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# UNIVERSITY NEWS

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## Announcement

A **Special Number of the University News** on the theme '**Digital Transformation in Higher Education**' is being brought out in the month of October, 2023 on the occasion of South Zone Vice Chancellors' Meet-2023-24 which is scheduled to be held on **October 26-27, 2023 at Visvesvaraya Technological University, Belagavi, Karnataka**. The **Special Issue** will cover articles by eminent educationists and policymakers. Readers of the University News are also invited to contribute to the Special Number by submitting papers/articles on the above theme by **October 15, 2023**. The papers will be published in the Issue subject to fulfillment of AIU Norms for publication as given on the AIU Website and on the approval of the Editorial Committee of the University News. The Subthemes for the Special Issue are:

- *The Future of Credentialling: Digital badges, Micro-Credentialing and Online Degree.*
- *AI and Analytics in Higher Education: Transforming Decision Making.*
- *Faculty Development & Digital Pedagogies: Empowering Educators.*

Interested Scholars may contribute articles by stipulated date keeping in view the following guidelines for contribution:

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Manuscripts including tables, figures, and references should be around 3000-4000 words for articles, 2000 – 5000 words for Convocation Addresses, 1000 words for Book Reviews, and 600 words for Communications. All the manuscripts should be typed in double-space with 12-point font and ample margin on all sides on A 4-size paper.

The cover page should contain the title of the paper, author's name, designation, official address, address for correspondence, contact numbers, and e-mail address.

The main text should not contain footnotes. References should be given at the end of the manuscript and should contain only those cited in the text of the manuscript. The full reference should be listed at the end in alphabetical order running the following style:

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

### Articles

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### Chapter in a Book

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

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The Editor is free to make editorial corrections in the content as well as the title of the article and change the title in accordance with the content of the article as well as the overall theme of the Issue.

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**Editor, University News**

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#Let'sCreateAtmanirbharBharatTogether

# Regional Analysis of the 2023 NIRF University Rankings: Unveiling Geographical Trends and Patterns

Priyan K M\* and A Ranganath\*\*

India's geography unfolds into distinct regions, each with its own cultural and historical essence. South India boasts a tropical climate and Dravidian heritage, while the North is defined by Indo-Aryan influences and the majestic Himalayas. East India's coastal plains nurture diverse languages and traditions, contrasting with the arid landscapes and urban hubs of the West. Central India pulsates with a blend of cultures, and the Northeast showcases unique ethnicities and lush landscapes, from Assam's hills to Nagaland's tribal richness. These divisions encapsulate India's captivating diversity and intricate identity.

The higher education system within India presents itself as a multifaceted fabric, encompassing an array of diverse regions, each marked by its own individual attributes and contributions. In this context, the present study assumes the task of conducting a comprehensive comparative analysis among universities situated across South India, North India, East India, West India, Central India, and North East India, with a specific focus on the context of the NIRF ranking for the year 2023. Through a meticulous exploration of critical parameters including Teaching, Learning and Resources (TLR), Research and Professional Practice (RP), Outreach and Inclusivity (OI), Graduation Outcomes (GO), and Perception (PR). This research endeavors to illuminate the distinctive strengths and challenges encountered by institutions of higher education dispersed across these diverse geographical areas.

The National Institutional Ranking Framework-2023 (NIRF-2023) University Rankings were examined in this research paper to reveal regional disparities and influential factors in Indian higher education. By categorizing universities into six regions, their representation in the top 100 ranks was analyzed, highlighting trends and disparities. Additionally, the most significant parameters impacting rankings were identified, with "Research, professional practice, and collaborative performance (RPC)" being found to hold the utmost importance. The dominance of Southern Indian universities in the top ranks was uncovered, while the North-Eastern and Central regions lagged. This exploration provides insights into regional dynamics and factors shaping university rankings, aiding policymakers, and educators in enhancing higher education quality across India.

\*Assistant Professor, ICAI University, Kamalghat, Mohanpur, Agartala, Tripura- 799210

\*\*Professor, ICAI University Kamalghat, Mohanpur, Agartala, Tripura- 799210

## **NIRF University Ranking Metrics within the Context of NEP-2020**

The convergence of the National Institutional Ranking Framework (NIRF) and the National Education Policy (NEP) 2020 has brought about a transformation, in how we evaluate and perceive education in India. The NIRF has served as a guiding principle since its establishment in 2015. The NEP 2020 has redefined its purpose by introducing a set of criteria that prioritize development and improvement in quality. This shift in approach aligns with the vision of positioning India as a hub for education as the NIRF metrics inspired by the NEP focus on Teaching, Learning, and Resources (TLR) Research and Professional Practice (RP) Graduation Outcomes (GO) Outreach and Inclusivity (OI) and Perception (PR).

The influence of NEP---2020 is visibly demonstrated through the introduction of metrics. TLR delves into the core essence of education by emphasizing innovative learning methods. RP acknowledges the significance of research and innovation to bridge the gap between academia and real-world challenges. GO assesses graduates' employability. Entrepreneurial acumen, in line with the policy's emphasis on capabilities. OI embodies inclusivity reflecting NEP's commitment to ensuring access, to education for all. The retention of perception recognizes both perceptions' impact while encouraging institutions to substantiate it with substance.

Overall, the coming together of the NIRF and the NEP-2020 marks the beginning of a chapter, in education. The metrics encompass the core values of the NEP covering areas such as inclusivity, employability, and research excellence. This combination not only pushes institutions to adapt and grow but also propels India toward achieving global recognition as an education powerhouse. Objectives of the Study are:

- To measure the percentage of universities in NIRF ranking by regions in India and compare regional participation in the top 100 ranks.
- To find the most influential parameters in NIRF ranking by comparing scores in the University ranking report.

## **Review of Related Literature**

Naveen and Palanichamy (2023) present

strategies for improving an institution's ranking in the NIRF (National Institutional Ranking Framework) to achieve a position within the top 200. The study provided valuable guidance on areas such as research publication, budget allocation, staff development, and facilities improvement. By following these recommendations, institutions can aim to enhance their research output, overall performance, and reputation, ultimately increasing their chances of securing a place among the top 200 in the NIRF ranking.

Kumar et al., (2023) investigated the returns on investment (ROI) from India's top ten leading university libraries in terms of research publication and found the significance of libraries in research publication and support decision-making, collection development, and institutional analysis. Moreover, it emphasizes the library's role in enhancing an organization's status and obtaining accreditation.

Ahirwal and Kumar (2023) discovered that the application of the Analytic Hierarchy Process (AHP) model to rank educational institutions based on NIRF criteria yielded valuable insights. The analysis emphasized the varying significance of different criteria, thereby influencing the selection process. By illuminating the importance of diverse parameters within the NIRF framework, the research contributed to the enhancement of transparency and objectivity throughout the selection process.

## **The Study**

The research used an analytical method to examine the 2023 NIRF University rankings. As a secondary source, data from the NIRF website was collected to examine variations in performance between universities in various regions and their placements on the list. Southern, Northern, Eastern, Western, Central, and North-Eastern were the six regions into which the 1112 universities were divided. The total number of universities in each region that were counted in the NIRF ranking was determined. To make comparisons, we calculated percentage scores.

To ascertain the most influential parameters within the NIRF ranking framework, an assessment of the discriminative power of each parameter was undertaken. The rank list of the top 100 universities was partitioned into two distinct groups: the initial 25 ranks and the final 25 ranks. Subsequently, a

comprehensive evaluation of the discriminatory strength of individual parameters was pursued through the computation of t-Values for each parameter.

### Analysis and Interpretation

Objective 1: 'To measure the percentage of universities in NIRF ranking by regions in India and compare regional participation in the top 100 ranks'

Across the expanse of India, a network of 1112 universities forms the bedrock of higher education. These institutions are dispersed throughout the diverse geographical regions of the nation. The Southern region has 221 universities, known for distinct academia and vibrant culture. The Western region has 167 universities, enriching education. The Northern region includes 293 universities, fostering intellectual growth. The North-Eastern quadrant holds 71 universities, enhancing uniqueness. The Eastern region comprises 144 universities, a hub of academia and culture. Lastly, the Central region hosts 216 universities, centers of learning and innovation. Table 1 provides a comprehensive overview of the distribution of universities listed within the top 100 ranks, segmented by region. It also highlights the corresponding percentage representation of universities from each region in the NIRF ranking.

**Table.1. Percentage of Regional-wise Participation in NIRF Ranking**

| Region        | Total Universities | Listed in First 100 Ranks | Percentage Score |
|---------------|--------------------|---------------------------|------------------|
| Southern      | 221                | 44                        | 19.91            |
| Western       | 167                | 13                        | 7.78             |
| Northern      | 293                | 21                        | 7.17             |
| North-Eastern | 71                 | 4                         | 5.63             |
| Eastern       | 144                | 8                         | 5.56             |
| Central       | 216                | 10                        | 4.63             |

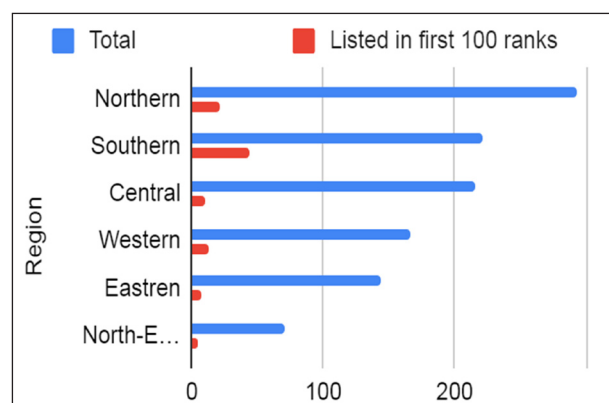
Table.1. shows the number of universities listed in the NIRF ranking list and the total number of universities in each region. In the following order, universities are ranked from top percentage score to lowest in each region as North-East, East, West,

Central, South, and North-East. In the NIRF ranking, universities are ranked from highest to lowest as South, North, West, Central, East, and North-East.

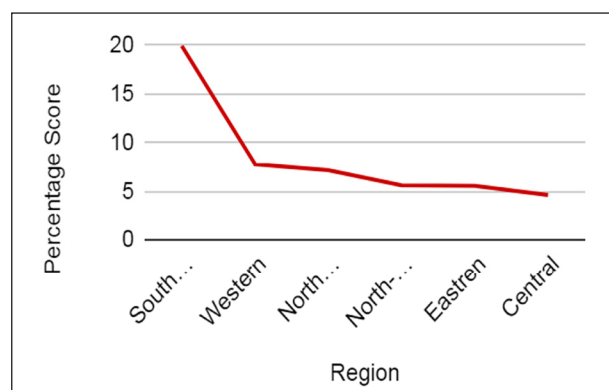
#### Percentage of Regional-wise Participation:

The South has the top representation at 19.91%, followed by the West at 7.78%, North at 7.17%, North-East at 5.63%, East at 4.63%, and Central at 4.63%.

**Graph-1: Regional-wise List of Total Universities and Universities listed in NIRF Ranking**



**Graph-2: Region-wise distribution of the Percentage of Representation in NIRF Ranking.**



Graph.1. depicts the relationship between the overall number of universities and the corresponding count of universities listed in the NIRF rank list. The number of universities in the northeast region is lowest others are in the increasing order in East, West, Central, South, and North. However, the number of universities featured in the NIRF ranking decreases in the following order South, North, West, Central, East, and Northeast.

Graph.2. allocates the universities based on their regional participation, with the percentages



distributed as South with a representation of 19.91%, West at 7.78%, North at 7.17%, North-East at 5.63%, East at 4.63%, and Central at 4.63%. The comparative analysis illustrates varying percentages of regional participation among universities in different geographic areas. The southern region acquired the top position at 19.91%, with a notable presence of universities. In contrast, the West, North, North-East, East, and Central regions exhibit comparatively lower percentages of 7.78%, 7.17%, 5.63%, 4.63%, and 4.63%, respectively. This discrepancy suggests variations in the concentration of universities across different parts of the country, with the Southern region leading in representation.

**Objective 2:** *“To find the most influential parameters in NIRF ranking by comparing scores in the University ranking report.”*

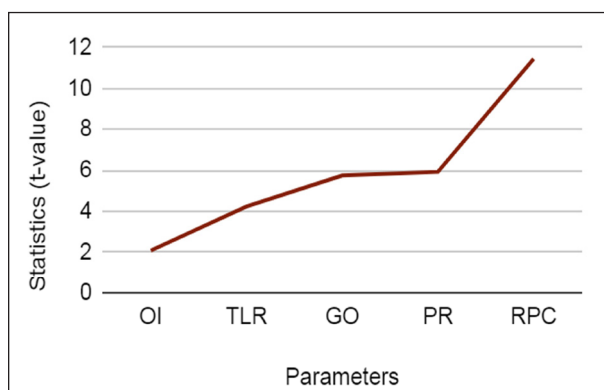
In order to determine the most influential parameters within the NIRF ranking framework, an assessment was conducted regarding the discriminative power of each parameter. The rank list of the top 100 universities was divided into two distinct groups: the initial 25 ranks and the final 25 ranks. Subsequently, a comprehensive evaluation of the discriminatory strength of individual parameters was pursued through the calculation of t-values for each parameter.

**Table 2: Relative Impact of Each Parameter in NIRF Ranking**

| Parameters                                                          | Statistics (t-value) | Df | p      |
|---------------------------------------------------------------------|----------------------|----|--------|
| OI (Outreach and inclusivity)                                       | 2.08                 | 52 | <0.042 |
| TLR (Teaching, learning and resources )                             | 4.23                 | 52 | <0.001 |
| GO (Graduation outcome)                                             | 5.74                 | 52 | <0.001 |
| PR (PERCEPTION)                                                     | 5.92                 | 52 | <0.001 |
| RPC (Research, professional practice and collaborative performance) | 11.44                | 52 | <0.001 |

Table.2. illustrates the relative impact of the factors in NIRF ranking follows an ascending sequence: OI (with a t-value of 2.08), TLR (with a t-value of 4.23), GO (with a t-value of 5.74), PR (with a t-value of 5.92), and RPC (with a t-value of 11.44).

**Graph 3 Depicts the Incremental Impact of Factors in NIRF Ranking, Arranged in Ascending Order: OI, TLR, GO, PR, and RPC.**



Graph.3.Relative Impact of Each Parameter in NIRF Ranking

The parameter related to teaching, learning, and resources has a t-value of 4.23. This suggests that there is a statistically significant relationship between the quality of teaching, learning, and available resources and the NIRF ranking. The RPC parameter has a high t-value of 11.44. This indicates a highly significant and strong relationship between research, professional practice, collaborative performance, and the NIRF ranking. This suggests that universities excelling in these areas tend to achieve higher rankings. The GO parameter has a t-value of 5.74, indicating a statistically significant relationship between graduation outcomes and the NIRF ranking. This implies that universities with better graduation outcomes have a stronger influence on their ranking. The OI parameter has a t-value of 2.08. While this value is lower compared to some other parameters, it still suggests a statistically significant relationship between outreach and inclusivity efforts and the NIRF ranking. The perception parameter has a t-value of 5.92. This indicates a significant relationship between how an institution is perceived and its NIRF ranking. Institutions with a positive perception tend to achieve higher rankings. In summary, the t-values in the table help you understand the strength and significance of each parameter's influence on the NIRF ranking. Higher t-values indicate stronger relationships, suggesting that parameters with higher t-values have a more substantial impact on the ranking. It's important to consider both the magnitude and statistical significance of these values when assessing the importance of each parameter in the context of university ranking.

## Findings and Discussion

1. Southern Indian universities exhibit a notable prevalence within the top 100 ranks of the NIRF University Ranking 2023, in contrast, the Northeastern and Central regions demonstrate relatively minimal engagement in these rankings.
2. The most determinant parameter of NIRF University ranking is Research, professional practice, and collaborative performance (RPC).

The comparison of the regional distribution of universities sheds light on their varying degrees of participation. Notably, the Southern region stands out with the highest percentage of universities at 19.91%, indicating a robust educational presence and significant academic activity in this area. In contrast, the Western region displays a moderate participation rate of 7.78%, while the Northern region closely follows at 7.17%. The North-Eastern region, characterized by its unique cultural tapestry, demonstrates a comparatively lower but still substantial involvement of 5.63%. Meanwhile, the Eastern and Central regions share a similar percentage of 4.63%, suggesting a parallel level of university representation.

This juxtaposition of percentages underscores the diverse educational landscape across India's regions. The higher participation in the Southern region might be attributed to historical, socio-economic, or developmental factors, while the varying lower percentages in other regions could be influenced by specific regional dynamics. The data not only highlights the disparities in regional university distribution but also serves as a starting point for further exploration into the underlying factors contributing to these variations. Such insights can potentially aid in shaping policies and initiatives to enhance educational access and quality across the nation.

Recognizing the relative influence of parameters that dictate the NIRF ranking holds significance. This analysis proves valuable for universities facing challenges, aiding them in pinpointing strengths and weaknesses, and formulating a strategic course of action. The parameter of Outreach and Inclusivity (OI), characterized by a t-value of 2.08. This relatively lower t-value suggests a statistically significant but comparatively weaker connection between outreach endeavors and inclusivity initiatives, and the over-

arching subject being investigated. While this indicates a notable link, the extent of influence is not as pronounced as with other parameters.

The parameter of Teaching, Learning, and Resources (TLR) takes the stage with a more substantial t-value of 4.23. This higher t-value signifies a statistically significant and stronger correlation between the quality of education, the learning experience offered, and the available resources. The elevated t-value underscores the heightened impact of these factors on the subject's dynamics.

The Graduation Outcome (GO) parameter is introduced, marked by a t-value of 5.74. This t-value implies a noteworthy and statistically significant relationship between graduation outcomes and the subject's overall characteristics. The robust t-value suggests that the success rates of students as they transition from education to the professional world wield considerable influence on the subject.

Both Perception (PR) and Research, Professional Practice, and Collaborative Performance (RPC) parameters emerge as prominent factors. PR boasts a substantial t-value of 5.92, indicating a significant correlation between how the subject is perceived and its overall impact. This highlights the weight of external perception in shaping the subject's evaluation.

However, the RPC parameter emerges as a standout with an exceptionally high t-value of 11.44. This remarkably strong t-value underscores an intensely robust and highly significant relationship between research endeavors, professional practices, collaborative performance, and the subject being examined. The weight of this parameter is indicative of its pivotal role in driving the subject's dynamics and outcomes. The RPC (Research, Professional Practice, and Collaborative Performance) parameter holds a key place in the NIRF ranking. It's important because it looks at how well universities do in research, applying knowledge practically, and working with others. This shows how much a university contributes to new ideas and real-world solutions. When a university scores well in RPC, it means they're not just teaching, but also actively making a positive impact through their work and collaborations. So, the RPC parameter helps show which universities are not only good at academics but also at making a difference beyond the classroom.

The notable prevalence of universities from the Southern region underscores its robust performance and academic distinction, positioning these establishments as frontrunners in the national ranking. Conversely, the North-Eastern and Central regions display relatively modest representation. This implies that universities in these areas could consider adopting the Southern universities as benchmarks, shaping their strategies, and devising comprehensive plans that account for the array of geographical, cultural, economic, and social diversities. Concurrently, institutions facing challenges in their performance should place greater emphasis on enhancing Research, Professional Practice, and Collaborative Performance (RPC), recognized as the paramount influential factor in the NIRF ranking.

## Conclusion

In conclusion, this study's findings emphasize the regional disparities in NIRF University rankings within India, with Southern universities outperforming their counterparts in Northeastern and Central regions. Additionally, the pivotal role of the Research, Professional Practice, and Collaborative Performance parameters underscores the significance of research and collaborative efforts in determining overall university rankings. These findings provide valuable insights for policymakers and educational institutions to focus on areas of improvement and strategic development to enhance university rankings and overall academic quality.

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# Paradigm Shift in Research Strategies toward Collaborative Approaches

Asit Kumar Das\*, Nivedita Sarkar\*\*, Prashant Balwantrao Thakare\*\*\* and Satabdi Das\*\*\*\*

The 21<sup>st</sup> century is the era of Collaborative Strategies in academia. A paradigm shift has been made in STEM (Science, Technology, Engineering, and Mathematics) Education and Research which is increasingly showing the trend of relying on Collaborative Approaches to address the complexity of real-world problems. It is revealed from several studies, policy decisions, and administrative reforms taken by several Governmental Organizations that Collaborative Strategies, i.e., multidisciplinary, interdisciplinary, and even transdisciplinary approaches have been considered for solving complexity of the real-world problems. Such an environment around the globe has fostered a paradigm shift in Education and Research strategies from Unidisciplinary to collaborative approaches. As a result, trends in the publication of 'multi-author' research papers are accelerating rapidly. Now the question arises, whether Multidisciplinary, Interdisciplinary, and Transdisciplinary collaborations in the field of Education and Research would be made within the different Disciplines (Subjects) of the same Institutions, different Institutions of the same state or the Country, or global collaboration. It depends upon the nature and complexity of the real-world Problems, the feasibility of collaboration, and the strategic planning of the collaborative institutions, funding agencies and ultimately, the governments concerned.

The paradigm shift in the strategy of Collaborative Research in academia has changed the global balance of the higher education system, prevalent in Science, Technology, Engineering,

and Mathematics (STEM) Education. Demands for solving the complexity of the real-world problems are gradually increasing before Higher Education Institutions (HEIs), research organizations, policymakers, and politicians. Scientists, researchers, policymakers, and even politicians are gradually assuming the great importance of collaborative strategies in teaching-learning and research approaches, which would accelerate both the quantity and quality of education and ultimately the research outputs.

Trends of the paradigm shift towards Collaborative Strategy from 'One-Paper – One-Author' to 'One-Paper – Multiple-Author' have been initiated since the 1920s, and gaining its momentum after the 1950s, and almost dominated by 1980s; commented Greene, M. (2007)<sup>1</sup> It has been revealed from the study conducted by He, Z.-L., Geng, X.-S., & Campbell-Hunt, C. (2009)<sup>2</sup> that- "...Collaborative research has been increasingly celebrated by the science community, but the hypothesized positive relationship between research collaboration and research output is more assumed than rigorously tested...." Adams, J. (2012)<sup>3</sup> commented that- "Collaboration is normally a good thing from a wider public perspective. Knowledge is better transferred and combined by collaboration, and co-authored papers tend to be cited more frequently. But could increased global collaboration mean a blending of objectives that risks leaving bland priorities?"

It is revealed from the Web of Science Data, that currently, the US has collaborated on about 3–4% of its papers with each of the UK (with 19,090 papers in 2011), China (with 19,141), and Germany (16,753). US collaboration with Asia is rising steeply, as is collaboration between countries in Western Europe. Rapid growth in China, since 2000 is leading to closer research collaboration with Japan (increase 4 times since 1999), Taiwan (up 8 times), South Korea (up 10 times), Australia (more than 10 times) and every other research-active country in the Asia-Pacific region (Adams, J. 2012)<sup>4</sup>.

\* Former Dean (SW), University of Kalyani and Director (Honorary), Indian Institute of Social Reform and Research, P-14, Regent Estate, F-3B, Kolkata-700092. E-mail: iisrr09@gmail.com / a sitkd09@gmail.com

\*\* Assistant Professor, Kolkata Teachers Training College, Panpur, P O Narayanpur, 24 Paraganas North, 24 Paraganas North, West Bengal-743126

\*\*\* Assistant Professor of Chemistry, Dr. Khatri College, Tukum, Chandrapur, Maharashtra- 442404. E-mail: prashant\_bt028@rediffmail.com

\*\*\*\* Research Scholar, Netaji Subhas Open University, Kolkata-700064

India has a growing research network with several countries throughout the globe. India has notified and implemented the “National Education Policy 2020”<sup>5</sup>, which emphasises Collaboration Strategies; particularly on the Multidisciplinary Approach in Education System. The UGC<sup>6</sup> has published a ‘Guidelines for Transforming HEIs into Multidisciplinary Institutions’(MDIs)<sup>7</sup>.

The paradigm shift towards collaborative research and co-authorship is gradually increasing, which are mainly Multidisciplinary, Interdisciplinary and Transdisciplinary in nature. These are the most predominated research approaches; however, there are similarities and dissimilarities too (NS State University-2020)<sup>8</sup>.

It is mentioned in the Report of the International Partnerships of Research Excellence UK– USA Academic Collaboration (ed. Robert, G. 2006)<sup>9</sup> that – the UK Government had published a ten-year strategy for science and innovation in July 2004, and had emphasised a commendable strategy of outward-looking towards global partnerships, highlighted the importance of building research links with the rest of European Union and improving networks in China, India and other countries.

Greene, M. (2007)<sup>10</sup> stressed two qualities of Scientific Research – ‘Increment of Scientific Ideas’ and ‘Credit for Discovery’; and commented, “Collaboration in multidisciplinary research is now universal as well as essential, and we determine from the list of authors who shares in the credit. Curiously, however, in most journals, we are not told which of these did what part of the work, nor may we be certain (have we ceased to care?) who drafted the paper.”

‘Co-authorship’ is a vital indicator of collaboration, which is a more symmetrical approach in comparing the costs of collaboration with the undoubted benefits when considering formulating strategies and policies towards research collaboration [Katz, J., & Martin, B. R. (1997)]<sup>11</sup>.

John Whitfield (2001)<sup>12</sup> said regarding issues of *Nature*<sup>13</sup> in 2001, there were only six single-author papers out of a total of 700 reports, and the proportions would be similar in other leading Research Journals too. Adams, J. (2012)<sup>14</sup> made similar comments; he found that the first paper with 1,000 authors was published in *Nature* in 2004; a

paper with 3,000 authors came in 2008. By 2015, there were 120 physics papers had more than 1,000 authors and 44 had more than 3,000 authors (King, C. 2012)<sup>15</sup>; many of which were from collaborations at the Large Hadron Collider at CERN<sup>16</sup>, Europe’s particle-physics lab near Geneva, Switzerland. Bu, Y., Ding, Y., Liang, X., & Murray, D. S. (2017)<sup>17</sup> indicated that Scientific collaboration is inevitable in many research fields. They had given importance to exploring the diversity of research collaborations.

Bordons, M., Zulueta, M. A., Romero, F., & Barrigón, S.(1999)<sup>18</sup> commented that Publications of MRP groups showed a higher interdisciplinary collaboration rate than the rest of the UCM (17% vs. 9%)”; which had revealed from a study conducted in ‘Universidad Complutense de Madrid’ (UCM)<sup>19</sup>, Spain, to support cross-disciplinary research projects; which was being developed as a Multidisciplinary Research Programme (MRP) since 1989.

Cummings, J. N., & Kiesler, S. (2005)<sup>20</sup> conducted a study to investigate scientific collaboration across disciplinary and university boundaries to understand the need for coordination, funded by US National Science Foundation (NSF)<sup>21</sup> in 1998 and 1999; positive outcomes were revealed.

Disis, M. L., & Slattery, J. T. (2010)<sup>22</sup> recommended on the basis of a study on Health Care that- Several academic institutions had invested in conducting many educational programmes, facilities and enhanced resources to encourage translational research; which are critically needed giving emphasis on creating and sustaining multidisciplinary research teams.

Jones, B. F., Wuchty, S., & Uzzi, B. (2008)<sup>23</sup> examined 4.2 million papers published over three decades and found that there were multi-university collaborations. They commented that- collaborative teamwork has made a dramatic shift in knowledge production that generalizes across virtually all fields of science, engineering, and even in social science arenas.

National Science Foundation (NSF)<sup>24</sup> developed a topic map of all their awards issued between 2000 and 2011, which provides a novel means for measuring interdisciplinarity by assessing the language or content of award proposals [Nichols, L. G. (2014)]<sup>25</sup>.

Porac, J. F., et. al. (2004)<sup>26</sup> and his co-researchers compared the publication outcomes of two teams within a multi-university scientific alliance, which revealed that when the alliance had been made between two teams, it increased the productivity of both teams at the highest level for the more heterogeneous team. In the heterogenous team, a variety of knowledge and concepts were employed in their research which yielded initially higher outputs.

From the noted Literature Review, it has been revealed that education and research approaches have rapidly shifted their strategies towards collaborations during the past several decades, which has led to policy and organizational reforms and collaboration among different disciplines, researchers, scientists, HEIs, Industries, and Government Organizations.

### **Emergence of Collaborative Strategies in Academia: Disciplinary, Multidisciplinary, Interdisciplinary and Transdisciplinary**

Collaboration in teaching-learning and research strategies may be of two types- 'Intra-disciplinary' and 'Interdisciplinary'. The 'Intra-disciplinary Collaborations' may be within the same Discipline of different Institutions of the same country and different countries. On the other hand, 'Inter-Disciplinary Collaborations' are made within different Disciplines; which may be of the same Institution or different Institutions within the same country, or globally; and may be between HEIs and Industries/ Societal Organizations. 'Interdisciplinary Collaborations' are mainly of three types- (1) Multidisciplinary, (2) Interdisciplinary and (3) Transdisciplinary (Figure-1).

### **Definition and Salient Features of Different Types of Collaborative Approaches: Multidisciplinary, Interdisciplinary and Transdisciplinary Approaches**

Several Educationists and Academic Organizations have defined the terminologies. However, definitions made by the 'International Bureau of Education', a unit of UNESCO are widely accepted, which are discussed below.

#### **Unidisciplinary Approach**

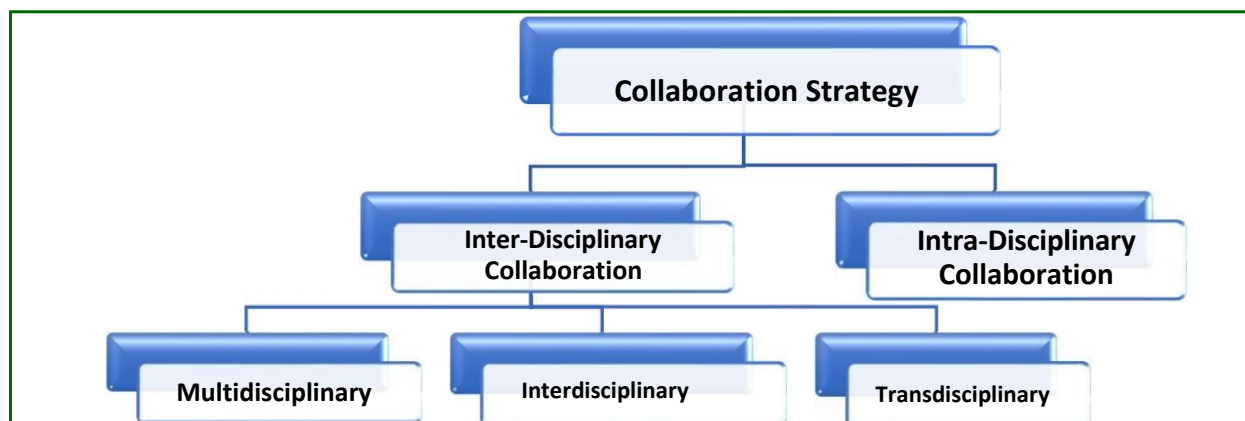
Salient Features of Unidisciplinary Approach are:

- a) *Research Approaches*: Advancement of Frontiers of Knowledge of Specific Discipline.
- b) *Strategy*: From the point of view of a single discipline; disciplinary boundaries exist
  - (i) *Perspectives*: Highly specialized in one discipline.
  - (ii) *Problem-solving*: Within its periphery; no cooperation with any other discipline.
  - (iii) *Integration*: No integration with any other Discipline.
  - (iv) *Disciplinary-Boundary*: Deals within the disciplinary boundary, never cross the border of the discipline.
  - (v) *Theory*: Within the periphery of discipline.
- c) *Research Outputs*: Specific disciplinary research outputs are revealed.

#### **Multidisciplinary Approaches**

Multidisciplinary Approach is defined by IBE,

**Fig 1: Types of Collaboration Strategy**

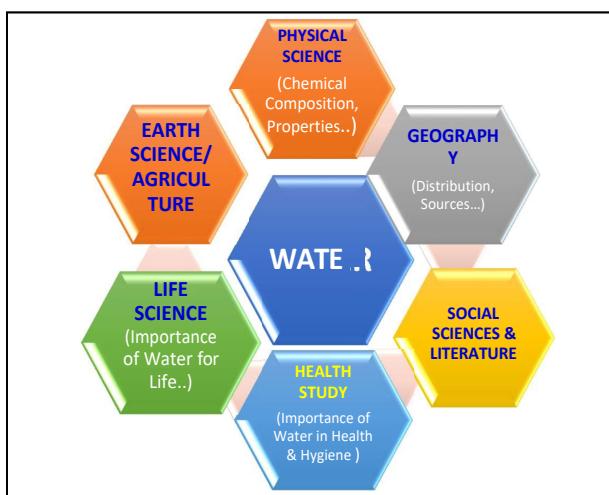


UNESCO as: “An approach to curriculum integration which focuses primarily on the different disciplines and the diverse perspectives they bring to illustrate a topic, theme or issue. A multidisciplinary curriculum is one in which the same topic is studied from the viewpoint of more than one discipline. Frequently multidisciplinary and cross-disciplinary are used as synonyms describing the aim to cross boundaries between disciplines”.

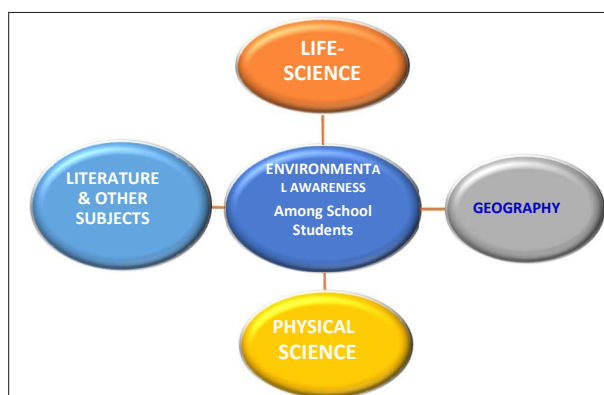
Salient features of multidisciplinary approaches are:

- a) *Research-Approaches:* Enhancement of understanding of observed phenomena from several disciplinary perspectives.
- b) *Strategy:* All disciplines stay separately but contribute inputs for solving common real-world problem(s).
  - (i) *Perspectives:* Researchers from different disciplines work together.
  - (ii) *Problem-solving:* Need discipline experts’ opinion towards solving the problem.
  - (iii) *Integration:* No integration of disciplines, but integration of curriculum is needed where cooperation and contribution of disciplines are involved.
  - (iv) *Disciplinary-Boundary:* Disciplinary boundaries exist; never cross the border.
  - (v) *Theory:* Need development of disciplinary theories.

**Figure 2: Multidisciplinary Project on ‘Awareness of Water’**



**Figure 3: Multidisciplinary Project on ‘Environmental Awareness’**



- c) *Research-Outputs:* Separate disciplinary output on the specific problem.

The emergence of multidisciplinary subjects is depicted in Figure 2.

### Interdisciplinary-Approaches

Interdisciplinary Approach is defined by IBE, UNESCO as: “An approach to curriculum integration that generates an understanding of themes and ideas that cut across disciplines and of the connections between different disciplines and their relationship to the real world. It normally emphasizes process and meaning rather than product and content by combining contents, theories, methodologies, and perspectives from two or more disciplines.”<sup>27</sup>

“Facilitating Interdisciplinary Research examines current interdisciplinary research efforts and recommends ways to stimulate and support such research...”(National-Science-Academy-Report-2005)<sup>28</sup>

Salient features of interdisciplinary approaches are:

- a) *Research Approaches:* Integration of Disciplinary knowledge for understanding holistically the phenomenon.
- b) *Strategy:* Multiple Disciplines collaboratively integrated and blended.
  - (i) *Perspectives:* Integration of Knowledge and Methodology from participating Disciplines.
  - (ii) *Problem-solving:* Focused on problem framing and solving from cross-disciplinary perspectives



- (iii) **Integration:** Stronger Integration of Curriculum from Disciplinary Perspectives and Cooperation.
  - (iv) **Disciplinary-Boundary:** Disciplinary boundaries are overlapping.
  - (v) **Theory:** Need Integration in understanding and formulating proper methodology, and epistemological and ontological perspectives
- c) **Research-Outputs:** Integrated Research Outputs.

The emergence of interdisciplinary subjects is depicted in Figure 4.

### Transdisciplinary Approach

Transdisciplinary-Approach is defined by IBE, UNESCO as : “An approach to curriculum integration which dissolves the boundaries between the conventional disciplines and organizes teaching and learning around the construction of meaning in the context of real-world problems or themes.

Salient Features of Transdisciplinary Approach are:

- a) **Research Approaches:** Integration and cross-fertilization of Disciplinary knowledge, and expertise for developing new methodology, tools, and techniques.
- b) **Strategy:** Develop a Cross-fertilized common strategy jointly by experts of different Disciplines, policy planners, Investors, and other stakeholders.
  - (i) **Perspectives:** Creating a cross-fertilized perspective of Intellectual frameworks

beyond the Disciplinary perspectives

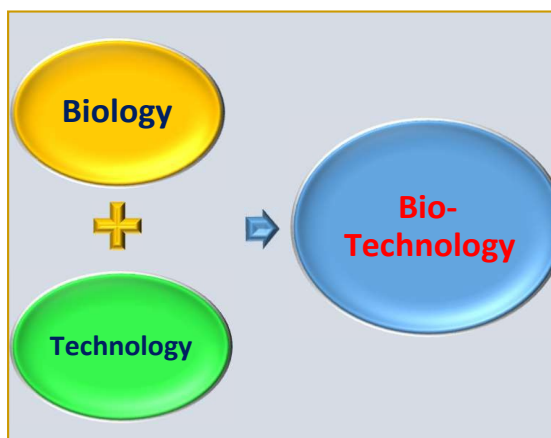
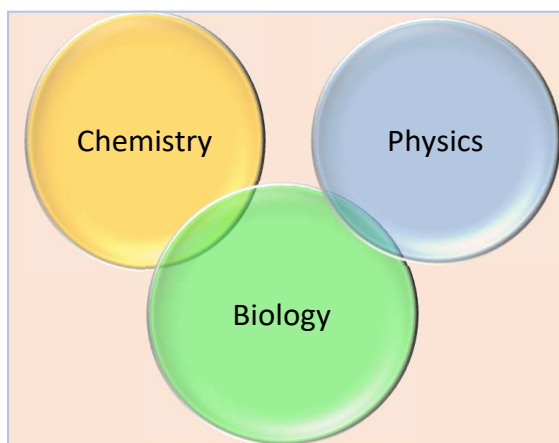
- (ii) **Problem-solving:** Solving problems by going beyond Disciplinary perspectives through involving Researchers, Practitioners, Policy-makers Beneficiaries and other stakeholders, and Industry concerns.
  - (iii) **Integration:** Stronger Integration of Curriculum & Perspectives and Cross-Fertilization of Expertise from several Disciplines.
  - (iv) **Disciplinary-Boundary:** All disciplinary boundaries would be dissolved; create a new boundary depending on the need for solving the problem(s).
  - (v) **Theory:** High level of integration of all disciplines needed to cross-fertilize new methodology, tools, and techniques.
- c) **Research-Outputs:** Integrated and Cross-Fertilized Strong Research Output.

The emergence of transdisciplinary subjects is depicted in Figure 5.

### Some Guiding Principles for Successful Implementation of Collaborative Research Strategies

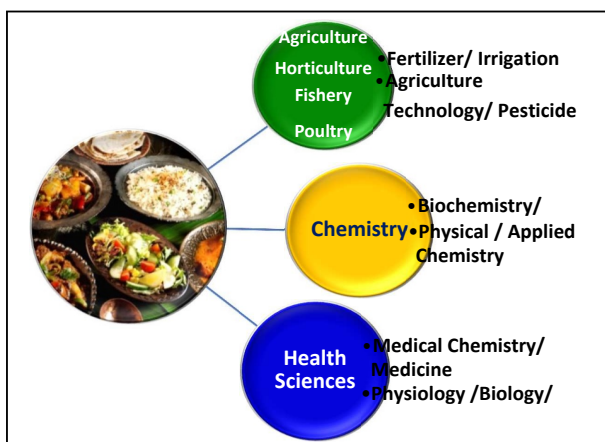
For effective implementation of Collaborative Research Strategies, it is very important to identify very scientific real-world problems, and engineering groundbreaking technologies, which requires good teams of researchers from different disciplinary backgrounds to work together and positive attitudes towards collaborative work.

**Figure 4: Sharing of Disciplinary Boundaries for Developing the Interdisciplinary Subjects**





**Figure- 5: Food: Transdisciplinary Research**



Collaborative Research Strategy, whether it is Multidisciplinary or Interdisciplinary or Transdisciplinary, would be determined depending on the characteristics and complexity of the real-world problem(s). There are specific guiding principles for each category of the research collaborative strategies; however, the following are some of the common guiding principles that may be more or less applicable for collaborative approaches; some modifications/ moderations may be needed. Some of the Guiding Principles for Conducting Successful Collaborative Research are:

#### ***Learn the Language***

Each discipline and laboratory have its own unique ‘language’, and common terminologies; those should be clearly defined depending on the collaborative common strategy.

#### ***Make an Operational Plan***

An operation plan shall be framed at the beginning of the project, including the role and objectives of each discipline, cross-fertilized ideas, new strategy, job distribution schedule, and training to co-researchers for maintaining discipline.

#### ***Address Differences in Operation***

Formulation of common communication strategy and useful reporting tools, preparing Reports of each disciplinary group and circulated among all before monthly meetings.

#### ***Share of Credits***

A comprehensive guideline shall be developed regarding ‘Authorship’, ‘Manuscript Writing’, ‘Credit allocation and Transfer’ and ‘Patent Rights’

of the co-researchers and the Principal Investigators (PIs).

#### ***Share the Funds***

Well-defined ‘Financial Planning and Budget’ shall be formulated. Lead PI should not control the Fund alone; all PIs shall agree to share the financial resources.

#### ***Discuss Project Plans & Time Management***

Working out project plans, objectives and long-term and short-term goals, allotment of activities, and planning of time management shall also be pre-defined.

#### ***Hold Frequent Meetings***

Planning and routine for monthly and quarterly/ annual meetings, submission of progress report by each discipline and provisions for re-grouping and reallocation of team members on a regular basis may be made.

#### ***Encourage Open Communication: Be Fair and Respectful***

Transparency, equality, and freedom of expression of views of all co-researchers shall be maintained.

SWOT Analysis is a must before Starting a Collaborative Research Project. SWOT Analysis is called situational assessment or situational analysis. It is a popular technique; that is designed mainly for use in the initial stages of decision-making processes of any project and can be used as a vital tool to evaluate the strategic position of the organization(s) of many kinds (for-profit enterprises, local and national governments, NGOs, etc. (Wikipedia)<sup>29</sup>. Additional acronyms using the same components include TOWS and WOTS-UP. It is also a framework used to evaluate a company’s competitive position and to develop strategic planning. SWOT analysis assesses internal and external factors, as well as current and future potential. (Kenton, W.- 2022)<sup>30</sup>

#### ***Strengths and Weaknesses***

Following internal factors within collaborating organizations may be the Strengths or Weaknesses, which must be taken into consideration.

- (i) *Human Resources*- PIs, Researchers, staff, volunteers, board members, target population

- (ii) *Physical Resources*–Infrastructure of collaborating Institutions / Organizations, their Laboratories / Workshops, Equipment, Locational advantages/disadvantages;
- (iii) *Financial*- Grants from Funding Agencies, Resource sharing, and other sources of income;
- (iv) *Integration of cross-fertilized Ideas*- Innovative Ideas of PIs and Researchers of collaborating Organizations would increase the strength of research output; on the contrary, the possibility of arising conflicts would be a great weakness;
- (v) *Past Experiences & Reputation*- of the collaborating Organization yield fruitful Research-output; or vice-versa;
- (vi) *Activities and Processes*- Joint effort in programme execution; upgradation of systems.

### Opportunities and Threats

Following external factors arising from governmental organizations or society may create opportunities, on the contrary, they may also create problems/threats:

- (vii) *Legislations/Policies*- New national/international policies, future trends in societal demands, strategies of collaborating organizations;
- (viii) *Economy*- Institutional, national, or international economic strategies.
- (ix) *Funding-Sources*- Institutional and new strategies of funding agencies, donors, and legislatures.
- (x) *Demographics*- Demographic positions of collaborating Institutions and the study area.
- (xi) *Physical Environment*- Is the building in a growing part of town? Is the bus company cutting routes?
- (xii) *Local, National, International Demands*- Research outputs depend on the urgency and complexity of the Real-World Problem(s) for which a collaborative Research Strategy has been adopted.

### Conclusion

Though paradigm-shift of research strategies from Unidisciplinary to Collaborative, i.e., Multidisciplinary, Interdisciplinary, or Transdisciplinary is considered a time-taking and complex system, these have significant effects on Research-outputs towards solving complex real-

world problems. Collaborative strategies enhance and accelerate collaborations between several researchers of different disciplines, HEIs, industries, policy-makers, and societal organizations and induce cross-breeding of new innovative ideas, resource-sharing, effective use of funds, bondage between co-researchers, institutions, increase global friendship which yield stronger research-outputs towards solving the complex real-world critical problems; ultimately used for societal benefits.

From the above study, it has been revealed that STEM education has already been rapidly shifting its strategies towards collaborations during the past several decades, and it is a continuing process. Several approaches and organizational reforms have evolved for administrating collaboration among different disciplines, researchers, scientists, HEIs, industries, government organizations and societal bodies throughout the globe towards productive outputs for solving the ever-emerging complex real-world problems for the cause of societal benefits.

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# Academic College Library Consortia of Chhattisgarh: A Feasibility Study

Purnima Kumari \*, Kirti Jachak\*\* and Suparna Sen Gupta\*\*\*

Academic college library consortia have been gaining popularity in recent years due to their ability to improve access to information and improve research outcomes. A library consortium is a partnership among a group of libraries to share resources, information, and expertise to achieve common goals. A consortium of libraries is renowned for sharing digital resources at the local, national, and international levels. Many libraries in India and abroad have formed consortia to share human and electronic resources to meet their users' expectations and demands.

A consortium is a collaborative network or partnership between multiple organizations or entities that come together to achieve a common goal or objective. It can be formed by companies, universities, research institutions, non-profit organizations, or even government agencies. According to Biswas and Dasgupta (2001), the term 'consortium' can be defined as follows: "A consortium is a temporary collaboration between several companies, powers, etc. to achieve a common goal. A consortium is an association of similar organizations and institutions that cooperate to produce and provide common goods and services." Consortia of libraries are communities of information agencies (cooperatives) that formally cooperate, coordinate, or consolidate certain functions to achieve mutual goals. It is possible to form consortia on a local, regional, national, or international basis, or on a topical or functional basis.

This paper presents a feasibility study of academic college library consortia in Chhattisgarh, India.

The state of Chhattisgarh is home to 379 colleges that offer undergraduate and postgraduate programs in various fields. The colleges are scattered across the state and are managed by different entities, including

government, private, and religious organizations. Despite the significant number of colleges, access to information resources is limited as most institutions do not have adequate budgets to acquire and maintain comprehensive collections of books, journals, and digital resources. Additionally, most colleges lack the technical expertise to manage their libraries effectively.

A library consortium could provide a solution to the challenges experienced by individual institutions. By pooling resources and expertise, institutions can create a more comprehensive collection of resources and provide better services to their respective users. A consortium can also negotiate better deals with publishers and vendors, resulting in reduced costs for its members.

Almost all academic libraries are struggling hard to acquire the latest facilities and resources to extend it to their readers. It is a difficult task for any stand-alone system. The difficulty gets multiplied when the libraries belong to tribal areas and are remotely located. Pecuniary finance and manpower are restricted to move forward. Consortium is although not the only, but a promising approach to combat such a situation.

The main challenges facing academic libraries in Chhattisgarh are limited budgets, inadequate infrastructure, and insufficient technical expertise. Most academic libraries lacked the resources to provide a comprehensive collection of books, journals, and digital resources to their users. Many institutions also struggled to keep up with technological advances and cared for the expertise needed to manage their libraries effectively.

## Diversity of Higher Education in Chhattisgarh

Chhattisgarh is a state located in the central part of India, known for its rich cultural heritage, diverse flora and fauna in its wildlife sanctuaries and abundant mineral resources. In the last few decades, the state has made remarkable progress in the field of higher education. Higher education in Chhattisgarh offers students a plethora of options in terms of fields

\* Assistant Librarian, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh. E-mail: purnimavaru@gmail.com

\*\* Library Assistant-II, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh. E-mail: kirtijachak@gmail.com

\*\*\* Librarian, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh. E-mail: suparnasengupta61@gmail.com



of study, quality of education, and opportunities for research and innovation. Chhattisgarh has a wide range of higher education institutions including public and private universities, colleges, and institutes. These institutes offer a wide range of courses in various fields including engineering, medicine, science, arts, and management. The state has also become a centre for technical education, with several engineering and management colleges providing state-of-the-art facilities and opportunities for students to pursue their passion.

In addition, Chhattisgarh is home to several top-tier research institutes such as the National Institute of Technology, the Indian Institute of Management, the Indian Institute of Technology, and the All India Institute of Medical Sciences, which are globally recognized for their contribution to research and innovation. These institutions have been instrumental in attracting top talent from across the country and shaping the future of India's higher education landscape.

The diversity of higher education in Chhattisgarh provides ample opportunities for students to pursue their desired field of study and career path. With a focus on innovation, research, and excellence, higher education in Chhattisgarh is set to drive the growth and development of the state in the years to come. The main objectives of the Study are:

*Facilitating Resource Sharing Among Academic Libraries in Chhattisgarh:* The consortium would work to create a collaborative environment between libraries and encourage them to share their resources, including books, journals, and databases. This would not only help minimize duplication of resources but would also provide access to a broader range of resources to the academic community.

*Improve the Quality of Library Services:* The consortium would provide training and professional development opportunities for library staff. It would also promote best practices and standards for library management, cataloguing, and collection development.

*Enhancing the Efficiency of Library Resources:* The consortium would promote the role of academic libraries as key players in the education and research ecosystem. It would also facilitate collaboration between libraries and academic departments to support research and innovation.

*Improve the Visibility and Impact of Academic Libraries:* The consortium would promote the role of academic libraries as key players in the education and research ecosystem. It would also facilitate collaboration between libraries and academic departments to support research and innovation.

### **Criteria for the Success of the Consortium**

To achieve these goals, the consortium will need to establish a governance structure, develop a funding model, and create policies and procedures for resource sharing, training, and collaboration. It will also require the active participation and commitment of Chhattisgarh's academic libraries and the support of government and funding agencies.

*Membership Policy:* The consortium will admit new members who are interested in the aims and objectives of the consortium. Membership will be open to organizations, companies and individuals committed to advancing research, innovation and collaboration. Membership will be subject to approval by the Consortium Management Team.

*Governance Policy:* The association will be governed by a management team consisting of members selected from the participating institutions. The management team will oversee the activities of the consortium and ensure that the policies are implemented. The Management Team will be responsible for making decisions on matters relating to the Consortium and ensuring that its objectives are met.

*Privacy Policy:* The Consortium will ensure that all information shared between members and partners is treated with strict confidentiality. All members must sign a confidentiality agreement to protect the Consortium's intellectual property and proprietary information.

*Conflict of Interest Policy:* Members of the Consortium and their management team must disclose any conflict of interest arising from their participation in the Consortium. The management team will review and approve any collaboration proposals that may give rise to a potential conflict of interest.

*Funding Policy:* The Consortium may seek funding from a variety of sources, including government agencies, private foundations, and corporate organizations. All funds will be managed by the Management Team by the objectives and goals of the Consortium.

**Meetings and Communication Policy:** The Consortium will hold periodic meetings among its members, and communication will be maintained periodically via email or videoconference. Minutes of the meeting will be kept and distributed to all members. Special meetings may be called to discuss specific issues.

The key elements required for a successful library consortium were identified as:

- i. **Strong Leadership:** A consortium requires strong leadership preferably the Government of Chhattisgarh, Department of Higher Education to coordinate activities and promote collaboration among member institutions.
- ii. **Clear goals and Objectives:** A consortium should have clear goals and objectives that are aligned with the needs of its members.
- iii. **Efficient Management:** A consortium must be well managed to ensure that resources are effectively allocated and services are delivered efficiently.
- iv. **Trust and Collaboration:** A successful consortium requires trust and collaboration among member institutions.
- v. **Adequate Resources:** A consortium requires adequate resources to provide the necessary infrastructure, acquire and maintain collections, and support staff.

### Benefits

The study identified several potential benefits of the Academic Library Consortium in Chhattisgarh. These include:

1. **Greater access to Information Resources:** A consortium could provide access to a more complete collection of resources than individual institutions could afford to purchase.
2. **Improved Services:** By pooling resources and experience, a consortium could provide better

services to users.

3. **Cost Savings:** A consortium could negotiate better deals with publishers and vendors, resulting in lower costs for its members.
4. **Knowledge Sharing:** A consortium could facilitate knowledge sharing among member institutions and promote collaboration in research training and teaching.

### Conclusion

Based on the results of this feasibility study, it is clear that academic library consortia could provide a solution to the challenges experienced by academic libraries in Chhattisgarh. By pooling resources and expertise, the institution could create a more comprehensive collection of resources and provide better services to its users. To ensure the success of the consortium, it is essential to have strong leadership, clear goals and objectives, efficient management, trust and collaboration among member institutions, and adequate resources. A Consortium of Chhattisgarh Academic Libraries could go a long way in improving access to information resources and promoting research and teaching in the state's academic institutions.

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# Consistency is the Key to Sustainable Progress

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**Padma Vibhushan, Padma Bhushan, and Padma Shri, Anil Kakodkar, Chairman, Rajiv Gandhi Science and Technology Commission, Government of Maharashtra and Member Atomic Energy Commission, Government of India delivered the Convocation Address at the first Convocation Ceremony of MGM University, Aurangabad, Maharashtra on November 27, 2022. He said, “I am certain; you would rise progressively in your respective careers. I do hope that as you rise, you will retain in you a spirit of trusteeship and contribute substantially to your roots, the society around, the institutions that brought you up, and the nation at large. It is this spirit of trusteeship and the desire to support others who were not as fortunate or as successful as us that makes this world a better place.” Excerpts**

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Inspired by the ‘Father of the Nation’, Mahatma Gandhi, Mahatma Gandhi Mission was established in 1982 to make affordable healthcare and quality education available to all sections of society. MGM University was established by Mahatma Gandhi Mission in 2019 with a vision to provide value-based, research-driven and experiential education that will transform the youth into professionally competent and socially responsible citizens. A number of MGM’s colleges in Aurangabad, many of whom shared a rich legacy of around 4 decades, were brought under the auspices of the University to provide them with more autonomy, additional resources, administrative structure and a host of other facilities. The key aspects MGM University’s working for our emphasis on experiential learning, cultivating the spirit of research and innovation, forming global collaborations, adopting multidisciplinary approach, promoting Indian arts and culture, environment conservation and nurturing sporting talents. I compliment MGM University to have chalked out a well-thought-out strategy.

My congratulations to all those graduating today. A special word of appreciation for top rankers and winners of various medals and awards. The competitive world of today presents unprecedented challenges as well as opportunities for all those who wish to take them. I expect that on the basis of capability that you have acquired here at MGM University, you would be able to realize maximum success for yourself as well as for the country. May all your dreams be fully realized.

I wish to use today’s occasion to talk about higher education in our country. Basically, higher education, in a country like India, should aim at human capability building at the following three levels;

1. Take learners all the way up to the current frontiers of knowledge in respective disciplines,

engage in research to push these frontiers forward & be in the forefront in delivering cutting-edge technologies emerging out of such new knowledge.

2. Build world-class professionals in the practice of state of art technologies and contribute to the welfare of humankind and protecting the ecology as well as the environment around.
3. Pay attention to capability building of people at the grassroots through knowledge empowerment to bridge the disparity gaps which seem to be growing even as more wealth is created. Rural areas need much greater attention in this context.

While pursuing this path, we should also ensure inculcation of a deeper understanding of human values through association and practice, preferably related to applications in different specialized areas one is working on. Inculcation of such values to leverage acquired capability for overall human and nature’s benefits without being exploitative is the key to sustainable progress and should be one of the key objectives of a university.

To be effective in this context, our knowledge institutions have to be both knowledge creators as well as value creators and inculcate such an aptitude and capability in our students through broad-based learning and practice environment. In terms of knowledge creation, we should note that today India is in the third position globally in terms of our scientific publications record with perhaps the fastest growth rate. While there is scope to improve further both in terms of quantity as well as quality, particularly across the full spectrum of institutions in the country, we have to cover a much larger ground in the context of value creation. As an extreme case for us to emulate, I would like to cite the example of Stanford University whose alumni and faculty

have created nearly 40,000 companies that generate around USD \$2.7 trillion in annual revenues. Notice that this number related to a single University is around the size of Indian economy as a whole. We need to create a such ecosystem in our universities. The Research Park at IIT Madras is a good beginning in India in this direction. More such examples are in the making. We need many more such initiatives.

We are now in an era dominated by high-end technologies like Semiconductors, Artificial Intelligence, Computing and Telecom, Clean Energy, Advanced Aerospace and Pharmaceuticals. Soon new knowledge frontiers exploiting Genetics, Quantum Physics, Cognitive and Brain Sciences, etc. would start dominating. We need to quickly close-in the expanding gaps between us and countries advancing rapidly in technologies emerging from these disciplines. Not being able to do so would not only put us at disadvantage but could, in fact, make us vulnerable through the emergence of new technology denial regimes even in commercial sectors, holding hostage entire segments of our nation's economy. We thus must quickly become a massive producer of high-end frontier technologies. A well-knit research entrepreneurship ecosystem involving a close triple-helix partnerships between academia, industry, and government is a critical necessity for this purpose. This is a necessity for our national security, our economic prosperity, and our societal well-being.

As we prepare ourselves to be at the forefront of emerging high-technologies and be a front runner in the global competition, we need to be also aware of the need to quickly bridge growing disparity gaps within the country that are becoming a matter of concern. A key aspect is the urban-rural gap. Nearly two third of India still lives in villages with less than half the average per capita income as compared to urban areas. Bridging the urban-rural divide is thus a matter of urgent necessity in our country. The emerging era of a knowledge driven economy that facilitates democratization and decentralization of technology-led economic activities is thus a great opportunity for transformation of the rural horizon that could bridge the urban-rural divide and contribute to a major boost to Indian economy. This, however, would involve capacity building of local people through education and training in dealing with emerging technologies and also the ability to internalise them including solving problems as they

arise. Eventually, we should create a self-empowered and locally relevant innovation ecosystem that can leverage the opportunities of the knowledge era. In principle, I believe that in the contemporary knowledge era, one could have greater opportunities in villages than in cities reversing the industrial era paradigms. In this context the universities or institutions can be instrumental in setting up what I call a CILLAGE—a knowledge-integrated sustainable village development model that aims to leverage new and appropriate knowledge-based technologies, including some created locally, to create additional and higher-level livelihood opportunities in villages that also include manufacturing and service sector activities in addition to agriculture and allied activities.

In the CILLAGE concept, a local Higher Education Institution serving as a Knowledge Partner hosts a Rural Human and Resources Development Facility (RHRDF) and linked with local community institutions and NGOs, works for the deployment of appropriate technologies for enhanced livelihood as well as related educational and knowledge support in the neighborhood. To facilitate sustained and comprehensive engagement between RHRDF and the neighborhood, a number of Advanced Knowledge-based Rural Technology sub-centers (AKRUTI for short), need to be established in proximity to existing schools. RHRDF and AKRUTIs would be the bridge between local higher education institutions and the neighborhood to spread technology-enabled livelihood on one side and ICT-enabled school education on the other. Exposure of school children to real-life livelihood activities based on contemporary technologies could be a significant value addition from an education perspective as well. The knowledge institution should also engage itself in solving problems that could arise during implementation of new technologies and search for new R&D problems to sustain a transformative knowledge-based ecosystem. The eco-system so created could also participate in the deployment of other Govt. Schemes as well as corporate initiatives.

The spread of technology adaptation and continuous access to new technologies could create better livelihood opportunities in the rural domain that eventually would compare well with opportunities in the urban domain thus leading to convergence of the



best of the city (i.e., opportunities for self-progress, modern infrastructure for education etc.) with best of a village (i.e., clean, calm and eco/human-friendly environment). Thus, the selected cluster of villages (Village) around a vibrant knowledge institution can be expected to become preferred working destination for young innovative and creative generations for leveraging local human and raw material resources on one side and new knowledge technologies on the other. Villages could thus become places, better than both cities and villages and may become the preferred habitats for the new age society in most of emerging India. This approach is being tried out on an experimental basis at a few places in Maharashtra. I must also mention that a number of very challenging deep research problems can be identified through such engagement. Our top-tier higher education and research institutions and their graduates have a special role in this context. In partnership with local Higher Education Institution, they can trigger a locally relevant high-tech-oriented innovation ecosystem to uplift rural India on the lines described above.

Technology and technology products that offer differentiating capabilities to their users, significantly add to their competitiveness and hence to their power both in the marketplace as well as strategically. This has several ramifications for our national progress as well as our relative position in the competitive world that exists around us. Both these dimensions are of immense importance. While technology empowers humans, the education that we provide to our young people should also make them responsible so as to ensure that the use of technology remains non-exploitative even as technology is used to empower everyone around through knowledge and minimize the disparity gaps that are becoming alarming by the day. Speaking more broadly, the process should bridge the gaps in key human needs viz. identity, prosperity and security and usher in peace and harmony. This should be both a global as well as a local effort. Bridging the disparity gaps

globally as well as within the country, to eliminate rich-poor, urban-rural and other divides even as technology uplifts the society as a whole is the key to a peaceful and harmonious world in my view. While this is a complex matter having multiple dimensions, I do believe that knowledge and more particularly knowledge technologies can be most effective in addressing this challenge. That is where young graduates from higher technical education and research institutions come in. I do wish all of you to be successful in your professional career and make an important difference to our country in the above context.

I wish that all of you would give some serious thought to what I have said above and decide your respective course of action. It should be our collective endeavor to progressively move towards making the world a better place. Through a lifelong learning process and maintaining knowledge institutions, industry and society are interconnected with each other, each one of us, regardless of the career we decide to pursue, can meaningfully contribute to this objective. After all, we are all here in this world to play our respective roles. Our happiness and joy in life depend on how well we play our roles. We must also remember that our happiness depends on the happiness all around us.

Dear students, I once again wish all of you well in your respective further pursuits. I am certain; you would rise progressively in your respective careers. I do hope that as you rise, you will retain in you a spirit of trusteeship and contribute substantially to your roots, the society around, the institutions that brought you up, and the nation at large. It is this spirit of trusteeship and the desire to support others who were not as fortunate or as successful as us that makes this world a better place.

Once again, my best wishes to you all.

Thank you

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## CAMPUS NEWS

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### **National Webinar on NEP-2020 and Indian Higher Education**

A two-day National Webinar on ‘NEP-2020 and Indian Higher Education: A Way Forward’ was organized by the Department of Teacher Education, Nagaland University (NU), Kohima Campus, Meriema, Nagaland from July 19-20, 2022. The event was sponsored by ICSSR, NERC, Shillong. The Chief Patron of the event was Vice Chancellor, Prof. Pardeshi Lal, Patron was the Pro-Vice Chancellor, Prof. N Venuh and Co-patron was the Dean, School of Humanities and Education, Nagaland University, Nagaland. The Coordinator of the event was Dr P K Pattnaik, Head, Department of Teacher Education, Nagaland University, Dr Surender Yadav, Assistant Professor, Department of Teacher Education, Nagaland University was the Convener of the event.

The Inaugural Session was moderated and chaired by Dr. T Yolila Sangtam, Assistant Professor, Department of Teacher Education, Nagaland University. Dr. Pradipta Kumar Pattnaik, Head, Department of Teacher Education, NU delivered the welcome address, while Dr. Surendra Yadav, Assistant Professor, Department of Teacher Education, Nagaland University presented the opening remarks of the Webinar. He highlighted the subthemes of the event i.e. Quality of Higher Education: Challenges and Solutions; Equity and Inclusion in Higher Education and Teacher Education; Vocationalisation of Higher Education; and Use of Technology in Teaching, Research, Evaluation and Governance. He further mentioned that the success and failure of NEP-2020 can be determined by its implementation. Therefore, it is important to discuss how far the policy implementation process has been carried out in the last two years.

The Chief Guest, Prof. Bhagirathi Panda, Director, ICSSR, NERC, Shillong, in his speech, emphasized the importance and relevance of NEP-2020 at the global level. Globalization of education particularly at the Higher Education level is stressed, in order to bring about changes in values and practices in the knowledge economy. This can be brought about by addressing the challenges such

as increasing the Gross Enrolment Ratio, improving the student-teacher ratio, Indigenization of Higher Education, and access to inclusiveness and research. He emphasized that for a successful NEP-2020, there is a need to collaborate between Government, Market, Community, and Civil Society.

The Guest of Honour, Prof. N Venuh, Pro-Vice Chancellor, Nagaland University, Kohima Campus, in his address, emphasized the need to be realistic and practical while implementing the NEP-2020 policies and goals, taking into consideration the social, cultural, geopolitical, economic challenges and issues. To upgrade quality in Higher Education, he encouraged research studies and utilization of available resources.

The Keynote Address was delivered by Prof. C B Sharma, IGNOU, New Delhi. He highlighted that there is a complete break between School Education and Higher Education. Bridge, this gap is one way forward to improving Higher Education. He emphasized the need for autonomy in the institutions for its improvement in quality.

The Technical Session on ‘Quality of Higher Education: Challenges and Solutions’ was moderated and chaired by Prof. G N Tiwari, Department of Teacher Education, Nagaland University. In the session, Resource Person, Prof. Ramesh Kothari, Former Vice Chancellor, Veer Narmad South Gujarat University, Surat highlighted the weaknesses of higher education such as limited resources, financial disparities due to privatization of institutions, no single yardstick for quality assessment, etc. One of the major challenges of NEP-2020 is the complete overhaul of teacher education and re-energizing of higher education. He deliberated on the multi-disciplinary education system as proposed by NEP-2020, the role of the National Higher Education Regulatory Council (NHERC), National Research Foundation (NRF), Choice Based Credit System (CBCS), grading system, extension work, the need for campus placement cell and open distance learning as important aspects for improvement in quality and quantity in Higher Education. A few solutions were also suggested such as the incorporation of seminar-based classes, 15 weeks of compulsory teaching,

research culture, and autonomy of institutions. At the end of the session, ten participants presented their papers under this subtheme. In the concluding remarks, Prof. Ramesh Kothari suggested including and contributing toward vocational education, Choice Based Credit System, and a grading system in the discussions.

The Technical Session on 'Equity and Inclusion in Higher Education and Teacher Education' was moderated and chaired by Dr. M Rajendra Nath Babu, Assistant Professor, Department of Teacher Education, Nagaland University. In the session, Recourse Person, Prof. S K Yadav, Former Head, Department of Teacher Education, NCERT, New Delhi deliberated on the 'Importance of Education as the Only Instrument for the Development of Society'. In order to adopt inclusiveness, several suggestions were recommended such as access to opportunities; equity to all sections of society; quality in research as well as training quality teachers; affordability to all sections of the society; and curriculum to be inclusive in school education, higher education, and teacher education. He discussed in detail the structure of Teacher Education as per NEP-2020. For Pedagogy, he emphasized hands-on experience, storytelling, art integrated and sport-integrated pedagogy. At the end of the session, eleven papers were presented and discussed by the presenter on the subtheme of the session.

The Session on 'Vocationalisation of Higher Education' was moderated and chaired by Dr. Rashmi, Assistant Professor, Department of Teacher Education, Nagaland University. The Resource Person, Kalpana Kaushik, Director (I/c) Indian Adult Education Association, New Delhi expressed her views on Vocationalisation of Education in Higher Education with reference to NEP- 2020. The speaker also highlighted the aims, recommendations, and provisions of NEP-2020 on vocationalisation of education. She also emphasized the worldwide data on vocational education and the role and responsibilities of the Ministry of Education, Ministry of Labor and Employment, and Ministry of Skill Development and Entrepreneurship as an agency for the implementation of vocational education in the country. At the end of the session, eleven papers were presented and discussed with the presenter on the topic.

The Session on 'Use of Technology in Teaching, Research, Evaluation and Governance' was moderated and chaired by Dr. Surendra Yadav, Assistant Professor, Department of Teacher Education, Nagaland University. Prof. P.K. Mishra, Director, CPRHE, NIEPA, Resource Person for the session emphasized the use of technology in teaching, research, assessment and governance. He stressed the importance of the efficiency of using technology among individuals. At the end of the session, fourteen papers were presented and discussed by the presenter and participants.

The Valedictory session was moderated and chaired by Dr. Pradipta Kumar Pattnaik, and the valedictory address was delivered by Dr. Amarendra Pani, Joint Director and Head (Research Division), AIU, New Delhi. In his valedictory speech, he highlighted the journey of education from the Mudaliar Commission (1952) to the Kothari Commission (1964), NEP (1986), NEP (1986), Acharya Commission (1990), Programme of Action (1992), Yashpal Commission (2005) and National Commission (2006-2007). The speaker also remarked that UNESCO (1972) brought about innovation and transformation in the educational system of India. However, the country felt that these policies are outdated and needed a new policy for the changing needs of the time which led to the introduction of the National Educational Policy (NEP, 2020). He emphasized that individuals now need not only the Intelligent Quotient and Emotional Quotient but also the Spiritual Quotient. With the internationalization of education, there is a need for adaptability, adjustability, and employability among students of higher Education. Asale Vitso and Thronlem Jorlim Konyak, research scholars, Department of Teacher Education, Nagaland University presented a brief report of the entire two days of the national event.

Prof. G N Tiwari, Department of Teacher Education, NU delivered the vote of thanks to all, in his address recognizing the significance of the event, Prof. Tiwari thanked the Coordinator and Convener of the webinar for successfully organizing the event. Gratitude was also extended to the Pro-Vice Chancellor, Nagaland University, Kohima campus, Prof. N Venuh and to all the resource persons, paper presenters, and participants for their active and valuable participation. Also, thanked ICSSR, NERC, Shillong, Meghalaya for giving the opportunity to organize the webinar.

### **Workshop on Artificial Intelligence for Blockchain**

A five-day Workshop on 'Artificial Intelligence for Blockchain' is being organized by the Department of Computer Science and Engineering, National Institute of Technology Rourkela, Odisha on December 18-22, 2023 through hybrid mode. Undergraduate/postgraduate students, research scholars/professionals, staff/ faculty members, and industry professionals working in the area of artificial intelligence and blockchain technologies may participate in the event. Participants having Computer Science and Engineering, Electronics and Communication Engineering, and Electrical Engineering backgrounds may also participate.

Artificial Intelligence has the ability to revolutionise numerous areas like healthcare, banking, education, and more. Its significance has grown in the modern world. In numerous industries, the use of AI has already boosted accuracy, decreased prices, and improved efficiency. Blockchain is a technique for storing data that makes it difficult or impossible for the system to be altered, hacked, or otherwise abused. A distributed ledger known as a blockchain copy disperses transactions among the network of computers involved in the blockchain. Combining blockchain technology with Artificial Intelligence (AI) can result in clever automated decision-making systems that deliver extremely trustworthy outputs that cause particular real-world consequences based on immutable, tamper-proof data. Bringing AI into Blockchain brings numerous opportunities across industries. The course aims to give an insight into how AI algorithms can be used along with blockchain technology to address the challenges in various use cases like healthcare, supply chain, financial services, life sciences, etc. The Topics of the event are:

- Introduction to Blockchain.
- Applications of Blockchain.
- Demystifying Blockchain.
- Components of blockchain.
- Challenges in the use of Blockchain Technology.
- Distributed Consensus: Nakamoto Consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy Utilization, and Alternate.

- Blockchain as a Path to Artificial Intelligence.
- Data Collection, Cleaning, and Processing in AI modeling.
- Smart Contract Advocates on Behalf of Digital Intelligence, Hyperledger.
- Direct Acyclic Graph, Play with Go-ethereum, Smart Contract Construction.
- Toy Application Development Using Blockchain, and Mining Puzzles.

For further details, contact Coordinator Department of Computer Science and Engineering, National Institute of Technology Rourkela Rourkela – 769008, Odisha. E-mail: [ashas@nitrkl.ac.in](mailto:ashas@nitrkl.ac.in). For updates, log on to: [www.nitrkl.ac.in](http://www.nitrkl.ac.in).

### **International Conference on Machine Learning, Image Processing, Network Security, and Data Sciences**

A two-day International Conference on 'Machine Learning, Image Processing, Network Security, and Data Sciences' is being organized by the Department of Computer Science and Engineering, National Institute of Technology, Hamirpur from December 21-22, 2023. The event will bring together researchers, experts, and practitioners from different fields to share their knowledge, insights, and experiences on the latest advancements and innovations in these domains. The conference aims to provide a platform for interdisciplinary collaborations and foster a vibrant community of researchers and practitioners in these areas. The event will provide an excellent opportunity for participants to learn from each other, network, and collaborate on new research projects. The Tracks of the Event are:

#### ***Machine Learning and Computational Intelligence***

- Theoretical Computer Science.
- Artificial Intelligence.
- Pattern Recognition.
- Computer Graphics.
- Virtual Reality.
- Distributed & Cloud Computing.
- Signal Processing.
- Software Architecture.
- Soft Computing.
- Grid and Cluster Computing.

- Evolutionary Algorithms.
- Ubiquitous Computing.
- Parallel and Distributed Networks.
- Perceptual Computing, and Related Topics.
- Learning using Ensemble and Boosting Strategies.
- Active Machine Learning.
- Manifold Learning.
- Fuzzy Learning.
- Kernel-based Learning.
- Genetic Learning.

#### ***Image Processing and Computer Vision***

- Watermarking Methods and Protection.
- Wavelet Methods.
- Image Data Structures and Databases.
- Multi-resolution Imaging Techniques.
- Multimedia Systems and Applications.
- Novel Image Processing Applications.
- Camera Networks and Vision.
- Cognitive and Biologically Inspired Vision.
- Active and Robot Vision.
- Fuzzy and Neural Techniques in Vision.
- Medical Image and Video Analysis.
- Color and Multispectral Processing.
- Computational Imaging.
- Video Processing and Analytics.
- Visual Quality Assessment.
- Deep Learning for Images and Video.
- Human Activity Recognition.
- Software Tools for Imaging.
- 3D Imaging.

#### ***Data Sciences and Big Data***

- Big Data Management.
- Platforms and Technologies for Big Data.
- Data Retrieval.
- Big Data Storage Techniques.
- Data Mining and Warehouse.
- Data Visualization.
- Modelling Structure and Storage of Big Data.

- Scalability and Portability Issues of Big Data.
- Big Data Recommender Systems.
- Digital Forensics.
- Parallel Processing of Big Data.
- Distributed Access to Big Data.
- Applications of Big Data and Related Topics.
- Web Mining.
- Social Network Analysis.
- Text Mining.
- Sentiment Analysis.
- Algorithms.
- Novel Theoretical Models.
- Novel Computational Models.
- Data and Information Quality.
- Data Integration and Fusion.

#### ***Network and Cyber Security***

- Network Performance Analysis.
- Human Factors in Security and Privacy.
- Security and Privacy in ad hoc Networks.
- Security and Privacy in e-services.
- Security and Privacy in Grid Computing.
- Security and Privacy in Mobile Systems.
- Cyber Risk and Vulnerability Assessment.
- Cyber-crime and Warfare.
- Insider Threat Detection and Prevention.
- Critical Infrastructure Protection.
- Intrusion Detection and Prevention.
- Botnet Detection and Mitigation.
- Visual Analytics for Cyber Security.
- Security and Privacy in Social Network.
- Machine Learning for Biometric Security and Privacy.
- Security and privacy in Wireless Sensor Networks.
- Security and Privacy in Pervasive Computing.

For further details contact, Organising Secretary, Department of Computer Science and Engineering, National Technology of Hamirpur, Himachal Pradesh-177005. E-mail: [mind2023@nith.ac.in](mailto:mind2023@nith.ac.in). For updates, log on to: <https://mind2023.nith.ac.in>.



### **Faculty Development Programme on Innovative Teaching Strategies and Tools**

A six-day Faculty Development Programme on 'Innovative Teaching Strategies and Tools' was organized by the Association of Indian Universities, New Delhi—Academic and Administrative Development Centre (AADC), Shri Vaishnav Vidyapeeth Vishwavidyalaya (SVVV), Indore from August 14-19, 2023 through online mode. About sixty-four participants were registered for the event.

The Inaugural Session began with the Welcome Address by the Vice Chancellor, Dr. Upinder Dhar. Dr. Dhar addressed participants and said that teachers being the role models and warriors have the ability and responsibility to change themselves to changing technology. Nodal Officer, Dr. Anand Rajavat, Dean Academic, SVVV briefed about the programme and its relevance. He gave a brief outline of the programme and requested all the participants to enrich their knowledge from this event by active participation. He said that the objective of a faculty development programme is to elevate the expertise, capabilities, and impact of educators within an educational institution.

Chief Guest, Prof Sandeep Sancheti, Vice Chancellor, Marwadi University, Rajkot, Gujrat delivered the Presidential Address. He delivered a highly motivating and inspirational address that left a strong impact. Prof. Sancheti encouraged participants to enthusiastically embrace Innovative Teaching Techniques and Wholeheartedly Adopt Collaborative Learning Approaches. He Expressed His Sincere Thanks to SVVV For Inviting Him As The Chief Guest.

Coordinator, Dr. Navneeta Upadhyay hosted and facilitated the Inaugural Programme as the Master of Ceremony. The inaugural session concluded with a Vote of Thanks by Dr. Deepali Saxena, Coordinator of the event and Assistant Professor, Food and nutrition, SVVV, Indore.

Dr. Sachin Parekh, Director, London School of Digital Business, UK delivered his talk on the 'How to Grab UK Opportunities in the Digital Age'. He stated that grabbing opportunities in the digital

age, especially in the UK, requires a combination of strategic thinking, skill development, networking, and staying up-to-date with the latest trends. Dr. Sachin also gave information about the scholarship programmes in UK for the teachers.

Prof. K Shrinivas, Head of ICT and Project Management Unit, Chairperson e-Learning Cell NEPA, Ministry of Education, Govt. of India headed the two sessions and spoke in detail about blended teaching and learning. He explained the seven characteristics of a teacher that are essential to being a digitally proficient educator. The session was very interactive and ended with a demonstration and hands-on practice to create our own teaching material with the help of available softwares and social media platforms.

Vice Chancellor, Bahadurgarh University, Haryana, Dr. A K Bakshi spoke about NEP-2020 and quality higher education. He clearly mentioned that NEP- 2020 emphasizes the importance of faculty development and proposes initiatives to enhance the skills and qualifications of educators.

Dr. Vimal Rarh, Project Head and Joint Director, GAD- TLC provided profound insights into MOOCS courses and various online platforms. She elucidated the four-quadrant approach to developing e-content, offering comprehensive guidance on creating MOOC proposals and the process of e-content development.

Dr. Prabal Bandhopadhyay, Senior Research Scientist/Project Management, Novartis Healthcare Pvt. Ltd., Hyderabad delivered a talk on the topic 'Gamification in Education: Creating Immersive Learning Experiences in the Digital Age'. The speaker provided an in-depth and comprehensive overview of the subject matter. To elucidate the central theme, he skillfully employed a variety of illustrative instances, which helped to clarify and solidify the key concepts.

Dr. Upinder Dhar addressed the session stating that the changes we are going through in current times have really brought out the best in our faculties who seem ready to develop their learning and gaining knowledge. Dr. Dhar's enlightening presentation



delved into innovative approaches to teaching, where he skillfully distinguished between creativity and innovation. He provided a comprehensive exploration of how these innovative techniques can effectively be integrated into the digital era. His lecture was not only highly informative but also engaging and captivating.

Prof. A K Bakshi, Senior Academician presented a talk on 'Digital Transformation in Higher Education in India: An Overview'. He delivered a lecture on the pedagogical dimensions of teaching and the creation of curricula. During the presentation, Prof. Bakshi demonstrated various methods for designing curriculum, outlining educational goals for programs, and defining the expected outcomes for a specific course example.

The Faculty Development Programme ended with a valedictory session. The event commenced with a warm reception of esteemed guests, followed by Dr. Navneeta Upadhyay, Coordinator, presenting the comprehensive event report.

Vice Chancellor, Dr. Upinder Dhar delivered the Welcome Address setting the tone for the session. Valuable insights and opinions about the programme were shared by the participants during the feedback session. Expressing gratitude and appreciation, Dr. Anand Rajavat, Nodal Officer proposed the vote of thanks to all. The session reached its conclusion with the National Anthem, fostering a sense of unity and patriotism among all present.

□

## HANDBOOK ON ENGINEERING EDUCATION (2016)

The 12<sup>th</sup> Edition of “**Handbook on Engineering Education**” is primarily meant for students seeking admission to Engineering/Technology/Architecture programmes at the undergraduate and postgraduate levels. It contains State-wise information on 1050 colleges/institutes/ university departments in the country. The information of Institutions in the Handbook includes: Year of establishment of Institute/ Department/ name of its Principal/ Director; probable date of Notification/last date of application; Number of seats available in each Engineering/ Technology branch; seats for NRIs/Foreign students; Eligibility; Application procedure; State-wise Common Entrance Test Rules for B.E/B.Tech/B.Arch courses; Fees; Hostel facilities, etc. Also given is 'Faculty strength', commencement of Academic Session, and System of Examination. Brief details of Post-graduate courses are also included.

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# Implementation Challenges of National Education Policy–2020 with Reference to Higher Education: Some Suggestions

Vikas Sharma\* and Parul\*\*

Implementation of any policy is of greater importance as it develops the social, economic, and political context of the system and influences itself from these contexts also. To make the implementation of any policy successful, the engagement of all stakeholders is necessary. The goals also should be clear. Also, the successful implementation of policy depends upon contextual factors. India observed the transformation in the current structure and introduced a New Education Policy in 2020 which promises to provide 21<sup>st</sup>-century skills and quality education at all levels- Elementary, Secondary, and for Higher. This policy is framed in line with the philosophy of Indian traditional knowledge and the thoughts and recommendations given by NEP 2020 are very innovative, student-centric, and forward-looking which can be helpful to achieve SDG 4 also which is related to quality education. The present paper in the initial part is going to discuss features of National Education Policy 2020 in relation to higher education and implementation challenges and suggestions for effective implementation of NEP 2020 will be discussed thereafter.

The most crucial factor in any nation's development is education since it enables people to reach their full potential, creates a just and equal society, and fosters total national growth. Access, equity, quality, and employability have remained in consideration for earlier policies, committees, and commissions but in terms of achieving that we are still not up to the mark. Due to significant scientific and technical advancements, the education sector has recently seen changes in the Programme structure and outcomes. NEP 2020 has recommended many approaches to bring about reforms in education. It has been created with both local and global requirements in mind, and it was formulated on the doctrine and principles of ancient Indian knowledge, wisdom,

and truth. (Mittal, 2021, p.19). To make learning more practical and fun, the pedagogy should instill in pupils a critical thinking and problem-solving attitude. The recently launched National Education Policy–2020 (NEP-2020) in India is an extremely beneficial move in this direction and may close all the disparities in higher education and schooling as well. Also, NEP 2020 can strengthen higher education by giving priority to quality and innovation which results in the development of human capital (Sharma and Sharma, 2021, p.91).

### Status of Higher Education

At present, there are 1113 universities and 43,796 colleges across the country in which Uttar Pradesh, Maharashtra, Karnataka, and Rajasthan are having more institutions. Higher education has a gross enrolment ratio of 27.3%, which includes 27.9% female students and 26.7% male students. For SC students, it is 23.9 and for ST it is 18.9. The total number of students enrolled in higher education is around 4.13 crore in 2020-21, with more females enrolling in M.Phil., PG, and certificate Programmes than male students, while male students enroll in more Ph.D. and diploma Programmes. Also, there are 24 students per instructor and 29.7 teachers per college. In 2019–20, the Gross Enrolment Ratio (GER) for men (26.9) was lower than the GER for women (27.3). Uttar Pradesh has the greatest overall GER of any state (16.07%), followed by Maharashtra (10.98%) and Tamilnadu (8.06%) (AISHE, 2020-21).

According to the AISHE report (2020-21) on higher education, it can be seen that in India, the number of higher education institutions and enrolment have both been growing rapidly during the past 30 years. Although India has faced an increase in enrolment of students in higher education institutions during the 1990s, there is a need for its educational quality landscapes by incorporating the idea of a quality assurance mechanism. Presently, in India, different quality assurance agencies like the National Assessment and Accreditation

\* Research Scholar, School of Education, Central University of Himachal Pradesh-176225. Email: 1993vikassharma@gmail.com.

\*\* Research Scholar, School of Education, Central University of Himachal Pradesh-176225.

Council (NAAC) National Board of Accreditation (NBA), etc. work to ensure quality According to the latest data there are only 406 universities and 8,686 colleges that underwent NAAC accreditation. Maharashtra is in the top position with having the highest accredited colleges. These accrediting agencies should guide the institutions in improving the quality of education and meeting the standards of quality education. This paper will discuss the guidelines of NEP--2020 regarding Higher Education and some implementation challenges and strategies to implement effectively.

### **Research Methodology**

This paper is based on secondary sources and the methodology adopted is analytical. The author has tried to understand the implementation challenges of NEP 2020. The fulcrum of the recommendation of NEP 2020 with reference to higher education has been discussed here.

### **Governance of Higher Education**

The UGC, AICTE, and seventeen statutory professional bodies, including MCI, BCI, DCI, ICAR, NCTE, NCI, COA, and ICAR, currently regulate the Indian Higher Education System. The policy has advocated the establishment of a Commission named as Higher Education Commission of India (HECI) as an umbrella entity to avoid hierarchical repetition in the operation of various regulatory agencies and to separate the tasks of accreditation, funding, and regulation. The commission shall consist of the four autonomous verticals listed below, each with distinct tasks and responsibilities: National Council for the Regulation of Higher Education (NHERC). National Accreditation Council (NAC), Council for Higher Education Grants (HEGC), and General Education Council (GEC) (NEP, 2020).

To coordinate regulations for higher education, the National Higher Education Regulatory Council will be in charge of this and uphold national higher education standards. On the other hand, the Higher Education Grants Council's only responsibility will be to distribute grants, and accreditation of the nation's HEIs will be overseen by NAC (National Accreditation Council). The National Higher Education Qualification Framework (NHEQF) will be established by the General Education Council (GEC) in accordance with the National Skills Qualification Framework (NSQF). At various Programme levels,

the GEC will specify the desired learning outcomes and graduation requirements. Norms for credit transfer, equivalence, and other uses of the NHEQF shall also be established. In order to prepare our children to be global citizens, the GEC must also determine what 21<sup>st</sup>-century abilities are needed.

### **Restructuring of Universities**

According to the NEP 2020, institutions of higher learning such as colleges and universities should all have at least 3,000 students each and should be large, multidisciplinary universities. The goal is to raise the higher education sector's overall enrolment ratio by 2035 from 26.3% to 50%. Over 40,000 institutions will be granted graded autonomy in order to become independent, autonomous degree-awarding colleges, which will help accomplish this. Universities have been further broken down into three categories by the NEP: universities with a focus on teaching, conducting research, and autonomously awarding degrees (NEP 2020).

### **Reforming Programmes**

The three-year graduation Programme has been changed by the NEP into a four-year curriculum with numerous entry and multiple departure options under the umbrella of liberal education. For instance, if a student needs to withdraw from the graduation Programme in the middle of it due to a health problem, financial difficulty, marriage, etc., he will receive a certificate after finishing the first year, a diploma after finishing the second year, and a degree after finishing the third or fourth year.

### **Continuous Assessment and Evaluation**

The NEP has undergone considerable changes regarding student evaluation and assessment. Rather than paying attention to a three-hour exam at the conclusion of the semester, the policy emphasizes ongoing monitoring and evaluation of students throughout the semester. Students can be continuously evaluated using a variety of methods, events, activities, in-person meetings, group debates, etc.

### **Internationalisation of Higher Education**

The policy has opened up opportunities for top-performing Indian institutions to set up campuses worldwide in order to promote our cultural heritage, traditional knowledge system, and Indian medical systems like Ayurveda, Naturopathy, Yoga, etc.

Moreover, campuses would be allowed to be established in India by the top 100 universities in the world. The presence of institutions from other countries in India will encourage international cooperation in terms of educators, pupils, course of study, semester, and research collaboration while generating competition among Indian educational institutions, which might help in improving the overall quality of our higher education system.

### **Re-energizing the Faculty**

The NEP suggests that in order to recognize the importance of faculty in raising the standard of higher education, the autonomy for faculty to develop their own curricula and pedagogical approaches within the established framework. While these will serve as the primary drivers for them to produce truly remarkable and creative work. Also, by fostering innovative teaching, research, and service, it will enable the faculty with the resources they need to do their jobs well.

### **Promoting Research**

The establishment of the National Research Fund (NRF) has been recommended in the policy to monitor and manage the funding of research grants to institutions. The National Research Foundation will work to link institutions with multiple funding sources and prevent the duplication of research awards from various funding agencies. The main objectives of the NRF will be (a) finance highly competitive, peer-reviewed proposals for grants across all disciplines; (b) by mentoring such institutions, one can start, foster, and make it easier for academic institutions to conduct research, particularly in universities and colleges where it is still in its infancy and (c) function as an interface liaison between researchers and the appropriate government and industry in order to keep researchers up to date.

### **Implementation Challenges**

#### ***Moving in the Direction of More Multidisciplinary Colleges and Universities***

Shifting the focus from single, highly specialized specializations to a multidisciplinary approach is required, as stated in the NEP--2020 statement. This gives higher education students a larger and more in-depth understanding of different fields, including, technical, professional, and vocational subjects. Although the concept is excellent, there are a few practical challenges because the differences between

multidisciplinary and transdisciplinary approaches are not well understood. Multidisciplinary refers to more than two fields. The UGC and other academic authorities can create expert committees to help bring this idea to life, and they need to come up with a plan of action that includes an experimental curriculum that can be used before being implemented in higher education institutions (Sharma and Swamy, 2021, p.54)

### ***Subject Specialization and Identification***

Although the concept of multiple entry and exit is excellent, skill-based disciplines need clear definitions. In order to select the sort of professional education, subject identification and specialization in science, business, and the arts are unclear. Furthermore, unclear is the specifics of implementation at the high school and college levels. Further, confounding and giving pupils incomplete knowledge is the idea of many entry and exit points for degrees, certificates, and diplomas.

### ***Digital Education Platform Services***

Unexpected situations like COVID 19 can come at any time which can affect learning. So, we should have a resilient education system that adapts to changes in the new situation and 21<sup>st</sup>-century requirements. Today is the age of technology, digitization, and innovation, and that requires the students to be well-equipped with such technology which will facilitate and enhance learning. For achieving this, we need a good infrastructure and resources such as internet connectivity in remote areas, smart classrooms, and technology-savvy teachers who have good techno-pedagogical skills. Providing all these services is a challenge according to cost bearing with these technological resources and existing diversity in rural and urban areas of our country.

### ***Redesigning the Content and Curriculum***

NEP is focusing on multidisciplinary education and for achieving that objective, we also need to redesign the content which will foster knowledge, skill, attitude, critical thinking, and creativity. Curricular choices will be the important aspects of multidisciplinary education. The development of the curriculum, its planning, and the teaching and learning process are the key determinants of higher education quality. A lot of effort, care, and resources are required when changing the pattern to one that is flexible, multidisciplinary, research-based, and liberal studies.



Accrediting organizations should adequately oversee higher education institutions and provide them with more freedom to establish a functional curriculum. Also, educators need to plan for suitable pedagogical practices to introduce multidisciplinary education. For introducing multidisciplinary education, we also need multiple language resources to make the curriculum multidisciplinary in approach.

### ***Need A Large Number of Teachers***

NEP is stressing multidisciplinary education, digital education, and restructuring the curriculum in the higher education system. In order to transact this multidisciplinary curriculum, a large number of teachers are required. Also, those teachers need pedagogical training to deal with the students for giving them better learning experiences. To deal with students, we need teachers who possess innovative pedagogical skills including techno-pedagogical skills, management and academic leadership skills and life skills including creative and critical thinking and their integration into their teaching style is very essential. More resources and financial assistance are required for filling up a large number of teaching positions in higher education institutions. The NEP does not address regular funding for teachers' training. Proper funding and infrastructure must be provided in order to make the NEP worthy.

### ***Socially and Economically Deprived Groups (SEDGs)***

Women, members, economically disadvantaged groups, students from tribes, students who live in rural areas, etc are clearly a diverse portion of the students who are unable to access higher education because of many factors (Sharma and Swamy, 2021, p.54). To include them, it is urgently necessary to organize awareness programmes about the accessibility of higher education both at national and state levels together.

### ***Timelines and Phasing***

Implementing NEP in a time-bound manner sharing the responsibilities and making coordination with multiple bodies at the central and state level is a huge task that demands much effort. A few recommendations in the NEP have deadlines, such as the GER objective of 50% by 2035, the complete elimination of affiliation by 2035, and the requirement that all standalone colleges and TEIs, and other institutions will become interdisciplinary by 2030.

### ***More Budget for Infrastructural Development***

A large fund is required for infrastructural development to implement multidisciplinary courses within various higher education institutions in terms of digital education infrastructure and other infrastructural facilities. Also, there is a target of achieving GER to 50% by 2035 which requires more budget allocation. This is also a challenge in the higher education system as it requires many materials and human resources in terms of the physical infrastructure of colleges and universities, digital education platform services, and a few competent teachers.

### ***Suggestions***

#### ***Multistakeholder Partnership***

By clearly outlining those who are responsible agencies and organisations, defining the primary, medium, and micro/unit level actions and strategies, the specific timelines and phasing, and having a variety of models for various States and institutions that depend on their readiness as well as the availability of infrastructural, human, and financial resources. All these responsibilities to be shared by different stakeholders are pre-requisite to implementing the policy well.

#### ***Focussing on and Strengthening Secondary Education***

The implementation of higher education reforms must take into account the realities and the existing state of secondary-stage education because NEP-2020 emphasizes the connections between various educational stages. For instance, GER in higher education is affected by the secondary education transition rate. The considerable gap between secondary school and higher education is a problem in the current educational system. The Ministry of Women and Child Development and the Ministry of Skill Development and Entrepreneurship are two government organisations that are active in education and skill development, which is in charge of ECCE and work to ensure that children learn the fundamentals of literacy and numeracy.

#### ***Capacity Building Programmes and Continuous Professional Development for Teachers***

Teachers are also one of the most important elements in the educational process. They need to be equipped with innovative skills so that they can

develop 21<sup>st</sup>-century skills among students. Therefore, to implement the policy well and to make teachers acquainted with the recommendations of NEP 2020, capacity-building Programmes should be organised by implementing agencies that integrate innovative pedagogical skills, life skills, and management skills. Also, for the continuous professional development of teachers' seminars, refresher courses and orientation Programmes should be organised.

### **Continuous feedback**

The NEP 2020 implementation plan must include continuing feedback mechanisms and the use of data to determine what has and has not worked in order to analyse and track overall progress. The was built on routine data analysis and was intended to take a long-term approach.

### **Resources in Multiple Languages and Curricular Choices**

It is necessary to have resources with a variety of curricular options. In light of India's diversity of languages and religions, it is important to promote Indian languages. Indian culture, dates to thousands of years and is regarded as being extremely knowledgeable. Due to this, we require resources for teachers, content, and a variety of pedagogical techniques.

### **Collaborations with other Universities and Institutions**

In order to become cost-effective as well as provide students with the necessary best infrastructure and resources, universities must adopt a strategy of collaboration with other universities and super specialty educational institutions. Universities will be able to share research facilities and digital platform services through this plan by making the best possible use of the available infrastructure.

### **Conclusion**

After a long time, the government has an innovative and forward-looking NEP 2020. This policy is firmly rooted in the Indian Ancient Knowledge system. It has been created with both local and global requirements in mind and was established in accordance with the doctrine and tenets of classical Indian knowledge, wisdom, and truth. The NEP can reestablish India's rich educational system and can make it *Vishwa Guru* again since it emphasizes the

holistic development of students. Implementation of NEP should be done with true spirit by involving and coordinating every stakeholder.

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# THESES OF THE MONTH

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## SCIENCE & TECHNOLOGY

**A List of doctoral theses accepted by Indian Universities  
(Notifications received in AIU during the month of July-August, 2023)**

### AGRICULTURAL & VETERINARY SCIENCES

#### Forestry

1. Chauhan, Indu Singh. **Bionomics and control of bamboo borer *Estigmene chinensis* Hope. (Coleoptera: Chrysomelidae) Chrysomelidae**. (Dr. K P Singh), Department of Forest Entomology, Forest Research Institute, Dehradun.

2. Nirmal. **Physiological and biochemical changes in response to elevated CO<sub>2</sub> in *Dalbergia sissoo* Roxb at nursery stage**. (Dr. Meena Bakshi and Dr. Hukum Singh), Department of Forest Botany, Forest Research Institute, Dehradun.

3. Rajni. **In vitro propagation of *Catamixis baccharoides* and *Dysoxylum gotadhora***. (Dr. Ajay Thakur), Department of Forest Biotechnology, Forest Research Institute, Dehradun.

#### Plant Pathology

1. Satapathy, Rakesh Roshan. **Studies on survey and management of *Alternaria Zinniae*, the incitant of leaf spot and flower blight of marigold (*Tagetes Erecta* L)**. (Dr. Kartik Chandra Sahu), Department of Plant Pathology, Siksha O Anusandhan University, Bhubaneswar.

### BIOLOGICAL SCIENCES

#### Biotechnology

1. Bishoyi, Ajit Kumar. **Biosynthesis, characterizations, and biological activities of silver nanoparticles with the cyanobacterium *Oscillatoria sp.*** (Dr. Rabindra Nath Padhy), Department of Biotechnology, Siksha O Anusandhan University, Bhubaneswar.

#### Food Science & Nutrition

1. Saiharini, N. **Valorization of fruit processing by products: Extraction, characterization, phenolic and pesticide residue profiling and utilization as a valuable source of pectin and dietary fiber**. Department of Food and Nutritional Sciences, Sri Sathya Sai Institute of Higher Learning, Anantapur.

#### Life Sciences

1. Vashishtha, Shubham. **Exploring the role**

**of L-asparaginase and HtpX as potential targets against *Neisseria gonorrhoeae***. (Prof. Biswajit Kundu), Kusuma School of Biological Sciences, Indian Institute of Technology Delhi, New Delhi.

### EARTH SYSTEM SCIENCES

#### Environmental Science

1. Parveen, Nazia. **Enhancing shelf life of carrier based microbial plant growth stimulants during storage and its application and its cultivation of some economically important plants**. (Prof. R P Singh), Department of Energy and Environment, Babasaheb Bhim Rao Ambedkar University, Lucknow.

### ENGINEERING SCIENCES

#### Biochemical Engineering

1. Kalakoti, Yogesh. **Leveraging representation learning for drug discovery**. (Prof. D Sundar), Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology Delhi, New Delhi.

2. Vipul Kumar. **Molecular insights and therapeutic potential of natural compounds**. (Prof. D Sundar), Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology Delhi, New Delhi.

#### Chemical Engineering

1. Chourasia, Vallari Ramesh Maneesha. **Lignocellulosic biomass valorisation using deep eutectic solvents for sustainable biorefineries**. (Prof. K K Pant and Prof. Robert Henry), UQ-IITD Academy of Research, Indian Institute of Technology Delhi, New Delhi.

#### Civil Engineering

1. Gupta, Garima. **Characterization of MSW incineration ash from three plants in Delhi options for disposal and reuse and comparison with data from other countries**. (Prof. Manoj Datta and Prof. B J Alappat), Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi.

#### Computer Science & Engineering

1. Biswal, Anil Kumar. **Design of IOT based**

**smart vehicle using Controller Area Network (CAN).** (Dr. Debabrata Singh and Dr. Binod Kumar Pattanayak), Department of Computer Science & Engineering, Siksha O Anusandhan University, Bhubaneswar.

2. Chopade, Madhuri. **Estimation of mangrove parameters using multi spectral images over Gulf of Khambhat, Gujarat.** (Dr. Seem Mahajan), Department of Computer Engineering, Indus University, Ahmedabad.

3. Lunagaria, Munindra Hasmukhbhai. **COVID-19 pneumonia detection from X-ray images using deep feature extraction and XGboost.** (Dr. Vijay Dadasaheb Katkar and Dr. Krupal Narumal Vaghela), Department of Computer Science & Engineering, Marwadi University, Gujarat.

4. Pati, Abhilash. **Fog-cloud-IoT integrated approaches for performance enhancements of e-Healthcare systems.** (Dr. Manoranjan Parhi and Prof. Binod Kumar Pattanayak), Department of Computer Science & Engineering, Siksha O Anusandhan University, Bhubaneswar.

5. Pradhan, Ashwini Kumar. **Design and development of medical image classification models exploring the capabilities of soft and nature inspired learning strategies.** (Dr. Kaberi Das Dr. Debahuti Mishra), Department of Computer Science & Engineering, Siksha O Anusandhan University, Bhubaneswar.

#### **Electrical & Electronics Engineering**

1. Bhugra, Swati. **Deep leaf phenotyping multi-level leaf phenotyping based on novel computer vision frameworks.** (Prof. Brejesh Lall and Prof. Santanu Choudhury), Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.

2. Chauhan, Vineeta Siddharthsingh. **Multi objective optimal power flow problems under the influence of distributed generation scenario.** (Dr. Jaydeep Chakravorty), Department of Electrical Engineering, Indus University, Ahmedabad.

3. Dash, Byomakesh. **Power quality improvement of grid-tied distribution system using Pv-Dstatcom.** (Prof. Bidyadhar Subudhi), Department of Electrical Engineering, Siksha O Anusandhan University, Bhubaneswar.

4. Gupta, Avi. **Multifunctional ceramic-based coatings on structural steels.** (Prof. Deepak Kumar), Centre for Automotive Research and Tribology, Indian Institute of Technology Delhi, New Delhi.

5. Saxena, Ankit. **Development and tribodynamic performance of environmentally friendly greases.** (Prof. Deepak Kumar and Prof. Naresh Tandon),

Centre for Automotive Research and Tribology, Indian Institute of Technology Delhi, New Delhi.

6. Shah, Hinal. **Implementation of new protection scheme for interconnected network with renewable energy sources.** (Dr. Jaydeep Chakravorty and Dr. Nilesh Chothani), Department of Electrical Engineering, Indus University, Ahmedabad.

7. Sharda, Pranav. **Design and performance investigation of OWC systems in indoor and outdoor scenarios.** (Prof. Manav Bhatnagar), Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.

8. Thakur, Anshul. **Co-channel coexistence of secondary OFDM networks over active DTV bands.** (Prof. Swades De), Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.

9. Vaishnav, Navneet. **Closed loop control analysis, speed sensorless operation and novel LC filter design criteria for VSI fed IM drive with output LC filter.** (Prof. Amit Kumar Jain), Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.

#### **Electronics & Communication Engineering**

1. Samant, Sunita. **Mutual information based CT and MR Image registration.** (Prof. Pradipta Kumar Nanda), Department of Electronics & Communication Engineering, Siksha O Anusandhan University, Bhubaneswar.

2. Shashi Kumar, D. **Investigations on the design, performance and effect of feed mechanisms, defected ground structures and metamaterials for optimized microstrip antenna array.** (Dr. Suganthi S), Department of Electronics & Communication Engineering, Christ University, Bangalore.

#### **Energy Studies**

1. Himanshu. **Development of biomass pellet based clean cookstove for cooking/heating applications.** (Prof. S K Tyagi and Prof. Sanjeev Jain), Department of Energy Science & Engineering, Indian Institute of Technology Delhi, New Delhi.

#### **Environmental Science and Engineering**

1. Yadav, Pooja. **Nanofiber membrane-based water treatment systems for desalination and heavy metals removal.** (Prof. Vivek Kumar), Centre for Rural Development & Technology, Indian Institute of Technology Delhi, New Delhi.

#### **Mechanical Engineering**

1. Ahuja, Ramya. **Studies on manufacturing and**



**pre-clinical testing of cardiovascular stent materials.** (Prof. Naresh Bhatnagar), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.

2. Amanpreet Singh. **Design of a robotic manipulator for minimally invasive surgery.** (Prof. Jitendra P Khatait), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.

3. Biswal, Sweta Rani. **A study on WS<sub>2</sub> dispersed novel aluminium based hybrid composites for green tribology.** (Dr. Seshadev Sahoo), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

4. Deheri, Chinmay. **Biohythane production and conversion for power generation from waste biomass and its statistical evaluation using machine learning.** (Dr. Saroj Kumar Acharya), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

5. Dharmender. **Damage assessment of spur gear through integrated oil, wear and vibration techniques.** (Prof. Harish Hirani and Prof. AshishK Darpe), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.

6. Sahu, Sagar Kumar. **A numerical investigation on darcy-forchheimer flow and thermal analysis of non-Newtonian nanofluids/hybrid nanofluids.** (Dr. Dharendra Nath Thatoi), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

7. Sarangi, Manoj Kumar. **Flow and heat transfer aspects of ternary composite nanofluids.** (Dr. Manoj Kumar Nayak), Department of Mechanical Engineering, Siksha O Anusandhan University, Bhubaneswar.

8. Singh, Neha. **Hybrid polymeric composites for tribological applications.** (Prof. Sujeet Kumar Singh), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.

9. Soni, Raj Bharatbhai. **Development of Ti-alloy for biomedical application using additive manufacturing.** (Dr. Sarang Sadashiv Pande), Department of Mechanical Engineering, Marwadi University, Gujarat.

#### Nanotechnology

1. Mishra, Mansi. **Nano-biopesticides development using cow dung and cow urine against oligonchus coffeae nietner.** (Prof. Kavya Dashora and Prof. Somnath Roy), Centre for Rural Development & Technology, Indian Institute of Technology Delhi, New Delhi.

## MATHEMATICAL SCIENCES

### Mathematics

1. Binjola, Manisha. **A study on regular genus and gem-complexity of 3-and 4-manifolds.** (Prof. Biplab Basak), Department of Mathematics, Indian Institute of Technology Delhi, New Delhi.

2. Boro, Laithun. **Characterization of some graph structures associated with rings and semirings.** (Prof. M M Singh), Department of Mathematics, North Eastern Hill University, Shillong.

3. Mishra, Soumyarani. **Finite element methods for multidimensional sobolev equation with burgers' type nonlinearity.** (Dr. Ambit Kumar Pany), Department of Mathematics, Siksha O Anusandhan University, Bhubaneswar.

4. Nitin Kumar. **Wavelet collocation methods for fractional optimal control problems.** (Prof. Mani Mehra), Department of Mathematics, Indian Institute of Technology Delhi, New Delhi.

5. Puneeth, V. **Heat and mass transfer analysis of Newtonian and non-Newtonian nanofluids in the presence of motile microorganisms.** (Dr. Manjunatha S), Department of Mathematics, Christ University, Bangalore.

6. Raj, Anna Treesa. **Topological indices based on distance labeling.** (Dr. Joseph Varghese), Department of Mathematics, Christ University, Bangalore.

7. Saha, Richa. **Dynamics of Newtonian fluids and nanofluids in various geometries.** (Dr. Smitha Saklesh Nagouda), Department of Mathematics, Christ University, Bangalore.

## MEDICAL SCIENCES

### Biotechnology

1. Champati, Bibhuti Bhusan. **Chemotyping and artificial neural network modeling in medicinally important *Andrographis paniculata* and *Asparagus racemosus* for elite selection and drug yield optimization.** (Dr. Sanghamitra Nayak), Department of Biotechnology, Siksha O Anusandhan University, Bhubaneswar.

2. Sahoo, Bhaskar Chandra. **Bioprospecting of betelvine (*Piper betle* L.) through metabolomics and trascriptomics emphasizing on cloning and characterization of disease resistance gene analogs.** (Dr. Basudeba Kar), Department of Biotechnology, Siksha O Anusandhan University, Bhubaneswar.

3. Uthansingh, Kanishka. **Identification and characterization of genes causing gastric cancer and**

**the development of biomarkers for diagnosis.** (Prof. Manoj Kumar Sahu), Department of Biotechnology, Siksha O Anusandhan University, Bhubaneswar.

#### Pharmaceutical Science

1. Sahu, Dipak Kumar. **Preparation and Characterization of noble ocular formulations for the treatment of dry eye.** (Dr. Gautam Rath), Department of Pharmacy, Siksha O Anusandhan University, Bhubaneswar.

#### PHYSICAL SCIENCES

##### Chemistry

1. Chauhan, Priyanka. **Synthesis, characterization and reactivity studies of organotin alkanesulfonates.** (Prof. Ravi Shankar), Department of Chemistry, Indian Institute of Technology Delhi, New Delhi.

2. Prusty, Deeptimayee. **Studies on Cu-In-S quantum dot functionalised materials for photocatalytic energy generation and environmental remediation.** (Prof. Kulamani Parida), Department of Chemistry, Siksha O Anusandhan University, Bhubaneswar.

3. Raghunath, B Shalini. **Synthesis of carbon containing composites for energy and environmental applications.** (Dr. Sunaja Devi K R), Department of Chemistry, Christ University, Bangalore.

4. Siddiqui, Namra. **RyJb, A novel riboregulator in Escherichia coli: Regulation of its expression and mechanism of its action.** (Dr. Tanmay Dutta), Department of Chemistry, Indian Institute of Technology Delhi, New Delhi.

5. Tripathy, Suraj Prakash. **Studies on UiO-66 MOF based photocatalytic systems towards energy and environmental applications.** (Dr. Kulamani

Parida), Department of Chemistry, Siksha O Anusandhan University, Bhubaneswar.

6. Wanniang, Kmendashisha. **Application of selenium and lead compounds for the synthesis of acyclic organic and related compounds.** (Prof. R L Nongkhaw), Department of Chemistry, North Eastern Hill University, Shillong.

##### Physics

1. Mohit. **Nanostructured materials for photoelectrochemical water splitting application.** (Prof. Neeraj Khare), Department of Physics, Indian Institute of Technology Delhi, New Delhi.

2. Naik, Kishore Chandra. **Nuclear structure and reaction for exotic nuclei within relativistic and non-relativistic formalisms.** (Dr. Rabinarayan Panda), Department of Physics, Siksha O Anusandhan University, Bhubaneswar.

3. Panda, Usharani. **Studies of physical behavior of transition metal doped SnO<sub>2</sub> for biomedical applications.** (Dr. Sushanta Kumar Kamilla), Department of Physics, Siksha O Anusandhan University, Bhubaneswar.

4. Sharma, Madan Lal. **Layer transfer of two-dimensional materials and semiconductors for next-generation flexible and heterostructures-based electronics.** (Prof. Rajendra Singh), Department of Physics, Indian Institute of Technology Delhi, New Delhi.

5. Thomas, Riya. **Facile fabrication of nanocarbon derivatives for optical and electrochemical applications.** (Dr. Manoj B), Department of Physics, Christ University, Bangalore. □

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Advt. No. 1/2023

Dean, Administration  
& Officiating Registrar

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COLLEGE**

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Phone-0484-2482084, 0484-2482497, Mob: 9645810941

**WANTED**

Applications are invited from fully qualified candidates for the following permanent post.

| Post                                                | Number of Posts |
|-----------------------------------------------------|-----------------|
| Physical Education, Assistant Professor- Open Merit | 1               |

Age and Qualification of the candidates as per University / UGC/NCTE/Government norms. Application form for the above mentioned post can be had from the undersigned on payment of Rs.1000/- directly or Rs.1050/- by post. Duly filled in application with self attested copies of mark lists and other certificates should reach the Manager **within 30 days** from the date of publication of this. advertisement. The appointment will be subject to approval by Government.

Moothakunnam  
30-09-2023

Sd/-  
Manager

Kolhapur Municipal Corporation's  
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(Affiliated to Shivaji University, Kolhapur)

(Permanently Granted)

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Applications are invited from eligible candidates for the following post:

| Sr. No. | Name of Post | Vacant Post | Unreserved (Open) Post |
|---------|--------------|-------------|------------------------|
| 1       | Principal    | 01          | Open to All - 1        |

**Note :** For detailed information about Post, Qualifications and Other Terms & Conditions please visit University Website: [www.unishivaji.ac.in](http://www.unishivaji.ac.in).

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Abhay Shikshan Kendra's  
**RAJARSHI SHAHU SR. COLLEGE OF ARTS,  
COMMERCE & SCIENCE**

Municipal School Bldg, 3<sup>rd</sup> Floor, Joglekar Wadi, Sion (E), Mumbai- 400 022.

**MINORITY**

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

**UN-AIDED**

| Sr. No. | Cadre               | Subject     | Total No. of Posts | Category |
|---------|---------------------|-------------|--------------------|----------|
| 1.      | Principal           | --          | 01                 | 01-OPEN  |
| 2.      | Assistant Professor | Accountancy | 01                 | 01-OPEN  |
| 3.      | Assistant Professor | Economics   | 01                 | 01-OPEN  |
| 4.      | Librarian           | ---         | 01                 | 01-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 10<sup>th</sup> March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell /ICC/2019-20/05 dated 05<sup>th</sup> July, 2019.

Candidates having knowledge of Marathi will be preferred.

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

The Government Resolution & Circular are available on the website [mu.ac.in](http://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.

Application with full details should reach the **SECRETARY, RAJARSHI SHAHU SR.COLLEGE OF ARTS, COMMERCE & SCIENCE**, Municipal School Bldg., 3<sup>rd</sup> Flr, Joglekar Wadi, Sion (E),Mumbai- 400 022. Within 15 days from the date of publication of this advertisement. This is University approved advertisement.

Sd/-  
SECRETARY



**Bharat Shikshan Prasarak Mandal, Latur**  
**JAIKRANTI COLLEGE OF EDUCATION**

**Wanted**

Applications are invited for the post of Principal to be filled in **Bharat Shikshan Prasarak Mandal, Latur's Jaikranti College of Education, Latur (Permanent Non-Granted)**. Eligible candidates should submit their application along with all necessary documents **within Fifteen days** from the date of publication of the Advertisement by Registered Post Only.

| Sr. No. | Name of the Post | Post | Reservation |
|---------|------------------|------|-------------|
| 01      | Principal        | 01   | Unreserved  |

**Educational Qualification:-**

1. Post Graduate Degree in Arts/Science/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 Teacher Education Institution.
4. Ten years of teaching experience in a Secondary Teacher Education Institution.

**Desirable:** Diploma/Degree in Educational Administration or Educational Leadership.

**Salary & Allowances:-**

Pay Scales as per the U.G.C., State Government & Swami Ramanand Teerth Marathwada University's 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 attend the interview.
- 3) Eligible candidates those who are already in services 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:-**

**Bharat Shikshan Prasarak Mandal, Latur**  
**C/o. Jaikranti College of Education,**  
**Sitaram Nagar, Latur- 413512**  
**Mobile No. 9422469174**

**Sd/-**  
**Secretary**  
**Bharat Shikshan Prasarak Mandal,**  
**Latur**

**WANTED**

Applications are invited from eligible candidates for the Post of Assistant Professor in **Bharat Shikshan Prasarak Mandal, Latur's Jaikranti College of Education, Latur (Permanent Non-Granted)**. The Application should reach the undersigned **within fifteen days** along with essential true copy of documents from the date of publication of this advertisement at the college address by Registered post only. Candidates from Reserve Category have to send one copy of their application to Assistant Registrar, Special Cell, Swami Ramanand Teerth Marathwada University, Nanded.

| Sr. No. | Designation with Subject                                                                  | No. of Post | Category Detail    |
|---------|-------------------------------------------------------------------------------------------|-------------|--------------------|
| 01      | Assistant Professor in Perspectives in Education                                          | 01          | OPEN - 04          |
| 02      | Assistant Professor in Pedagogy Subjects (Mathematics, Science, Social Science, Language) | 06          | SC - 02            |
| 03      | Assistant Professor in Health and Physical Education                                      | 01          | ST- 01<br>OBC - 01 |

**Educational Qualifications as per UGC & NCTE Regulation-2014:-**

**A. Perspectives in Education:**

- 1) A Master Degree in Social Science with 55% Marks (or an equivalent grade in a point wherever grading system is followed). 2) M.Ed. with at least 55% marks (or an equivalent grade in a point wherever grading system is followed). 3) SET / NET / Ph.D. in Education.

**OR**

- 1) M. A. In Education with 55% Marks (or an equivalent grade in a point wherever grading system is followed). 2) B. Ed. with at least 55% marks (or an equivalent grade in a point wherever grading system is followed). 3) SET / NET / Ph.D. in Education

**B. Pedagogy Subjects:**

- 1) A Master Degree in Sciences, Mathematics, Social Sciences, Languages with 55% Marks or Marks (or an equivalent grade in a point wherever grading system is followed). 2) M. Ed. Degree with at least 55% marks or an equivalent grade in a point wherever grading system is followed. 3) SET/NET/Ph.D. in Education.

**C. Health and Physical Education:**

- 1) Master of Physical Education (M. P. Ed.) with minimum 55% marks (Training/qualification in yoga Education Shall be desirable). 2) SET/NET/Ph.D. in Physical Education.

**Salary & Allowances:-** Pay Scales as per the U. G. C., State Government & S. R. T. M. University's rules from time to time.

**Note:-**

- 1) Prescribed application form is available on the University **Website: (srtmun.ac.in)**.
- 2) There is no T. A./D. A. will be paid to attend the interview.
- 3) Candidates from SC, ST Category are eligible having minimum 50% marks at their Post Graduate Degree
- 4) 3% Reservation for Physically Handicapped Candidate.
- 5) 30% Reservation for women Candidate.
- 6) Those Candidate who are working in private and government institute apply through proper channel.
- 7) As per G.R. No.संकीर्ण-२२०५/प्र.क्र. ६८/विशि-१, Date: 24/06/2022 Sr. 03 the Reservation Policy for teaching & non-teaching post have not applied for permanent Non-Granted colleges/institutions.

**Address for correspondence :-**

**The Secretary,**  
**Bharat Shikshan Prasarak Mandal, Latur's**  
**Jaikranti College of Education, Sitaram Nagar, Latur- 413512**  
**Mobile No. 9422469174**

**Sd/**  
**Secretary**  
**Bharat Shikshan Prasarak Mandal, Latur**

# ST. PIUS X COLLEGE

(Govt. Aided College Affiliated to Kannur University Accredited with NAAC A Grade, and  
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Mob: 8281925726, Email: stpius@gmail.com, Website : www.stpius.ac.in

## NOTIFICATION

| Sl.No. | Category            | Number of Vacancies |                       |
|--------|---------------------|---------------------|-----------------------|
| 1      | Assistant Professor | Hindi               | 1 (Community)         |
| 2      | Assistant Professor | Microbiology        | 1 (PWD*)              |
| 3      | Office Attendant    |                     | 2 (Open) and 1 (PWD*) |

Applications are invited from qualified candidates as per UGC / Kerala Govt. / Kannur University Norms and Regulations for appointment against the following posts.

\*The vacancy reserved for the PWD as per benchmark disability mentioned in Claus 34 of the right of persons with disability act 2016 as per G.O. (MS) No. 242/2022/H.Edn. dated, 18.05.2022. The PWD candidates should submit the copy of the Medical Certificate in the prescribed format along with their application

Application form can be downloaded from the college website or can be bought from the college office, for Sl. No. 1 & 2 on payment of Rs. 2000/- in person or 2100/- if DD drawn in favour of the Principal, St. Pius X College, Rajapuram, payable at Federal Bank, Rajapuram Branch, Kasaragod and for Sl. No. 3 Rs. 1000/-. The last date of receiving the duly filled in application will be the 30th day from the date of publication of this notification.

NB: Notification given on 13.09.2023 regarding the office attendant is cancelled herewith. Candidates, if any, applied as per this notification need not have to apply again.

25.09.2023  
Rajapuram

Sd/-  
Manager

## Themes/Subthemes for the Special Issues of University News-2023-24

| S. No. | Zonal Vice Chancellors' Meets-2023-24 | Theme/ Subthemes for Special Issues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Last Date to Contribute* | Date of Publication  |
|--------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------|
| 1.     | South Zone                            | <b>Digital Transformation in Higher Education</b><br><i>Subthemes</i> <ul style="list-style-type: none"> <li>The Future of Credentialling: Digital badges, Micro-credentialing and Online Degree</li> <li>AI and Analytics in Higher Education: Transforming Decision Making</li> <li>Faculty Development and Digital Pedagogies: Empowering Educators</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | October 15, 2023         | October 23-29, 2023  |
| 2.     | East Zone                             | <b>Integrating Bhartiya Knowledge System (BKS) with Higher Education</b><br><i>Subthemes</i> <ul style="list-style-type: none"> <li>Using Bhartiya Knowledge System-based Approach for Teaching-learning for Holistic Development.</li> <li>Bhartiya Knowledge System in Sustainable Development.</li> <li>Embedding Bhartiya Knowledge System for Futuristic Education.</li> <li>Ancient Bharatiya Wisdom in Modern Context: Everlasting Relevance of Indian Knowledge System Heritage for Human Development.</li> <li>Return of the Vishwa Guru Status: Strategies to Maintain and Propagate Ancient Indian Wisdom for Global Welfare.</li> <li>Embedding Indian Traditional Knowledge into Advanced Scientific Research and Futuristic Technology to Optimise the Advantages.</li> <li>Traditional Tribal Knowledge Treasure in India: How to Make Best Use of.</li> <li>Challenges in Communication and Dissemination of Traditional Knowledge.</li> </ul> | November 06, 2023        | November 20-26, 2023 |
| 3.     | West Zone                             | <b>Future of Work and Skill Development</b><br><i>Subthemes</i> <ul style="list-style-type: none"> <li>Sustainable Careers: Navigating a Dynamic Workplace</li> <li>Human-centered Skills in a Tech-driven World: Soft Skills and Emotional Intelligence</li> <li>Resilience &amp; Adaptability: Impact of Gig Economy on Higher Education</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | December 04, 2023        | December 18-24, 2023 |
| 4.     | Central Zone                          | <b>Nurturing Research and Innovation Ecosystem</b><br><i>Subthemes</i> <ul style="list-style-type: none"> <li>Collaborative Research Networks: Fostering Inter-disciplinary Research</li> <li>Entrepreneurship and Innovation: From Idea to Impact</li> <li>Innovative Funding Models for Research</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | January 01, 2024         | January 15-21, 2024  |
| 5.     | North Zone                            | <b>Globalization and Internationalization of Higher Education</b><br><i>Subthemes</i> <ul style="list-style-type: none"> <li>International Collaborations and Partnerships: Building Bridges for Higher Education</li> <li>Global Higher Education Policy and Regulation: Harmonizing Standards</li> <li>Student Mobility and Diversity: Enhancing International Experience</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | January 31, 2024         | February 12-18, 2024 |

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