RESEARCH AND DEVELOPMENT POLICY, PUBLISHED BOOK SERIES, CONFERENCE PROCEEDINGS AND RESEARCH GRANTS

Content:

Research and Development Cell

(Under the aegis of IQAC and in line with UGC Guidelines 2022)

BANWARILAL BHALOTIA COLLEGE ASANSOL-713303

Research and Development Policy for Banwarilal Bhalotia College, Asansol

B. B. College, Asansol, strives to foster a vibrant research culture that promotes innovation, enhances the quality of education, and contributes to societal advancement. Time and again the college aims to nurture academic excellence, encourage interdisciplinary research, and strengthen collaboration with academia and industry. In order to achieve and maintain such high standards, ***the college administration under the leadership of the Principal Dr. Amitava Basu has directed the IQAC to form a R&D Cell in accordance to the "Guidelines for Establishment of Research & Development Cell in Higher Education Institutions" as published by the UGC on 4th March 2022 and the subsequent letter from the Chairman UGC vide letter no. 1-5/2021(NEP DESK-PARL) dated 14th March 2022.*** A Research and Development (R&D) Cell was then designed to set the framework and guidelines for enhancing the research activities of the college in alignment with the national priorities as stated by the UGC and as per the requirements of the local students. Then the newly formed R&D Cell immediately envisaged an R&D policy under the leadership of the Principal and the aegis of the IQAC. Following are the key takeaways of the policy:-

1. Vision and Mission

- **Vision:** To establish B. B. College as a center of academic excellence by promoting innovative, high-quality research in all disciplines and providing a platform for faculty, staff, and students to contribute to the advancement of knowledge.
- **Mission:** To create an enabling environment for the development and execution of impactful research that contributes to solving societal challenges and enhances the institution's reputation both nationally and internationally.

2. Objectives

- To promote high-quality research in diverse academic disciplines.
- To facilitate the effective utilization of research outcomes in teaching and community development.
- To support faculty members in undertaking innovative and interdisciplinary research.
- To enhance student participation in research activities.
- To foster collaborations with industries, academia, and other research institutions.

Convener
R & D Cell
B. B. College Asansol
West Bengal - 713303

Sudipta Das
Convener
Internal Quality Assurance Cell
(I Q A C)
B. B. College, Asansol

DR. AMITAVA BASU
Principal, B. B. College
Ushagram, Asansol, P Bardhaman
West Bengal - 713303

- To ensure that research activities comply with ethical standards and contribute to social, economic, and environmental well-being.
- To establish a sustainable research infrastructure and systems, including the Research Information Management System (RIMS).

3. Research Governance Structure

- **R&D Cell:** The Research and Development (R&D) Cell as envisaged as per the UGC R&D Guidelines and it will be responsible for overseeing the research activities of the college. This cell will comprise members from various departments, under the leadership of a senior faculty member as the R&D Cell Coordinator and the structure framed by the UGC.

4. Research Infrastructure and Facilities

- **Research Information Management System (RIMS):** The institution will maintain and enhance the **IRINS (Indian Research Information Network System)** to streamline research activities, manage research data, and showcase the institution's research outputs. For this purpose the R&D Cell approached INFLIBNET Centre Gandhinagar to launch an IRINS instance for the college. **With a prompt support from the INFLIBNET center, the college was able to launch its IRINS instance via the link https://bbcollege.irins.org/ We are very pleased that our college became the very first college in our District of Paschim Bardhhaman to launch its own IRINS Instance.**
- **Laboratories and Equipment:** The college will invest in state-of-the-art laboratories, research equipment, and facilities to support experimental and computational research. Faculty and students will be provided access to these resources.
- **Plagiarism Checkers:** The college will strive to provide access to plagiarism detection tools like Turnitin and Urkund, either through partnerships or open-access alternatives, to ensure research integrity. The college maintains its Plagiarism policy as per the 2018 regulation of UGC.

5. Research Funding and Incentives

- **External Funding:** Faculty members are encouraged to apply for research grants and funding from government and non-government organizations (e.g., SERB, UGC, DBT, ICSSR, DST, etc.) for both major and minor research projects. **Lately, our faculties have been awarded SERB projects, fundings from ICSSR etc.**
- **Internal Funding:** The R&D Cell will allocate seed funds for initiating high-impact research projects, particularly those involving interdisciplinary collaboration or addressing societal challenges.

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- **Incentives for Research Publications:** Faculty members who consistently publish in high-impact international journals, book chapters, or patents will be rewarded with financial incentives and recognition.
- **Corpus Fund:** The college will continue to build a Corpus Fund to support long-term research initiatives, with the revenue from research projects and consultancy forming the primary source of funding.

6. Research Collaboration

- **Interdisciplinary Research:** Faculty members will be encouraged to undertake interdisciplinary research to address complex problems across various fields.
- **Industry Collaboration:** The college will actively pursue collaborations with industry partners to facilitate applied research, innovation, and technology transfer. Industry collaborations will focus on fostering joint research initiatives, internships, and product development.
- **Academic Partnerships:** The college will continue to establish Memoranda of Understanding (MoUs) with national and international universities, research institutes, and industry players to promote joint research, student exchanges, and faculty development programs.
- **Collaborations with Government Initiatives:** The college will explore and participate in national research schemes such as the **SERB-SURE scheme** and others launched by the Government of India.

7. Faculty Development and Support

- **Research Training:** The college will provide continuous professional development opportunities for faculty members through workshops, seminars, and online courses in research methodology, intellectual property rights, academic writing, and ethical research practices.
- **Research Sabbaticals:** Faculty members will be encouraged to take research sabbaticals for pursuing advanced research projects, collaborations, and publishing their work.
- **Mentorship Programs:** Senior faculty will act as mentors to junior faculty and students, guiding them in research proposal writing, publication, and securing research funding.

8. Student Engagement in Research

- **Undergraduate and Postgraduate Research:** Students will be encouraged to participate in research projects under faculty supervision. Research-based assignments, mini-projects, and dissertation work will be an integral part of the curriculum at both UG and PG levels.

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- **Research Conferences and Seminars:** The college will organize national and international research conferences, seminars, and workshops to provide a platform for students and faculty to showcase their research and interact with experts.
- **Research Clubs and Societies:** The college will form research clubs and societies to engage students in various research activities, foster a spirit of inquiry, and offer training in research methodologies and scientific writing.

9. Ethical Considerations

- **Ethical Research Practices:** All research activities will adhere to ethical guidelines, ensuring integrity, fairness, and transparency in data collection, analysis, and reporting.
- **Intellectual Property Rights (IPR):** The college will educate researchers on patenting, copyrighting, and other IPR-related matters, ensuring that intellectual property is protected and managed according to legal standards.

10. Performance Monitoring and Evaluation

- **Research Output Review:** The college will regularly assess research outputs through publications, patents, and funded projects to ensure alignment with strategic objectives. Annual reviews will be conducted by the Research Advisory Committee.
- **Feedback Mechanism:** Faculty and students will be encouraged to provide feedback on the research environment, which will be used to make continuous improvements to the R&D ecosystem.
- **Reporting:** The R&D Cell will prepare and submit an annual research report to the governing body of the college, highlighting achievements, challenges, and plans for future growth.

11. Promotion of Research Culture

- **Awareness Programs:** The college will organize awareness campaigns, seminars, and workshops on the importance of research and development, emphasizing the significance of innovation in education and community development.
- **Recognitions and Awards:** Regular research awards and recognitions will be instituted to honor faculty and students for their exceptional contributions to research and innovation.

B. B. College, Asansol is committed to fostering an environment that values research excellence, academic integrity, and societal contribution. This R&D Policy will serve as a guiding framework for future research activities and ensure that the college remains at the forefront of academic and scientific advancement.

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PLAGIARISM POLICY

Banwarilal Bhalotia College Asansol has adopted the regulation "*as is*" issued by the University Grants Commission, New Delhi, vide No.-1-18/2010 (CPP-II) dated 23rd July 2018 regarding the promotion of academic integrity and prevention of plagiarism in higher education institutions regulations 2018 through a circular dated 12.02.2020.

The Research and Development Cell (formerly Research Advisory Committee) is continuously striving to ensure academic integrity and prevent plagiarism in all the academic articles, manuscripts, book chapters, review reports, projects, dissertations etc. published by the faculties, students or any stakeholder belonging to the institution.

At first, the R&D Cell performs the initial screening and evaluation of the manuscripts using the freely available plagiarism checking software. For achieving better accuracy, access to paid versions of plagiarism checking software like Urkund, Ourginal, Turinitin, etc. are required. In this regard the R&D cell has approached the affiliating university KNU and the nearby central university VBU to extend their support in providing the access to plagiarism detecting software as notified by UGC to check plagiarism and generate similarity reports. We have received support from the Librarian VBU and the letter is attached.

Enclosures:

1. A joint certificate from the Principal B. B. college and Librarian regarding the extended support in checking Plagiarism.

2. Circular from the Principal regarding adoption of the UGC notification.

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B. B. College Asansol
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Convener
Internal Quality Assurance Cell
(I Q A C)
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DR. AMITAVA BASU
Principal, B. B. College
Ushagram, Asansol, P Bardhaman
West Bengal - 713303

Banwarilal Bhalotia College

Constituent college of the **KAZI NAZRUL UNIVERSITY**, Asansol
(GOVT. SPONSORED **U G & P G** College)
ASANSOL – 713303, WEST BENGAL
(INDIA)

Estd: 1944

Dr Amitava Basu, M Com, Ph D
Principal

Ref. No.

Date: 28.01.2025

TO WHOM IT MAY CONCERN

This is to certify that Dr. Amitava Basu, Principal of Banwarilal Bhalotia College (B.B. College), Asansol, West Bengal, formally requested Dr. Nimai Chand Saha, Librarian, Visva-Bharati, Santiniketan, considering his vast experience in the related domain to assist for checking similarity index for chapters of edited book(s). This is a purely academic cooperation without involving any monetary involvement from both sides.

In response to this request, Dr. Nimai Chand Saha, as the Librarian of Visva-Bharati, graciously agreed to provide the necessary support as purley voluntary academic cooperation. By using Urkund and Ouriginal plagiarism detection software he has checked the similarity index to ensure the academic integrity of the submitted chapters for edited book volumes spanning the years 2020 to 2023, covering a period of four years.

This collaborative effort reflects the mutual commitment of both institutions to uphold academic excellence and ethical standards in scholarly publishing.

We sincerely acknowledge the cooperation extended by Dr. Nimai Chand Saha and the Visva-Bharati Central Library team for their diligent efforts in ensuring the quality and originality of the academic work.

28/01/25

Dr. Nimai Chand Saha
Librarian
Visva-Bharati
Santiniketan, West Bengal

विश्वभारती केंद्रीय पुस्तकालय
Visva-Bharati Central Library
पुस्तकालयअध्यक्ष / Librarian
विश्वभारती / Visva-Bharati
शांतिनिकेतन / Santiniketan

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Dr. Amitava Basu
Principal
Banwarilal Bhalotia College
Asansol, West Bengal

DR. AMITAVA BASU
Principal, B. B. College
Ushagram, Asansol, P Bardhaman
West Bengal - 713303

Phone: 0341-2274842
Fax: 0341-2274529
Mobile : 9932940169

Web: www.bbcollege.ac.in
E-mail: bbcollege1944@gmail.com, naac.hec@gmail.com

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(GOVT. SPONSORED **U G & P G** College)
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(INDIA)

Dr Amitava Basu, M Com, Ph D
Principal

Ref. No. Date: 12/02/2020

Circular

In a meeting chaired by the Principal, the Internal Quality Assurance Cell (IQAC) and the Research Advisory Committee (RAC) reviewed and formally adopted the notification "*as is*" issued by the University Grants Commission, New Delhi, vide No.-1-18/2010 (CPP-II) dated 23rd July 2018 regarding the promotion of academic integrity and prevention of plagiarism in higher education institutions regulations 2018.

In this regard, the Principal has directed the Research Advisory Committee to take appropriate steps to prevent plagiarism (as stated in the notification), in order to maintain academic integrity & originality in the academic articles, book chapters, review reports, projects, dissertations etc. published by the faculties, students or any stakeholder belonging to the institution.

Plagiarism if detected in any form shall be delt seriously as per the order issued by the UGC.

Encl: UGC Academic Integrity and prevention of Plagiarism Regulation-2018 vide D. O. No F.1-18/2010 (CPP-II) dated 23 July 2018.

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DR. AMITAVA BASU
Principal, B. B. College
Ushagram, Asansol, P Bardhaman
West Bengal - 713303

Phone: 0341-2274842
Fax: 0341-2274529
Mobile : 9932940169

Web: www.bbcollege.ac.in
E-mail: bbcollege1944@gmail.com, naac.hec@gmail.com

रजिस्ट्री सं० डी० एल०-33004/99 REGD. NO. D. L.-33004/99

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विश्वविद्यालय अनुदान आयोग

अधिसूचना

विश्वविद्यालय अनुदान आयोग (उच्चतर शिक्षा संस्थानों में अकादमिक सत्यनिष्ठा एवं साहित्यिक चोरी की रोकथाम को प्रोत्साहन) विनियम, 2018

नई दिल्ली, 23 जुलाई, 2018

मि. सं. 1–18/2010 (सीपीपी-II).—

प्रस्तावना

जबकि, विश्वविद्यालय अनुदान आयोग (यूजीसी) अधिनियम, 1956 के अनुसार, उच्च शिक्षा के मानकों को समन्वित एवं सुनिश्चित करने के लिए आदेशाधीन है।

तथा जबकि, किसी छात्र या संकाय या शोधकर्ता या कर्मचारी द्वारा निष्णात तथा शोध स्तर पर डिग्री प्रदान करने हेतु आंशिक रूप से सम्पादित किया गया कार्य, जिसका अकादमिक एवं शोधकार्य का मूल्यांकन किया जा चुका हो, जो शोध–निबन्ध, शोध–प्रबन्ध, शोध पत्रों के प्रकाशन, पुस्तकों में अध्याय, सम्पूर्ण पुस्तकों के रूप में हो तथा कोई अन्य समरूप कार्य, जो अकादमिक, सत्यनिष्ठा एवं मौलिकता के मूल तत्वों को दर्शाये तथा जिसका उच्चतर शिक्षा संस्थानों (HEIs) द्वारा अपनायी गई विभिन्न संबंधित प्रक्रियाओं में अवलोकन किया जाए।

अतः, वि. अ. आ. अधिनियम 1956 के अनुच्छेद 26 के उप अनुच्छेद (1) के खण्ड (एफ) एवं (जी) के साथ पठित अनुच्छेद 12 के खण्ड (जे) के द्वारा प्रदत्त अधिकारों का प्रयोग करते हुए, वि. अ. आ. ने एतद्द्वारा निम्नलिखित विनियम निर्मित किए हैं:–

1. संक्षिप्त शीर्षक, अनुप्रयोग तथा प्रारंभ :

(ए) इन नियमों को, विश्वविद्यालय अनुदान आयोग (उच्चतर शिक्षा संस्थानों में अकादमिक सत्यनिष्ठा एवं साहित्यिक चोरी की रोकथाम को प्रोत्साहन) विनियम 2018 कहा जाएगा।

(बी) ये विनियम, देश के सभी उच्चतर शिक्षा संस्थानों के छात्रों, संकायों, शोधकर्ताओं तथा कर्मचारियों पर लागू होंगे।

(सी) ये विनियम, सरकारी राजपत्र में उनकी अधिसूचना की तारीख से प्रभावी होंगे।

2. परिभाषाः

इन विनियमों में, जब तक कि प्रसंग में अन्यथा अपेक्षित न हो–

(ए) ''अकादमिक सत्यनिष्ठा '' से तात्पर्य, किसी क्रियाकलाप को प्रस्तावित करने, निष्पादित करने, सूचित करने एवं बौद्विक ईमानदारी से है, जिससे बौद्विक गुणों का सृजन हो सके।

(बी) ''रचनाकार'' रचनाकार के अंतर्गत उच्चतर शैक्षिक संस्थान (HEI) के छात्र या संकाय या शोधकर्ता या कर्मचारी आते हैं जो विचाराधीन कार्य के सृजनकर्ता होते हैं।

(सी) ''आयोग'' से अभिप्राय वि. अ. आ. से है, जैसा कि वि. अ. आ. अधिनियम, 1956 में यथापरिभाषित है।

(डी) ''सामान्य ज्ञान'' से अभिप्राय, सुप्रसिद्व तथ्य, उद्वरण, आंकडा या जानकारी से है जिसकी अधिकांश व्यक्तियों को जानकारी हो।

(ई) ''डिग्री'' से अभिप्राय, वि. अ. आ. द्वारा निर्धारित की गई ऐसी डिग्री से है जो कि वि. अ. आ. अधिनियम 1956 के अनुच्छेद 22 के अंतर्गत सरकारी राजपत्र में अधिसूचित की गई हो।

(एफ) ''विभागीय अकादमिक सत्यनिष्ठा नामसूची'' से तात्पर्य होगा विभागीय स्तर पर गठित निकाय, जो साहित्यिक चोरी के आरोपों की जांच पड़ताल करेगा।

(जी) ''संकाय'' से तात्पर्य, किसी उच्चतर शिक्षा संस्थान में नामांकित किसी व्यक्ति से है जो छात्रों को शिक्षण तथा/या मार्गदर्शन प्रदान करता हो, चाहे वह किसी भी क्षमता का हो अर्थात् नियमित, तदर्थ, अतिथि, अस्थायी, मुलाकाती आदि।

(एच) ''उच्चतर शिक्षा संस्थान (HEI)'' से अभिप्राय ऐसे वि. वि. से है जो वि. अ. आ. अधिनियम, 1956 के अनुच्छेद 2(एफ) के अंतर्गत मान्यताप्राप्त हो या वि. अ. आ. अधिनियम 1956 के अनुच्छेद 3 के अंतर्गत वह संस्थान जो मानित वि. वि. के अंतर्गत आता हो या मान्य महाविद्यालय/संस्थान या किसी वि. वि. की एक संघटक इकाई हो।

(आई) ''सूचना'' इसके अंतर्गत आंकड़े, संदेश, पाठ्यवस्तु, आकृतियां, ध्वनि, आवाज, कोड, कम्प्यूटर कार्यक्रम, सॉफ्टवेयर एवं डाटाबेस या माइक्रोफिल्म या कम्प्यूटर सृजित माइक्रोफिश सम्मिलित हैं।

(जे) ''संस्थागत अकादमिक सत्यनिष्ठा नामसूची'' से अभिप्राय एक ऐसे निकाय से है जो विभागीय अकादमिक सत्यनिष्ठा नामसूची की सिफारिशों पर विचार करने के लिए तथा साहित्यिक चोरी के आरोपों के बारे में उचित निर्णय लेने तथा दण्ड लागू करने संबंधी निर्णय लेने के लिए संस्थागत स्तर पर गठित किया गया हो। अपवादिक मामलों में यह न्यास संस्थागत स्तर पर साहित्यिक चोरी के आरोपों की जांच करेगा।

(के) ''अधिसूचना'' से तात्पर्य, सरकारी राजपत्र में प्रकाशित की गई अधिसूचना से है तथा अधिसूचित करने की अभिव्यक्ति का उसके समानार्थी तथा व्याकरणीय भिन्नता के अनुरूप अनुमान लगाया जाएगा।

(एल) ''साहित्यिक चोरी'' से अभिप्राय किसी अन्य के द्वारा किए गए कार्य या विचार को निज प्रयोग में लेना तथा अपने नाम से दूसरे को देना।

(एम) ''पाठ्यक्रम'' से तात्पर्य, अध्ययन किया जाने वाला वह पाठ्यक्रम जिसके लिए निष्णात एवं शोध स्तर पर डिग्री प्रदान की जाए।

(एन) 'शोधकर्ता'' से तात्पर्य है उच्चतर शैक्षिक संस्थानों में अकादमिक/वैज्ञानिक शोध करने वाला व्यक्ति।

(ओ) ''पाण्डुलिपि'' के अंतर्गत शोध–लेख, शोध–निबन्ध, शोध–पत्र, पुस्तकों में अध्याय, सम्पूर्ण पुस्तकें तथा अन्य समान कार्य का मूल्यांकन/अभिमत हेतु जमा किया जाने वाला कार्य जो उच्चतर शिक्षा संस्थान के छात्रों या संकाय या शोधकर्ता या कर्मचारी द्वारा निष्णात एवं शोधस्तर की डिग्रियों को प्राप्त करने या प्रिंट या इलेक्ट्रॉनिक मीडिया में प्रकाशन हेतु तैयार किया जाए। तथापि, इसमें नियत कार्य/आवधिक पत्र/परियोजना रिपोर्ट/पाठ्यक्रम संबंधी कार्य/निबन्ध तथा उत्तर पुस्तिकाएं शामिल नहीं होंगी।

(पी) ''स्त्रोत'' से अभिप्राय, किसी भी स्त्रोत से किसी भी रूप में प्राप्त की गई प्रकाशित मुख्य एवं गौण अध्ययन सामग्री से है, जिसमें लिखित जानकारी तथा अन्य व्यक्तियों अर्थात विख्यात विद्वानों, लोकप्रिय हस्तियों, किसी भी प्रकार के पेशेवर व्यक्तियों से प्रत्यक्षतः प्राप्त किये गए दृष्टिकोण को शामिल किया गया हो। इसके अतिरिक्त, इलेक्ट्रॉनिक रूप में आंकड़े एवं सूचना यथा श्रव्य, दृश्य, आकृति या पाठ्यक्रम के रूप में, जिसकी सूचना समान अर्थ में, सूचना प्रौद्योगिकी अधिनियम 2000 के अनुच्छेद 2(1)(V) के अंतर्गत वर्णित है तथा जिसको यहां विनियम 2(1) में पुनः प्रस्तुत किया गया है।

(क्यू) ''कर्मचारी'' से तात्पर्य उच्चतर शिक्षा संस्थानों में कार्यरत् गैर–शैक्षणिक कर्मचारी वर्ग से है, जो किसी भी क्षमता अर्थात नियमित, अस्थायी, अनुबन्धात्मक, बाह्य स्त्रोत आदि में कार्यरत् हों।

(आर) ''छात्र'' से तात्पर्य उस व्यक्ति से है, जिसका विधिवत दाखिला हुआ हो, पाठ्यक्रम का अध्ययन कर रहा हो, जिसमें किसी भी पद्धति (पूर्णकालिक या अंशकालिक या दूरस्थ माध्यम) से अध्ययन करने वाले शोध पाठ्यक्रम को सम्मिलित किया गया है।

(एस) ''विश्वविद्यालय'' से अभिप्राय उन विश्वविद्यालयों से है, जो केन्द्रीय अधिनियम, प्रान्तीय अधिनियम या राज्य अधिनियम के अधीन स्थापित अथवा निगमित हैं तथा उनमें वह मानित वि. वि. संस्थान सम्मिलित हैं जो यूजीसी अधिनियम, 1956 के अनुच्छेद (3) के अंतर्गत आते हैं।

(टी) ''वर्ष'' से तात्पर्य वह अकादमिक सत्र है, जिसमें प्रमाणित अपराध किया गया हो।

ऐसे शब्द तथा अभिव्यक्तियां, जिन्हें इन विनियमों में परिभाषित नहीं किया गया है, लेकिन वि.अ.आ. अधिनियम, 1956 में परिभाषित हैं तथा इन विनियमों के साथ सुसंगत नहीं हैं उनका इस अधिनियम में निर्दिष्ट तद्नुरूप अर्थ लगाया जाएगा।

3. उद्देश्यः

3.1 शोध, शोध–पत्र, शोध–निबन्ध के दायित्वपूर्ण आचरण, अकादमिक सत्यनिष्ठा के प्रोत्साहन के प्रति जागरूकता पैदा करना, छात्र संकाय, शोधकर्ता एवं कर्मचारी वर्ग में अकादमिक लेखन में साहित्यिक चोरी सहित कदाचार से बचाव करना।

3.2 शिक्षण एवं प्रशिक्षण के जरिये, संस्थानात्मक तंत्र स्थापित करना, जिससे शोध, शोध–पत्र शोधनिबन्ध, अकादमिक सत्यनिष्ठा तथा साहित्यिक चोरी के निवारण में प्रोन्नति सहज हो सके।

3.3 साहित्यिक चोरी का पता लगाने के लिए पद्वतियां विकसित करना तथा साहित्यिक चोरी से बचाव के लिए रचना–तंत्र की स्थापना करना तथा उच्चतर शिक्षा संस्थान के छात्र, संकाय, शोधकर्ता या कर्मचारी को साहित्यिक चोरी का कृत्य करने पर दण्डित करना।

4. उच्चतर शिक्षा संस्थान के दायित्व :

प्रत्येक उच्चतर शिक्षा संस्थान को एक ऐसे तंत्र की स्थापना करनी चाहिए जैसा कि इन विनियमों में निर्दिष्ट किया गया है, जो कि शोध एवं अकादमिक कार्यकलापों के दायित्वपूर्ण आचरण के प्रति जागरूकता लाने में संवर्धन करे, साथ ही अकादमिक सत्यनिष्ठा को प्रोन्नत करे तथा साहित्यिक चोरी से बचाव करे।

5. जागरूकता कार्यक्रम एवं प्रशिक्षण :

(क) उच्चतर शिक्षा संस्थान, अपने छात्रों, संकायों, शोधकर्ताओं तथा कर्मचारियों को उचित आरोपण के संबंध में अनुदेश देगा, जहां कहीं भी आवश्यक हो, लेखक से स्वीकृति की मांग करेगा, आवश्यकतानुसार उन सुसंगत तथा अनुमतिनिर्दिष्ट अनुशासनों के स्त्रोत की जानकारी प्राप्त करेगा तथा जो नियमों के अनुरूप, अंतर्राष्ट्रीय सम्मेलन तथा स्त्रोत को नियंत्रित करने वाले विनियमों से संबंधित होंगे।

(ख) उच्चतर शिक्षा संस्थान, प्रत्येक सत्र में सम्मेलन/जागरूकता कार्यक्रमों का सुग्राही संचालन करेगा, जो शोध, शोध–पत्र, शोध–निबन्ध के दायित्वपूर्ण आचरण तथा अकादमिक सत्यनिष्ठा की प्रोन्नति तथा छात्रों, संकायों, शोधकर्ताओं तथा कर्मचारियों के लिए शिक्षा में नैतिकता को बढ़ावा देगा।

(ग) उच्चतर शिक्षा संस्थान, निम्नलिखित कार्यों पर जोर देगा :

i. एक अनिवार्य पाठ्यक्रम कार्यविधि/माड्यूल के रूप में स्नातकपूर्व (यूजी)/स्नातकोत्तर (पीजी)/निष्णात डिग्री की पाठ्यवस्तु में अकादमिक सत्यनिष्ठा के आधारभूत सिद्वांतों को सम्मिलित करना।

ii. निष्णात एवं शोधविशेषज्ञों के लिए अनिवार्य पाठ्यक्रम कार्यविधि/मॉड्यूल के रूप में शोध एवं प्रकाशन के दायित्वपूर्ण आचरण संबंधी मूल तत्वों को सम्मिलित करना।

iii. उच्चतर शिक्षा संस्थान के संकाय एवं कर्मचारी सदस्यों हेतु अभिमुखी एवं पुनश्चर्या पाठ्यक्रमों को आयोजित करना, शोध एवं प्रकाशन के आधारभूत दायित्वपूर्ण आचरण के तथ्यों को शामिल करना।

iv. छात्र, संकाय, शोधकर्ता एवं कर्मचारियों को साहित्यिक चोरी का पता लगाने वाले उपकरणों/साधनों तथा संदर्भप्रबन्धन उपकरणों को प्रयुक्त करने का प्रशिक्षण प्रदान करना।

v. साहित्यिक चोरी का पता लगाने हेतु आधुनिक प्रौद्योगिकियों सहित सुविधा उपकरणों की स्थापना करना।

vi. अंतर्राष्ट्रीय शोधकर्ताओं की पंजीकरण पद्धतियों पर छात्र, संकाय शोधकर्ता एवं कर्मचारी सदस्य के पंजीकरण को प्रोत्साहित करना।

6. साहित्यिक चोरी पर रोकथाम :

(ए) उच्चतर शिक्षा संस्थान, उपयुक्त सॉफ्टवेयर प्रयुक्त करते हुए प्रौद्योगिकी आधारित रचनातंत्र की घोषणा एवं कार्यान्वयन करेगा, जिससे यह सुनिश्चित हो सके कि शोध–पत्र, शोध–निबन्ध, प्रकाशन या कोई अन्य दस्तावेज उसकी प्रस्तुति के समय साहित्यिक चोरी से मुक्त हैं।

(बी) ऊपर (ए) में वर्णित रचनातंत्र, शोधकार्य में संलिप्त सभी छात्रों को उपलब्ध कराया जाएगा जिसमें छात्र, संकाय शोधकर्ता एवं कर्मचारी सदस्य आदि भी सम्मिलित होंगे।

(सी) प्रत्येक छात्र, जो शोध–पत्र, शोध–निबन्ध या समान दस्तावेज, उच्चतर शिक्षा संस्थान को प्रस्तुत करने जा रहा है, वह एक ऐसा वचन–बंध प्रस्तुत करेगा जिसमें यह दर्शाया जाएगा कि प्रस्तुत दस्तावेज उसके द्वारा तैयार किया गया है तथा यह दस्तावेज उसका मौलिक लेखन कार्य है तथा किसी भी प्रकार की साहित्यिक चोरी से मुक्त है।

(डी) इस वचन–बंध में यह तथ्य भी शामिल किया जाएगा कि इस दस्तावेज की उच्चतर शिक्षा संस्थान द्वारा साहित्यिक चोरी का पता लगाने वाले उपकरणों के जरिये विधिवत जाँच कर ली गई है।

(ई) संस्थान, साहित्यिक चोरी के संबंध में एक ऐसी संबंधित नीति का विकास करेगा तथा इससे संबंधित विधायी निकायों/प्राधिकरणों से उसे स्वीकृत कराएगा। स्वीकृत नीति को HEI वेबसाइट के होमपेज पर डाउनलोड किया जाएगा।

(एफ) प्रत्येक पर्यवेक्षक, एक प्रमाण–पत्र प्रस्तुत करेगा जिसमें यह निर्दिष्ट किया जाएगा कि शोधकर्ता द्वारा किया गया अमुक कार्य, शोधकर्ता के द्वारा तथा मेरे अधीन रहकर किया गया है तथा यह साहित्यिक चोरी से मुक्त है।

(जी) संस्थान, सभी निष्णात, शोध पाठ्यक्रम के शोध–पत्रों तथा शोध–निबन्धों को, डिग्री प्रदान किए जाने के पश्चात् 1 माह के भीतर **'शोध गंगा ई–रिपोजिटरी'** के अंतर्गत डिजीटल रिपोजिटरी को पोषित करने हेतु इनफ्लीबनेट पर इसकी सॉफ्ट प्रतियां प्रस्तुत करेगा।

(एच) संस्थान, संस्थानात्मक रिपोजिटरी का संस्थान की वेबसाइट पर सृजन करेगा जिसमें शोध–निबन्ध/शोध–पत्र/पत्र–आलेख/प्रकाशन तथा अन्य आंतरिक (इन–हाउस) प्रकाशनों को भी सम्मिलित करेगा।

7. साहित्यिक चोरी के बहिष्करण हेतु समरूपता रोकथाम :

साहित्यिक चोरी के लिए समानता जांच में निम्नवत वर्जित होंगे :

i. सभी अनिवार्य अनुमतियों और/अथवा गुणधर्म के साथ उद्धृत कार्य।

ii. सभी सदर्भ, पुस्तकसूची, विषयवस्तु की तालिका, आमुख तथा साभार।

iii. सभी सामान्य शब्दावली, विधि, मानक, चिहन् तथा मानक समीकरण।

नोटः

छात्रों, संकाय, शोधकर्ताओं तथा कर्मचारिवृंदों द्वारा किया गया शोधकार्य, मूल विचार पर आधारित होगा, जिसमें केवल संक्षेपण, सारांश, अवधारणा, टिप्पणियां, परिणाम, निष्कर्ष तथा सिफारिशें शामिल होंगी तथा इसमें कोई समानताएं नहीं होंगी। इसमें चौदह (14) क्रमगत शब्दों तक सामान्य ज्ञान अथवा अनुरूप शब्दावली विवर्जित होगी।

8. साहित्यिक चोरी के स्तर :

साहित्यिक चोरी को परिभाषित करने के प्रयोजनार्थ उसकी गंभीरता के बढ़ते क्रम में साहित्यिक चोरी को निम्नवत स्तरों में मापा जाएगाः

i. स्तर शून्य : दस प्रतिशत तक समानता– थोड़ी बहुत समानताएं, कोई दण्ड नहीं।

ii. प्रथम स्तर : दस प्रतिशत से चालीस प्रतिशत तक समानताएं।

iii. द्वितीय स्तर : चालीस प्रतिशत से साठ प्रतिशत तक समानताएं।

iv. तृतीय स्तर : साठ प्रतिशत से अधिक समानताएं।

9. साहित्यिक चोरी का पता लगाना/जानकारी प्रदान करना/कार्यवाही करना :

यदि शैक्षिक समुदाय का कोई सदस्य उपर्युक्त प्रमाण के साथ संदेह व्यक्त करता है कि किसी दस्तावेज में साहित्यिक चोरी का कोई प्रकरण बनता है, वह इस मामले की जानकारी विभागीय शैक्षिक सत्यनिष्ठा पेनल (डीएआईपी) को देगा। डीएआईपी, ऐसी शिकायत अथवा आरोप की प्राप्ति पर मामले की जांच करेगा तथा उच्चतर शिक्षा संस्थान की संस्थागत शैक्षिक सत्यनिष्ठा नामसूची (आईएआईपी) को अपनी सिफारिशें सौंपेगा।

उच्चतर शिक्षा संस्थान के प्राधिकारी साहित्यिक चोरी के कृत्य का *स्वयंमेव* संज्ञान भी ले सकते हैं और इन विनियमों के तहत कार्यवाहियां कर सकते हैं। इसी प्रकार, परीक्षक के निष्कर्षों के आधार पर भी उच्चतर शिक्षा संस्थान द्वारा कार्यवाही आरंभ की जा सकती है। ऐसे सभी मामलों की आईएआईपी द्वारा जांच की जाएगी।

10. विभागीय शैक्षिक सत्यनिष्ठा नामसूची (डीएआईपी) :

i. उच्चतर शिक्षा संस्थान के सभी विभाग एक डीएआईपी को अधिसूचित करेंगे जिसकी संरचना नीचे दी गई है:

क. अध्यक्ष–विभागाध्यक्ष

ख. सदस्य–विभाग से इतर एक वरिष्ठ शिक्षाविद्, जिसे उच्चतर शिक्षा संस्थान के प्रमुख द्वारा नामित किया जाएगा।

ग. सदस्य–साहित्यिक चोरी के साधनों से भली–भांति परिचित एक व्यक्ति, जिसे विभागाध्यक्ष द्वारा नामित किया जाएगा।

बिंदु 'ख' तथा 'ग' के संबंध में सदस्यगणों का कार्यकाल दो वर्षों का होगा। बैठक के लिए सदस्यों की गणपूर्ति 3 में से 2 सदस्यों द्वारा होगी (सभापति सहित)।

ii. डीएआईपी, छात्रों, संकाय, शोधकर्ताओं तथा कर्मचारिवृंदों के विरूद्ध साहित्यिक चोरी के आरोपों के संबंध में निर्णय देते हुए नैसर्गिक न्याय के सिद्धांतों का पालन करेगा।

iii. डीएआईपी, को साहित्यिक चोरी के स्तरों का मूल्यांकन करने तथा तदनुसार, दण्ड की सिफारिश करने की शक्तियां प्राप्त होंगी।

iv. शिकायत प्राप्त होने/ कार्यवाहियां आरंभ किए जाने की तिथि से 45 दिनों के भीतर डीएआईपी, जांच उपरांत, अपनी रिपोर्ट सहित लगाए जाने वाले दण्डों पर अपनी सिफारिशों को आईएआईपी को प्रस्तुत करेगी।

11. संस्थागत शैक्षिक सत्यनिष्ठा पेनल (आईएआईपी) :

i. उच्चतर शिक्षा संस्थान, आईएआईपी को अधिसूचित करेंगे जिसकी संरचना नीचे दी गई है :

क. अध्यक्ष–उच्चतर शिक्षा संस्थान का सम–कुलपति/संकाय अध्यक्ष/वरिष्ठ शिक्षाविद्।

ख. सदस्य–उच्चतर शिक्षा संस्थान के अध्यक्ष द्वारा नामित एक वरिष्ठ शिक्षाविद्।

ग. सदस्य–उच्चतर शिक्षा संस्थान से इतर किसी अन्य उच्चतर शिक्षा संस्थान द्वारा नामनित किया जाने वाला एक सदस्यगण।

घ. सदस्य–साहित्यिक चोरी के साधनों से भली–भांति परिचित एक व्यक्ति, जिसे विभागाध्यक्ष द्वारा नामित किया जाएगा।

एक ही व्यक्ति, डीएआईपी और आईएआईपी का अध्यक्ष नहीं होगा। अध्यक्ष सहित समिति के सदस्यगणों का कार्यकाल 3 वर्षों का होगा। बैठक के लिए सदस्यों की गणपूर्ति 3 में से 2 सदस्यों (सभापति सहित) द्वारा होगी ।

ii. आईएआईपी, डीएआईपी की सिफारिशों पर विचार करेगा।

iii. आईएआईपी, इन विनियमों में उल्लिखित उपबंधों के अनुसार साहित्यिक चोरी के मामलों की जांच भी करेगा।

iv. आईएआईपी, उच्चतर शिक्षा संस्थान के छात्रों, संकाय, शोधकर्ताओं तथा कर्मचारिवृंदों के विरूद्ध साहित्यिक चोरी के आरोपों के संबंध में निर्णय देते हुए नैसर्गिक न्याय के सिद्धांतों का पालन करेगा।

v. आईएआईपी को विधिवत् औचित्य के साथ दण्ड सहित डीएआईपी की सिफारिशों की समीक्षा करने की भी शक्तियां प्राप्त होंगी।

vi. आईएआईपी जांच उपरांत रिपोर्ट तथा उच्चतर शिक्षा विभाग के प्रमुख द्वारा लगाए जाने वाले दण्ड संबंधी सिफारिशों को डीएआईपी द्वारा शिकायत प्राप्त होने/ कार्यवाहियां आरंभ किए जाने की तिथि से 45 दिनों के भीतर भेजेगा।

vii. आईएआईपी उस व्यक्ति(यों) को रिपोर्ट की प्रति उपलब्ध कराएगा जिसके विरूद्ध जांच रिपोर्ट प्रस्तुत की गई है।

12. दण्ड :

साहित्यिक चोरी के मामले में निष्णात तथा शोध कार्यक्रमों के स्तर पर उच्चतर शिक्षा संस्थान में अध्ययनरत छात्रों तथा उच्चतर शिक्षा के संस्थानों के शोधकर्ताओं, संकाय तथा कर्मचारिवृंदों पर केवल उस स्थिति में ही दण्ड लगाया जाएगा जब बिना किसी संदेह के किसी व्यक्ति विशेष द्वारा शैक्षिक कदाचार किए जाने की पुष्टि हो जाती है और जब अपील के सभी विकल्पों को पूर्णतः उपयोग कर लिया जाता है और जब अमुक व्यक्ति को अपना बचाव करने के लिए स्पष्ट अथवा पारदर्शी पद्धति से पर्याप्त अवसर प्रदान किया गया हो।

12.1 शोध–प्रबंध (थीसीस) तथा शोध–निबंध (डिसरटेशन) को प्रस्तुत करने के मामले में साहित्यिक चोरी :

संस्थागत शैक्षिक सत्यनिष्ठा नामसूची (आईएआईपी) साहित्यिक चोरी की गंभीरता पर विचार कर दण्ड आरोपित करेगा :

i. **स्तर शून्य : दस प्रतिशत तक समानताएं–** थोड़ी बहुत समानताएं, कोई दण्ड नहीं।

ii. **प्रथम स्तर : दस प्रतिशत से चालीस प्रतिशत तक समानताएं–** ऐसे छात्रों को अधिकतम छह माह की विनिर्धारित अवधि के भीतर संशोधित आलेख जमा करने को कहा जाएगा।

iii. **द्वितीय स्तर : चालीस प्रतिशत से साठ प्रतिशत तक समानताएं–** ऐसे छात्रों को अधिकतम एक वर्ष की अवधि के लिए संशोधित आलेख जमा करने से वंचित किया जाएगा।

iv. **तृतीय स्तर : साठ प्रतिशत से अधिक समानताएं–** ऐसे छात्रों के उस कार्यक्रम के लिए पंजीकरण को रद्द कर दिया जाएगा।

नोट 1: बार–बार साहित्यिक चोरी करने पर दण्ड : प्रत्येक छात्र को साहित्यिक चोरी के लिए दण्डित किया जाएगा यदि उसके द्वारा की गई साहित्यिक चोरी पिछली बार की गई साहित्यिक चोरी से एक स्तर अधिक हो। यदि सर्वोच्च स्तर की साहित्यिक चोरी की गई हो तो उसे कारगर दंड दिया जाएगा।

नोट 2: उस स्थिति में साहित्यिक चोरी जब उपाधि/क्रेडिट पहले ही प्राप्त किया गया हो– यदि उपाधि/क्रेडिट किए जाने, जैसा भी मामला हो, प्रदान किए जाने की तिथि के बाद में साहित्यिक चोरी सिद्ध हो तो उसकी उपाधि/क्रेडिट को आईएआईपी द्वारा संस्तुत अवधि के लिए आस्थगित रखा जाएगा तथा संस्थान के प्रमुख द्वारा अनुमोदित किया जाएगा।

12.2 शैक्षिक तथा शोध प्रकाशनों में साहित्यिक चोरी के मामले में दण्ड :

I. **स्तर शून्य : दस प्रतिशत तक समानताएं–** थोड़ी बहुत समानताएं, कोई दण्ड नहीं।

II. **प्रथम स्तर : दस प्रतिशत से चालीस प्रतिशत तक समानताएं–**

   i. ऐसे छात्रों को, पांडुलिपि वापस लेने को कहा जाएगा।

III. **द्वितीय स्तर : चालीस प्रतिशत से साठ प्रतिशत तक समानताएं–**

   i. उन्हें पांडुलिपि वापस लेने को कहा जाएगा।

   ii. उन्हें एक वार्षिक वेतन वृद्धि के अधिकार से वंचित किया जाएगा।

   iii. उन्हें दो वर्ष की अवधि के लिए किसी नई निष्णात, एम.फिल., पीएच.डी. छात्र/ विद्वान का पर्यवेक्षण करने की अनुमति नहीं दी जाएगी।

IV. **तृतीय स्तर : साठ प्रतिशत से अधिक समानताएं–**

   i. उन्हें पांडुलिपि वापस लेने को कहा जाएगा।

   ii. उन्हें लगातार दो वार्षिक वेतन वृद्धि के अधिकार से वंचित किया जाएगा।

   iii. उन्हें तीन वर्ष की अवधि के लिए किसी नए निष्णात, एम.फिल., पीएच.डी. छात्र/ विद्वान का पर्यवेक्षण करने की अनुमति नहीं दी जाएगी।

नोट 1: बार– बार साहित्यिक चोरी करने पर दण्ड : उन्हें पांडुलिपि वापस लेने को कहा जाएगा और उन्हें की गई साहित्यिक चोरी के निम्न स्तर से एक स्तर ऊपर की साहित्यिक चोरी के लिए दण्डित किया जाएगा। यदि की गई साहित्यिक चोरी सर्वोच्च स्तर की हो तो उसके लिए विहित दंड लागू होगा। यदि तृतीय स्तर के दोष की पुनरावृत्ति की गई हो तो उच्चतर शिक्षा संस्थान द्वारा सेवा नियमों के अनुसार निलंबन/सेवा समाप्ति सहित अनुशासनात्मक कार्रवाई की जाएगी।

नोट 2: उस स्थिति में दण्ड, जब साहित्यिक चोरी का लाभ अथवा क्रेडिट पहले ही प्राप्त किया गया हो– यदि लाभ अथवा क्रेडिट प्राप्त किए जाने, जैसा भी मामला हो, की तिथि के बाद साहित्यिक चोरी सिद्ध हो तो उसके द्वारा प्राप्त लाभ अथवा क्रेडिट को आईएआईपी द्वारा संस्तुत अवधि के लिए आस्थगित रखा जाएगा तथा संस्थान के प्रमुख द्वारा अनुमोदित किया जाएगा।

नोट 3 : उच्चतर शिक्षा संस्थान ऐसा तंत्र विकसित करेंगे ताकि यह सुनिश्चित किया जाए कि छात्र, संकाय, शोधकर्ता अथवा कर्मचारिवृंद द्वारा प्रकाशित किए गए प्रत्येक पत्र/शोध–प्रबंध (थीसीस) तथा शोध–निबंध (डिसरटेशन) को अग्रेषित/ प्रस्तुत किए जाने के समय साहित्यिक चोरी के लिए जांचा जाए।

नोट 4 : यदि उच्चतर शिक्षा संस्थान के प्रधान के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, इन विनियमों के अनुरूप उच्चतर शिक्षा संस्थान के नियंत्रण अधिकारी द्वारा उपर्युक्त कार्रवाई की जाएगी।

नोट 5 : यदि संस्थागत स्तर पर विभागाध्यक्ष/प्राधिकारियों के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, इन विनियमों के अनुरूप आईएआईपी द्वारा उपयुक्त कार्रवाई की जाएगी जिसे सक्षम अधिकारी द्वारा अनुमोदित किया जाएगा।

नोट 6 : यदि डीएआईपी अथवा आईएआईपी के किसी सदस्यगण के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, ऐसा सदस्य ऐसी बैठकों में भाग नहीं लेगा जहां उसके मामले के संबंध में चर्चा की जा रही हो/अथवा जांच की जा रही हो।

13. कठिनाइयों का निवारण

विश्वविद्यालय अनुदान आयोग, इन विनियमों के कार्यान्वयन के दौरान सामने आने वाली कठिनाइयों को भारत सरकार/मानव संसाधन विकास मंत्रालय के परामर्श से निवारण करने का अधिकार सुरक्षित रखता है।

प्रो. रजनीश जैन, सचिव

[विज्ञापन–III/4/असा./161/18]

UNIVERSITY GRANTS COMMISSION

NOTIFICATION

UNIVERSITY GRANTS COMMISSION (PROMOTION OF ACADEMIC INTEGRITY AND PREVENTION OF PLAGIARISM IN HIGHER EDUCATIONAL INSTITUTIONS) REGULATIONS, 2018

New Delhi, the 23rd July, 2018

F. 1-18/2010(CPP-II).—

Preamble

Whereas, University Grants Commission (UGC), as per UGC Act, 1956, is mandated to coordinate and determine the standards of higher education;

And whereas, assessment of academic and research work done leading to the partial fulfillment for the award of degrees at Masters and Research level, by a student or a faculty or a researcher or a staff, in the form of thesis, dissertation and publication of research papers, chapters in books, full-fledged books and any other similar work, reflects the extent to which elements of academic integrity and originality are observed in various relevant processes adopted by Higher Educational Institutions (HEIs);

Therefore, in exercise of the powers conferred by clause (j) of Section 12 read with clauses (f) and (g) of sub-section (1) of Section 26 of the University Grants Commission Act, 1956, the University Grants Commission hereby makes the following regulations:-

1. Short title, application and commencement –

a. These regulations shall be called the University Grants Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2018.

b. They shall apply to the students, faculty, researchers and staff of all Higher Educational Institutions in the country.

c. These regulations shall come into force from the date of their notification in the Official Gazette.

2. Definitions -

In these regulations, unless the context otherwise requires—

a. "Academic Integrity" is the intellectual honesty in proposing, performing and reporting any activity, which leads to the creation of intellectual property;

b. "Author" includes a student or a faculty or a researcher or staff of Higher Educational Institution (HEI) who claims to be the creator of the work under consideration;

c. "Commission" means the University Grants Commission as defined in the University Grants Commission Act, 1956;

d. "Common Knowledge" means a well known fact, quote, figure or information that is known to most of the people;

e. "Degree" means any such degree specified by the University Grants Commission, by notification in the Official Gazette, under section 22 of the University Grants Commission Act, 1956;

f. "Departmental Academic Integrity Panel" shall mean the body constituted at the departmental level to investigate allegations of plagiarism;

g. "Faculty" refers to a person who is teaching and/or guiding students enrolled in an HEI in any capacity whatsoever i.e. regular, ad-hoc, guest, temporary, visiting etc;

h. "Higher Educational Institution (HEI)" means a university recognized under section 2(f) of the UGC Act, 1956 or an institution deemed to be university under section 3 of the UGC Act, 1956 or an affiliating college / institution or a constituent unit of a university;

i. "Information" includes data, message, text, images, sound, voice, codes, computer programs, software and databases or microfilm or computer generated microfiche;

j. "Institutional Academic Integrity Panel" shall mean the body constituted at Institutional level to consider recommendations of the departmental academic integrity panel and take appropriate decisions in respect of allegations of plagiarism and decide on penalties to be imposed. In exceptional cases, it shall investigate allegations of plagiarism at the institutional level;

k. "Notification" means a notification published in the Official Gazette and the expression "notify" with its cognate meanings and grammatical variation shall be construed accordingly;

l. "Plagiarism" means the practice of taking someone else's work or idea and passing them as one's own.

m. "Programme" means a programme of study leading to the award of a masters and research level degree;

n. "Researcher" refers to a person conducting academic / scientific research in HEIs;

o. "Script" includes research paper, thesis, dissertation, chapters in books, full-fledged books and any other similar work, submitted for assessment / opinion leading to the award of master and research level degrees or publication in print or electronic media by students or faculty or researcher or staff of an HEI; however, this shall exclude assignments / term papers / project reports / course work / essays and answer scripts etc.;

p. "Source" means the published primary and secondary material from any source whatsoever and includes written information and opinions gained directly from other people, including eminent scholars, public figures and practitioners in any form whatsoever as also data and information in the electronic form be it audio, video, image or text; Information being given the same meaning as defined under Section 2 (1) (v) of the Information Technology Act, 2000 and reproduced here in Regulation 2 (l);

q. "Staff" refers to all non-teaching staff working in HEIs in any capacity whatsoever i.e. regular, temporary, contractual, outsourced etc.;

r. "Student" means a person duly admitted and pursuing a programme of study including a research programme in any mode of study (full time or part-time or distance mode);

s. "University" means a university established or incorporated by or under a Central Act, a Provincial Act or a State Act, and includes an institution deemed to be university under section 3 of the UGC Act, 1956;

t. "Year" means the academic session in which a proven offence has been committed.

Words and expressions used and not defined in these regulations but defined in the University Grants Commission Act, 1956 shall have the meanings respectively assigned to them in UGC Act, 1956.

3. Objectives

3.1 To create awareness about responsible conduct of research, thesis, dissertation, promotion of academic integrity and prevention of misconduct including plagiarism in academic writing among student, faculty, researcher and staff.

3.2 To establish institutional mechanism through education and training to facilitate responsible conduct of research, thesis, dissertation, promotion of academic integrity and deterrence from plagiarism.

3.3. To develop systems to detect plagiarism and to set up mechanisms to prevent plagiarism and punish a student, faculty, researcher or staff of HEI committing the act of plagiarism.

4. Duties of HEI:

Every HEI should establish the mechanism as prescribed in these regulations, to enhance awareness about responsible conduct of research and academic activities, to promote academic integrity and to prevent plagiarism.

5. Awareness Programs and Trainings:

(a) HEI shall instruct students, faculty, researcher and staff about proper attribution, seeking permission of the author wherever necessary, acknowledgement of source compatible with the needs and specificities of disciplines and in accordance with rules, international conventions and regulations governing the source.

(b) HEI shall conduct sensitization seminars/ awareness programs every semester on responsible conduct of research, thesis, dissertation, promotion of academic integrity and ethics in education for students, faculty, researcher and staff.

(c) HEI shall :

i. Include the cardinal principles of academic integrity in the curricula of Undergraduate (UG)/Postgraduate (PG)/Master's degree etc. as a compulsory course work/module.

ii. Include elements of responsible conduct of research and publication ethics as a compulsory course work/module for Masters and Research Scholars.

iii. Include elements of responsible conduct of research and publication ethics in Orientation and Refresher Courses organized for faculty and staff members of the HEI.

iv. Train student, faculty, researcher and staff for using plagiarism detection tools and reference management tools.

v. Establish facility equipped with modern technologies for detection of plagiarism.

vi. Encourage student, faculty, researcher and staff to register on international researcher's Registry systems.

6. Curbing Plagiarism

a) HEI shall declare and implement the technology based mechanism using appropriate software so as to ensure that documents such as thesis, dissertation, publications or any other such documents are free of plagiarism at the time of their submission.

b) The mechanism as defined at (a) above shall be made accessible to all engaged in research work including student, faculty, researcher and staff etc.

c) Every student submitting a thesis, dissertation, or any other such documents to the HEI shall submit an undertaking indicating that the document has been prepared by him or her and that the document is his/her original work and free of any plagiarism.

d) The undertaking shall include the fact that the document has been duly checked through a Plagiarism detection tool approved by the HEI.

e) HEI shall develop a policy on plagiarism and get it approved by its relevant statutory bodies/authorities. The approved policy shall be placed on the homepage of the HEI website.

f) Each supervisor shall submit a certificate indicating that the work done by the researcher under him / her is plagiarism free.

g) HEI shall submit to INFLIBNET soft copies of all Masters, Research program's dissertations and thesis within a month after the award of degrees for hosting in the digital repository under the "*Shodh Ganga e-repository*".

h) HEI shall create Institutional Repository on institute website which shall include dissertation / thesis / paper / publication and other in-house publications.

7. Similarity checks for exclusion from Plagiarism

The similarity checks for plagiarism shall exclude the following:

i. All quoted work reproduced with all necessary permission and/or attribution.

ii. All references, bibliography, table of content, preface and acknowledgements.

iii. All generic terms, laws, standard symbols and standards equations.

Note:

The research work carried out by the student, faculty, researcher and staff shall be based on original ideas, which shall include abstract, summary, hypothesis, observations, results, conclusions and recommendations only and shall not have any similarities. It shall exclude a common knowledge or coincidental terms, up to fourteen (14) consecutive words.

8. Levels of Plagiarism

Plagiarism would be quantified into following levels in ascending order of severity for the purpose of its definition:

i. Level 0: Similarities upto 10% - Minor similarities, no penalty

ii. Level 1: Similarities above 10% to 40%

iii. Level 2: Similarities above 40% to 60%

iv. Level 3: Similarities above 60%

9. Detection/Reporting/Handling of Plagiarism

If any member of the academic community suspects with appropriate proof that a case of plagiarism has happened in any document, he or she shall report it to the Departmental Academic Integrity Panel (DAIP). Upon receipt of such a complaint or allegation the DAIP shall investigate the matter and submit its recommendations to the Institutional Academic Integrity Panel (IAIP) of the HEI.

The authorities of HEI can also take *suomotu* notice of an act of plagiarism and initiate proceedings under these regulations. Similarly, proceedings can also be initiated by the HEI on the basis of findings of an examiner. All such cases will be investigated by the IAIP.

10. Departmental Academic Integrity Panel (DAIP)

i. All Departments in HEI shall notify a DAIP whose composition shall be as given below:

a. Chairman - Head of the Department

b. Member - Senior academician from outside the department, to be nominated by the head of HEI.

c. Member - A person well versed with anti plagiarism tools, to be nominated by the Head of the Department.

The tenure of the members in respect of points 'b' and 'c' shall be two years. The quorum for the meetings shall be 2 out of 3 members (including Chairman).

ii. The DAIP shall follow the principles of natural justice while deciding about the allegation of plagiarism against the student, faculty, researcher and staff.

iii. The DAIP shall have the power to assess the level of plagiarism and recommend penalty(ies) accordingly.

iv. The DAIP after investigation shall submit its report with the recommendation on penalties to be imposed to the IAIP within a period of 45 days from the date of receipt of complaint / initiation of the proceedings.

11. Institutional Academic Integrity Panel (IAIP)

i. HEI shall notify a IAIP whose composition shall be as given below:

a. Chairman - Pro-VC/Dean/Senior Academician of the HEI.

b. Member - Senior Academician other than Chairman, to be nominated by the Head of HEI.

c. Member - One member nominated by the Head of HEI from outside the HEI

d. Member - A person well versed with anti-plagiarism tools, to be nominated by the Head of the HEI.

The Chairman of DAIP and IAIP shall not be the same. The tenure of the Committee members including Chairman shall be three years. The quorum for the meetings shall be 3 out of 4 members (including Chairman).

ii. The IAIP shall consider the recommendations of DAIP.

iii. The IAIP shall also investigate cases of plagiarism as per the provisions mentioned in these regulations.

iv. The IAIP shall follow the principles of natural justice while deciding about the allegation of plagiarism against the student, faculty, researcher and staff of HEI.

v. The IAIP shall have the power to review the recommendations of DAIP including penalties with due justification.

vi. The IAIP shall send the report after investigation and the recommendation on penalties to be imposed to the Head of the HEI within a period of 45 days from the date of receipt of recommendation of DAIP/ complaint / initiation of the proceedings.

vii. The IAIP shall provide a copy of the report to the person(s) against whom inquiry report is submitted.

12. Penalties

Penalties in the cases of plagiarism shall be imposed on students pursuing studies at the level of Masters and Research programs and on researcher, faculty & staff of the HEI only after academic misconduct on the part of the individual has been established without doubt, when all avenues of appeal have been exhausted and individual in question has been provided enough opportunity to defend himself or herself in a fair or transparent manner.

12.1 Penalties in case of plagiarism in submission of thesis and dissertations

Institutional Academic Integrity Panel (IAIP) shall impose penalty considering the severity of the Plagiarism.

i. Level 0: Similarities upto 10% - Minor Similarities, no penalty.

ii. Level 1: Similarities above 10% to 40% - Such student shall be asked to submit a revised script within a stipulated time period not exceeding 6 months.

iii. Level 2: Similarities above 40% to 60% - Such student shall be debarred from submitting a revised script for a period of one year.

iv. Level 3: Similarities above 60% -Such student registration for that programme shall be cancelled.

Note 1: Penalty on repeated plagiarism- Such student shall be punished for the plagiarism of one level higher than the previous level committed by him/her. In case where plagiarism of highest level is committed then the punishment for the same shall be operative.

Note 2: Penalty in case where the degree/credit has already been obtained - If plagiarism is proved on a date later than the date of award of degree or credit as the case may be then his/her degree or credit shall be put in abeyance for a period recommended by the IAIP and approved by the Head of the Institution.

12.2 Penalties in case of plagiarism in academic and research publications

I. Level 0: Similarities up to 10% - Minor similarities, no penalty.

II. Level 1: Similarities above 10% to 40%

i) Shall be asked to withdraw manuscript.

III. Level 2: Similarities above 40% to 60%

i) Shall be asked to withdraw manuscript.

ii) Shall be denied a right to one annual increment.

iii) Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of two years.

IV. Level 3: Similarities above 60%

i) Shall be asked to withdraw manuscript.

ii) Shall be denied a right to two successive annual increments.

iii) Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of three years.

Note 1: Penalty on repeated plagiarism - Shall be asked to withdraw manuscript and shall be punished for the plagiarism of one level higher than the lower level committed by him/her. In case where plagiarism of highest level is committed then the punishment for the same shall be operative. In case level 3 offence is repeated then the disciplinary action including suspension/termination as per service rules shall be taken by the HEI.

Note 2: Penalty in case where the benefit or credit has already been obtained - If plagiarism is proved on a date later than the date of benefit or credit obtained as the case may be then his/her benefit or credit shall be put in abeyance for a period recommended by IAIP and approved by the Head of the Institution.

Note 3: HEIs shall create a mechanism so as to ensure that each of the paper publication/thesis/dissertation by the student, faculty, researcheror staff of the HEI is checked for plagiarism at the time of forwarding/submission.

Note 4: If there is any complaint of plagiarism against the Head of an HEI, a suitable action, in line with these regulations, shall be taken by the Controlling Authority of the HEI.

Note 5: If there is any complaint of plagiarism against the Head of Department/Authorities at the institutional level, a suitable action, in line with these regulations, shall be recommended by the IAIP and approved by the Competent Authority.

Note 6: If there is any complaint of plagiarism against any member of DAIP or IAIP, then such member shall excuse himself / herself from the meeting(s) where his/her case is being discussed/investigated.

13. Removal of Difficulty

UGC reserves the right to remove difficulty/difficulties in the course of implementations of these Regulations in consultation with the Government of India/ Ministry of Human Resource Development.

Prof. RAJNISH JAIN, Secy.

[ADVT.-III/4/Exty./161/18]

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BOOK SERIES AND EDITED VOLUMES WITH ISBN/DOI (2023-2024)

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To whom it may concern

The Kazi Nazrul University approves the following List of Edited volumes/Book Series/Conference Proceedings by International/National Publishers with ISBN/DOI Nos. for the purpose of API Calculation, Vide UGC Notification No. F.1-2/2016 dated 11.07.2016, W.B. Government Memorandum No. 516-Edn(U)/1U-91/10 Dated, Kolkata the 16th May, 2017 & W.B. Govt. Notification No. 1373–Edn (CS)/5P-52/98 Dated 07.12.2017.

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DETAILS OF THE EDITED VOLUMES PUBLISHED BY DIFFERENT DEPARTMENTS OF BANWARILAL BHALOTIA COLLEGE

NAME OF THE BOOKS	EDITORS	ISBN AND DOI	PUBLISHER	YEAR AND MONTH OF PUBLICATION
1. BRAIN BLOOMERS (FIRST EDITION)	PROF AMITAVA BASU, DR AMALENDU SAMANTA, MR SANTANU MALLICK.	ISBN: 978-1-304-01711-6 ISBN-10:1-304-01711-7 ISBN-A:10.1/304017117 DIP:18.10.1304017117 DOI:10.25215/1304017117	REDSHINE PUBLICATION 132, BILTON ROAD, PERIVALE, GREENFORD PASSCODE: UB6 7HL LONDON, UK **(INTERNATIONAL)**	AUGUST,2021
2. BRAIN BLOOMERS (VOLUME 2)	PROF AMITAVA BASU, DR SANTANU MALLICK, DR AMALENDU SAMANTA,	ISBN: 978-1-387-53109-7 ISBN-10:1-387-53109-3 DIP:18.10.1304017117 DOI:10.25215/1387531093	REDSHINE PUBLICATION 132, BILTON ROAD, PERIVALE, GREENFORD	OCTOBER,2022

	PROF ARUNAVA NARAYAN MUKHERJEE		PASSCODE: UB6 7HL LONDON, UK **(INTERNATIONAL)**	
3. REVISITING STRATEGIES FOR SUSTAINABLE DEVELOPMENT: an eConSus Book Series (VOLUME 2)	PROF AMITAVA BASU, MR RAJARSHI DAS, DR SUBHARTHI SARKAR, MR KAJAL MAJI, DR BINITA DUTTA, DR NIMAI CHAND SAHA.	ISBN: 978-93-94727-41-0 ISBN-10:93-94727-41-8 DIP:18.10.9394727418 DOI:10.25215/9394727418	REDSHINE PUBLICATION PVT. LTD. LUNAWADA INDIA- 389230 **(NATIONAL)**	OCTOBER,2022
4. REVISITING STRATEGIES FOR SUSTAINABLE DEVELOPMENT: e-ConSus 2020 (International Conference Proceeding)	PROF AMITAVA BASU, DR SUDIPTA DAS, MR RAJARSHI DAS, MR KAJAL MAJI MR SHASHI KR SHAW, DR NIMAI CHAND SAHA, DR SAYANTAN PARIA, DR ANIRUDDHA ADHIKARI, DR AMIT TRIBEDI	ISBN: 978-93-90937-61-5 ISBN-10:93-90937-61-2 DIP:18.10.9390937612 DOI:10.25215/9390937612	REDSHINE PUBLICATION PVT. LTD. LUNAWADA INDIA- 389230 **(NATIONAL)**	JULY, 2021
5. Proceedings of International	Dr. Kousik Mukherjee, Dr. K.	ISBN:978-93-89817-84-3	Ideal International E-	March, 2023

conference on Recent Trends in Physics and Allied Sciences	K. Dey,Dr. Jayanta Kumar Majhi, Mr. Kajal Maji, Dr. S. Mondal, Dr. S.S. Mandal		Publication Pvt. Ltd. MP, India **(International)**	
6. Proceedings of Two-Day **NAAC Sponsored** National Seminar on Creation and Use of OER	Dr Amitava Basu, Mr. Abhijit Chakrabarti, Dr. Amalendu Samanta	ISBN: 978-93-83859-69-2	Sudarshan Prakashan, Kolkata -12 **(National)**	June 2023

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Dr. Chandan Koner
Registrar

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To whom it may concern

The Kazi Nazrul University approves the following List of Subject Books/Text Books and Edited Volumes, published by International/National level publishers, with ISBN/ISSN Nos. for the purpose of API Calculation, Vide UGC Notification No. F.1-2/2016 dated 11.07.2016, W.B. Government Memorandum No. 516-Edn(U)/1U-91/10 Dated, Kolkata the 16th May, 2017 & W.B. Govt. Notification No. 1373–Edn (CS)/5P-52/98 Dated 07.12.2017.

(For calculation of API since 07.12.2017 the subject expert, in recognition of interdisciplinary or domain-knowledges wherever applicable, may consider approved list of Subject Books/Text Books and Edited Volumes published by International/National level publishers, with ISBN/ISSN numbers for determining the score of given publication)

DETAILS OF THE TEXT BOOKS/EDITED VOLUMES PUBLISHED BY DIFFERENT FACULTIES OF BANWARILAL BHALOTIA COLLEGE

SL. No.	NAME OF THE BOOKS	Author	ISBN	PUBLISHER	YEAR AND MONTH OF PUBLICATION
1	Sketches in Zoology: Non-Chordata (Vol. 2)	Dr. Arnab Ganguli Pankaj Dutta Post-Graduate Department of Zoology	978-81-941760-8-4	Taurean Publications, New Delhi-110019	March 2019
2	A short book on non-communicable disease and remedies	Dr. Atrayee Dey Assistant Professor Post-Graduate Department of Zoology	9879382505228	Kanan Prakashani, Kolkata-700009	August 2023

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Ph. No. : - 0341-2270456, Fax: 0341-2250456, E-mail: registrar@knu.ac.in, Website: www.knu.ac.in

3	Use of Nano-Materials in Power Industry	Dr. Binita Dutta Assistant Professor Dept. of Chemistry	978-93-91479-00-8	RED'SHINE Publication Pvt. Ltd. in Association with, **RED'MAC International Press & Media. Inc, United Kingdom.**	June 2021
4	FINANCIAL ACCOUNTING PREMIER	Dr. Banaeswar Kapasi, Dr Amalendu Samanta, Sourav Sarkar	ISBN 10: 9393239185	Redshine Publication, India	October 2021
5	Brain Bloomers Vol. 3	Prof. Amitava Basu Dr. Santanu Mallick Dr. Amalendu Samata Prof. Parag Kalkar Prof. Siddhartha Sankar Saha	ISBN: 978-1-304-78778-1 ISBN-10: 1-304-78778-8	RED'SHINE Publication Pvt. Ltd. in Association with, **RED'MAC International Press & Media. Inc, United Kingdom.**	December 2023
6	BEYOND BOUNDARIES EXPLORING OER	Prof. Amitava Basu Mr Abhijit Chakrabarti Dr Amalendu Samanta	ISBN: 978-1-304-76856-8 ISBN-10: 1-304-76856-2	RED'SHINE Publication Pvt. Ltd. in Association with, **RED'MAC International Press & Media. Inc, United Kingdom.**	December 2023

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7	BHARATIYA PURATATWA O JADUGHAR	Dr. Goutam Maji, Assist. Prof. Dept. of History	ISBN: 978-81-968400-1-3	Setu Prakashani Kolkata-700006	January 2024

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REVISITING STRATEGIES FOR SUSTAINABLE DEVELOPMENT

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Website: www.redshine.se

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Foreword

The "e-ConSus 2023: Revisiting Strategies for Sustainable Development" is an edited volume published by Banwarilal Bhalotia College, Asansol. It is a cross-disciplinary anthology envisaged to address the piquant situation of life and nature in this planet due to unsustainable habits of our life-world. This book, the third revised edition in the eConSus book series, brings together a variety of research articles that explore ground-breaking concepts in sustainable development. The book explores sustainable materials and technologies, focusing on rice husk ash in cement production, bio-based materials in infrastructure development, and the green synthesis of nanoparticles. The book also highlights the importance of preserving biodiversity and cultural heritage, addressing global challenges like neglected tropical diseases, pollution, waste management, and sensitive issues like human health and environmental responsibility. In addition, the book explores diverse perspectives on sustainability, such as the impact of invasive plant species on heritage buildings, mosquito control, and sustainable waste management practices. Moreover, new ideas on the transformation of libraries into eco-conscious spaces, the August 2017 flood, and green marketing have been discussed among other important things relevant to university curricula.

This book is divided into 32 chapters and the respective authors have taken utmost care to prepare the chapters. Each book chapter has been reviewed by renowned experts in the concerned field and has undergone plagiarism and similarity checks as per the mandate of the UGC. Indeed, the book serves as a valuable resource for researchers, policymakers, and individuals seeking to contribute to a sustainable future.

I offer my sincere congratulations to the writers and editors for this outstanding work, and I wish them the best of luck in all of their future endeavours.

Prof. Debashis Bandyopadhyay
Vice Chancellor
Kazi Nazrul University

EDITORIAL

Building upon the success of the previous two volumes, "e-ConSus 2023: Revisiting Strategies for Sustainable Development" presents a diverse collection of chapters exploring various facets of sustainability across disciplines. This edited volume, published by the Publishing Committee of Banwarilal Bhalotia College, Asansol, offers insightful perspectives on navigating the complexities of achieving a sustainable future, broadly classified and summarised as follows:

Sustainable Materials and Technologies:
The book delves into the potential of sustainable materials and technologies, showcasing research on utilising rice husk ash in cement production, harnessing bio-based materials in infrastructure development, and exploring the green synthesis of nanoparticles. These chapters highlight innovative approaches to reducing environmental impact and fostering resource efficiency.

Preserving Biodiversity and Cultural Heritage:
The volume recognises the significance of preserving biodiversity and cultural heritage. It features studies on orchid conservation in Darjeeling, exploring the medicinal value of these plants, and investigating the threats faced by the Sundarbans mangrove forest. Additionally, a chapter examines the challenges faced by Dokra artisans, emphasising the need to integrate sustainability with cultural preservation efforts.

Addressing Global Challenges:
The book tackles critical global challenges like neglected tropical diseases, pollution, and waste management. It explores the potential of green chemistry in mitigating environmental damage, emphasises the importance of ecological democracy in achieving sustainability, and proposes sustainable strategies for solid waste management.

Human Health and Environmental Responsibility:
The chapters address the interconnectedness of human health and environmental responsibility. They explore the link between pollution and reproductive health, investigate the bioremediating potential of bacteria, and advocate for environmental ethics as a cornerstone of sustainable development.

Diverse Perspectives on Sustainability:
"e-ConSus 2023" embraces diverse perspectives on sustainability. It examines the impact of invasive plant species on heritage buildings, explores the potential of Lantana camara in controlling mosquito populations, and analyses sustainable waste management practices in Varanasi. Additionally, the book highlights the role of libraries in promoting environmental consciousness and the growing preference for green products among Indian women.

This book is broken up into 32 chapters, each of which has been meticulously prepared by the respective authors. As required by UGC, every book chapter has been reviewed by distinguished experts in the relevant fields and has been subjected to plagiarism and similarity checks. The works which did not meet the review standards or have failed to meet the required criteria set by UGC have been rejected.

In essence the edited volume "e-ConSus 2023" serves as a valuable resource for researchers, policymakers, and individuals seeking to understand and contribute to achieving sustainable development. By exploring a wide range of issues and solutions, the book offers a comprehensive and thought-provoking perspective on navigating the path towards a sustainable future.

Dr. Amitava Basu
(Editor-in-Chief)

DR. AMITAVA BASU
Principal, B. B. College
Ushagram, Asansol, P Bardhaman
West Bengal - 713303

CONTENTS

CHAPTER : 1

SUSTAINABLE RESOURCE MANAGEMENT: UTILIZING RICE HUSK ASH AS SUPPLEMENTARY CEMENTING MATERIAL FOR THE CONSTRUCTION OF RIGID PAVEMENT

Aditya Shankar Ghosh [1], Simee Biswas [2], Rony Sk [3], Dr. Tapas Kumar Roy [4]

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Abstract:
The calorific value of the agricultural waste Rice Husk being very close to the calorific value of coal finds its use as a fuel for boilers in cement production, which otherwise uses 5% of the country's coal production. The resultant Rice Husk Ash (RHA) produced is mostly used in land filling which is an environmentally hazardous way of disposing the agricultural waste. However, the high silica content of RHA makes it a suitable Supplementary Cementitious Material (SCM). This reduces the cost of cement as well as the use of the non-renewable energy resource caused during cement production. The research is keen on achieving sustainability in industry, innovation & infrastructure by not only reducing the usage of non-renewable energy resources but also effectively addressing the environmental & economic concerns. In this study the properties of hydrated cements are investigated when mixed with the Rice Husk Ash (RHA). This not only improved the properties but also made them sustainable for high grade concrete construction, conventionally used for the construction of rigid pavements. The activity of the RHA made variation in the mortar properties which was analysed by X-Ray Diffraction (XRD). Experimental results confirmed increased compressive strength of high-grade RHA mixed cement concrete by replacement up to 15% and 5% of Ordinary Portland

[1] Research Scholar, Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah-711103, India
[2] Undergraduate Student, Department of Civil Engineering, Dream Institute of Technology, Kolkata-700104, India
[3] Site In-Charge, Soiltech India Pvt. Ltd., Hadapsar, Pune-411013, India
[4] Associate Professor, Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah-711103, India

Cement (OPC) and Portland Pozzolana Cement (PPC) respectively by weight compared to high grade virgin cement concrete. The incorporation of RHA also reduced the pH value and consequently the Alkali Aggregate Reaction (AAR).

Keywords: *Sustainable industry innovation & infrastructure, RHA, XRD, AAR.*

Introduction

In India 63.73 lakh kilometres of road network exists, making it the 2nd largest road network in the world. The road network carries 87% passenger traffic and 60% freight transport (MoRTH, Year End Review 2022, 2023). 90% of these paved roads are bituminous and the remaining 10% are rigid pavement (MoRTH, Specifications for road bridge works 5th revision, 2013). This statistical data shows that the rigid pavements are less favourable, which is mainly due to its high initial construction cost (Mohod & Kadam, 2016). However, their low maintenance cost in comparison to the flexible pavement have kept the researchers and engineers ever interested in their implementation whenever possible. In recent years the Government of India has started significant endeavours to implement all weather road connectivity to habitations in Left Wing Extremism (LWE) areas (PMGSY, 2017). This have once again opened up the opportunity of implementation of rigid pavement on a large scale. On the contrary, this project requires a huge quantity of material, which is leading to a potential material crisis and utilizing the materials form the neighbouring lands. Besides the growing production cost of Portland cement have made researchers interested in partially replacing it with Supplementary Cementitious Materials (SCM) (Mehta & Pitt, 1976). On the other hand, a mounting increase in the amount of siliceous waste material like agricultural waste in the form of Rice Husk Ash (RHA) has made researchers and industry professionals interested towards the replacement of cement with these (Nehdi, Duquette, & Damatty, 2003). The pozzolanic properties of RHA finds its utility in construction material as it enhances the structural sustainability and service life (Reddy, Jyothy, & Reddy, 2013). This further leads to recycling the RHA. This tackles the disposal issues and consequent environmental threats. It further reduces the cement content as well as reduces the energy consumption, non-renewable raw material consumption and consequent carbon dioxide emissions.

The aptness of utilizing RHA as SCM mainly depends upon its silica content and large surface area, which is due to the porous

structure of the particles (Cook, Pama, & Damer, 1976). The reactive silica content of RHA along with its mineralogical properties depend upon the combustion time, temperature and turbulence during combustion (Deshmukh, Bhatt, Peshwe, & Pathak, 2012).

Investigators obtained rapid analytical method for determining the silica in RHA which is present in its amorphous phase. It is highly pozzolanic that can be used as SCM. Its reactivity depends on the temperature of incineration. The RHA becomes highly reactive as the temperature of incineration reaches 500°C (Zain, Islam, Mahmud, & Jamil, 2011). On increasing the temperature of incineration, the nature of RHA changes from amorphous to crystalline (Memon, Shaikh, & Akbar, 2011). It has been investigated that, the RHA mixed concrete produces satisfactory slump as well as setting time (Zhang, Lastra, & Malhotra, 1996). The RHA mixed concrete has excellent chloride ion penetration resistance, reduced surface scaling and excellent performance under freezing and thawing conditions (Givi, Rashid, Aziz, & Salleh, 2010). Researchers stated that, the pozzolanic reaction lowers the calcium hydroxide content in the RHA blended cement concrete as well as enhance its compressive strength and workability (Jaturapitakkul & Roongreung, 2003). Investigational works showed that, incorporating RHA in structural concrete is a good alternative of the disposal of this agricultural residue (Sakr, 2006). Moreover, this also improves the toughness of the concrete structure (Gastaldini, Isaia, Gomes, & Sperb, 2007). Although numerous research works have been done determining the different properties of the concrete using RHA, most of them have used Low Grade Concrete (M30).

This study is to investigate the compatibility of RHA to partial replacement of cement. This study finds out the possibility of using RHA as SCM as well to check the classical properties of the RHA blended high grade cement (M40).

Methodology

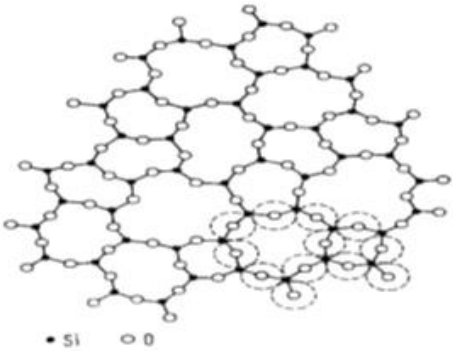
The RHA has been added to the cement in the form of SCM (0%, 2.5%, 5%, 7.5% and 10% by weight of PPC) and (0%, 5%, 10%, 15% and 20% by weight of OPC). Then 150 mm concrete cubes were casted using the blended cement, coarse aggregate, fine aggregate, water and admixture followed by compaction using needle vibrator. The mix proportion conformed to IS: 10262 (10262, 2009). After 24 hours, the casted cubes were taken out from the mould and subjected to curing before they were tested.

Materials Used in this Investigation

The materials used in this investigational work have been described as follows:

Rice Husk Ash

The RHA was procured from the Rice Mill of Burdwan, a district of West Bengal, India. It was produced by burning the Rice Husk for over 5 minutes at a temperature of 1000°C. This produced crystalline silica that is built by the repetition of silicon tetrahedron unit, oriented in a three-dimensional network (Monteiro, Shomglin, & Wenk, 2001). The framework type structure is made up of quartz shown in Figure 1 which is found later in this study by performing the XRD analysis of the sample. The large silica content of the RHA represented in the Table 1 makes it suitable as a SCM. The physical properties of RHA are in Table 2.



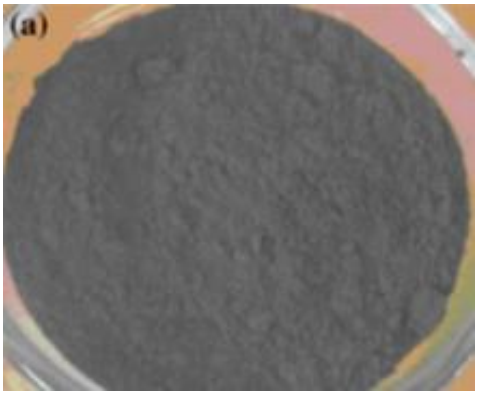


Figure 1. 2-Dimensional framework of SiO_2 (Shomglin et al. 2001) present in RHA

Table 1. Chemical composition of RHA

Components of RHA	Percentage Present
Silica (SiO_2)	83.00%
Alumina (Al_2O_3)	12.00%
Ferric Oxide (Fe_2O_3)	0.50%
Titanium Oxide	Nil
Calcium Oxide (CaO)	1.35%
Magnesium Oxide (MgO)	0.70%
Sodium Oxide (Na_2O)	0.30%
Potash	0.20%
Loss on Ignition	1.95%

Table 2. Physical Properties of RHA

Physical Properties of RHA	Percentage Present
Plasticity	Non-Plastic
Optimum Moisture Content	86.95%
Maximum Dry Density	0.54 gm/cc
Specific Gravity	2.06
Soaked CBR	4.14%
Unsoaked CBR	8.36%
Moisture Content (by weight)	6.08%
Ash Content	23.39%
Bulk Density	90.0 kg/m^3

Cement

The OPC 43 Grade and the PPC used in the investigational work was supplied by the Ultra Tech Cement Limited.

Super Platicizer

The super plasticizer used is of brand FOSROC made Auromix-400 shown in the Figure 2 was collected from local market, which mainly steadies the workability of the concrete mix keeping its strength intact. Auromix-400 used in the concrete mix is also a High Range Water Reducer (HRWR) having polycarboxylic base conforming IS: 9103 with specific gravity of 1.09.

Course Aggregate

In this study the coarse aggregate used is of Pakur variety with sizes ranging 10 mm to 20 mm.

Fine Aggregate

Fine aggregate is collected from local market with maximum aggregate size passing 2.36 mm. The sand is thoroughly washed and dried for removing any organic matters present.

Water

Potable water is used for preparing the concrete mix samples. The water should be free from any organic substances.

Figure 2. The Super Plasticizer AURAMIX-400 used for the study.

Measurement of Classical Properties of Blended Cement

Classical properties of the cement used in this study has been evaluated in order to identify their grade and quality. The test methods are presented in a tabulated form in Table 3 along with their standard code.

Table 3. Various Test methods with standard

Name of the Test	Standard Code
Fineness of cement by Specific Surface Method	IS:269-1080
Consistency of Cement used	IS:4031 (Part IV)
Compressive Strength test	IS:516-1959

Determination of the Nature of R.H.A

X-Ray Diffraction (XRD) analysis was carried out on 4gm of RHA sample by a Philips PW 1830 Diffractometer in the department of Metallurgy and Material Science, IIEST Shibpur. 35 kW, 25 mA power supply was used for this shown in figure 3. The procedure included a filament made out of copper, which is being pelted by electrons for characteristic Cu-Kα X-Ray generation. These rays after passing

through a Beryllium monochromatic filter, was radiated towards the sample at an incident angle (Θ) from 2.5° - 40° (2Θ = 5°-80°) (Vayghan, Khaloo, & Rajabipour, 2013). Specific values of Θ were found as peak intensities as the XRD pattern revealed constructive interference. According to Bragg's Law, the inter-atomic spacing (d) of the crystals formed in the sample is related to the value at each peak. Although the peaks of crystalline materials are very sharp and prominent, the amorphous materials gives very broad peaks without an identifiable Θ value (Vayghan, Khaloo, Nasiri, & Rajabipour, 2012).

Figure 3. The X-Ray Diffraction Instrument in IIEST Shibpur

Mixing, Casting and Testing of Concrete Cubes

Design mix of M40 grade of concrete was prepared conforming to IS:10262-2009. The ingredients were mixed thoroughly by hand-mixing in surface dry condition. Water and admixture in designed amount were mixed to it. Needle vibrator was used to cast the cubes as shown in the figure 4. Design mix of RHA blended cement samples were also prepared identically. Curing of the samples was done, and the compressive strength of the cubes were tested after 7 days and 28 days of curing in the highway engineering laboratory of IIEST Shibpur.

Figure 4. Cement Concrete Cube casting by compaction with Needle Vibrator

Results and Discussions

Interpretations of the experimental results along with their respective discussions have been done in the article as follows:

Evaluation of Classical Properties of tested Modified Cement

The consistency of the cement samples after adding RHA in the proportions of 0%, 2.5%, 5%, 7.5% and 10% to the PPC and 0%, 5%, 10%, 15% and 20% to the OPC have been evaluated and furnished in the Table 4 and Table 5 respectively. The test results showed increasing trend of consistency for increasing proportion of RHA blended with PPC and OPC. Increasing percentage of porous RHA which is shown in the Figure 5 as determined by the Scanning Electron Microscopy (SEM) test, makes the blended mix porous, increasing its water absorption (Marthong, 2012).

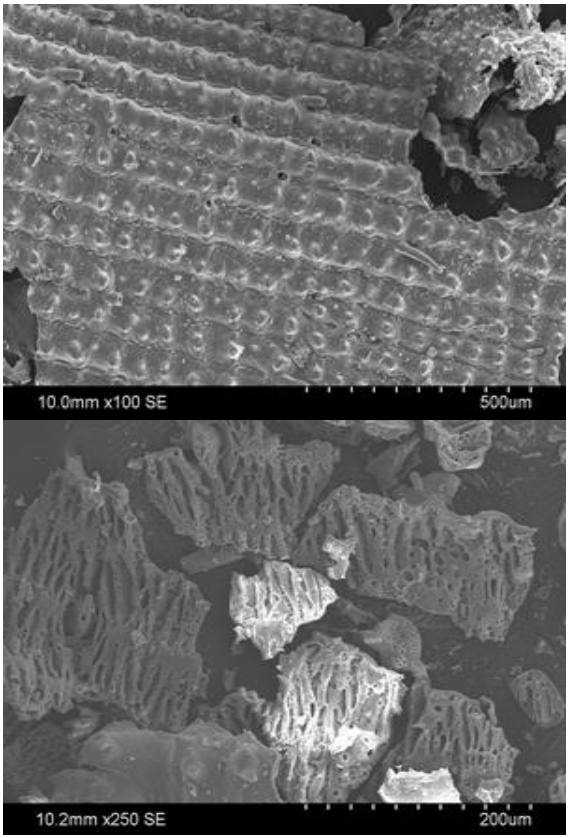


Figure 5. Porous Multi-layered structure of RHA seen under SEM.

Table 4. Consistency of PPC blended with RHA

Percentage of RHA as SCM	Consistency Values
0%	32.0%
2.5%	34.5%
5.0%	36.5%
7.5%	37.5%
10.0%	39.5%

Table 5. Consistency of OPC blended with RHA

Percentage of RHA as SCM	Consistency Values
0%	28.5%
5.0%	29.0%
10.0%	32.5%
15.0%	38.6%
20.0%	44.0%

Determination of the Nature of RHA using XRD

XRD analysis was performed on the RHA sample to understand the nature of RHA. According to the analysis as represented by Figure 6 the RHA sample showed crystalline nature. The crystalline nature of the RHA is for the presence of Silica in the form of Cristobalite (Pavia, Lampman, Kriz, & Vyvyan, 2014) and is indicated by the sharp peaks and the identifiable Θ values. This lowers the reactivity of the RHA with the cement.

Evaluation of Compressive Strength of RHA Mixed Concrete

The compressive strength of concrete prepared by varying the ratio of RHA, 0%, 2.5%, 5%, 7.5% and 10% for PPC and 0%, 5%, 10%, 15% and 20% for OPC have been determined for 7 days and 28 days of curing and represented by Table 6 and Table 7 respectively. The compressive strength test is shown in Figure 7. Every mortar's compressive strength datum was calculated using the average results of two samples. The test results clearly indicates that with the increase in the content of RHA as SCM the compressive strength also increases initially. However, for both the types of blended cement the value drops after reaching an optimum percentage of SCM, which is 5% for PPC and 15% for OPC. Better results for compressive strength test is observed for RHA blended OPC compared to RHA blended PPC all throughout the curing period. The results confirmed the pozzolanic nature of RHA. The high fineness of the RHA further contributes towards the strength development of the blended concrete (Rajput, Yadav, & Chandak, 2013).

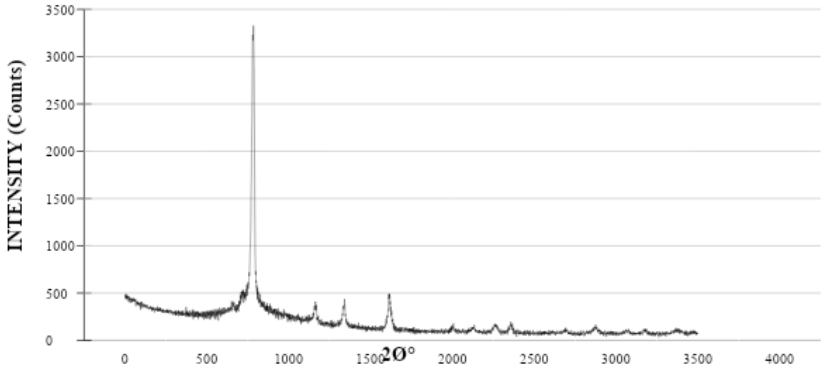


Figure 6. Mineral Phase detection of RHA using XRD analysis

Table 6. Compressive strength of concrete samples prepared by RHA blended PPC

Percentage of RHA as SCM	**Compressive Strength (MPa)**	
	7 days	28 days
0%	20	28
2.5%	22	36
5.0%	34	49
7.5%	30	44
10.0%	28	40

Table 7. Compressive strength of concrete samples prepared by RHA blended OPC

Percentage of RHA as SCM	**Compressive Strength (MPa)**	
	7 days	28 days
0%	35	48
5.0%	50	62
10.0%	47	60
15.0%	46	59
20.0%	34	47
25.0%	32	45

Figure 7. Compressive Strength Test being conducted.

pH analysis of Blended Cement Concrete

The pH determination as shown in figure 8 of the blended OPC with optimum RHA content of 15% and blended PPC with optimum RHA content of 5% after 7 days of curing showed pH reading of 11.20 and 11.68 respectively. This value is substantially lower than the pH value of sound concrete having pore-water pH of 13-13.50 (Dutta, Rakib, Hossain, & Rashid, 2020). RHA consists of silica which is an acidic oxide. On further reaction with water, it gives Silicic Acid (H_4SiO_4) having pH 9.02 (Iier, 1979). The lower pH value considerably reduces the concrete brought on by Alkali Aggregate Reaction (AAR) which occurs at higher pH levels. The obtained pH values also reduce the rate of corrosion of the reinforcements in the concrete.

20th CENTURY BENGALI SOCIETY, CULTURE AND WOMEN

A HISTORICAL OUTLOOK

Editors

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Dr. Goutam Majee
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Foreword
Bengal in the Twentieth Century: A Prelude

*Prof. Mahua Sarkar**

Plurality is an important ethos in the history of thought and consciousness of Bengal. By *Bangali* I mean mainly the Bhagirathi Ganga basin, the Himalayas and the Sundarbans and all other riverine areas of the eastern margins in terms of geographical culture, but the meaning of the word *Bangali* has changed over time. The origin of the word *Bangal* comes from the combination of the word *aal* of the Bhati country with the term called *Banga*. By manipulating the Bengali grammatical *Karok-bibhokti* in *saptami* and another time in *sashthi*, the word becomes a language and a territory. Through it, the Bengali language, the area called Bengali and the Bengalis as the users of that language can be identified. This Bengali identity from the twelfth-thirteenth century AD is historically defined; it was multidimensional and complex. Historian Niharranjan Ray, therefore, while writing his book, named it *Bangalir Itihas* and not *Banglar Itihas*, which locates the high-low polyglot groups in a large specific circle. He emphasized the multi-dimensionality of *Bangali* by repeatedly emphasizing on Bengali culture. His writings suggest that *Bangali* has a base that is proto-Australoid and Mongoloid i.e., in the so-called Dravidians or Mongols whom we think as non-Bengali. There is no apparent conflict with this identification with the Bengali sense of culture. Along with the pace of history, the picture of life and cultural situation of the people of Bengal is bound to change compared to the early days. On the other hand, it is impossible to have a complete understanding of Bengal and *Bangalis* without the cultural revolution of nineteenth century Bengal.

The underlying tendency of the people and their rulers in the Bengal region has been to tolerate and even foster religio-cultural and social pluralism, notwithstanding significant shifts in the governing elites and sporadic outbursts of violence and suppression of

competing religio-cultural traditions in the past. Throughout the course of two millennia, the people and rulers of the Bengal region have had to deal with a great deal of diversity in the form of numerous "Little Traditions," elite "Great Traditions," and ethnic minorities. These complex elements may help to explain this. Rather than presenting a repressive monolithic notion of a Hindu state in Bengal, my goal is to broadly convey the prevalent trend of tolerant plurality against which certain ideologically driven religio-political forces are attempting to destroy. One has to remember that in spite of the partition of Bengal in 1947 a common *Bangali* is never bothered about her/his Hindu/Muslim identity in her/his daily life. Instead of communalism there is a perfect communitarianism in every corner of West Bengal. It is sometimes disturbed by political interventions but the original spirit of harmony returns with its essentialities.

An essential component of any country's development is its culture. It stands for a collection of common beliefs, values, objectives, and customs. Almost every economic, social, and other activity incorporates elements of culture and creativity. The diversity of Bengali culture serves as a metaphor for the nation as a whole. Bengal has one of the world's largest collections of songs, music, dance, theatre, folk traditions, performing arts, rites and rituals, paintings and writings that are known, as the 'Intangible Cultural Heritage' of humanity. This collection was not patronised in colonial Bengal due to the state policy of 'divide and rule'.

While speaking on diversity, divisive elements like caste and religion are worth mentioning. In culture caste has a definite role to play. While Phule, Ambedkar, and Periyar rightfully take up a large portion of the discursive space in the history of anti-caste struggle, their contemporary Bengali counterparts also made a substantial and little-known intellectual and political contribution. Dalit communities residing in Bengal have diverse anti-caste thinkers, namely, Harichand Thakur, Guruchand Thakur, Mahendranath Karan, Rajendranath Sarkar, and Mahendranath Mallabarman. They questioned the Brahmanical appropriation of Bengal's anti-caste legacy through a critical rejection of nationalist, Marxist, and subaltern historiographies. They emphasized the Dalits of colonial Bengal's autonomous and self-critical intellectual past. They highlighted the underappreciated discourse of Dalit resistance and renaissance that had occurred concurrently in Bengal and exposed the epistemic

violence experienced by Dalit thinkers and reformers in the textbook historical narratives that exalt a Brahmanical India. Their agendas demonstrate how these organic intellectuals against caste struggled against Brahmanical supremacists during the anti-British movement spearheaded by the upper castes and Brahmins, and how their agendas of wealth redistribution and self-respect ran counter to the Swadeshi movement and other political struggles. Bengal in the twentieth century was distinctly different from nineteenth century renaissance Bengal. The century signifies a fascinating status in the society, economy and culture of India, emerging as a major site of deliberation among scholars of social sciences.

It is not sure whether the Bengalis had great expectations for the new century or they were more nostalgic about the past. But it is certain that the century came with the warmth of *Swadeshiana.* The Swadeshi Movement stimulated a fresh sense of Bengali nationalism and heightened the political consciousness of both Hindus and Muslims in Bengal. It symbolised the principles of personal improvement and independence, whether in the realms of education, economy and administration, or science and technology. The emergence and decline of *Swadeshi* vividly highlighted the conflict of interests between the subjugated population and their colonial rulers. The local and regional politicization played a crucial role in determining the future of the province for the following century. The repercussions of this politicization were- a) the process of making the language of politics more accessible to the general people. b) the encouragement of regional pride and the rise of regional leaders such as Chittaranjan Das, as well as national leaders like Subhas Chandra Bose.

c) advancement of scientific knowledge and development of national education d) expansion of rural towns e) the rise of a new middle class within the Muslim community f) emergence of the 'new women' and many other related and occasional developments.

Militant nationalism did not end in the twentieth century and several martyrs like Surya Sen and Dinesh Sen were hanged to death in the 1930s. The people of Bengal desired independence in several ways and results were manifold. The colonial policy of divide and rule was strongly manifest thereby. At the same time, the first partition of Bengal in 1905 signaled a caution against the rise of divisive identities along geographical lines. Though the governmental decision of partitioning of Bengal was cancelled, (1911) there was an alarm which

not be avoided in 1947. ... the partition

Sabyasachi Bhattacharyya regarded the 1920s as the defining moments of Bengal. In this period, the important question of how regional patriotism was to be reconciled with Indian nationalism determined many political issues in Bengal. The leading role played by the Hindu *bhadralok* elite of Calcutta ushered a typical urbanism in political culture. Sumit Sarkar points out that the ambiguity of the term *bhadralok* was that it was much too broad, ranging presumably from the Maharaja of Mymensingh to the east Indian railway clerk. The Bengali *bhadralok* of the twentieth century had become highly diverse in terms of education, profession, property and land ownership, access to positions of power, social connections, residential areas, affiliations with caste associations, adoption of community-oriented religious beliefs, and various other socio-cultural factors. However, the privileged upper class controlled the political landscape of Bengal by leveraging their wealth and social status within the colonial economic system. They played a significant role in shaping a renaissance, influencing national conversations through their dominance and educational goals, as well as their exclusive access to education. The intricate association between the Bengali *bhadralok* and the Indian bourgeoisie, as well as their interconnection with the agrarian and industrial economy, are subjects of historical discourses. However the presence of women was felt in the political sphere of nationalism and also in the wider arena of education and work. Women appeared as a strong social force beyond the circle of organized politics. The emergence of the *bhadramahila* was *a* new symbol of the century and women had still to proceed further with their claims for gender equality.

In spite of *bhadralok* predominance, the emergence of caste movements constituted an important watershed in the history of nationalism in Bengal in the 1930s and 1940s. In this context, Sekhar Bandopadhyay's researches on caste and caste movements are worth mentioning. Muslims, dalits, adivasis, peasants, labourers, women and other marginalized groups who were engaged with local socio-economic processes shaped the identity of the region in the twentieth century. The early period of it was highlighted by the occurrence of two world wars, widespread famines, genocide, communal unrest, labour union activism, student uprisings, leftist ideologies, and

[illegible] of the Kallol era, the hungry [illegible], and the cultural movement of the Indian People's Theatre Association. Over the course of a century, there was a remarkable display of intellectual brilliance in various artistic fields, ranging from Salil Chowdhury's music, Sambhu Mitra's theatre, to Satyajit Ray's mastery in filmmaking.

The retreat of British colonial power in 1947 led to the fragmentation of the regional identity leading to the most complex reality of the partition and refugee influx in West Bengal. The partition of Bengal produced new social, political and cultural processes in the state. The coming of a large number of migrants from East Pakistan had serious repercussions on the society and economy of West Bengal. Also, the transition towards decolonization brought new groups into the public sphere of West Bengal. The narratives of partition and decolonization are important expressions of the mindset of twentieth century. In the history of communalism, which in the context of the Indian subcontinent means the Hindu-Muslim divide, Bengal occupies an important position. Not only did this province have a large concentration of Muslims, it also witnessed the first articulation of a political consciousness among these people. It is no wonder that in 1906 the Indian Muslim League was born in Dacca in the eastern part of the province, where an enthusiastic Muslim leadership had already distanced itself from the Hindu-dominated National Congress and was fighting for a share of political power: a process which ended in the partition of the province and the creation of East Pakistan in 1947. Suranjan Das has studied this process by exploring a series of Hindu-Muslim riots that took place in Bengal in the first half of the twentieth century. He has two clear assumptions. First, he distinguishes between religious conflict and communal violence, the former being the hallmark of Hindu-Muslim relations in the pre-colonial and perhaps also the early colonial periods, while the latter phenomenon characterized the late colonial period. While, in his opinion, religious conflicts centred around "sectarian and doctrinaire differences", communal animosity was engendered by "political power and economic resources". His second important assumption concerns the distinction between elite and

popular communalism. The two realms, he argues, were not mu exclusive and it is their gradual merger in the 1940s which inter communalism and the partition.

Along with the crisis of rehabilitation Bengal faced problems. During the year 1943, Bengal experienced a significant devastating famine, which was the fifteenth and most lethal famin colonial India. This famine was deliberately driven by humans was falsely portrayed as a mere 'food shortage' for a significant pe of time. Consequently, this resulted in the conversion of nationa politics and widespread emotions into a strong desire for liberat A tragedy that originally occurred at a provincial level was escala to a national level and became an appalling act that strong motivated the demand for self-governance during the final stages British rule. The 3.5 million deaths caused by famine in Bengal we regarded as significant national tragedies. The dissemination photographs, films, plays, charity appeals, and vernacular repo effectively conveyed news of the Bengal Famine beyond t province's boundaries, leading citizens in other regions to percei these deaths as being caused by human actions and avoidable. Th people were disgusted by the reports of trucks and railway co transporting rice to British soldiers. They interpreted this as a betray of "Golden Bengal" and viewed it as undeniable evidence imperialism's moral and economic collapse.

In the 1920s, there was a consistent increase in the communi movement, which was actively protesting against colon imperialism. The Tebhaga movement was launched in Bengal in 194 by the Kisan Sabha, which is the peasants' front of the Communi Party of India. The objective of the Tebhaga (sharing by thirds movement was to decrease the portion allocated to landlords to one third. Violent unrest erupted in numerous regions, causing landlord to abandon villages and resulting in the Kisan Sabha gaining contro over certain rural areas. The government of the Muslim League at that time had to yield to the demand.

In the later years during the late 1950's The Food movement originated as a demonstration against the apathy of the Bidhan Roy-led Congress government towards the food shortage in Bengal. This crisis led to a significant increase in the price of rice, reaching Rs 28-30 per *maund*. The subsequent hoarding and black-marketing aggravated the situation, almost causing a famine in rural areas. The Science and Culture Group

and mobilised global backing to oppose it. It is important to acknowledge that Dr. Bidhan Chandra Roy was a prominent national figure in the twentieth century. He was a renowned physician, prominent political figure, generous philanthropist, esteemed educator, and dedicated social worker. He served as the Chief Minister for a significant period of time and is widely recognised as the architect of the modernization of West Bengal.

After Independence the introduction of universal adult franchise created new types of dynamism and popular participation in the political perspectives of West Bengal. The zamindari system was abolished and the Panchayati Raj was established with a policy of further decentralisation. After the Congress administration (1966-1971) the Left Front Government ruled over West Bengal till 2011. Meanwhile Bengal had to experience the aftermaths of Emergency declaration during the regime of Indira Gandhi. In May-June 1967, there was a peasant uprising in certain villages of Naxalbari in the Indian state of West Bengal. During this uprising, armed peasants, led by a small group of dissident CPI (Marxist) leaders, established a 'parallel administration' and forcefully took control of the land belonging to some wealthy landowners known as *jotedars*. The instigators of the Naxalbari uprising prioritised political actions involving the physical elimination of their class adversaries. They also criticised the CPI (M) leadership for engaging in 'neo-revisionism'. The debate persisted for approximately two years among the pro-Beijing Indian communists, culminating in the establishment of a new political party on 1 May 1969. The newly formed political party, CPI (Marxist-Leninist), began emulating the Naxalbari movement in other regions. The movement garnered the interest of numerous scholars, but ultimately failed as a result of its elitist nature and various other factors, including acts of sabotage. Nevertheless, in 1970s, due to the increasing focus on northwestern Indian politics, the significant events of Bengal experiencing two consecutive partitions and migrations in 1947 and 1971 did not receive sufficient administrative attention. The Bangladesh Liberation War of 1970s incited anger among the young people of Bengal. In 1970-71, the state witnessed the largest youth revolution in the form of the Naxalite movement. It was subsequently governed by the Communist Party of India (Marxist), a thirty-five-year rule that was ousted by the Trinamool Congress (TMC) in 2011.

বিংশ শতকে বাঙালীর সংস্কৃতি, নারী ও রাজনীতি

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অমৃত হালদার
ও
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ABHIJEET PUBLICATIONS
4658-A, First Floor, Ambika Bhawan,
21, Ansari Road, New Delhi 110002
Phone : 011-23259444
E-mail: abjijetpublication@gmail.com
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কৃতজ্ঞতা স্বীকার

আমরা আসানসোলের বানোয়ারিলাল ভালোটিয়া কলেজের অধ্যক্ষ প্রফেসর অমিতাভ বসুকে প্রথমেই ধন্যবাদ জানাতে চাই, যাঁর নির্দেশনায় এবং সহায়তায় এই বইটি প্রকাশ করা অনেক সহজ হয়েছে। আমরা কাজী নজরুল বিশ্ববিদ্যালয়ের মাননীয় উপাচার্য প্রফেসর দেবাশিস বন্দ্যোপাধ্যায়ের কাছে গভীরভাবে ঋণী। আমরা সম্মানিয় উপদেষ্টামণ্ডলীর সদস্যদের প্রতিও কৃতজ্ঞ, যারা এই বইটি সম্পাদনের ক্ষেত্রে সর্বক্ষণ গুরুত্বপূর্ণ পরামর্শ, মূল্যবান তথ্য প্রদান করে আমাদের সহযোগিতা করেছেন। অবসরপ্রাপ্ত অধ্যাপক মহুয়া সরকার, যাদবপুর বিশ্ববিদ্যালয়ের ইতিহাস বিভাগ, অধ্যাপক প্রজিত কুমার পালিত, আসাম বিশ্ববিদ্যালয়ের ইতিহাস বিভাগ, অধ্যাপক ফতেমা হেরেন, ইতিহাস বিভাগ, সরকারী ব্রজমোহন কলেজ, বরিশাল, বাংলাদেশ, ড. সৈয়দ আনভীর নাসরীন, ইতিহাস বিভাগ, বর্ধমান বিশ্ববিদ্যালয়, ড. কস্তুরী ঘোষ, ইতিহাস বিভাগ, রায়গঞ্জ বিশ্ববিদ্যালয়, ড. শান্তনু ব্যানার্জী, ইংরেজি বিভাগ, কাজী নজরুল বিশ্ববিদ্যালয় এবং কিউরেটর কে.এন.ইউ. মিউজিয়াম, ড. শুভঙ্কর দে, ইতিহাস বিভাগ, সিধো-কানহো বিরসা বিশ্ববিদ্যালয়, ড. তিস্তা দাস, ইতিহাস বিভাগ, বাঁকুড়া বিশ্ববিদ্যালয় এবং ড. প্রদীপ কুমার দাস, ইতিহাস বিভাগ কাজী নজরুল বিশ্ববিদ্যালয়, যাঁরা এই বইটির জন্য বৌদ্ধিক সহায়তা দিয়েছেন। সবচেয়ে গুরুত্বপূর্ণ বিষয় হল, এই যে, রাজ্যের ও বাইরের বিভিন্ন বিশ্ববিদ্যালয়, কলেজ এবং অন্যান্য প্রতিষ্ঠানের অধ্যাপক-অধ্যাপিকা, গবেষক-গবেষিকা, ছাত্র-ছাত্রী এবং অন্যান্য বিশিষ্ট ব্যক্তি, নানা বিষয়ে মৌলিক প্রবন্ধ প্রেরণ করে এই বইটিকে সমৃদ্ধ করেছেন। আমরা এই বইটি সুষ্ঠভাবে প্রকাশের জন্য প্রকাশক, কারীগরি বিভাগের কর্মি সহ অন্যদেরকেও ধন্যবাদ জানাই।

অমৃত হালদার ও
ডঃ গৌতম মাজী

Members of the Advisory Board

সূচিপত্র

২৯. প্রকৃতি : বিশ শতকের একটি পত্রিকার ইতিহাস

ড.মাল্যবান চট্টোপাধ্যায় , সহকারী অধ্যাপক, ইতিহাস বিভাগ, আসানসোল গার্লস কলেজ

৩০. বিংশ শতকে বাংলায় গ্রন্থাগার আন্দোলন: বঙ্গীয় গ্রন্থাগার পরিষদের প্রতিষ্ঠা

কুশধর মান্না

পি.এইচ.ডি. গবেষক, ইতিহাস বিভাগ, কাজী নজরুল বিশ্ববিদ্যালয়,

৩১. বিংশ শতাব্দীর প্রথমার্ধে কলকাতার সাধারণ খেটে খাওয়া মানুষের লোক সংস্কৃতির ইতিবৃত্ত : একটি ঐতিহাসিক পর্যালোচনা

দীপঙ্কর রায়

সহকারী অধ্যাপক, ইতিহাস বিভাগ ,কালনা কলেজ,কালনা, পূর্ব বর্ধমান

ভূমিকা

বিংশ শতাব্দীতে বাংলা, বহু সামাজিক, সাংস্কৃতিক এবং রাজনৈতিক পরিবর্তন প্রত্যক্ষ করে। বাঙালি 'বুদ্ধিমত্তা'র নেতৃত্বে ব্রিটিশবিরোধী জাতীয়তাবাদী আন্দোলনের পাশাপাশি চরমপন্থীদের পরিচালিত বিপ্লবী আন্দোলন বাঙালির মননে এক নতুন উদ্দিপনার সৃষ্টি করে। পশ্চিম বঙ্গ সহ, বাংলার সমগ্র ভূখণ্ড; বাংলাদেশ, বিহার ও উড়িশ্যা এক ছাতার নিচে ছিল। ১৯০৫ সালের বঙ্গভঙ্গ আন্দোলন, কোনো না কোনো ভাবে ধর্মীয় ও ভাষাগত দিক থেকে বেশ কিছু বিভাজনের সৃষ্টি করেছিল। বঙ্গভঙ্গ বিরোধী আন্দোলন কলকাতা ও তার পার্শবর্তি অঞ্চলে নতুন এক সাংস্কৃতিক জাগরনের সৃষ্টি করেছিল। সাহিত্য, নাটক, গান, চিত্রকলা এবং অন্যান্য লোককাহিনী দীর্ঘদিন ধরে সমাজকে প্রভাবিত করেছে। নারী ও শিক্ষার্থীদের অংশগ্রহণ সমাজের প্রতিটি ক্ষেত্রে এক নতুন উদ্দীপনা সৃষ্টি করেছে। ১৯১১ সালে কলকাতা থেকে দিল্লিতে ভারতের রাজধানী স্থানান্তরের ফলে বাংলার গুরুত্ব কিছুটা হলেও কমে যায়। বিখ্যাত জাতীয়তাবাদী নেতা গোপাল কৃষ্ণ গোখলে একদা বলেছিলেন; 'বাংলা আজ যা ভাবছে, কাল ভারত তা ভাববে'। বেশ কয়েকজন বিশিষ্ট জাতীয়তাবাদী নেতা ও বিপ্লবী ব্রিটিশ বিরোধী আন্দোলনে গুরুত্বপূর্ণ ভূমিকা পালন করেছিলেন।

কিন্তু, সাম্প্রদায়িক উত্তেজনা এবং ধর্মীয় অনুভূতি যথাসময়ে বাংলাকে তাড়িত করে। ১৯৪৭ সালে ভারত ভাগের পর ব্রিটিশ বিরোধী আন্দোলন এবং ভৌগোলিক অখণ্ডতা অল্প সময়ের মধ্যে ভেঙে যায়। রাজনৈতিক স্বাধীনতা বাঙালিদের মধ্যে অনেক ধর্মীয়, ভাষাগত ও সাংস্কৃতিক সমস্যা উত্থাপন করে। অবিভক্ত বাংলা ও বাঙালি সংস্কৃতি রূপক হয়ে ওঠে। অন্যদিকে পশ্চিমবঙ্গ ও ত্রিপুরায় বাঙালিদের অবস্থা তেমন ছিল না। ১৯৪৭ সালে ভারত বিভাগ এবং পূর্ব বাংলাকে পূর্ব পাকিস্তান হিসাবে পাকিস্তানের সাথে অন্তর্ভুক্ত করা হয়েছিল। এতদসত্ত্বেও, বাঙালি সংস্কৃতি, সেতুবন্ধন করেছে বাঙালি ও তাদের সংস্কৃতি। ১৯৭১ সালে বাংলাদেশের স্বাধীনতা অবিভক্ত প্রাক-ঔপনিবেশিক বাংলার ইতিহাসের নতুন সম্ভাবনা সৃষ্টি করেছিল। এই ধরণের রাজনৈতিক, প্রশাসনিক

সমস্যাগুলি অত্যন্ত গুরুত্বপূ

সৃজনশীল রচনা, শিল্প ও চিত্রকলা, লোককাহিনী, নাটক, যাত্রা, কবিগান বাঙালির কাছে অত্যন্ত জনপ্রিয় ছিল। রবীন্দ্রনাথ ঠাকুর, কাজী নজরুল ইসলাম, জীবনানন্দ দাশ, নন্দলাল বসু, উৎপল দত্ত, তুলসী লাহিড়ি, সম্ভু মিত্র এবং অন্যান্য গুরুত্বপূর্ণ ব্যক্তিত্ব তাতে ব্যাপক প্রভাব ফেলেছিলেন। ব্রিটিশ বিরোধী জাতীয়তাবাদী আন্দোলন সত্ত্বেও; ১৯৪৩ সালের দুর্ভিক্ষ বাংলায় নিয়ে এসেছিল এক নীদারুণ বিপর্যয়। স্বাধীনতা পরবর্তী উদ্বাস্তু সমস্যা এবং সাম্প্রদায়িক দাঙ্গা নতুন ভাবে বাংলার রাজনীতিকে প্রভাবিত করেছিল। আবার ভাষা আন্দোলন সাংস্কৃতিক ক্ষেত্রে এক নতুন মাত্রা নিয়ে আসে।

এই গ্রন্থে বিংশ শতকে, অবিভক্ত বাংলার নানা সামাজিক ও সাংস্কৃতিক ইতিহাস উঠে এসেছে। সেখানে অবশ্যই স্থানীয় ইতিহাস , একটি গুরুত্বপূর্ণ স্থান পেয়েছে। নীলাঞ্জন চাকী, বিশ শতকে বাঁকুড়া জেলার স্বাধীনতা সংগ্রাম ও সন্ত্রাসবাদী কার্যকলাপ আলোচনা প্রসঙ্গে উপনিবেশিক যুগে বাঁকুড়া জেলায় যে ব্রিটিশ বিরোধী বিপ্লবী আন্দোলন হয়েছিল সেই বিষয়গুলি এখানে তুলে ধরেছেন এর সাথে সাথে বাঁকুড়া জেলায় বিভিন্ন যে সন্ত্রাসবাদী কার্যকলাপ ধীরে ধীরে সংগঠিত হয়েছিল যেমন অনুশীলন সমিতি, যুগান্তর দল প্রভৃতি সন্ত্রাসবাদী কার্যকলাপ বিষয় আলোচিত হয়েছে। এই সমস্ত সন্ত্রাসবাদী কার্যকলাপ গুলি কিভাবে বাঁকুড়া জেলায় বিশেষ করে বাঁকুড়া জেলার দক্ষিণ অংশে জঙ্গল পূর্ণ বিস্তীর্ণ অঞ্চলে বিস্তার লাভ করেছিল এবং এর সাথে সাথে বাঁকুড়ার এ সমস্ত অংশে বামপন্থী আন্দোলন ধীরে ধীরে বিস্তার লাভ করেছিল সে বিষয়ে বিস্তারিত বিবরন দেওয়া হয়েছে।

বিভিন্ন আঞ্চলিক ইতিহাস রচনার ক্ষেত্রে ভারতের আইন অমান্য আন্দোলনের সময় বাংলার দক্ষিণ চব্বিশ পরগনা জেলার বিপ্লবী আশুতোষ দলুই কিভাবে ভারতের অন্যান্য অংশের মতো পশ্চিমবঙ্গের দক্ষিণ চব্বিশ পরগনা জেলার বিস্তীর্ণ অংশে ব্রিটিশ বিরোধী আইন অমান্য আন্দোলন ছড়িয়ে দিয়েছিল সে বিষয়ে আলোচনা করা হয়েছে। আশুতোষ দলুই দক্ষিণ ২৪ পরগনা জেলায় কিভাবে 'নুনমারা আন্দোলন' বিখ্যাত করে তুলেছিল সে বিষয়ে আলোকপাত করা হয়েছে। আঞ্চলিক ইতিহাসের আরেকটি উল্লেখযোগ্য

বৈশিষ্ট্য ছিল ভারতের স্বাধীনতা আন্দোলনে হুগলি জেলার অবদান। জাতীয় কংগ্রেস প্রতিষ্ঠার অনেক আগে থেকেই বিশেষ করে সুরেন্দ্রনাথ বন্দ্যোপাধ্যায় ও আনন্দমোহন বসু প্রতিষ্ঠিত 'ভারত সভা' গঠনের সময় থেকেই হুগলি জেলা স্বাধীনতা আন্দোলনে যোগ দিয়েছিল। বঙ্গভঙ্গ আন্দোলনের সময় এই জেলার উত্তর পাড়া চন্দননগর চুঁচুড়া প্রভৃতি শহরেও এই আন্দোলনের ঢেউ বয়ে গিয়েছিল। স্বাধীনতা আন্দোলনে ১৯৩০ সালে আইন অমান্য আন্দোলন, ১৯৪২ সালে ভারত ছাড়ো আন্দোলনে হুগলি জেলা স্বতঃস্ফূর্তভাবে অংশগ্রহণ করেছিল। এই জেলার স্বাধীনতা সংগ্রামীদের মধ্যে উল্লেখযোগ্য ছিলেন; নগেন্দ্রনাথ মুখোপাধ্যায়, জ্যোতিষ চন্দ্র ঘোষ, ডক্টর আশুতোষ দাস, ভূপতি মজুমদার, শরৎচন্দ্র ভট্টাচার্য, অতুল্য ঘোষ, প্রফুল্ল চন্দ্র সেন, হুগলি জেলার নারীরাও স্বাধীনতা সংগ্রামে বিশেষ ভূমিকা নিয়েছিল। যাঁদের মধ্যে উল্লেখযোগ্য ছিলেন দুরকিবালা দেবী, বিমল প্রতিভা দেবী, লতিকা ঘোষ, প্রমুখ।

এই গ্রন্থে,সত্যেন্দ্রনাথ বসু কিভাবে ভারতীয়দের মধ্যে বিজ্ঞান চেতনার বীজ বপন করেছিলেন, সে বিষয়ে আলোচনা করা হয়েছে সত্যেন্দ্রনাথ বসু মাতৃভাষায় দেশের জনসাধারণকে বিজ্ঞানমনস্ক করে তুলতে কিভাবে উদ্যোগী হয়েছিলেন এবং বিজ্ঞানকে জনপ্রিয় করে তোলার জন্য বিজ্ঞান পরিষদ ও জ্ঞান-বিজ্ঞান নামক পত্রিকা প্রকাশ করেছিলেন সে বিষয়েও আলোচনা করা হয়েছে। এছাড়া, ইতিহাস চর্চা ও পুরাতত্ত্ব বিষয়ে নিয়োজিত বিভিন্ন বাঙালি পন্ডিতদের কথা তুলে ধরার প্রয়াস করা হয়েছে।। যাঁদের মধ্যে উল্লেখযোগ্য ছিলেন অক্ষয় কুমার মৈত্র, রাখালদাস বন্দোপাধ্যায়, নলিনীকান্ত ভট্টশালী, প্রমুখ তাঁরা সাহিত্যিক উপাদানের থেকে প্রত্নতাত্ত্বিক উপাদানের উপর বেশি নির্ভরশীল ছিলেন। আবার অনেকাংশে রাজেন্দ্রনাথ মুখার্জি, নগেন্দ্রনাথ বসুর প্রমূখ ঐতিহাসিক না হয়েও ইতিহাস চর্চা ও সংরক্ষণে পৃথক নজির সৃষ্টি করেছিলেন। নিহার রঞ্জন রায়ের মতো ঐতিহাসিক প্রথাগত সংস্কৃতির উপর ভিত্তি করে ইতিহাস অনুধাবন করার চেষ্টা করেছিলেন। দেশভাগের প্রেক্ষাপট ও সমসাময়িক বাংলা সাহিত্য বিষয়, এই গ্রন্থের বিভিন্ন রচনায় উঠে এসেছে। দ্বিতীয় বিশ্বযুদ্ধের সময় মূল্যবৃদ্ধি, বেকারত্ব, মন্বন্তর, তার পরবর্তী সময় দেশভাগ, সম্প্রদায়িক সংঘাত, উদ্বাস্তু সমস্যা, ৫০ এর দাঙ্গা, এই সময় উপন্যাস, নাটক, কবিতা, চলচ্চিত্র, ছোট গল্পের মত বিষয় হয়ে উঠেছিল এই মুছে যাওয়া সময়ের মূল্যবান দলিল।

ENVIRONMENTAL SCIENCE

An interdisciplinary Approach

Dr. Debashis Mandal
Dr. Sandip Chatterjee
Dr. Arnab Ganguli

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The organize committee from our college always extremely supportive to me. As a member of technical committee Dr. Arnab Ganguly, Dr. Kajal Majhi, Dr. Animesh Mondal, full dedicatedly performed their duties, without their help recording and live at YouTube and online session would not be possible. No doubt it was team work and I'm really thankful to all the supportive staff of B B College, Asansol. Our students' volunteers always ready to performed their duty with their beautiful smile. The backbone of the seminar was our student volunteers. I am really grateful to all of them.

EDITORIAL

As we stand at the crossroads of environmental crisis and opportunity, the call for innovative and holistic solutions has never been more urgent. The volume " Environmental Science: An Interdisciplinary approach", expertly curated by Dr. Debashis Mandal, Dr. Sandip Chatterjee, and Dr. Arnab Ganguli, embarks on a thrilling journey through the intricate web of environmental challenges, weaving together insights from social sciences, natural sciences, economics, and mathematics. Under the esteemed patronage of Dr. Amitava Basu, Principal, Banwarilal Bhalotia College, Asansol and financial help from ICSSR, New Delhi, this edited collection is not just a book—it's a clarion call for collaboration and creativity in confronting the pressing issues of our time. Imagine a world where human behavior, ecological science, economic theory, and mathematical modeling converge to create sustainable solutions. The social sciences illuminate the human dimensions of environmental issues, offering profound insights into community dynamics, cultural values, and the psychology of conservation. Contributions from sociology, anthropology, and psychology reveal how societal norms and individual actions shape our environmental landscape. By understanding these connections, we can design strategies that resonate with diverse communities, transforming environmental stewardship into a shared value.

Natural sciences, the backbone of environmental inquiry, provide the essential knowledge that informs our understanding of ecosystems and the processes that govern them. The contributions in this volume underscore the urgency of scientific research in monitoring changes to our planet, assessing biodiversity loss, and pioneering sustainable technologies. With the rigorous methodologies of biologists, chemists, and geologists, we arm policymakers with the critical evidence needed to combat environmental degradation and foster resilience.

Economics, often viewed as a separate realm, emerges as a vital player in the sustainability dialogue. The economic insights presented in this volume explore the delicate balance between conservation and progress, offering innovative frameworks for valuing ecosystem services and implementing sustainable practices. By integrating

economic analysis into environmental decision-making, we can craft policies that not only protect our planet but also stimulate economic growth, ensuring a sustainable future for all.

Mathematics, the universal language of science, provides the analytical backbone for understanding complex environmental systems. The mathematical approaches discussed herein reveal the intricate dynamics of ecological interactions, from statistical assessments of biodiversity impacts to predictive models of climate change. These tools empower us to make informed, evidence-based decisions that can shape effective environmental policies.

The interdisciplinary nature of this volume emphasizes that no single discipline can adequately address the multifaceted challenges we face. By breaking down silos and fostering collaboration, we create a rich tapestry of ideas that encourages innovation and creative problem-solving. Each contributor brings their unique expertise to the table, enriching our collective understanding and providing a comprehensive overview of the diverse dimensions of environmental issues.

We extend our heartfelt gratitude to all the contributors and faculty members of Banwarilal Bhalotia College, Asansol, whose dedication and commitment have made this volume a reality. A special thank you is due to the Indian Council of Social Science Research (ICSSR), New Delhi for providing the funding that has supported this crucial work. Your invaluable contributions have not only enriched our understanding but have also laid the groundwork for future research and collaboration.

In this book articles reflected the India's contribution to protect our nature from ancient times to present days. Environmental awareness and various issues were mentioned in the ancient texts like Vedas or in the Artha sastras, as we know the antiquity of the Indian civilization. In medieval times also various steps were taken to control the animal slaughters. In present days also India is in leading position to aware and protect the global environmental issues or climate changes. In G20 Delhi summit proposal given by our government, gladly accepted by the global leaders. So, in this volume some articles also dealing with the various policies and government initiatives, project for the

sustainable development taken by the present government. Apart from this volume also highlighted scholarly articles about the various scientific research to control greenhouse gas or carbon emission which helps to aware environmental problems to our citizens.

As we navigate the complexities of our environmental reality, embracing an interdisciplinary approach is essential. This volume, "Environmental Science: An Interdisciplinary Approach," serves as both a platform for diverse voices and a rallying cry for future research and collaboration. We hope this collection sparks inspiration and ignites meaningful dialogue among readers, researchers, and policymakers alike, driving innovative solutions to the urgent environmental challenges we face.

In conclusion, we invite you to dive into the rich tapestry of ideas presented in this volume. Together, we can forge a path toward a more sustainable and equitable future—one that acknowledges the intricate connections between our social, scientific, economic, and mathematical landscapes, and champions the multifaceted approaches needed to safeguard our planet for generations to come.

We know the environment is our greatest concern of the recent times. We are not only fighting with pollution, but also climate change, heavy rain, deforestation, massive landslide, draught etc. In the Delhi G-20 summit, environmental problems and sustainable development were the major concern for all the global leaders. As we know that G20 nations are responsible for 80% global greenhouse gas emission (GHG) and they fixed their target to achieve global CHG emission neutrality by the mid of the century. UNO Secretary General Antonio Guterres, remarked in the Conclusion of COP27 at Sharm el-Sheikh, Egypt “Our planet is still emergency room…. We need to drastically reduce emission now….. the world still needs a giant leap on climate ambition…to have any hope of keeping to 1.5, we need to massively invest in renewables and end our addiction to fossil fuels”. Keeping mind this global situations India government urges to the world leaders in the G20 summit at New Delhi, 2023 that every country should fixed their Nationally Determined Contributions (NDCs) by the end of 2023 and target should achieve by 2030. G20 nations fully agreed by the proposal of Hon’ble PM of India as a president of

summit. The G20 nations assure that they will take initiative to triple renewable energy capacity as well as use of zero or low emission technologies by the 2030. The leaders also affirmed 'G20 High Level Voluntary Principles on Hydrogen' to build a sustainable and equitable global hydrogen ecosystem that benefits all nations. Our government also launched the global biofuels alliance with USA, Brazil, Italy, Canada, Argentina and south Africa. So to fight climate change and for the sustainable development India take a great role and G20 is a great success for "one family , one earth".

So keeping mind this situation, we organize this internation seminar entitled "Environmental Issues, Global Politics and India's leadership: Historical Perspectives" with the help of ICSSR, New Delhi. This seminar is organised by the Department of History and a major thrust was the environment consciousness in from ancient times in India. We received papers dedicated to Sustainable Development Goal-2 and initiatives to ensure No-Hunger in India. Another paper examines the intersection of eco-ethics, religious/spiritual teachings, and higher education, focusing on the translation of micro-rituals into macro-impacts on ethical perspectives and educational practices. An important paper was focused on Climate change and its impact on human health in the Northeastern region of India. A scholarly take on diminishing coral reefs provided us food for thought. Impact of Environment and Mental Health of Women was explored in another paper. While one presenter threw in insights into environmental consciousness in Ancient India, another presenter spoke on pollution in the space. Exploration of environmental awareness from the literary points of view was also in vogue. Finally this edited volume is the result of the international seminar organised by the Department of History, Banwarilal Bhalotia College, Asansol, West Bengal.

Dt. 5th September, 2024
Banwarilal Bhalotia College, Asansol, WB

Dr. Debashis Mandal
Dr. Sandip Chatterjee
Dr. Arnab Ganguli

CONTENTS

Chapter - 1

ECOLOGICAL WISDOM IN VEDIC LITERATURE: A COMPREHENSIVE ANALYSIS

Dr. Anamika Ganguly [1]

ISBN: 978-1-300-79727-2 | **DOI:** 10.25215/1300797274.01

Abstract:

This research highlighted the timeless ecological wisdom that has long been a part of India's cultural legacy by exploring the profound ecological insights concealed within the ancient Vedic texts. The oldest holy books in Hinduism, the Vedas, offer a wealth of information that goes well beyond spiritual domains and includes a profound comprehension of how nature and humanity are intertwined. The thorough examination starts with a study of the Rigveda, Samaveda, Yajurveda, and Atharvaveda, with a focus on verses and hymns that highlight the value of ecological balance and respect for nature. The Earth is portrayed in Vedic literature as a living being that is sacred and deserving of reverence and protection. The idea of responsible stewardship is reinforced by the various rituals and ceremonies that are described in the Vedas, which emphasize a harmonious coexistence between humans and their natural surroundings. The study also looks at the idea of "Rita" in Vedic philosophy, which stands for the cosmic balance and order that controls the cosmos. The Vedic seers encouraged a comprehensive approach to ecological preservation because they understood the delicate balance needed for life's sustenance. The Upanishads are also discussed, as they highlight the interconnectedness of all living things and encourage an ecological consciousness that transcends anthropocentrism. By offering insights into how these Vedic principles can guide environmental ethics and sustainability practices today, the analysis concludes with a discussion of how ancient ecological knowledge can be applied to address contemporary

[1] Assistant Professor, Department of History, Balarampur College, Purulia, Email- anamika.ganguly100@gmail.com

ecological challenges. Examining the literature of the Vedas offers a helpful foundation for encouraging a more ecologically conscious relationship with nature during a time when environmental issues are of utmost importance to humanity.

Key Words: *Ecological Wisdom, Vedic literature, Environment, Relationship*

Introduction:

The traditions of the Indian religious system is dialectically as well as ideologically intertwined with various cultural, social, linguistic, philosophical and ethical systems that have developed over a vast history, traditionally compounded with movement of peoples, foreign interventions, and internal transformations in structures and identities experienced over time. The multilingual and ethnically diverse country like 'India' is a house of wisdom with various religious sects like 'Hinduism' which corroborates in socio-cultural harmony. But, apart from religious and social pragmatism what is unique is the reverence for nature/ecology which serves as an unifying ethical principle against the diverse narratorial, historical and cultural discourses of our nation. Though the term 'ecology' perpetrated by Western critical discourses during the later half of the 20th century, but, its objective and subjective ramifications started echoing during the formation and celebration of ancient Indian literary texts. And, to this extent the influential Western critic Wendy Doniger argued about how ancient Indian myths and epics reflected human relationships with nature. She highlights that these texts often depicts the environment as both a nurturing and powerful force that exclusively meant for balanced and respects. Further noted historian Romila Thapar has examined how ancient Indian texts reflects the socio-environmental dynamics of their times which otherwise offers insights into how societies perceived and interacted with their natural surroundings. To the narrator, real discourses off these critics as well as after rigorously analysing the Vedic Indian ancient text, we conceal an argument about how these traditional Indian ancient texts provide rich materials for understanding historical environmental perspectives as well as trying to illustrate a sophisticated awareness of ecological balance and the moral imperatives of environmental stewardship. And, the

main focus area of this article is to critically analyze all perspectives to highlight or bring into focus the role ancient Indian Vedic text creates in forming a deep ecological sensibility and socio-cultural harmony.

Before moving to the argument about the role the Indian Vedic text/Scriptures plays in constructing the spirit of deep ecological wisdom, a brief discussion is indeed needed about the formation of the term 'Ecology' in global historical narratives. The etymological formation of the word 'Ecology' is fascinating journey that spans across centuries and is highly influenced by various cultural, philosophical and scientific developments. The early ideas related to the relationship between organism synchronisation and its relation to environment can be traced back to the rich heritage of ancient civilization cultures. For instance, Aristotle and Theophrastus in ancient Greece made observations about plants and animals relationship to their distinct habitats. Further in oriental historical discourses, the Islamic scholar like Al-Jahiz wrote about the significance of the natural world and its contributions toward the utopian idealism of ecological sensibility. During the emergence of the great 'Renaissance' there was a deep resurgence in the study of natural history. The explorers and naturalists like John Ray and Carl Linnaeus during 80th century begin laying the groundwork for deep ecological embellishment in 'colonised/hinterland' countries. Apart from this historical evaluation of the term 'Ecology' its epistemological and cultural appropriation was first coined by Ernst Heckel during 1866 A.D with the introduction of the term 'ecosystem'. This volatile terminology (Eco-System) is a complex network of living organism and their relations to physical environment. This system helps involve in the flow of energy and the cycling of its nutrients resulting in sustaining life within the boundary of deep ecological system.

Now moving back to the main locus standi of this article is about the contribution of Vedic ancient Indian texts in formulating utopian idealism of ecological sustainability or how the parameter of ecological wisdom helps in heritage formation of ancient Indian Vedic literary scriptures? In 'Atharva Veda' Dwivedi cultural discourses solemnly declare the enduring allegiance of human kind to mother earth. The discourses of 'Vedas' highlight the concept that

everything in the world has life of its own whether it is a living or non-living being. Further, the practice of Vedas being with it worship of God of nature viz the terrestrial god's like Prithvi, Agni, Rudra, Indra, Vayu, Ushas and Asvins. This clearly reflects that during the Vedic period the humankind has a clear cosmos idea of their own environmental and cultural surroundings.

The Rig Veda explains deities like Mitra Varuna, Indra, Maruts and Aditya who are exclusively responsible for maintaining the balance in functioning of all entities of nature like mountains, lakes, heavens and earth, forests and the waters. The four Vedas of Indian scriptures-Rigveda, Samaveda, Yajurveda and Atharva Vedas perceive the importance of maintenance of the seasonal cycle which can highly alter the due to the influence of climate changes resulted in inappropriate human action. What is noticeable is that the people in the Vedic period regarded nature and the environment in a holistic manner and revered each of its constituents and entities by carefully preserving them. The first message incorporated by the Vedic philosophy is to respect the 'mother nature' and its natural resources like land, water, hills, forest and other animals, etc. The 'Environment' both in its sacredness and materialistic nuances has been perceived as a friendly abode in the Vedic literature. Further, the text of the Vedic period created a greater awareness regarding the conservation of water which is noted as one of the most important natural resources. The significance of water as a harbinger to life is well known to all Vedic practitioners. They knew that the sacredness or divine purity of the water can be perceived by the religious hymns that carries the massage of water nectars and main source for preservation of good health. Besides, water serves as destroyers of disease as well as a theory of purification where the pilgrims performed the rituals of purity by delving deep into the sacred river banks. Thus, the ancient knowledge system of India regarded water as a vital element for life and is very strict in maintaining its pure and serene form from any kind of pollution.

The Vedic text considered 'Yajna' or 'Sacrifices' as an important mechanism for living a highly moral life. The ancient scripture 'Yajna' contains the key to ideal maintenance of the ecosystem and environment of life. The philosophy of Monu Sruthi defines Yajna as a harbinger that refines the body, mind and the inner self. The

philosophical dimensions of Yajurveda and Rigveda describes the moral practices of 'Yajna' as the nucleus of the whole world system. In the 'Purushasukta' the creation of the cosmos of universe is considered as a kind of Yajna. The beliefs that yajna cleanse the atmosphere through its medical smoke and provides longevity, breath, vision etc is established in the philosophical dimension of Yajurveda. The Rigveda makes a clear reference to the presence of a protective layer which is also termed as an 'ozone layer' that filters the harmful rays of the sun and protects the art from its harmful radiation. So looking into the contemporary scenario though the whole world of today is run by controlling the man made pollution by various means of scientific process. But if the world community learns the basic values of Vedas which our saints gave us thousands of years back then it will work as an instrument for protection of the environment. The community of the whole world should take the Vedic values and its manifestations by heart and rejuvenate and spread its all over to save our future generations against massive devastations or exploitation.

Thus, before concluding this article, the nexus between ecological wisdom and Vedic philosophy share a profound connection by emphasising a harmonious relationship between humans and nature. The Vedic text, which are profoundly known as an ancient Indian scriptures, provides insights into how humanity can coexist with the environment in a more sustainable and respectful manner. In Vedic philosophy 'Prakriti'(nature) is seen the fundamental forces of nature that emphasize the physical, mental and spiritual realms. The word 'Prakriti' is considered sacrosanct and is often personified with the mother goddess. So respecting the wisdom of Prakriti is a kin to respect the divine serenity of gods or goddesses. The deep ecological practices inspired by the discourses of Vedic philosophy involves organic farming, crop rotation and the uses of nature fertilizers to strengthen the health of soils. Besides, the importance of trees in Vedic culture involves specific rituals dedicated to planting and protection. The sacred groves like 'Devara Kaadu' are observed in some regions as spiritual house deities. What is important to note is that the concept of Vedic philosophy encourages a minimalist lifestyle that reduce the negativity of consumption and waste. Thus, this principle aligns with modern sustainable living practices call a

better lifestyle that is morally integrated with the wisdom of ancient Vedic literature.

Thus, the 'Environmental Protection Act' that is formed during the 1986 A.D defines the narratives of environment as a natural force that includes water, air and land that harmoniously co-exist with other living creatures, plants, microorganisms, and property. Our nation has a long tradition of conserving nature by providing it with a spiritual and moral dimension. But with the fast changing world and with the advent of consumerism and population escalation a consequent pressure can be failed on our land and natural resources that have changed the entire demographic of our value system. In top of that the emergence of global warming and the clarion call of climate change calls for a better response from the worlds power and its religious system. The every aspect of nature is sacred for 'Vedic' civilizations. This sacred is still visible in modern India wisdom as well as to its rural areas especially among its primitive/tribal communities. The Vedic people were considered oneness with nature and those ancient sages, religious ancestors, observant of truth, etc rejoiced together with the divine power of religious deities who ultimately discovered the hidden light and supreme power of the universes.

Besides, their is a very strong and intimate relationship between the biophysical ecosystem and its economic institutions. These two are inextricably held together by cultural relations. The practices of Hinduism has a defined code of environmental morality and ethics. The philosophy embedded in the Vedic scriptures reveals a profound appreciation and respect for the environment. The power of Vedas helps in personifying natural elements as deities that codifies with elements of sacredness and divine powers. The Veda also advocates for sustainable agricultural practices that emphasise the highly use of natural fertilizers and the importance of crop rotation for better agricultural outsourcing. The French critic and the greatest critical thinker of all ages Michel Foucault used his theoretical tools to offer valuable insights into understanding about how ancient societies like those described in the discourses of Vedas interacted with the utopian idealism of the environment. By closely examining the relationship between power and knowledge and ecological practices, Foucault mythology helps in understanding the complex dynamics of social, religious and environmental factors in recent times. And this

approach is highly negotiable in shaping human interactions with the natural world in both past and contemporary history. The ecological norms prescribed in the narratives of Vedas, such as the protection of sacred groups or ethical treatment of animals, can be viewed through the lens of governmentality. And the very sacralization of natural elements in Vedic texts or scriptures can be witnessed as the workings of the discourses that imbued the environment with divine intervention. This helps in not only fostering a sense of reverence and care for nature but also reinforces the dictatorship of religious leaders who seem as an intermediaries figure between god and its people. So, the Vedic text can serve as a perfect mediator in the course of history to negotiate the deep ecological serenity that we later found in contemporary eras.

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Chapter - 2

ECHOES OF TRADE ROUTES: THE JOURNEY OF IMEC

Abhijit Aditya [1], Yashodeepto Narayan Ghosh [2]

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Abstract:

The India-Middle East-Europe Economic Corridor (IMEC) is a strategic initiative aimed at stimulating economic growth and improving connectivity across Asia, the Persian Gulf, and Europe. This paper examines the historical context and significance of the IMEC, which proposes a comprehensive transportation and communication network from India to Europe via the United Arab Emirates, Saudi Arabia, Jordan, Israel, and Greece. As a response to China's Belt and Road Initiative, the IMEC signifies a shift in global economic dynamics, competing with the established Suez Canal route. The corridor consists of two main sections: the East Corridor connecting India to the Arabian Gulf, and the Northern Corridor linking the Arabian Gulf to Europe. The IMEC's infrastructure includes proposed railway lines through the UAE, Saudi Arabia, and Jordan to Israel, alongside plans for improved digital connectivity and clean hydrogen export pipelines. Advocates anticipate various economic benefits, such as reduced shipping costs and faster delivery times, facilitating regional and international economic integration. However, the realization of the IMEC faces complex political challenges that require careful consideration and resolution. This study examines the historical roots, geopolitical implications, and economic imperatives of the India-Middle East-Europe Economic Corridor, highlighting its potential transformative impact and the inherent implementation complexities.

[1] Dr. B. C. Roy Academy of Professional Courses (BCRAPC),Durgapur, MAKAUT, WB, India

[2] Dr. B. C. Roy Academy of Professional Courses (BCRAPC),Durgapur, MAKAUT, WB, India

Keywords: *IMEC, Geopolitical Dynamics, Great Power Competition, Multipolarity, Gulf Arab States, China's Belt and Road Initiative, Regional Connectivity*

Introduction

The unveiling of the India-Middle East-Europe Economic Corridor (IMEC) at the G20 summit in New Delhi in September 2023 represents a pivotal moment in the historical trajectory of global trade and economic cooperation. This landmark initiative, jointly introduced by leaders from France, Germany, India, Italy, Saudi Arabia, the United Arab Emirates, the United States, and the European Commission, harkens back to a time when nations sought to forge new pathways for connectivity and collaboration.

Rooted in the rich tapestry of history, IMEC's vision of an Eastern Corridor linking India to the UAE, Saudi Arabia, Jordan, and Israel, alongside a Northern Corridor connecting these Middle Eastern nations to Europe, echoes the ancient trade routes that once crisscrossed continents. Drawing inspiration from the Silk Road and maritime trade networks of antiquity, IMEC seeks to revitalize these historical connections through modern infrastructure such as energy facilities, railways, high-speed cables, and shipping lanes.

The participation of countries representing a significant portion of the world's population and global economy evokes memories of past eras when empires and civilizations intersected along trade routes. The strategic reliance on the UAE and Saudi Arabia's seaports and logistics hubs harkens back to a time when maritime powers held sway over global commerce.

Moreover, viewed through a historical lens, IMEC's geopolitical dimensions offer a glimpse into how nations have adapted to shifting power dynamics over time. The integration of some Gulf Cooperation Council (GCC) states into the Shanghai Cooperation Organization (SCO) and BRICS bloc mirrors historical alliances forged for mutual benefit and strategic advantage. The enthusiastic embrace of IMEC by the UAE and Saudi Arabia underscores their aspirations to shape the evolving geoeconomic landscape much like past empires sought to influence trade routes and economic centers.

In this historical context, IMEC emerges not just as a modern economic initiative but as a continuation of age-old aspirations for connectivity and prosperity. By exploring IMEC through the lens of history, this research paper aims to uncover deeper insights into how past legacies shape present-day endeavors and how historical forces continue to shape the future of global trade and cooperation.

Literature Review

The literature surrounding the India-Middle East-Europe Economic Corridor (IMEC) presents a multifaceted exploration of its potential to reshape global trade and economic dynamics. Several key factors contribute to the significance of IMEC, encompassing India's unique foreign policy, its reconnection to Eurasia, strategic relations with key Middle Eastern nations, and its role in the Indo-Pacific region. This literature review synthesizes insights from diverse studies that address these factors and delves into the geopolitical dimensions, recent data, and potential consequences associated with IMEC.

India's Unique Foreign Policy and Reconnection to Eurasia:

Studies such as **Brar (1995)** underscore the crucial role of the European Economic Community (EEC) as a trading partner for India, highlighting the importance of international trade relationships. **Sen (2014)** contributes by focusing on the role of economic corridors in providing access to global production networks, emphasizing the significance of connectivity in enhancing economic integration. The literature emphasizes India's strategic positioning and the imperative for increased connectivity with global partners. The India-Middle East-Europe Economic Corridor is a complex geopolitical space, influenced by India's unique foreign policy **(Aaron, 2009)**, its strategic interest in Eurasia **(Mukhia, 2022),** and its role in the Indo-Pacific region **(Sudan, 2022).** India's relations with China, a key player in the region, are also crucial **(Ahamed, 2020)**. These factors underscore the corridor's potential for economic growth and regional stability, and also highlight the challenges of navigating diverse interests and power dynamics.

Geopolitical Relations and Strategic Alliances:

Jaklič (2019) discusses China's relations with Central and Eastern European Countries (CEECs), offering insights into the potential implications for IMEC due to China's expanding influence in the region. **Brach (2007)** underscores the Euro-Mediterranean Partnership's role in fostering cooperation and stability in the Middle East and North Africa, hinting at how regional partnerships could impact IMEC. These studies shed light on the intricate web of geopolitical relations and alliances that contribute to the corridor's evolving landscape.

Key Findings from Recent Data:

Recent data from the G20 summit in New Delhi in September 2023 further elucidates the significance of IMEC. The participation of leaders from France, Germany, India, Italy, Saudi Arabia, the United Arab Emirates, the United States, and the European Commission highlights the international collaboration behind IMEC. The corridor comprises both an eastern and a northern corridor, aiming to connect India to the UAE, Saudi Arabia, Jordan, Israel, and Europe, enhancing connectivity and economic integration through various infrastructure projects.

In conclusion, the literature review and recent data collectively underscore IMEC's potential to reshape global trade dynamics through enhanced connectivity. The corridor's implications for international relations, economic integration, and geopolitical landscapes highlight its significance in the evolving global economic order. As the initiative progresses, further research into IMEC's development and its impact on regional cooperation and trade relationships will be essential for a comprehensive understanding of its implications on the global economy. The collaborative efforts of diverse nations in shaping IMEC position it as a key player in the changing dynamics of global economic connectivity.

Identification of the Research Gap:

Despite the extensive literature examining the India-Middle East-Europe Economic Corridor (IMEC) from various perspectives, there remains a notable research gap regarding the historical antecedents

and precedents of similar economic corridors in Eurasia.While the available literature reviews the contemporary significance of IMEC and its potential to reshape global trade dynamics, there's a dearth of research focusing on historical economic corridors that connected regions across Eurasia. Investigating historical examples such as the Silk Road, ancient trade routes, and colonial-era trade networks could provide valuable insights into the challenges, opportunities, and long-term implications of cross-continental economic integration. Understanding the historical context of economic connectivity in Eurasia could offer a nuanced perspective on the development and sustainability of IMEC.

Another pertinent research area involves examining how historical geopolitical shifts, conflicts, and alliances have influenced the formation and evolution of economic corridors. Exploring historical instances where political and economic interests intersected to shape trade routes and economic integration could elucidate the complexities inherent in contemporary initiatives like IMEC. By analyzing historical case studies, researchers can identify recurring patterns, geopolitical challenges, and strategies for mitigating conflicts in transcontinental economic partnerships.

Furthermore, there is a need to draw parallels between historical trade networks and modern-day economic corridors to glean valuable lessons for policymakers, economists, and strategists. Studying the resilience, adaptability, and cultural exchange facilitated by historical trade routes can inform strategies for fostering sustainable economic integration, promoting cultural diplomacy, and managing geopolitical tensions along the IMEC and similar initiatives. By contextualizing contemporary endeavors within the broader historical continuum of Eurasian trade, researchers can offer actionable insights into the long-term viability and socio-political implications of IMEC.

Addressing these research gaps can enrich scholarly discourse on IMEC and contribute to a more comprehensive understanding of its historical roots, geopolitical dynamics, and implications for global economic governance. By integrating historical perspectives into contemporary analyses, researchers can offer holistic insights into the multifaceted nature of transcontinental economic corridors and their role in shaping the future of global trade and connectivity.

Significance of the Study:

This study seeks to contribute to scholarly understanding by bridging the gap between historical precedents of transcontinental economic corridors and contemporary initiatives like IMEC. By elucidating the historical context and geopolitical dynamics underlying IMEC, the research aims to inform policymakers, economists, and strategists about the challenges and opportunities of cross-continental economic integration in a multipolar world. Moreover, the study may offer insights into strategies for fostering sustainable economic cooperation and managing geopolitical tensions along transcontinental corridors in the twenty-first century.

Objective of the Study:

The objective of this study is to comprehensively examine the historical antecedents and geopolitical dynamics underlying the development of the India-Middle East-Europe Economic Corridor (IMEC), with a particular focus on its relationship to past economic corridors in Eurasia and the evolving global geopolitical landscape.

Research Questions:

- Influence of Historical Geopolitical Shifts on Economic Corridors: By analyzing historical instances where political and economic interests intersected to shape trade routes and economic integration, the study seeks to elucidate the complexities inherent in contemporary initiatives like IMEC.
- Comparison with China's Belt and Road Initiative (BRI): By comparing IMEC with China's Belt and Road Initiative (BRI), the study aims to analyze great power competition and the geopolitical implications of competing transcontinental corridors in the so-called "new Cold War" between the United States and China.

Methodology:

The research will employ a multidisciplinary approach, drawing upon historical analysis, geopolitical theory, and case studies of past economic corridors. Primary sources, including historical documents, diplomatic archives, and trade records, will be utilized to reconstruct

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Foreword

We are moving in a business world which is becoming highly dynamic, uncertain, and tumultuous. There is an urgent need to learn and unlearn the business knowledge and skills to stay relevant and competitive in the present business and economic scenario. There is a need to make a balanced approach in dealing with the ecological, economic and social challenges to pursue the sustainable development goal, and it is forcing companies, and organizations worldwide to devise their visions, and business strategies which can deal with the challenges of the business needs as well the needs of the future generations, and the environment. In that background, it becomes very pertinent to evaluate our business environs, and its dynamics adding to the emerging knowledge base to generate new dialogue and enquiry for facilitating the desired learning to cater to these challenges. The present edited book, Brain Bloomers (3rd Volume) is a good effort in that direction, it is a compendium of 34 Chapters representing various business and commerce areas, and the jobs done by the editors, and the authors is highly commendable. The book covers chapters on a variety of important topics ranging from entrepreneurship development to Indian economy, to development economics to accounting and financial management to marketing management. Each chapter has done a great value addition in that regard. Topics like fostering entrepreneurship skills to entrepreneurship barriers to digital start-up to documenting the history of entrepreneurship in Jharkhand are just a showcase to know that how rich is this compendium for any management and commerce graduates, teachers, and researchers alike.

In accounting and finance subject areas, the book is full of great topics from corporate governance to corporate sustainability to CSR to digital banking. Topics like capital adequacy and non-performing assets, financial performance analysis, FII, and risk and return of mutual funds in India are covered which make the book an interesting read. There are eleven chapters devoted to development economy and Indian economy, and five chapters pertain to marketing management area. In these segments, topics like SDGs, cryptocurrency, and digital technology to unemployment and women empowerment like topics are covered which provide the readers the much-desired knowledge in these areas. In marketing management section, papers on topics like online purchase behavior, reliability and credibility of social-media on buyers' motives, consumer impulsive buying, and online grocery buying behaviors of consumers are worth mentioning, and I am sure a large business school audience will get benefited with the provided knowledge and learning of these chapters. In all, the book is a must add for any business collection for individual business and commerce readers, students, teachers, researchers, and the library. It will surely enrich the business and commerce discipline by disseminating information and knowledge which are highly pertinent and useful. I wish the editors, and the authors a great success for its wider reach and appreciation.

Dr. Sami A. Khan
Professor in HRM
Faculty of Economics & Administration
(An AACSB Accredited Business School)
King Abdulaziz University
Jeddah, Saudi Arabia
https://www.linkedin.com/in/samikhan2139

Place: Jeddah
Date: 31st December 2023

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EDITORIAL

With immense pleasure and gratitude, we present the third edition of the edited volume of research articles, "Brain Bloomers." to you. The resounding success of our two earlier volumes has fuelled our commitment to the 21st century world of academia and industry when research has become integral to the very fabric of business, finance, and the economy. "Brain Bloomers" emerges as a gateway to explore the numerous dimensions of knowledge, offering a tapestry of insights that transcends boundaries.

This volume explores diverse aspects of finance, management, economics and education providing a panoramic view from multiple perspectives. The diverse sub themes of the book encapsulate the dynamism of the contemporary business world and horizon of related research. Its intended audience spans a spectrum, including academicians, professionals, budding researchers, and students.

The introductory article investigated the collaborative synergy between Non-Governmental Organizations (NGOs) and Higher Education Institutions, focussing on fostering entrepreneurship skills among students and community development. Aligned with the New Education Policy 2020 of India, the author advocates for bridging traditional learning with vocational education and training, addressing challenges and opportunities in such endeavours. The proposed model in the article highlighted the pivotal role of various stakeholders in cultivating entrepreneurship for sustainable economic development in the Indian context.

Another article examined the relationship between investment in equity shares by Foreign Institutional Investors (FIIs) and BSE financial services sectoral index. Establishing a long-run direct relationship, this study sheds light on the impact of FIIs on stock market performance in Indian context.

The volume also includes research on the effect of the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) on poverty reduction, showcasing positive outcomes through empirical analysis, aligning with Sustainable Development Goals.

A cross-country analysis, encompassing Mexico, Indonesia, Brazil, Russia, India, and China, explores the role of financial

development in the nexus of foreign direct investment and economic growth, revealing both non-linear and asymmetric effects.

An empirical analysis on factors contributing to entrepreneurship development in India has been incorporated in this volume which used the Ordinary Least Squares (OLS) method and the Generalized Method of Moments (GMM) estimate to portray the role of mental ability, determination, mental setup, and government policy and support in fostering entrepreneurship development.

A case study investigated entrepreneurial barriers, offering specific insights into a female entrepreneur's journey in the organic products sector in Kolkata.

Other contributions include studies on post-COVID sustainable development challenges, unemployment issues in India utilizing the Autoregressive Distributed Lag (ARDL) model, environmental, social, and corporate governance disclosures by FMCG companies in India, exploration of online consumer purchase behaviour, study on entrepreneurship development in Jharkhand and the influence of perceived promotional benefits on consumer behaviour.

Besides these there are valuable research articles within the confines of the subthemes of the book that haven't been explicitly mentioned here due to space constraints. We hope that meticulous researchers will read the articles and provide feedback, contributing to continuous improvement and future advancements.

We extend our heartfelt thanks to all the contributors – the brilliant minds who have enriched the pages of "Brain Bloomers" with their insights and research findings. Your dedication in advancing knowledge in diverse fields is truly commendable, and we are honoured to be the platform that showcases your intellectual prowess.

Our appreciation also goes to the budding researchers, the torchbearers of future academia, who find inspiration within the pages of "Brain Bloomers." Your enthusiasm and thirst for knowledge are the driving force behind the continued success of this endeavour. We intend to present this book as a suitable platform for those who are new to the world of research.

A special note of gratitude is reserved for our honorary reviewers, whose tireless and meticulous efforts have ensured the scholarly rigor and quality of the accepted articles. The rigorous review process led to the acceptance of 34 articles out of the 106 submissions (32.01%). The thorough feedback provided by the reviewers has been invaluable in shaping the content of this edition.

Heartfelt thanks are also due to our esteemed publisher, Red Shine Publication House, for their unwavering support and commitment to excellence. Their collaboration has been instrumental in bringing this volume to fruition, and we look forward to many more years of partnership.

To those whose articles did not find final selection, we encourage you to view this as an opportunity for growth and refinement. Your dedication to research is commendable, and we invite you to submit your work for consideration in our next volume. It is often through setbacks that we find the resilience to achieve even greater heights.

"Brain Bloomers" Volume 3 is slated to be released on the auspicious day of 25th December 2023, a day symbolizing unity and celebration. As we come together to unveil the intellectual tapestry within its pages, we also extend warm wishes for a joyous and fulfilling New Year in 2024.

May the knowledge shared within "Brain Bloomers" continue to inspire, challenge, and pave the way for a brighter and more innovative future.

Warm regards,

Editor-in-Chief
Prof Amitava Basu

Editor
Dr Santanu Mallick

Editor
Dr Amalendu Samanta

Editor
Prof. (Dr.) Parag Kalkar

Editor
Professor (Dr.) Siddhartha Shankar Saha

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Prof. Amitava Basu

Prof. Amitava Basu is the Principal of prestigious Banwarilal Bhalotia College, Asansol with more than 7000 students per academic session. Hejoined as an Assistant Professor in this college in 2002. Prof. Basu obtained his M. Com degree from the University of Burdwan. He was awarded Ph.D. in 2004 by the same university. He has many research papers in Journals of National and International repute. He has also completed research project of UGC and has acted research supervisor to Ph.D. students who have successfully completed their research under his guidance. In a short span of time, he has taken the College to new heights with his exemplary leadership and administrative prowess. He is also involved in community service and different social projects.

Prof Swagata Sen

Prof. Swagata Sen is a Professor of Commerce in the University of Calcutta. Prof. Sen has an extensive experience of 35 years in teaching at post graduate level and academic administration. He was Pro Vice Chancellor (Academic) of the University of Calcutta and also the Vice Chancellor, University of Gour Banga, Malda and Biswa Bangla University, Bolpur. Prof. Sen did his M. Com from University of Calcutta and obtained first class with first rank in the examination and obtained doctorate degree from the same university. He is also a professionally qualified Cost Accountant and holds the Associate Membership of ICWAI. He has to his credit quite a number of research publications in the National and International Journals of repute. He has guided successfully fifteen Ph.D. research scholars and many M.Phil. scholars. He is also one of the members in the editorial board of different national and international journals.

Prof. R. Rangarajan

Prof. R. Rangarajanis a Professor and Head of the Department of Commerce in University of Madras, Chennai. He holds D.Litt in Commerce from the University of Madras, Chennai. He is a renowned academician with a vast experience of 27 years in teaching and academic administration. He has produced 32 Ph.D. Scholars under his guidance. He has presented & published more than 100 articles in various high impact factor Journals. He has authored a book titled “Corporate Accounting” with Co-author and also jointly edited over four books under his tenure. He is a specialist in the areas of Human Resource Management, Organizational Behaviour and International Business & Research Methodology.

Dr. Abhik Kumar Mukherjee

Dr. Abhik Kumar Mukherjee is an Assistant Professor, Department of Business Administration, The University of Burdwan, West Bengal. He has a wide experience of teaching in undergraduate and post graduate level over a decade. He obtained his M. Phil (securing highest aggregate) and Ph.D. in Commerce from the University of Calcutta. He did his graduation from theprestigious of St. Xavier's College, Kolkata and placed thirdin the merit list of University of Calcutta and obtained his Masters in Commerce from the same university and placed 2nd in the University merit list. He has professional qualifications like PGDBA (Finance) and Accounting Technician Certificate of ICAI. He has authored five books on accounting and related field which got wide popularity in academic fraternity.He has published a number of research articles in various journals and edited books of repute. He remains actively engaged as a resource person in different workshops, faculty development programmes, management development programmes, seminars and webinars.

Prof. Debdas Rakshit

Prof. Debdas Rakshit is a renowned professor of commerce. Presently He is working as a Professor in the University of Burdwan, West Bengal, India. Dr. Rakshit has over 19 years of

teaching experience at the post-graduate level and 5 years of industry experience. He is the Fellow member of The Institute of Cost Accountants of India. Prof. Rakshit has 108 Research papers published in reputed national and international journals. He has authored five books. Under his supervision 13 researchers and 5 scholars have completed their Ph.D. and M.Phil degrees respectively. His areas of interest include Corporate Restructuring, Corporate Performance Measurement, Corporate Financial Management, International Accounting, Value Based Management, Computer Application in Business and Empirical Finance.

Prof Jaydeb Sarkhel

Professor Jaydeb Sarkhel is a retired professor of Economics from the Department of Commerce, The University of Burdwan, West Bengal. He is the President of Indian Accounting Association, South Bengal Branch. He has an extensive teaching experience of 40 years at the UG and PG level and in academic administration. He has authored many research articles in different national and international journals of repute. He also authored several Economics textbooks which got wide popularity across the globe. He has successfully guided more than 25 research scholars. He has an outstanding academic track record. He stood first in the district among humanities students at higher secondary level. He stood first class first in both undergraduate and post graduate level from the University of Burdwan. He is very active in the field of research till now. He regularly participates different national and international level seminars, conferences, and webinars throughout the world in different capacities.

Dr. Nitashree Barman

Dr. Nitashree Barmanis Head and Assistant Professor in the Department of Accountancy, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Tulungia (A Government Model College), Bongaigaon , Assam, India. She has acquired M. Com degree with Gold Medal from Assam University in 2010 and Ph.D. degree from the Department of Commerce of Assam University in 2016. She has

presented more than 25 research papers in seminars/Conferences, and contributed 17 papers in academic journals and edited volumes. She is an awardee of Silver medal of Best Business Academic of the Year Award (BBAY Award) in 65th All India Commerce Conference, 2012. She is the editorial board member of several reputed journals and life member of various academic/ professional bodies, viz. Indian Commerce Association, Indian Accounting Association, etc.

Dr. Rupam Mukherjee

Dr. Rupam Mukherjee is an Assistant Professor of Economics at Kabi Sukanta Mahavidyalaya under the University of Burdwan, West Bengal, India. He holds M.Sc., M.Phil., and Ph.D. in Economics. He has over seventeen years of teaching experience. His research interests span Agricultural Economics, Development Economics, and International Economics. As the principal investigator, he submitted a Minor Research Project funded by UGC. He has numerous research publications in national and international journals of repute and in edited volumes published by national and international publishers. He has presented many research papers at different conferences and workshops at national and international levels and received "best paper" awards several times. He took part in several faculty development programmes and short courses, and chaired sessions as a resource person at numerous international conferences. His interviews about ongoing economic problems in India have been aired by All India Radio. He has also served as a peer reviewer for several prestigious international journals.

Prof. Prabodha Kumar Hota

Prof. Prabodha Kumar Hota is currently the Head of P.G. Department of Commerce and the co-ordinator of MBA (FM) formerly MFC. He is also the dean of faculty Business and President of All Odisha Commerce Association (OCA) and he is the former Comptroller of Finance, Utkal University. Prof. Hota was awarded M.com, M. Phil and doctorate degree in Commerce. He has 28 years of experience in P.G. teaching. He has published 4 books and 55 Research papers

(including 5 in international journals). He has also chaired sessions in many international seminars. His area of interest includes quantitative techniques and security analysis.

Dr. Vasant Balu Boraste

Dr. Vasant Balu Boraste is an Assistant Professor in Commerce at M.V.P. Samaj's KTHM College, Nashik in Maharashtra. He has a vast experience of undergraduate and postgraduate teaching over one and half decade. He did his M. Com from Savitribai Phule Pune University (SPPU), Pune. He also obtained his doctorate degree in the year 2016 from the same university. He was also awarded MBA degree from YCMOU, Nashik. He has presented several research papers in different national and international seminars and conferences. His research articles have been published in different national and international journals of repute. He also worked as coordinator in a national level online faculty development programme. He is also the author of twenty-four books which got wide popularity in academic fraternity. His area of interest is business administration, accounting and taxation.

Prof. Rajib Dasgupta

Prof. Rajib Dasgupta is a professor of Commerce in University of Calcutta. Prof. Dasgupta is also a former senate member of the University of Calcutta. He has completed his M.Com. Degree in 1989 from University of Calcutta and was ranked First in First Class (Gold medallist). Later he completed his M. Phil and Ph.D. in Marketing from the same University. He has an experience of over two decades in Post Graduate Teaching and almost seven years of Undergraduate teaching in prestigious St. Xavier's College, Kolkata. He is also a successful Research Guide for Ph.D. and M.Phil. Scholars at the University of Calcutta. Prof. Dasgupta has to his credit eight scholars who have been awarded Ph.D. under his supervision. He has publications in various peer reviewed journals of repute at national and international level. His area of specialisation is Organisational Behaviour and Marketing Management.His area of research includes Artificial Intelligence and Marketing, Corporate

Social Responsibility and Brand Image, Emotional Intelligence and Organisational Behaviour.

Dr. Indranil Bose

Dr. Indranil Bose is a seasoned academician and researcher for more than two decades. His academic engagement spreads over India, United Kingdom and UAE in the higher education sector. As a researcher, he has many peer reviewed publications with reputed national and international journals to his credit. He has presented research papers in many countries across Asia and Europe. He is also a regular invited resource person to international and national faculty development programmes, research workshops, webinars and spoken to almost fifty universities, b-schools, institutes of higher learning in India, UAE, Oman, Bahrain, UK, Bangladesh, Malaysia, Nepal, Sri Lanka and elsewhere. He also evaluates PhD theses on different areas of management of the PhD scholars from around ten universities from India and abroad.

Dr. Susmita Chatterjee

Dr. Susmita Chatterjee is an assistant professor in Economics Department at Maharaja Manindra Chandra College under University of Calcutta and also a guest faculty of Department of Commerce. Susmita Chatterjee studied economics at the University of Calcutta (B.Sc. Lady Brabourne College),Presidency College (MSc), completed M.Phil and Ph.D. dissertation (2013) from University of Calcutta thereafter joined IIMC for post-doctoral Research (Dec. 2013). She is supervising PhD students of Department of Commerce and Department of Economics (University of Calcutta). Her research interests are applied econometrics, industrial organisation, gender studies and entrepreneurship. She is the author of a large number of articles published in reputed journals of Elsevier, Emerald, Sage, Palgrave, Springer and three books, several book chapters in national and international publications. She is reviewer of journals (SAGE) and books (OXFORD).

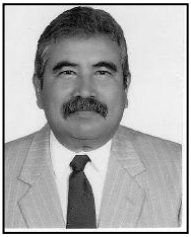
Dr. Hasan Dincer

Dr. Hasan Dincer is Professor of finance at Istanbul Medipol University, Faculty of Economics and Administrative Sciences, Istanbul-Turkey. Dr. Dincer has BAs in Financial Markets and Investment Management from Marmara University. He received his PhD in Finance and Banking with his thesis entitled "The Effect of Changes on the Competitive Strategies of New Service Development in the Banking Sector". He has work experience in the finance industry as a portfolio specialist and his major academic studies focusing on financial instruments, performance evaluation, and economics. He is the executive editor of the International Journal of Finance and Banking Studies (IJFBS) and the founder member of the Society for the Study of Business and Finance (SSBF). He has about 200 scientific articles and some of them is indexed in SSCI, SCI-Expended and Scopus. In addition to them, he is also editor of many different books published by Springer and IGI Global.

Prof. Sharmistha Banerjee

Prof. Sharmistha Banerjee is a professor of business from the University of Calcutta and a Fulbright scholar who studied women's empowerment in South Korea and Kenya. She has a teaching experience of more than 20 years. Her research interest lies in the field of Small Business Management. Microfinance, Entrepreneurship, Social Entrepreneurship, Human Resource Management, Women empowerment. She was a visiting faculty in SolBridge International School of Business, Woosong University, Daejeon, South Korea and BRAC Business School, BRAC University, Dhaka, Bangladesh. She acted as a visiting professor at Graduate School of East Asian Studies, Yamaguchi University, Japan. She acted as resource person in the Workshop on Field Research on Violence against Children in Kenya, in Nairobi and Mombasa, Conducted by IREWOC, University of Amsterdam and Plan Kenya. She was the first Global Links Scholar of USA Department of State for Global Women's Issues, Rollins College & Tupperware Brands

Corporation, USA. She has published several quality articles, book chapters in different journal of repute and books.



José Guadalupe Vargas Hernández

Prof. José Guadalupe Vargas Hernández is a Research professor at the University Centre of Economic and Administrative Sciences of the University of Guadalajara, Mexico. He also holds different teaching and administrative assignments at different reputed educational centres across the globe. He is an MBA and also an awardee of Ph.D. He has successfully completed different research projects on different social issues related to his field of research. He has attended more than four hundred national and international conferences in different capacities. He is the author of many research articles which were published in different international Journals and in books (in English, French, German, Portuguese, Farsi, Chinese, etc.). Emerald Best Paper Award 2010, Emerald/EMRBI Business Research Award, British Council Award, Ford Foundation Award are some of the feathers conferred in his academic crown.

Professor (Dr.) Siddhartha Sankar Saha

Professor (Dr.) Siddhartha Sankar Saha is Professor of Commerce and Head & Chairman of PGBOS in Commerce, Department of Commerce, University of Calcutta, Kolkata, India currently. He is also member, Faculty Council for Post-Graduate Studies in Commerce, Social Welfare & Business Management, and member of Senate University of Calcutta. Professor Saha became Dean, Faculty Council for Post-Graduate Studies in Commerce, Social Welfare and Business Management, University of Calcutta. He has more than two decades of teaching experience in the under-graduate in college and post-graduate levels in the University. Professor Saha has become a prolific author and he has to his credit 146 published research papers covering accounting and finance issues in leading national and international journals including UGC-CARE listed Journals.

Dr. Parag Chandrakant Kalkar

Dr. Parag Chandrakant Kalkar, currently serving as the Pro Vice Chancellor at Savitribai Phule Pune University, has an impressive academic and administrative career. With qualifications including M.Com., MMS (Finance), Ph.D., and FDP (IIMA), he held the positions of Director at STE Society's Sinhgad Business School and Dean of the Faculty of Commerce and Management at Savitribai Phule Pune University. His teaching experience spans nearly three decades, and as a Research Guide, he has successfully mentored seven Ph.D. students. Dr. Kalkar has a prolific research record with more than fifty papers published in national and international journals of repute, authoring or co-authoring nineteen books, and having six patents applied and published. His extensive involvement at Savitribai Phule Pune University, including roles in management and academic councils, highlights his commitment to institutional development. As the treasurer of AIMS and an association with ISMA India, he actively contributes to management education and stress management initiatives. Dr. Kalkar's reputation as an eminent speaker is evidenced by his participation in various national and international conferences, where he has chaired and inaugurated several events. In addition to his academic prowess, he engages in motivational programs for the holistic development of students and professionals, earning him numerous national and international awards for academic excellence.

Dr. Ahana Sen

Dr. Ahana Sen is presently working as an Assistant Professor in the department of Management in Raiganj University, Raiganj. Her schooling is done from South Point High School and her graduation is done from Goenka College of Commerce & Business Administration. She has done M.Com. and also MBA (Finance) from University of Calcutta. In both M. Com & MBA (Finance), she has secured "**First Class First**" Rank. She is SET qualified. She has received her Ph.D. degree from Department of Commerce, University of Calcutta. Her area of specialization is Accounting & Finance and research interest

lies in the field of Banking & Finance. She is having six years of teaching experience. She has authored a couple of research papers in different journal of repute and CARE listed journals and has also participated in different workshops and seminars.

Dr. Nilanjan Ray

Dr. Nilanjan Ray is from Kolkata, India and presently associated as an Associate Professor of Marketing Management and Centre Coordinator for Research in Business Analytics at Adamas University in Department of Management, School of Business and Economics, West Bengal, India. Dr Ray has obtained certified Accredited Management Teacher Award from All India Management Association, New Delhi, India. He has obtained his Ph.D. (Mktg); M. Com (Mktg); MBA (Mktg), STC FMRM (IIT-Kgp). Dr. Ray has obtained three certificates (Short term course) on several Specialized Marketing domains from University of Illinois and University of Colorado. He has 12 years teaching experience and 6 years Research experience and guided around 56 Post Graduate students' project and awarded 1 PhD as well as 3 Scholars are working under his supervision. He has obtained 1 German patent and 1 copyright from India. Dr. Ray has contributed over 90 research papers in reputed National and International Referred, Peer Reviewed Journals, Proceedings and 11 Edited Research Hand Books from Springer, IGI-Global USA and Apple Academic Publisher CRC Press (A Taylor & Francis Group), USA. He has also associated himself as a reviewer of Tourism Management Elsevier, Journal of Service Marketing Emerald Group Publishing Limited, Journal of Business and Economics, Research Journal of Business and Management Accounting and as an Editorial Board Member of several referred Journals. He has also chaired in a technical session at IJAS Conference 2012, at Harvard University, Boston, USA. Dr. Ray is a life-member of the International Business Studies Academia, Fellow Member of Institute of Research Engineers and Doctors Universal Association of Arts and Management Professionals (UAAMP) New York, USA, Life Member of Indian Accounting Association.

Dr. Anindita Sengupta

Dr. Anindita Sengupta is Associate Professor of Economics in Barrackpore Rastraguru Surendranath College, West Bengal. She completed M. Sc. In Calcutta University in 1994. She joined as a Lecturer in Economics in Hooghly Women's College, West Bengal during 2000. Since then, she is teaching undergraduate level and postgraduate level (as Guest Faculty in Calcutta University since 2017) of Economics. She got her Ph.D. degree form Calcutta University in 2011. Her Ph.D. thesis was titled as "Cross-District Migration of Labour Force in West Bengal During the Post-Reform Period". Her research areas are Migration, Labour Economics, Inequality, Wellbeing, Gender Discrimination, Industry etc. She has published research papers in many national and international peer-reviewed journals and edited books published by famous publishers. She has co-authored of four textbooks for B.Com. (Honours) students for Calcutta University published by Oxford University Press. She has presented papers in many national level conferences within and outside India. She has also an YouTube channel through which she delivers lectures online.

Prof. (Dr.) Debasish Sur

Prof. (Dr.) Debasish Sur is Professor at the Department of Commerce of the University of Burdwan, West Bengal. He did his M. Com (Gold Medalist) in 1990, M. Phil (Topper) in 1993 and Ph.D. (Human Resource Accounting) in 2002 from the University of Burdwan. He obtained his B. Com (Hons) degree from the same University in 1988 and stood first in the first class. He has over 26 years of teaching experience at the post - graduate level (13 years as Professor). He is an invited member of various academic bodies in different universities in India. He is also a member of NAAC Peer Team. Professor Sur has so far contributed more than 120 papers in reputed professional and academic journals. He has authored 4 books. Dr Sur has acted as visiting faculty in different universities in India. Under his supervision 19 researchers and 23 scholars have completed their Ph.D. and M. Phil degrees respectively. Dr Sur has attended many seminars and conferences in India and abroad and also acted as

Resource Person in several national and international seminars. He is also acting as Reviewer in many international publishing houses like Palgrave Macmillan, Taylor and Francis, Springer, Emerald etc.

Prof. (Dr.) Sami A. Khan

Prof. (Dr.) Sami A. Khan is currently working as a Professor in HRM at King Abdulaziz University, Jeddah at Saudi Arabia. Prof. Khan has 27+ years of Post Ph.D. experience of teaching, training and research in the area of human resource management. Dr. Khan has taught courses in HRM, Strategic Human Resource Management, Performance Management, Staffing, Compensation Management, Training & Development, Industrial Relations, Labor Laws, Organizational Behavior, Organization Development & Change, HRD, Fundamentals of Management, Strategic Management, Entrepreneurship, CSR & Business Ethics, and Economic Development in the Gulf States. His specific areas of interest include HRM, HR Strategy and Benchmarking HR Practices, Performance Management, HRD & OD Interventions, and Management of Change. Dr. Khan has also conducted many MDPs, Workshops and In-Company Training Programs on topics like Managing HR, Leadership Styles &Managerial Effectiveness, Team-Building, Constructive Discipline, Basic Managerial Skills, and Management of Change for middle and senior level managers of public and private sectors. He conducted in-company training programs for many companies in India, important among them are: Fritolays (PepsiCo), Shri Ram Fertilizers & Chemical Ltd., Ranbaxy Laboratories, Voltas, DLF Industries Ltd. A Book (Saini & Khan) titled, Human Resource Management: Emerging Perspectives in the New Era, was published by SAGE Response in 2000. Dr. Khan was the Associate Editor of Management & Change, a journal of Management published from India for a period of four years till the end of 2000. Specialties: Teaching, research, training and providing consultancy in HRM, HR Strategy and Benchmarking HR Practices, Performance Management, HRD & OD Interventions. He is also member of Harvard Business Review Advisory Council.

Dr. Supriyo Patra

Dr. Supriyo Patra is bringing on board over 18 years of Academic and Industry experience with reputed Management Colleges, Institutes, and Universities and with National and Multinational Advertising Agencies. Dr. Patra successfully completed his MBA with Marketing & Ph.D. in Management. He is also holding a Certificate of Competence in LIFE SKILLS & Digital Marketing. Certificate in Brand Management from IIM-Bangalore. Dr. Patra is the ex-Professor-in-Charge of Management in the BMS/Business Administration Department at St. Xavier's College (Autonomous) Kolkata and also acting as a Principal Supervisor for Ph.D. programme in Commerce. He is extremely passionate about research and is having over 15 years of Research experience in the domain of Branding, Advertising, Consumer Behaviour and Celebrity endorsement etc. He is a Prestigious Member of Editorial Board and Managing Editor and Reviewer of Various International & National Journals. Dr. Patra had published over 30 Research papers in reputed International, National & UGC Care approved Journals. His research papers were accepted for presentation in over 30 International and National Conferences in India and abroad including the IIM Calcutta, IIM Indore, at 2nd EUROMED Conference 2009 - University of Salerno (Italy) at 7th EUROMED conference 2014 - University of Kristiansand (Norway) etc. Dr. Patra is regularly acting as Session Chair and Co-Chairperson at various International and National Conferences. Dr. Patra is recognized with Leading Educationists of India Award 2019 and also won the Best Paper Awards at International and UGC Sponsored National Conferences.

Dr. Santanu Mallick

Dr. Santanu Mallick is an Assistant Professor in the Department of Commerce, Banwarilal Bhalotia College, Asansol, Paschim Burdwan, West Bengal, India. He also held the position of Additional Treasury Officer in Bongaon Treasury under Department of Finance, Government of West Bengal. He stood second in M.Com examination in 2015 of University of Calcutta. He completed Ph.D. in Behavioural Finance

from University of Calcutta. His research interest lies in Financial Market, Behavioural Finance, Developmental Economics, Women empowerment etc. He has presented many research papers in different national and international conferences, seminars and webinars. He is the coordinator of the Entrepreneurship Development Cell – Swabalamban of Banwarilal Bhalotia College, Asansol.

Dr. Amalendu Samanta

Dr. Amalendu Samanta, currently holds the position of Assistant Professor in the Department of Commerce at Banwarilal Bhalotia College in Asansol, West Bengal, India, has an impressive academic journey. He completed his undergraduate studies at St. Xavier's College, Kolkata, followed by a master's degree from the University of Burdwan. In 2015, he earned his doctoral degree in Business Administration from the same university. With over two decades of teaching experience, Dr. Samanta brings a wealth of knowledge to his role. His commitment to academic research is evident through his active participation in national and international seminars and webinars, where he has contributed research papers. He also plays a pivotal role in organising such seminars and workshops. His scholarly contributions can be found in esteemed national and international journals as well as edited volumes of research articles. He authored the book "Financial Accounting Premiere" tailored for undergraduate and post graduate students of Financial Accounting. He also served as the editor for compilations of research articles in different edited volumes. Dr. Samanta's expertise lies in the fields of Accounting and Financial Management, reflecting his passion for these areas of study. His unwavering dedication to both teaching and research highlights his significant contributions to the academic community.

CONTENTS

ENTREPRENEURSHIP DEVELOPMENT

CHAPTER 1

FOSTERING ENTREPRENEURIAL SKILLS IN INDIA: EXPLORING THE COLLABORATIVE ROLE OF NGOS AND HIGHER EDUCATION INSTITUTIONS

Dr. Amalendu Samanta[1]

ABSTRACT

This article investigates into the transformative potential of collaborative efforts between Non-Governmental Organizations (NGOs) and Higher Education Institutions (HEIs) in fostering entrepreneurial skills for sustainable development of India. The study identifies the intricate dynamics, challenges, and opportunities in collaborative mechanisms between NGOs and HEIs to nurture entrepreneurship skills among young Indians. The article also suggests the role of other stakeholders in fostering entrepreneurial skills and making entrepreneurial environment conducive to the learners. This article also aims to fill existing research gaps by discussing different dimensions of the topic. Based on a comprehensive literature review, the article proposes strategic recommendations, including the establishment of clear objectives, formalized partnership agreements, curriculum innovation, and community engagement. The collaborative model, encapsulated in a star framework, emerges as a holistic approach to education, integrating theory with real-world applications and addressing challenges for sustainable economic growth.

Keywords: *Entrepreneurship, Higher Education Institutions, Non-Governmental Organizations, Collaborative Strategies, Star Model*

"What you think, you become.
What you feel, you attract.
What you imagine, you create." — *Buddha*

[1] Assistant Professor, Department of Commerce (Hindi Shift), Banwarilal Bhalotia College, Asansol. Email Id: amalendu1978@gmail.com

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"Entrepreneurship is the engine fueling innovation, employment generation and economic growth. Only by creating an environment where entrepreneurship can prosper and where entrepreneurs can try new ideas and empower others, we can ensure that many of the world's issues will not go unaddressed."— Klaus Schwab (German Engineer and Economist)

Introduction

The timeless insights uttered by Lord Buddha encapsulate the transformative power of thought and imagination, offering a philosophical foundation for the journey of personal and collective growth. The sentiment that is echoed by the German Engineer and Economist Klaus Schwab underlines the pivotal role that entrepreneurship plays in addressing global challenges and steering nations toward sustainable development. In the context of India, a country packed with untapped potential and a growing youth demographic, the need to foster entrepreneurial skills takes center stage. In the context of India, a nation marked by its youthful population and a growing economy, the promotion of entrepreneurship is not just a matter of economic necessity but also a crucial step towards addressing a wide array of socio-economic challenges. The development of entrepreneurial skills is instrumental in unlocking the potential of the country's diverse and dynamic population. This article centres on the collaborative efforts of Non-Governmental Organizations (NGOs) and Higher Education Institutions (HEIs) — two pillars that stand at the forefront of catalyzing change and empowering aspiring entrepreneurs. While entrepreneurship education in HEIs is widely acknowledged as a critical element in nurturing these skills, the partnership with NGOs plays an equally vital role in expanding and deepening the entrepreneurial ecosystem in India. The dynamic interaction between these two sectors is a key driver in nurturing an environment where innovative ideas can take root, flourish, and contribute to the nation's economic growth and social well-being. This article aims to study the interconnected situation of entrepreneurship development, exploring pathways, challenges, and the way forward in harnessing India's immense entrepreneurial potential for sustainable development. This will provide valuable insights through a refined understanding of entrepreneurship in the Indian context, guiding stakeholders towards fostering an

environment conducive to innovation, empowerment, and economic prosperity.

Literature Review

A review of literatures on the Role of NGOs and HEIs in developing entrepreneurial skills and its significance in India shows entrepreneurship has gained increasing importance as a driver of economic growth and development in India.

Importance and Current Scenario

The country's predominantly young population, has the potential to be a demographic dividend if harnessed effectively (UNCTAD, 2019). This highlights the need for developing entrepreneurial skills to empower the youth to become job creators rather than job seekers. In this process, Higher Education Institutions are also acting as a Catalyst for Entrepreneurship development and related skill formation. HEIs play a pivotal role in nurturing entrepreneurial skills. Research has consistently shown the positive correlation between entrepreneurship education and the likelihood of individuals pursuing entrepreneurial ventures (Fayolle et al., 2006). HEIs are increasingly incorporating entrepreneurship courses and programs into their curricula to cultivate entrepreneurial mindsets (Lackéus., 2014,2015). This integration helps to create a pipeline of aspiring entrepreneurs. Entrepreneurship has emerged as a transformative force in India, fuelled by economic liberalization, globalization, and a vibrant start up ecosystem. As the world's third-largest start-up hub, India has witnessed a surge in entrepreneurial ventures (Barda and Sharma, 2016; Andaleeb and Singh,2016). HEIs have been at the forefront of cultivating entrepreneurial talent in India. A growing body of research emphasizes the pivotal role of HEIs in imparting entrepreneurial education and fostering an entrepreneurial mindset (Chhabra et al., 2021). Entrepreneurship programs, incubators, and industry collaborations within HEIs have contributed significantly to skill development and innovation (Sharma and Vohra, 2021). Entrepreneurship education demonstrates a positive influence on instigating start-up intentions among interdisciplinary students within HEIs. Individual intent to initiate a new business, as per the Theory of Planned Behaviour (comprising of attitude, perceived behavioural control, and social norms), is positively associated with personal aspirations for starting

a new venture. Moreover, factors such as student background, encompassing gender and degree specialization, also exhibit positive correlations with the individual inclination to embark on a new entrepreneurial endeavour. (Paray and Kumar,2020)

Challenges and Opportunities in the Indian Context

However, this promising landscape is accompanied by a myriad of challenges, necessitating the development of entrepreneurial skills at various levels. India, as developing economy with its predominantly traditional social outlook, faces specific challenges and opportunities.

While HEIs have made substantial progress, challenges persist. Curricula often lag behind rapidly evolving entrepreneurial environments (Morris et al., 2013). Faculty training, research-commercialization linkages, and access to financial resources remain areas that require attention. These shortcomings emphasize the importance of external partnerships and collaborative efforts. While HEIs offer the infrastructure for structured learning, they often encounter challenges related to curriculum adaptation, faculty training, and access to resources (Panigrahi and Johsi,2015; Kapil et. al.,2023). This is where the collaborative efforts with NGOs become particularly significant. (Singh,2022)

Role of NGOs in Bridging the Gap and Challenges

NGOs have a rich history of contributing to entrepreneurship development in India. Their agility, local presence, and social outreach allow NGOs to bridge gaps that HEIs often face. NGOs facilitate mentorship, provide access to capital, and create a support ecosystem for emerging entrepreneurs, especially in women entrepreneurship and in underserved regions. (Shefali and Kushwaha, 2019; Singh, 2002). NGOs have a long history of playing a pivotal role in entrepreneurship development in India. They contribute by providing mentorship, access to capital, and facilitating networking opportunities for aspiring entrepreneurs (Banakar and Yatnalli, 2018; Gupta, 2021).

Research Gap

The notable research gap in understanding the cooperative collaboration between NGOs and HEIs, particularly within the context of India, is existing studies often focus on either NGOs or

higher education institutions in isolation, neglecting the potential combined impact of their collaborative efforts. This research seeks to fill this gap by investigating the specific mechanisms, challenges, and outcomes associated with the partnership between NGOs and higher education institutions in India to promote entrepreneurial skill development.

Objectives

Based upon the identified research gap, the objectives of the study can be formulated as follows:

- Identifying Key Mechanisms of Collaboration
- Evaluating the Opportunities and Challenges
- Propose Recommendations based on the analysis of the study

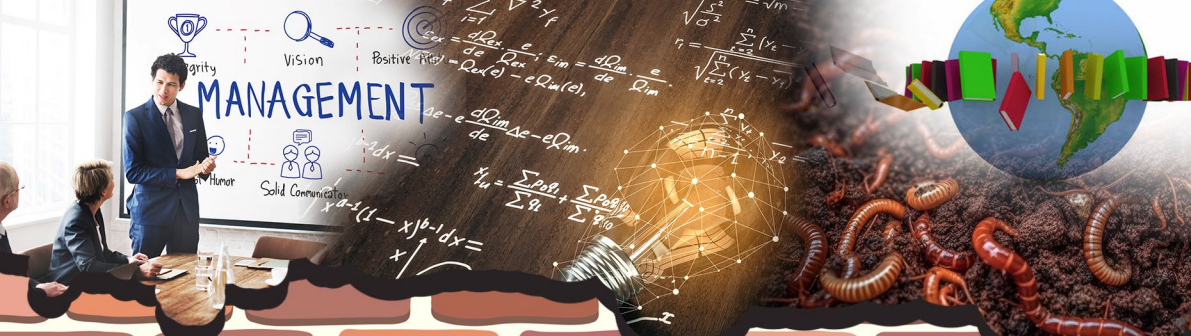
Analysis

To present a comprehensive overview of the study's objectives, it is essential to engage in a thorough discussion for each objective individually. By delving into these discussions, a holistic perspective on the central theme of the article can be achieved. This process involves the analysis of ideas presented by various researchers, incorporating discussions that have preceded this study, and integrating the author's personal experiences and analyses.

Collaborative Strategies

Collaboration between NGOs and HEIs can be highly beneficial for fostering entrepreneurial skills. There may be several collaborative strategies to have a cooperative partnership that significantly contributes to the development of entrepreneurial skills in individuals and communities.

- NGOs and HEIs can sign Memorandum of Understanding (MOUs) through formal agreements clearly defining the roles, responsibilities, and expectations of each party to ensure a transparent and effective collaboration.
- NGOs and HEIs can organize joint programs, workshops, and training sessions that integrate the expertise of both NGOs and HEIs. This can provide a holistic approach to entrepreneurial skill development.
- NGOs and HEIs can share resources and facilities, such as training spaces, libraries, and research facilities. This can



Open Educational Resources

BEYOND BOUNDARIES

EXPLORING OER

EDITORS
Prof. Amitava Basu
Mr Abhijit Chakrabarti
Dr Amalendu Samanta

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by: Prof. Amitava Basu, Mr Abhijit Chakrabarti, Dr Amalendu Samanta

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Prof. Bulu Maharana
HOD, Lib. & Info. Science
P. G. Department of Library &
Information Science
Sambalpur University, Jyoti Vihar-768019
8327789475 (Mob) hodlibsc@suniv.ac.in

MESSAGE

It is a great pleasure to know that Banwarilal Bhalotia College, Asansol, West Bengal, India is going to publish a book "Beyond Boundaries: Exploring OER" with edited papers submitted to the college by resource persons and subject experts.

Open Educational Resource (OER) are teaching, learning and research materials in any format or medium that are in the public domain published under an open license, allowing for free access, reuse, repurpose, adaptation, and redistribution by any one anywhere. These materials are published under open license which allows derivation and further enrichment of the scholarly materials. In the face of spiraling cost of traditional learning materials such as text and reference books, OER provides a free of cost access to high quality reading materials.

OER tremendously support the foundational pillars of education as per NEP-2020 such as **Access**, Equity, Quality, and Affordability. These learning resources also foster distant learning to millions of those potential learners who are debarred to participate the formal education system.

In this context, the book will prove to be an excellent source information to understand the technical intricacies of OER and enhance familiarity to these new genre of learning materials to the students, teachers and research scholars subsequently boosting the quality of education in general and higher education in particular.

Date: 08/12/2023
Place: Sambalpur University

(Dr Bulu Maharana)

Prof. Abhijit Kr. Pal

M.Sc.(Edn), B.Ed.,Ph.D., C.E.S.
Professor & Head
DEPARTMENT OF EDUCATION
WEST BENGAL STATE UNIVERSITY
Berunanpukuria, Barasat, Kolkata-126
West Bengal, India
-+9133 2425 1978 Fax-+9133 2524 1977

लक्ष्यं विश्वमानम्

Residence

42, New Daspara Lane, Rishra
P.O-Morepukur ,Dist-Hooghly
PIN-712250(WB)
-+9133 2672 8081
-+919433 534259/+919748 502524
E-Mail: akpal.india@gmail.com
abhijitpal98@yahoo.in

Message

It is a great pleasure to know that Banwarilal Bhalotia College, Asansol, West Bengal, India is going to publish a book "Beyond Boundaries Exploring OER " by editing the different papers which were presented by different scholars and resource persons.

Open Educational Resources or OER is the most modern concept, which is the ultimate demand of the students, teachers, scholars etc.at present context.OER is very much helpful not only to the teachers, students, scholars in their teaching, learning & research work but also helpful to the interested people who want to gather correct information to satisfy their curiosities.

Hope, this book will help the students, teachers, scholars of different streams in the field of Education and will also help the common people.

I wish the endeavour of Banwarilal Bhalotia College a grand success for publishing the book on OER.

Abhijit Kumar Pal.

2nd December,2023

Prof.(Dr.) Abhijit Kumar Pal,
Professor and Head,
Department of Education,
West Bengal State University.
Barasat, Kolkata-700126.

EDITORIAL

"A writer only begins a book. A reader finishes it"

- Samuel Johnson

As the editors of the inaugural volume of "Beyond Boundaries" we are thrilled to witness the realization of a long-cherished dream of Banwarilal Bhalotia College to publish a multi-disciplinary collection of research articles. This edited volume represents a significant milestone in our collective pursuit of knowledge and understanding in the realm of Open Educational Resources (OER). We extend our heartfelt congratulations to all the authors and express our sincere gratitude to everyone who contributed to this endeavour.

The theme of the volume—examining the problems, opportunities, and challenges of adapting OER in a country like India and drawing comparisons with advanced nations—reflects the dynamic nature of educational landscapes worldwide. We received a remarkable 82 submissions, each offering a unique perspective on the subject. After careful consideration, we are proud to announce that 30 outstanding papers have been selected for publication. (Acceptance Rate- 37%)

In this curated volume of research articles on OER, a diverse array of topics has been explored, reflecting the expansive scope of OER applications. Due to space constraints and to preserve the uniqueness of each article's findings, we offer concise summaries of select contributions, aiming to instigate the interest of inquisitive readers and to encourage them in comprehensive exploration of the contributions captured in the book. One featured article investigated the transformative impact of OER in higher education, specifically within commerce and management disciplines. Emphasizing how OER fosters inclusivity by providing a platform for diverse perspectives, the article discusses the potential for customization to address evolving industry and regional needs. Addressing the realm of Economics, another paper within this volume examines the opportunities and challenges associated with leveraging OER in the

field. Meanwhile, a separate contribution explores the broad concept of OER, shedding light on initiatives such as digital libraries, open-access journals, and open courseware. This article not only underscores the potential of OER but also identifies obstacles and provides recommendations for overcoming them. The relationship between OER and Mathematics is explored in a distinct paper, covering online repositories, teacher add-ons, open mathematical tools, and research tools for locating mathematics-related articles in various publications. Another contribution stressed upon the significance of sustainability and cost-effectiveness of OER within the academic pursuits of NSOU. One interesting research paper elucidated how evaluation systems guide creators and users in crafting optimal components of OER, aiding in the selection of suitable courses for effective learning. Meanwhile, a unique paper threw light on Indian MOOCs initiative, specifically highlighting platforms like SWAYAM. Another noteworthy inclusion discussed the pivotal role of OER in alignment with the National Education Policy (NEP) of 2020. Each of these contributions offers a valuable perspective, collectively enriching the discourse on OER and inspiring researchers to delve deeper into the contents of this comprehensive volume

To the authors whose papers have found a place in this volume, we commend your dedication in advancing research in the field of OER. Your insightful contributions have enriched the discourse and expanded the horizons of our understanding. We look forward to witness the impact of your work on the broader academic community and beyond.

To those contributors whose articles did not make it into this edition, we express our gratitude for your submissions. we encourage you to persist in your scholarly pursuits, as we anticipate that your valuable insights will find a place in future volumes of "Beyond Boundaries”

A heartfelt acknowledgment goes to the dedicated reviewers who lent their expertise from diverse academic fields. Your meticulous evaluation has been pivotal in maintaining the scholarly excellence that defines this volume.

The unwavering support of the Banwarilal Bhalotia College authorities has been a cornerstone in the realization of this ambitious project. We express our deepest gratitude for the untiring commitment to academic excellence and for providing the

resources and encouragement necessary for the successful publication of this volume.

We extend our appreciation to Red Shine Publication House, UK for their hard work and timely publication of the book. Their commitment to quality aligns seamlessly with our vision for "Beyond Boundaries," and we are grateful for their partnership in bringing this project to fruition.

As we turn the page on another year, the editors wish all the readers of "Beyond Boundaries: Exploring OER" a joyous and prosperous New Year 2024. May the knowledge encapsulated within these articles inspire transformative ideas and pave the way for future exploration and discovery in the diverse field of research.

Looking forward, we anticipate continued support from all stakeholders. It is our hope that future volumes of "Beyond Boundaries" will be enriched by the collective wisdom and collaboration of the academic community.

Thank you for joining us on this exciting journey.

Prof. Amitava Basu

Mr Abhijit Chakrabarti

Dr Amalendu Samanta

EDITORS

Prof. Amitava Basu is the Principal of prestigious Banwarilal Bhalotia College, Asansol with more than 7000 students per academic session. He joined as an Assistant Professor in this college in 2002. Prof. Basu obtained his M. Com degree from the University of Burdwan. He was awarded Ph.D. in 2004 by the same university. He has many research papers in Journals of National and International repute. He has also completed research project of UGC and has acted research supervisor to Ph.D. students who have successfully completed their research under his guidance. In a short span of time, he has taken the College to new heights with his exemplary leadership and administrative prowess. He is also involved in community service and different social projects.

Mr Abhijit Chakrabarti presently working as a Librarian in Banwarilal Bhalotia College, Asansol, West Bengal, India. He is an MA in English and completed B.Ed. from the University of Calcutta. He has also completed BLIS and MLIS from University of Calcutta. He has also cleared UGC-NET and WBSET. He has published many research papers in different journals of repute. He presented many research papers in National and International Conferences. His areas of interest are Open educational resources, institutional repository and preservation and conservation of reading materials, academic library and LIS education. He is a Guest faculty at Sidho Kano Birsha University, Purulia, West Bengal and Sambalpur University, Odisha. He received Best Young Librarian Award in 2019 and 2023 from Madras Library Association. In 2023 he received Best Paper Award from DLSDE-2023 at IIT Kharagpur, West Bengal.

Dr Amalendu Samanta is the Asst. Professor and Head of the Department of Commerce (Hindi Shift) in Banwarilal Bhalotia College, Asansol. He is also serving as the Bursar of the College. He did his graduation from St. Xavier's College, Kolkata and obtained his master degree from the University of Burdwan. He was awarded the doctorate degree in Business administration by the University of Burdwan in 2015. He has presented research papers in different national and international seminars and webinars He also plays a pivotal role in organising such seminars and workshops. His scholarly contributions can be found in esteemed national and international journals as well as edited volumes of research articles. He authored the book "Financial Accounting Premiere" tailored for undergraduate and post graduate students of Financial Accounting. He also served as the editor for compilations of research articles in different edited volumes. Dr. Samanta's expertise lies in the fields of Accounting and Financial Management, reflecting his passion for these areas of study.

ADVISORY BOARD MEMBERS/ REVIEWERS

Prof. Subal Chandra Biswas is presently working as a Librarian of B C Roy Engineering College, Durgapur, W.B. He was a Retired Professor & Head of PG Department of LIS in University of Burdwan, West Bengal. He was also Professor of Banaras Hindu University. He is an MA in Economics. He has completed B. Lib. Sc, M B. Lib Sc from the University of Burdwan, West Bengal and stood first in order of merit in both B. Lib Sc & M. Lib Sc. He completed PhD from Loughborough University of Technology (UK). He received Commonwealth Scholarship for conducting research in Loughborough University of Technology (UK) and Best paper Award from BLA, Kolkata. He has published more than hundred research papers in different national and international journals of repute. He presented many research papers in National and International Conferences. He supervised many MPhil dissertations and PhD Thesis in LIS. He was an External Examiner of M.Phil. and PhD in different universities in India. He acted as a Resource person in different national and state level workshop and seminar. He was a member of Board of Studies in many universities in India. He acted as an interviewer in different board for appointment of Teachers.

Prof. Jaydeb Sarkhel is a retired professor of Economics from the Department of Commerce, The University of Burdwan, West Bengal. He is the President of Indian Accounting Association, South Bengal Branch. He has an extensive teaching experience of 40 years at the UG and PG level and in academic administration. He has authored many research articles in different national and international journals of repute. He also authored several Economics textbooks which got wide popularity across the globe. He has successfully guided more than 25 research scholars. He has an outstanding academic track record. He stood first in the district

among humanities students at higher secondary level. He stood first class first in both undergraduate and post graduate level from the University of Burdwan. He is very active in the field of research till now. He regularly participates different national and international level seminars, conferences, and webinars throughout the world in different capacities.

Prof. Abhijit Kumar Pal is presently acting as Professor and Head, Department of Education, West Bengal State University, Barasat, Kolkata-126. He is also the Guest Faculty in the Dept. of Education, University of Calcutta. He completed his P.G and Ph.D. Degree in Education from Kalyani University. He also served as a guest faculty in Education in P.G section, Diamond harbour Fakir Chand College and Rabindra Bharati University, Kolkata. He has completed 14 years College teaching and 14 years University teaching. His areas of interest are Philosophical bases of Education, Educational Sociology, History of Education, Mental Hygiene, Guidance of Counselling, Educational Management etc. He has written about 15 books in Bengali and 10 books in English version. He has presented many papers in different seminars. He also acted as Resource Persons/Chairpersons in various National, Inter-national level seminars/workshops etc. About 5 M.Phil. scholars and 10 M.Ed. students completed their research work under his guidance, Six Ph.D. scholars were awarded Ph.D. Degree under his supervision. He is the member of different academic bodies like UGBOS, PGBOS, BRS(DRC), RAC of different universities and institutes in West Bengal and outside West Bengal. He has been serving as Ph.D. thesis adjudicator for last 10 years . He was also selected as NCTE peer-team member.

Prof. Debasish Sur is the Professor at the Department of Commerce of the University of Burdwan, West Bengal. He did his M. Com (Gold Medallist) in 1990, M. Phil (Topper) in 1993 and Ph.D. (Human Resource Accounting) in 2002 from the University of Burdwan. He obtained his B. Com (Hons) degree from the same University in 1988 and stood first in the first class. He has

over 26 years of teaching experience at the post - graduate level (13 years as Professor). He is an invited member of various academic bodies in different universities in India. He is also a member of NAAC Peer Team. Professor Sur has so far contributed more than 120 papers in reputed professional and academic journals. He has authored 4 books. Dr Sur has acted as visiting faculty in different universities in India. Under his supervision 19 researchers and 23 scholars have completed their Ph.D. and M. Phil degrees respectively. Dr Sur has attended many seminars and conferences in India and abroad and also acted as Resource Person in several national and international seminars. He is also acting as Reviewer in many international publishing houses like Palgrave Macmillan, Taylor and Francis, Springer, Emerald etc.

Prof. Bulu Maharana presently is a Professor & Head of PG Department of LIS in Sambalpur University, Odisha. He is an MA in Economics. He has completed BLIS, MLIS, M.Phil. and PhD from Sambalpur University of Odisha. He has also cleared UGC-NET with JRF. He has published many research papers in different national and international journals of repute. He presented many research papers in National and International Conferences. He supervised many MPhil dissertations and PhD Thesis in LIS. He acted as a Resource person in different national and state level workshop and seminar. Besides being his academic assignments, he is a Director of UGC-HRDC of Sambalpur University. He is a member and chairman of many boards and committees of Sambalpur University. He is a member of Board of Studies in many universities in India. He acted as an interviewer in different board for appointment of Teachers. His area of interest is Information Technology, Library Automation and Information Storage and Retrieval.

Prof. Parthasarathi Mukhopadhyay is a Professor in Library and Information Science and presently Head, Department of Library and Information Science, Kalyani University. Prof. Mukhopadhyay, a recipient of Best Young LIS Teacher award (IASLIC), is an open source

enthusiastic and worked as a developer and promoter of many open-source projects. He has more than 100 papers in journals and conference volumes, and five books in his beeline. His recent book on Interoperability and Retrieval is published by UNESCO, Paris. Prof. Mukhopadhyay acted as metadata consultant for the project NDL (National Digital Library) hosted by IIT, Kharagpur. He is presently a member of the Advisory Committee for National Virtual Library Project of Ministry of Culture, Govt. of India. He developed Vidya Online as e-learning portal for Vidyasagar University in 2006 and developed modules for three online courses in SWAYAM platform.

Dr Savera Sharma is presently serving as an Associate Professor and Head, Department of Political Science, Bidhan Chandra College, Asansol. She has more than 22 years of teaching experience. She was awarded her Ph.D. degree in 2007, in International Relations and successfully completed UGC sponsored research project on Indian foreign policy. She authored a book on " India's China Policy Vis-a-vis India's Tibet Policy" by reputed international publisher. She has published several research papers in journals of national and international repute. She is an eminent speaker invited to various seminars and conferences.

Dr Shri Ram Pandey is currently Associate Professor at Department of Library and Information Science, Central University Haryana, Mahendragarh. Before joining CUH, he was working as an Asst. Professor at Department of Library and Information Science, Banaras Hindu University, Varanasi (4.6 Years), MLS University, Udaipur (5.6 Years) and The LNMIIT, Jaipur (3.6 years) He is the recipient of the prestigious Commonwealth Professional Fellowship at the University of East London, UK. He holds Master Degree in Library and Information Science from Bananas Hindu University and Information and Knowledge Management from Indian Institute of Science, Bangalore, and PGDLAN from University of Hyderabad and PhD from Sambalpur University, Odisha. He is an expert in designing and developing

learner-centric Massive Open Online Courses (MOOCs) and trained thousands on professionals and teachers of various institutions in India. His research interest includes Educational Technology, E-Learning, Ontology, Semantic Web and Knowledge Management. He has published more than 50 research papers in UGC-CARE list/Scopus Index journals and conference proceedings, guided 2 PhD students and undertaken one research project. He received several awards and fellowship for his career achievement including Jawaharlal Nehru Memorial Award, UGC-Junior Research Fellowship, and BHU-Gold Medal.

Dr Santanu Banerjee is an Assistant Professor in the Department of English, at Kazi Nazrul University, Asansol, West Bengal. He has also served as the Co-ordinator of that department besides shouldering the additional responsibilities of first Deputy Director of the Nazrul Centre for Social and Cultural Studies and first Curator of SETUBANDHA – The KNU Museum. He is also one of the founding members of the Asansol Heritage Research Group - a collective of independent researchers and activists who have pioneered systematic documentation and preservation of industrial heritage in the Paschim Burdwan district and created relevant public awareness in this field. In this regard, Banerjee has been collaborating with the Edinburgh College of Arts, Edinburgh University in Scotland, ICOMOS Eastern Zone in India, and British Association for Cemeteries in South Asia, London. A recipient of the prestigious Banaras Hindu University Gold Medal, V Rai Memorial Scholarship, and UGC Junior Research Fellowship, he is now one of the Raza Foundation Fellows editing a series of eleven volumes of Bengali translations from various modern Hindi poets under the Raza Granthamala Series. After completing his PhD on Modern Indian English Poetry specifically on A K Ramanujan, he has contributed several translations, research papers, and book chapters in the areas of Cultural Studies, Environmental Humanities, Postcolonial Studies, Translation Studies, Gandhian Studies and Art and Heritage Studies. He has published with Allied Publishers, Avenel Press, Authors Press, Niyogi Books, Routledge, and Bloomsbury. At present, he is co-editing in Bengali a massive volume of translations of Anglo-American Ghost Stories and

writing scripts for a Research Community Video Series under the Digital Archive of Heritage Initiative (DAHI) of Kazi Nazrul University.

Prof. Ashutosh Ghosh, FASc, is a distinguished chemist born on December 29, 1959. He holds a Ph.D. from Jadavpur University (1987), M.Sc. in Chemistry from the University of Calcutta (1981), and a B.Sc. in Chemistry Honours from Presidency College, University of Calcutta (1979). Prof. Ghosh has undertaken significant post-doctoral research and visiting assignments globally, including at Charles University in Prague, Nagoya University in Japan, and the University of Utah, USA. Throughout his academic career, he has held various academic and administrative positions. He acted as Head of the Department of Chemistry, University of Calcutta. He also served as the Dean of the Faculty Council for Postgraduate Studies in Science and as the Director of the Institute of Agricultural Science at Calcutta University. Notably, he assumed the role of Vice-Chancellor (Interim) at the University of Calcutta from July 15, 2016, to July 14, 2017. Prof. Ghosh's expertise encompasses diverse fields, including supramolecular chemistry and molecular dynamics, making him a prominent figure in the academic and research community.

Prof. Manjusha Majumdar is a distinguished academician specializing in Advanced Differential Geometry. She earned her B.Sc. (Hons.) from Bethune College, University of Calcutta, followed by an M.Sc. and Ph.D. (Sc) from the University of Calcutta. Currently serving as a Professor in the Department of Pure Mathematics at Calcutta University, she has contributed significantly to the field of Differential Geometry. Prof. Majumdar's research interests span Advanced Differential Geometry and the application of Differential Geometry in various spaces. Professor Majumdar has an impressive track record in research guidance and publications. Prof. Majumdar's expertise and leadership make her a valuable asset to the academic community.

Dr Anjalika Roy is a distinguished botanist and educator. She did her Ph.D. in Botany from Visva-Bharati in 2008 focused on structural and floral variations in mutants of "Catharanthus roseus." Before joining Visva-Bharati, Dr. Roy gained research experience at the Central Institute of Medicinal and Aromatic Plants, Lucknow. As an Assistant Professor at Visva-Bharati, she specializes in stress cytology, chemical aspects of pollen biology, mutation breeding, and allelopathic effects of medicinal plants. Dr. Roy has mentored several research scholars and contributed significantly to her field with research articles published in national and international journals of repute. She has led research projects and actively participated in workshops, showcasing her commitment to advancing botanical knowledge. As a life member of the Indian Science News Association and a reviewer for the International Journal of Horticultural Science and Technology, Dr. Anjalika Roy remains a prominent figure in the academic community.

CONTENTS

Chapter 1

OPEN EDUCATIONAL RESOURCES (OER) REVOLUTIONIZING COMMERCE AND MANAGEMENT EDUCATION: AN ANALYSIS OF THEIR ROLE AND IMPACT IN HIGHER STUDIES

Dr Amalendu Samanta [1]

ABSTRACT

This article examines the transformative impact of Open Educational Resources (OER) in higher education, with a specific focus on commerce and management disciplines. OER, known for their accessibility, affordability, and adaptability, are influential tools in enhancing learning experiences and expanding educational reach. This work investigates the diverse roles and importance of OER in reshaping the future of commerce and management education in India and abroad. It explores how OER foster inclusivity by providing a platform for diverse perspectives and discusses their potential for customization to meet evolving industry and regional needs. Furthermore, the article explores the pedagogical benefits of OER, emphasizing their ability to foster active learning, collaborative engagement, and critical thinking among students. It highlights how integrating OER can empower educators to embrace innovative teaching methods, thereby enhancing the overall quality of commerce and management education. Additionally, the research addresses the challenges and considerations tied to OER adoption in these disciplines, encompassing issues related to quality assurance, intellectual property, and technological infrastructure. In conclusion, the article underscores the significant role of OER in reshaping commerce and

[1] Assistant Professor, Department of Commerce, Banwarilal Bhalotia College, Asansol, West Bengal, India.

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management education, rendering it more affordable, accessible, and adaptable. It advocates for keen collaboration among educators, institutions, and policymakers to fully unlock the potential of OER in higher education, ultimately shaping a brighter future for commerce and management professionals.

Key words: *Open Educational Resources (OER), Commerce and Management Education, Global Perspectives, Pedagogical Advantages, Critical Thinking, Innovative Teaching Methods, Intellectual Property, OER Initiatives etc.*

Introduction:

In the ever-evolving world of higher education, the incorporation of Open Educational Resources (OER) has emerged as a transformative force, reshaping the way knowledge is disseminated, acquired, and utilized. Within this dynamic environment, the field of commerce and management education is not an exception. The rising costs of traditional educational materials and the demand for pedagogical innovation have converged to make commerce and management disciplines a fruitful ground for the exploration of OER's role and importance. Open Educational Resources, characterized by their accessibility, affordability, and adaptability, have emerged as powerful catalysts of change within the educational realm. They hold the promise of reducing financial burdens on students and institutions, thereby democratizing access to knowledge. In doing so, OER also provide a platform for diverse and global perspectives, fostering inclusivity and cultural richness in educational content. Moreover, OER's inherent flexibility allows for customization and localization, ensuring that the educational materials align with the ever-evolving needs of industry and the unique characteristics of regional contexts. Beyond these pragmatic advantages, OER also hold the potential to revolutionize pedagogical practices within commerce and management education. They encourage active learning, collaborative engagement, and critical thinking among students, aligning with the evolving demands of the job market. The integration of OER empowers educators to adopt innovative teaching methods, thereby enhancing the quality of education provided. However, the incorporation of OER into higher education is not without its challenges and considerations. Quality assurance,

issues related to intellectual property, and the need for robust technological infrastructure all loom as significant hurdles on the path to OER integration. Therefore, this research article embarks on an exploration of the multifaceted role and importance of OER in commerce and management education, delving into the transformative possibilities they offer and the hurdles that must be surmounted for their successful adoption. Through a comprehensive analysis of successful OER initiatives and an examination of the challenges posed by their integration, this article aims to showcase the significance of OER in reshaping commerce and management education, making it more affordable, accessible, and adaptable. It also advocates for increased collaboration among educators, institutions, and policymakers to harness the full potential of OER in higher studies, ultimately paving the way for a brighter future for commerce and management professionals.

Literature Review:

The literature review in this article extensively covers various aspects to be explored. It categorizes existing works into two sections: the first section examines studies conducted within the Indian context, while the second section focuses on research conducted worldwide.

Indian Perspective: Sharma and Kapoor (2017) delved into the state of OER and e-Learning in India, providing valuable insights into the utilization and availability of OER resources within the country's educational system.

In their study, Prasanna Venkatesh and Geetha (2018) discussed the role of Open Educational Resources (OER) in developing quality assurance and accreditation practices in higher education in India. Their research focused on how OER could contribute to enhancing educational quality.

Kumar and Murthy (2018) explored the opportunities and challenges associated with OER adoption in Indian higher education. Their research offered insights into the evolving landscape of OER implementation within the Indian educational context.

Singh and Sharma (2019) examined the potential of OER for management education in India. They emphasized the relevance of OER in enhancing teaching and learning practices, particularly within the field of management education.

Murugesan and Sankar (2020) conducted a case study exploring the utilization of OER in higher education institutions in India. Their work delved into the practical aspects of OER implementation, shedding light on its impact on the Indian education landscape.

Global Perspective: Lane (2009) discussed the impact of openness in bridging educational digital divides, particularly how OER can contribute to overcoming barriers to education.

Hodgkinson-Williams and Gray (2009) discussed the emergence of OER at the University of Cape Town, offering insights into the institutional experience and challenges faced during the implementation of OER.

Dhanarajan and Porter (2013) provided an Asian perspective on OER, discussing the relevance and challenges of OER adoption in the region.

Bliss and Patrick (2013) report explored how OER can serve as a catalyst for innovation in education, emphasizing the transformative potential of open resources in learning.

Yuan and Powell (2013) examined the implications of Massive Open Online Courses (MOOCs) and OER for higher education, particularly in the context of global accessibility to educational resources.

The Hewlett Foundation (2013) report addressed the significance of OER in education, advocating for the open sharing of educational resources to enhance learning opportunities.

In their mapping study, Mulder, Janssen, and Verstelle (2015) explored the educational potential of OER, summarizing existing research and identifying key areas of impact.

The Hilton III (2016) review focused on OER research published between 2015 and 2018, particularly highlighting student efficacy and user perceptions regarding open educational resources.

The Babson Survey Group (2017) presented a comprehensive overview of the state of OER in U.S. higher education. Their report provided insights into the adoption and impact of OER in American educational institutions.

In his work, Cox (2017) discussed the potential of OER and mobile technology in narrowing the learning divide. His focus was on how OER could be accessed and effectively utilized through mobile devices.

In their study, Kimmons and Veletsianos (2018) employed data mining methods to analyze Twitter discourse surrounding open education, providing valuable insights into the online discussion and perception of OER. Conole and Mak (2018) conducted a study on learning and teaching strategies in the open education landscape, examining the role of OER in educational innovation.

In their work, Wiley and Hilton III (2018) proposed a framework for defining OER-enabled pedagogy, emphasizing the pedagogical aspects of using open educational resources.

In their research, Mtebe and Raisamo (2018) investigated students' acceptance of mobile learning in higher education and its relation to OER, highlighting the role of OER in mobile learning environments.

In their work, Zaid & Alabi (2021) investigated the factors contributing to the longevity and effectiveness of OER programs within the Nigerian higher education system. The research assesses the challenges faced by universities in maintaining OER initiatives and proposes strategies for their sustained implementation.

McBride & Abramovich (2022) explored the role of open educational resources (OER) as boundary objects in higher education. The study investigated the transformative potential of OER adoption in breaking down silos and fostering interdisciplinary cooperation within the higher education environment.

The article of Zulaiha, D., & Triana, Y. (2023) focussed on students' perceptions of the use of open educational resources (OER) to enhance their writing skills. The study investigated students' attitudes, preferences, and challenges when utilizing OER for writing skill development and offered valuable feedback on the practical application of OER in language education.

These articles collectively provide a comprehensive overview of the state of OER in various contexts, from Indian higher education to international perspectives, encompassing topics such as utilization, challenges, impact, and pedagogical considerations.

Research gaps:

Based on the foregoing literature survey on Open Educational Resources (OER) in commerce and management education the following research gaps have been identified:

(i) Underrepresented Regions: More studies are required to investigate OER adoption and its impact in underrepresented

regions within the Indian subcontinent and globally. Many studies focussed on prominent institutions, but there may be gaps in our understanding of OER utilization in less well-known educational settings.

(ii) Cultural Context: Empirical studies are required to gauge how cultural factors influence OER adoption and customization within commerce and management education, both in India and globally Studies are also required to explore the role of cultural differences in the design and adaptation of OER materials.

(iii) OER Accessibility: More studies are required to assess the accessibility of OER platforms and resources for students and educators, especially in resource-constrained regions. Discussion are necessary to identify gaps in access and to propose solutions for ensuring equitable distribution.

(iv) Teacher Training: In order to investigate the need for and effectiveness of OER-related teacher training programs for faculty members in commerce and management education primary data analysis are required specially in Indian context. This will help to identify the gaps in current training initiatives.

(v) OER Policy Implementation: Research works to investigate the effectiveness of OER policies and initiatives in driving institutional change are limited in number. More studies are required to explore how policy frameworks impact OER integration, and identify gaps in policy implementation.

(vi) Pedagogical Innovation: Several studies are required to explore innovative pedagogical approaches that can be enhanced by OER in commerce and management education. Researches are essential to identify specific strategies that harness OER for active learning, problem-solving, and skill development.

(vii) Interdisciplinary Collaboration: Discussions and studies are required to explore the potential for interdisciplinary collaboration facilitated by OER in commerce and management education. More research work will be helpful to investigate how OER can bridge gaps between these disciplines and promote cross-disciplinary learning.

(viii) Inclusive Education: More studies in Indian context are required to examine the role of OER in promoting inclusive

education in commerce and management. These studies will be helpful to investigate how OER can address the needs of diverse student populations, including those with disabilities.

(ix) Industry Integration: Studies on industry integration to explore the role of OER in bridging the gap between academia and industry within commerce and management education have not been noticed. Such studies could investigate how OER can facilitate industry-relevant skill development.

Besides these studies may be conducted on long term impact of OER, Sustainability of OER etc.

Objectives:

Based on the identified research gaps, this study has certain objectives. These are summarized as follows

(i) Assessing OER Utilization: To investigate the extent of Open Educational Resources (OER) utilization in commerce and management education, both within the Indian subcontinent and internationally, and to identify the key factors influencing its adoption.

(ii) Comparative Study: To conduct a comparative analysis between the Indian experience and international experiences of OER adoption in commerce and management education, highlighting similarities, differences, and lessons learned.

(iii) Analyzing Challenges and Solutions: To identify and analyze the common challenges and barriers associated with OER adoption in commerce and management education, and to propose effective strategies and solutions based on insights from the literature.

(iv) Recommendations for Effective Implementation: To derive practical recommendations for educators, institutions, and policymakers, drawing from the literature's insights, in order to maximize the potential of OER in enhancing commerce and management education at both regional and global levels.

Database and Methodology:

Based on the study's objectives and identified research gaps, secondary data have been systematized covering the period from 2013 to October, 2023. This data was sourced from various platforms including websites, journals, news reports, etc. The focus

was on gathering information related to the availability and utilization of Open Educational Resources (OER). Additionally, financial data was obtained from quality assessment reports of numerous higher education institutions of India, USA, Japan, Malaysia, Thailand etc. with a specific emphasis on commerce and management education.

To analyze the collective data, the following methodologies were employed:

(a) Content Analysis: This involved an examination of existing OER materials to gauge their adaptability to industry demands and regional contexts, considering possibilities for customization and localization.

(b) Pedagogical Assessment: To explore the educational advantages of OER, a review of literature was conducted to compare outcomes in courses utilizing OER against those using traditional resources.

(c) Literature Review: A comprehensive survey of literature was undertaken to identify successful OER initiatives in commerce and management education. Implementation strategies and resultant outcomes were meticulously analyzed.

(d) Quantitative and Qualitative Data Analysis: Statistical software was utilized to analyze quantitative data, while qualitative data from surveys, interviews, and content analysis underwent both statistical and thematic analyses to extract meaningful insights.

(e) Comparison and Synthesis: Findings from each objective were compared and synthesized to form comprehensive conclusions regarding the significance and role of OER in commerce and management education.

Analysis:

At the outset a table is presented to make a comparative analysis between India, a representative of developing economy and USA being a representative of developed economy to portray the progress in adoption of Open Educational Resources (OCR) and Open Educational Courseware (OCW). From India Swayam, ePG Pathshala and Vidyamitra have been considered and OER Commons and MIT OCW have been chosen from USA as they turned out to be the major and renowned contributories in this field from different studies. The analysis of the table will provide a clear idea to the reader regarding the landscape of OER in developed and developing economy. The table

clearly shows that around 25% of OER and 4% of OCW is contributed by Indian counterparts whereas approximately 75% of OER and 96% of OCW comes out from US Partners. This discrepancy in contribution can be attributed to various factors, including social perspectives, economic considerations, and structural disparities within the educational systems of the two nations.

NAME OF OER/OCW PLATFORMS	SUBJECT DOMAIN	NUMBER OF OERS	NUMBER OF OCWS	PERCENTAGE OF OERS	CUMULATIVE PERCENTAGE OF OERs	PERCENTAGE OF OCWs	CUMULATIVE PERCENTAGE OF OCWs
INDIA							
Swayam		NA	10	NA		0.74906367	0.754716981
ePGPathshala	Buisness Economics	457	NA	4.287456609		NA	
	Commerce	469	NA	4.400037527		NA	
	Management	599	NA	5.619664134	14.30715827	NA	NA
Vidya Mitra	Accounting	63	4	0.591049817		0.299625468	
	Business Management	73	2	0.684867248		0.149812734	
	Business Economics	469	14	4.400037527		1.048689139	
	Business Law	5	1	0.046908716		0.074906367	
	Commerce	548	17	5.141195234		1.27340824	
	Commercial law	19	1	0.178253119		0.074906367	
	Financial Management	60	4	0.562904588	11.60521625	0.299625468	3.220973783
TOTAL		2762	53	25.91237452		3.970037453	

UNITED STATES OF AMERICA							
OER Commons	Accounting	57	NA	0.534759358		NA	
	Finance	168	NA	1.576132845		NA	
	Management	354	NA	3.321137067		NA	
	Marketing	395	NA	3.705788536	9.137817807	NA	
MIT OCW	Commerce	822	332	7.711792851		24.86891386	
	Management	6101	950	57.23801482	64.94980767	71.16104869	96.02996255
TOTAL		7897	1282	74.08762548		96.02996255	
TOTAL OF INDIA AND USA		10659	1335		100		100

Table 1: COMPARATIVE ANALYSIS OF RENOWNED OER AND OCW PLATFORMS OF INDIA AND USA AS ON 31ST OCTOBER, 2023

Source: Official websites of SWAYAM, e-PG Pathshala, Vidya Mitra, OER Commons and MIT OCW

In the following pie diagram (Fig-1), the scenario regarding OER contributions have been presented. Here we have excluded Swayam as their OERs are not accessible without registration in OCW provided by them. So Swayam has been considered as the provider of OCW only in this study. From the diagram it is evident that Indian contributions are significantly smaller than US Contributions.

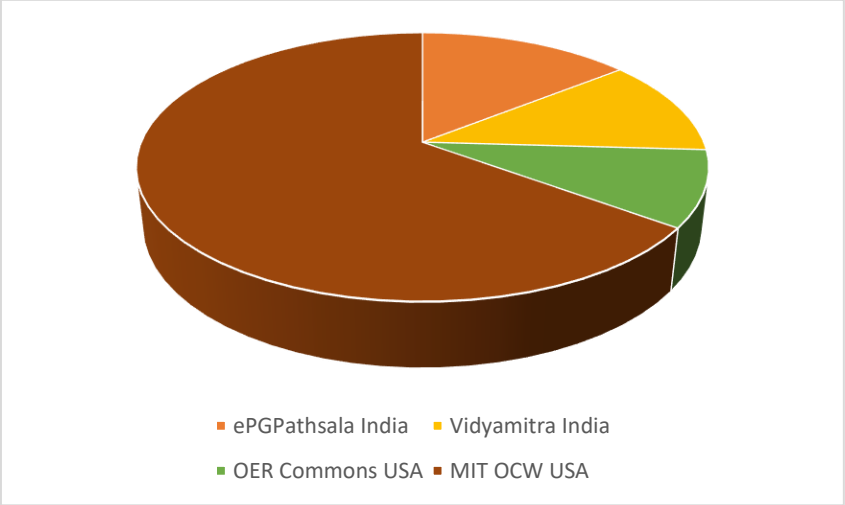

Figure 1: PERCENTAGE OF OER PROVIDED BY RENOWNED OER PLATFORMS IN INDIA AND USA

The following bar diagram (Fig-2), depicts the contribution in the field of OCW by Indian and US stakeholders. Here we have excluded ePG Pathshala and OER commons because they do not provide any OCW to the academic fraternity. The diagram clearly represents the hell-heaven difference between the contributions of two different countries. Clearly US picture is predominantly brighter than Indian scenario.

RESEARCH GRANTS RECEIVED 2023-2024

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ESTD. 1944

BANWARILAL BHALOTIA COLLEGE

Constituent College of Kazi Nazrul University

Govt. sponsored (U.G.& P.G.)

College with potential for Excellence

Asansol-713303, West Bengal (India)

Report

On

PROJECTS AND OTHER GRANTS RECEIVED BY FACULTIES OF THE COLLEGE

2023-2024

ICSSR Seminar grant details of Dr Debashish Mandal

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH
Aruna Asaf Ali Marg

Ref. No. NIS/IS/153/IC/2023-24 **Dated: 07.10.2024**

The Principal
Banwarilal Bhalotia College
Asansol-713303, West Bengal

Subject: Release of second and final Installment of the grant for organizing an International seminar on **"Environmental Issues, Global Politics, & India's Leadership: Historical Perspectives"**.

Dear Sir/Madam,

In continuation of the Council's letter on the above subject, I am directed to convey the sanction of the ICSSR for the payment of Rs. 25,000/- (Rs. Twenty Five Thousand only) to The Principal, Banwarilal Bhalotia College as second and final instalment of the total grant of Rs. 1,00,000/- sanctioned for the above-mentioned seminar held during 04-05 March 2024.

The amount of Rs. 25,000/- will be released on receipt of the enclosed grant-in aid bill duly signed and stamped by the Competent Authority of the College/University/Organization along with the bank detail for RTGS transfer of the grant. A revenue stamp may also be affixed.

The expenditure will be debited to the budget head "General/ (OH31) NIS- (National Seminars& International Seminars)".

(Dr. Abhinav Piyush)
Deputy Director (NIS)
For Member Secretary

Copy for information and necessary action to:

1. **Dr. Debashis Mandal**
   Assistant Professor
   Department of History
   Banwarilal Bhalotia College
   Asansol-713303, West Bengal

2. Finance Branch is requested to transfer amount of Rs.25,000/-as per the PFMS details given and place it on the file.

(Dr. Abhinav Piyush)
Deputy Director (NIS)
For Member Secretary

ICSSR Seminar grant details of Dr Shantanu Mullick

Phone : (033) 2436 0093
2436 0104
Email : info@ercicssr.org
icssrerc@gmail.com
Website : www.ercicssr.org

भारतीय सामाजिक विज्ञान अनुसंधान परिषद
पूर्वी क्षत्रीय केन्द्र
(शिक्षा मंत्रालय)

ICSSR-ERC

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH
EASTERN REGIONAL CENTRE
(Ministry of Education)
1/R-1 Baishnabghata Patuli Township, Kolkata 700 094

Ref.:ICSSR-ERC/2024-25/29

Date: 18.06.2024

Program ID : 5138/24-25/RES

To
Dr. Santanu Mallick
Assistant Professor
GT Road, Ushagram
Asansol
Pin-713303

Dear Dr. Mallick,

Your proposal, dated 08/04/2024 requesting funds for organizing a Five-day Research Methodology Workshop on Social Sciences during July 8-12, 2024 has been considered and an amount of Rs.1,25,000/-(Rupees one lakh twenty five thousand only) has been sanctioned by the ERC towards partial financial assistance for the above mentioned workshop.

The sanctioned grant in aid of Rs.1,25,000/- will be released in two installments, i.e.

i) 1st installment Rs.1,00,000/-
ii) 2nd installment Rs.25,000/-

We shall now require a formal request addressed to the Director, ICSSR-ERC in a letter head signed by you, in order to release the amount of Rs.1,00,000/- towards the first installment of the sanctioned amount **indicating name of the payee with bank details**. Disbursement of the final installment of funds shall be made on receipt of the workshop papers/ proceedings, audited statement of accounts and utilization certificate duly certified by the auditor (soft copies at info@ercicssr.org and hard copies by speed post or courier). It is to be noted that the financial grant from the ICSSR-ERC must be mentioned in subsequent flyers, notices, banners and workshop proceedings. The ICSSR-ERC may send one or more observers from its office to attend the workshop.

With best wishes,

Saibal Kar
(Hony. Director)
ICSSR-ERC

ICSSR Seminar grant details of Dr Gautam Maji

Phone : (033) 2436 0093
2436 0104
Email : info@ercicssr.org
icssrerc@gmail.com
Website : www.ercicssr.org

भारतीय सामाजिक विज्ञान अनुसंधान परिषद
पूर्वी क्षत्रीय केन्द्र
(शिक्षा मंत्रालय)

ICSSR-ERC

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH
EASTERN REGIONAL CENTRE
(Ministry of Education)
1/R-1 Baishnabghata Patuli Township, Kolkata 700 094

Ref.:ICSSR-ERC/2023-24/66 Date: 04.09.2023

Program ID : 5070/23-24/SEM

To
Dr. Goutam Majee
Assistant Professor
Department of History
Banwarilal Bhalotia College
Asansol
PIN - 713303

Dear Dr. Majee,
Your proposal, dated 2.06.2023 requesting funds for organizing a seminar on "Gender, Culture and Politics in 20th Century Bengal" by the Department of History, Banwarilal Bhalotia College, Asansol during September 20-21, 2023 has been considered and an amount of Rs.1,20,000/- (Rupees one lakh twenty thousand only) has been sanctioned by the ICSSR-ERC towards partial financial assistance for the above mentioned seminar.

The sanctioned grant in aid of Rs.1,20,000/- will be released in two installments, i.e.
i) 1st installment 70,000/-
ii) 2nd installment 50,000/-

We shall now require a formal request addressed to the Director, ICSSR-ERC in a letter head signed by you, in order to release the amount of Rs.70,000/- towards the first installment of the sanctioned amount **indicating name of the payee with bank details**. Disbursement of the final installment of funds shall be made on receipt of the seminar papers/ proceedings, audited statement of accounts and utilization certificate duly certified by the auditor (soft copies at info@ercicssr.org and hard copies by speed post or courier). It is to be noted that the financial grant from the ICSSR-ERC must be mentioned in subsequent flyers, notices, banners and seminar proceedings. The ICSSR-ERC may send one or more observers from its office to attend the seminar.

With best wishes,

Saibal Kar
(Hony. Director)
ICSSR-ERC

ICSSR Seminar grant details of Dr Amalendu Samanta

Phone : (033) 2436 0093
2436 0104
Email : info@ercicssr.org
icssrerc@gmail.com
Website : www.ercicssr.org

भारतीय सामाजिक विज्ञान अनुसंधान परिषद
पूर्वी क्षत्रीय केन्द्र
(शिक्षा मंत्रालय)

ICSSR-ERC

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH
EASTERN REGIONAL CENTRE
(Ministry of Education)
1/R-1 Baishnabghata Patuli Township, Kolkata 700 094

Ref.:ICSSR-ERC/2023-24/103 Date: 15.12.2023

Program ID : 5095/23-24/SEM

To
Dr. Amalendu Samanta
Assistant Professor
Banwarilal Bhalotia College
P.O. – Sripally Bardhaman
Dist. – Puba Bardhaman
Pin - 713103

Dear Dr. Samanta,
Your proposal, dated 14.07.2023 requesting funds for organising a seminar on "Transforming Education and Empowering Entrepreneurs: NEP 2020's Impact on Vocational and Conventional Learning in India" by the Department of Commerce, Banwarilal Bhalotia College, Purba Bardhaman during January 8-9, 2024 has been considered and an amount of Rs.70,000/- (Rupees seventy thousand only) has been sanctioned by the ICSSR-ERC towards partial financial assistance for the above mentioned seminar.

The sanctioned grant in aid of Rs.70,000/- will be released in two installments, i.e.
i) 1st installment 60,000/-
ii) 2nd installment 10,000/-

We shall now require a formal request addressed to the Director, ICSSR-ERC in a letter head signed by you, in order to release the amount of Rs.60,000/- towards the first installment of the sanctioned amount **indicating name of the payee with bank details**. Disbursement of the final installment of funds shall be made on receipt of the seminar papers/ proceedings, audited statement of accounts and utilization certificate duly certified by the auditor (soft copies at info@ercicssr.org and hard copies by speed post or courier). It is to be noted that the financial grant from the ICSSR-ERC must be mentioned in subsequent flyers, notices, banners and seminar proceedings. The ICSSR-ERC may send one or more observers from its office to attend the seminar.

With best wishes,

Saibal Kar
(Hony. Director)
ICSSR-ERC

SERB Project details of Dr Shubharthi Sarkar

FILE NO. SUR/2022/001419

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(A statutory body of the Department of Science & Technology, Government of India)

Science and Engineering Research Board
3rd & 4th Floor, Block II
Technology Bhavan, New Mehrauli Road
New Delhi - 110016

Dated: 22 September, 2023

ORDER

Subject: Financial Sanction of the research project titled **Numerical investigation of MHD Taylor column phenomenon in a rotating viscous fluid considering the penetration of magnetic field and heat transfer** under the guidance of Dr. Subharthi Sarkar, Department of Mathematics, Banwarilal Bhalotia College, Asnasol , Gt rd, ushagram, asansol, Bardhaman, West bengal-713303 - Release of Ist grant.

Sanction of Science and Engineering Research Board (SERB) is hereby accorded to the above mentioned project at a total cost of **Rs. 618350/-** (Rs. Six Lakh Eighteen Thousand Three Hundred and Fifty Only) with break-up of **Rs. *282140*/- under Capital (Non-recurring) head** and **Rs.*336210*/- under General (Recurring) head** for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 618350**/- has been approved are given below:

The following budget may be considered for **Banwarilal Bhalotia College, Asnasol, GT Rd, Ushagram, Asansol**

S. No	Head	Total (in Rs.)
A	**Non-recurring**	
1	Equipment -> Online UPS -> Laser Printer -> Workstation Computer -> Computer Monitor	282140
A'	Total (Non-Recurring)	**282140**
B	**Recurring Items**	
1	Recurring - I : (Research Personnel) Recurring - II : (Consumables, Travel, Contingencies) Recurring - III : Scientific Social Responsibility	0 280000 0
2	Recurring - IV : (Overhead Charges)	56210
B'	Total (Recurring)	**336210**
C	**Total cost of the project (A' + B')**	**618350**

2. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website (www.serb.gov.in).

3. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

4. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 90,000 each should be spent for travel and contingency.

5. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

6. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.

7. The institute will furnish to the SERB, separate Utilization certificate (UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

8. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

9. The research personnel sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any beyond the duration of the project

10. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

11. The project File no. SUR/2022/001419 should be mentioned in all communications arising from the above project. The organization/institute/university should ensure that the technical support/financial assistance provided to them by SERB should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by SERB.

12. Sanction order for release of funds under a) Non-recurring and b) Recurring will be issued separately depending on the availability of funds. The project become operational from the day the first release of grant received by the implementing Institute.

(Dr. V Ramesh)
ms_pac_sure@serbonline.in

To,
Under Secretary
SERB, New Delhi
Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R.Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB , New Delhi.
3.	File Copy
4.	**Dr. Subharthi Sarkar** **Department of Mathematics** **Banwarilal Bhalotia College, Asnasol , Gt rd, ushagram, asansol, Bardhaman, West bengal-713303** **Email: ssarkar@iitbbs.ac.in** **Mobile: 919709132343** (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit www.serb.gov.in.)
5.	**PRINCIPAL,** **Banwarilal Bhalotia College, Asnasol, GT Rd, Ushagram, Asansol** (Receipt of Grant may be intimated by name to the undersigned)

(Dr. V Ramesh)
ms_pac_sure@serbonline.in

SERB-SURE project details of Dr Abhik Ghosh

-------- Forwarded message --------
From: «SERB_Administrator@serbonline.in»
Date: Mon, May 8, 2023 at 10:47 AM
Subject: SERB-Notification
To: «serbinfo1@gmail.com»

Science and Engineering Research Board
(Statutory Body Established Through an Act of Parliament : SERB Act 2008)
Department of Science and Technology, Government of India

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)

Science and Engineering Research Board
3rd & 4th Floor, Block II
Technology Bhavan, New Mehrauli Road
New Delhi - 110016

Approval Letter

File Number: SUR/2022/000595

Dated: 08-May-2023

Subject: Project titled "Ionospheric effect on the redshifted 21-cm radio-interferometric observations with uGMRT and satellite observations".

Dear Dr. Abhik Ghosh,

The project cited above has been recommended by the related **State University Research Excellence (SERB SURE)** to the Science and Engineering Research Board (SERB) for funding. The following are the items recommended for a period of 3 years. The final budget to be sanctioned would be based on quotations received, existing norms, funds availability etc.

The committee recommended the following budget

Manpower :
-> Junior Research Fellow - 1
Equipment Details : Rs. 500000
-> Workstation - 1
-> Printer - 1
Consumables : Rs. 20000
Other Cost : NIL
Travel Cost: As per norms
Contingencies : As per norms
Overhead : As per norms

You need to accept the above budgetary allocation before proceeding further. To accept the budgetary recommendations , you may follow the following steps :

1. Go to www.serbonline.in through your credentials

2. Go to Menu --> Proposal submission --> View submitted proposals

3. Click on the link under Status column "Proposal Approved, Acknowledgment pending from PI"

You are requested to upload the following documents of the approved budget strictly within one month from the date of this letter.

1. Upload the lowest quotation for equipment/s (including freight, insurance, customs charges etc., if any).
2. Salary structure for the project staff (including HRA, Medical Benefits, if applicable etc.).
3. A certificate stating that any visit abroad for a period more than eight weeks would be undertaken after due permission from SERB, may also be submitted.
4. RTGS details of the implementing institute to facilitate transfer of the fund as per the template.
5. Any other documents (as detailed bellow specific the programme concerned).

SERB has adopted the Scientific Social Responsibility (SSR) Policy which mandates SERB Grantees to undertake some SSR activities during their project period. You are requested to read the SSR guidelines available under SSR menu and choose the activities according to your preference. Please note that choosing the SSR activities is mandatory for issue of financial sanction subject to submission and acceptance of other necessary documents

Kindly upload the documents related viz., animal ethical clearance certificate, institutional bio safety clearance certificate, etc., matching with exact approved title of project submitted to SERB.

If the project does not require (viz., animal ethical clearance certificate, institutional bio safety clearance certificate, etc.,) please confirm with a self-certification saying that it does not involve any animal/human studies or genetic modification in any organisms or bio safety issues.

(Kindly note that during the issue of sanction order or during the implementation of this project, if SERB come across/found that the project work involves/requires animal/human studies or genetic modification in any organisms or bio safety issues, RCGM approval/ approval from Biodiversity Management Committee Environmental clearance, the project may be terminated without any notice.)

Please note that release of grant is subject to availability of funds under the scheme. Kindly quote the reference number in all future correspondence. The project's reference no. **SUR/2022/000595** may also be mentioned in all research communications arising from the above project.

Yours sincerely,

(Dr. V Ramesh)

Email: ms_pac_sure@serbonline.in

Dr. Abhik Ghosh

Physics

Banwarilal Bhalotia College, Asansol , Gt Rd, Ushagram, Asansol, Bardhaman, West Bengal-713303