtra Post Reservation
1	Chemistry	01	OBC – 01

Instructions: -

1. Open post is open to all, however, candidates from any category can apply for the post.
2. Educational Qualification and other requirements are as prescribed by the UGC Notification dated 18th July, 2018, Govt. of Maharashtra Resolution No. Misc 2018/C.R.56/18 UNI-1 dated 8th March, 2019 and University Circular No. PAHSUS/Estt./7th pay/20192285/dated 25th March, 2019.
3. A relaxation of 5% shall be allowed at the Bachelors as well as at the Masters Level for the candidates belonging to SC/ST/OBC (Non-Creamy Layer) Differently-abled for the purpose of eligibility and assessing good academic record for direct recruitment.
4. Reserved candidates, who are domiciled out of Maharashtra State, will be treated as open Category candidates.
5. Reserved candidates should also to send a copy of their application to the Deputy Registrar, Special Cell, Punyashlok Ahilyadevi Holkar Solapur University, Solapur.
6. Application received after the last date will not be considered. The College will not be responsible for postal delay, if any.
7. Reservation of PWD, Women and Disable persons will be as per the Govt. norms.
8. Reserved category candidates shall produce the Caste Validity Certificate as per the directives issued by the State Government vide Circular No. BCC-201/Pra.Kra.1064/2011/16B dated 12/12/2011.
9. Reserved category candidates (except SC/ST) shall produce Non-Creamy Layer Certificate at the time of interview.
10. Reservation for VJNT Categories is internally transferable.
11. Applicants who are in service must send their application through proper channel.
12. Applications are required to account for breaks, if any, in their academics career.
13. T.A.,D.A. will not be paid for attending the interview.
14. Application with full details should reach through the proper channel to the Secretary, Barshi Shikshan Prasarak Mandal, Barshi to The Principal, Shriman Bhausaheb Zadbuke Mahavidyalaya, Barshi, Taluka – Barshi, Dist. Solpur – 413401 **within 15 days** from the date of publication of this advertisement.
15. Incomplete application will not be entertained.
16. All the Terms & Conditions are applicable as mentioned in the NOC letter No. JDHESolapur / NOC / 2019/10 dated 25/03/2013 from Hon. Deputy Secretary, Higher and Technical Education Dept, Govt. of Maharashtra, Mumbai and letter No. DJD/HE/SDS/2023/517 dated 28/03/2023, Hon. Deputy Director of Higher Education, Solapur Division, Solapur.
17. All the Terms and Conditions are applicable as mentioned in the GR Dated 12/11/2021 from Higher and Technical Education Department of Government of Maharashtra.
18. Please note that the recruitment procedure initiated by this advertisement is subject to the decision by Hon. Bombay High-Court, Aurangabad, Bench in Writ Petition No. 12051/2015.
19. **This is University approved advertisement.**

Secretary / Principal
Barshi Shikshan Prasarak Mandal

Place: **Barshi**
Date : **/05/2023**

Tal. Barshi. Dist. Solpaur - 413401