



IQAC, DU Students Research Conference

January 29, 2026

Organizer

**Institutional Quality Assurance Cell (IQAC)
University Of Dhaka**



1st IQAC, DU Students Research Conference 2025

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29 January 2026



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Keynote Speeches

Keynote 1

From Curiosity to Contribution: Building Research Minds for Bangladesh and Beyond

M. Rezaul Islam
Director, IQAC, University of Dhaka

Student research lies at the heart of knowledge creation, innovation, and societal transformation. In an era marked by rapid technological change, complex social challenges, and global uncertainty, universities are no longer mere sites of knowledge transmission; they are engines of inquiry, evidence, and impact. This keynote reflects on the transformative journey from *curiosity* to *contribution*, highlighting how student-led research can evolve from classroom questions into meaningful academic, policy, and societal outcomes.

Drawing on examples from science, the social sciences, the arts, and business studies, the keynote emphasises the importance of cultivating a strong research mind-set, grounded in critical thinking, methodological rigour, ethical integrity, and interdisciplinary engagement. It explores how student research can address pressing national and global challenges, including public health, climate change, social inequality, technological disruption, and sustainable development, while positioning young scholars as future researchers, innovators, and leaders.

The keynote also underscores the role of research ethics, academic integrity, and responsible use of emerging technologies—particularly artificial intelligence in shaping credible and socially responsive scholarship. By situating student research within both the Bangladesh context and the global knowledge ecosystem, the session aims to inspire students to view their research not as an academic requirement but as a lifelong intellectual commitment and a public responsibility.

Ultimately, this keynote calls upon students to embrace research as a pathway to discovery, contribution, and impact, encouraging them to transform curiosity into evidence, ideas into innovation, and knowledge into meaningful change for Bangladesh and beyond.



Keynote 2

Fixing the Future: From Hypothesis to Hustle-Entrepreneurship and Innovation in Action

Dr. Syed Abidur Rahman
Associate Professor, University of Sharjah

This keynote, *Fixing the Future: From Hypothesis to Hustle-Entrepreneurship and Innovation in Action*, makes a clear case for why Bangladesh must urgently reorient its development strategy toward research-driven entrepreneurship. With a young population, millions of graduates entering the job market each year, persistent youth underemployment, and a relatively low MSME contribution to GDP, the speech argues that traditional job creation pathways are no longer sufficient. The future, it stresses, will not be inherited, it must be deliberately built.

Challenging the long-held myth that research belongs in journals while entrepreneurship belongs only in markets, the keynote demonstrates that many of the world's most impactful ventures began as research questions. Local examples such as bKash, Pathao, and ShopUp are used to show how clearly framed problems: financial exclusion, urban mobility inefficiencies, and SME supply-chain gaps were transformed into scalable ventures. To guide this transition, the keynote introduces the **HUSTLE Framework** (Hypothesis, User, Solution, Testing, Learning, Expansion), offering a practical roadmap from academic inquiry to market and policy impact.

The speech emphasizes the evolving role of universities as idea factories rather than certificate shops and highlights skills that matter more than CGPA, including problem framing, data literacy, experimentation, and ethical leadership. It concludes with a call for students, faculty, and institutions to jointly build a research-to-venture ecosystem essential for Bangladesh's innovation-led future.



Keynote 3

Ethics in Research: An Overview

Professor Dr.SalehHasanNaqib
Honourable Vice-Chancellor
University of Rajshahi

Research ethics constitutes a foundational framework that guides the responsible conduct of scholarly inquiry across disciplines. Research ethics addresses issues of data integrity, confidentiality, and privacy, mandating honest data collection, analysis, and reporting, as well as the secure handling of sensitive information. Ethical considerations also extend to authorship, plagiarism, conflicts of interest, and responsible publication practices. By integrating ethical principles throughout all stages of research-from design to dissemination-research ethics not only safeguards the practitioners but also strengthens public trust, enhances scientific validity, and supports the advancement of knowledge for the greater good.



Part 1: Science

Developing A Suicide Prevention Training Manual for Dhaka University Students Based on Cognitive Behavior Therapy

Tahmida Nusrat
Dept. of Clinical Psychology

Abstract:The present study aimed to develop a therapist's manual for providing suicide prevention training to Dhaka University students based on cognitive behavior therapy. The process included groundwork, draft preparation, judge evaluation, and finalization. The groundwork included literature review, need assessment, and expert interviews. Need assessment was done through a semi-structured focus group discussion with practitioners managing suicidal cases and in-depth interviews with clients with prior attempts. Experts from psychiatry, clinical psychology, and counseling psychology were interviewed. Thematic analysis identified four major themes- poor coping skills, cognition, hopelessness, and lack of goal-directed behavior- with fifteen sub-themes.

In response to these needs, an initial draft of the manual was developed, combining knowledge and skills. The manual emphasized psychoeducation and structured interventions that were brief, effective, and time-limited. Skills incorporated included emotion regulation, problem-solving, crisis management, relaxation, thought identification and modification, developing reasons for living, and goal setting. Eleven judges evaluated the manual's fluency, content, and structure. Most supported its effectiveness, with suggestions incorporated. The final draft accumulated all the feedback and was planned for piloting.

Keywords: Suicide Prevention, Training Manual, Dhaka University Students, Cognitive Behavior Therapy

Simulation and Performance Evaluation of WRF-ARW in Modelling the Structure, Track, and Intensification of Extremely Severe Cyclonic Storm Mocha over the Bay of Bengal

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Abstract:Tropical cyclones over the Bay of Bengal pose severe risks to coastal communities, with rapid intensification events greatly amplifying their impacts. In May 2023, Extremely Severe Cyclonic Storm (ESCS) Mocha underwent rapid intensification and caused significant damage in Bangladesh and Myanmar. This study evaluates the performance of the Weather Research and Forecasting (WRF-ARW) model (v4.6) in simulating Mocha's structure, intensity, and trajectory, and identifies key atmospheric drivers of intensification. WRF-ARW successfully simulates ESCS Mocha's track, intensity, and drivers, reproducing the storm's rapid intensification and overall structure. Intensification was associated with strong low-level vorticity ($\sim 300 \times 10^{-5} \text{ s}^{-1}$), deep moisture (relative humidity $>80\%$ below 500 hPa), and low vertical wind shear ($<10 \text{ m/s}$). The simulated track closely followed India Meteorological Department observations over the ocean but diverged near landfall, likely due to limitations in representing land-surface interactions. Post-landfall weakening involved dry air intrusion, increased vertical wind shear ($>35 \text{ m/s}$), and disrupted convergence-divergence patterns. These findings demonstrate WRF's capability for operational cyclone forecasting in the Bay of Bengal and highlight the importance of higher-resolution ensembles and improved land-surface parameterizations for enhancing coastal impact predictions and preparedness.

Keywords: Cyclone, ESCS Mocha, WRF, Track, Intensity



Paradoxical Role of Y Chromosome Loss in Papillary Renal Cell Carcinoma: Multi-Omic and Single-Cell Insights into Tumor Biology and Prognosis

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Abstract: Loss of Y chromosome (LOY) is the most commonly occurring somatic event in elderly males. Though LOY is associated with poor outcomes in some other cancers, it shows better survival in pRCC, representing a complex biological paradox. The study was designed to dissect the molecular mechanism and predict the potential reasons behind the better survival. The pathway enrichment analysis and tumor microenvironment analysis elucidate the molecular mechanism of LOY in pRCC. Leveraging this differential expression landscape, we deployed a machine learning-driven approach to derive and rigorously validate a minimal 6-gene prognostic signature (*WASF1*, *MTHFD2*, *PRC1*, *MXD3*, *CDKN2C*, *CHMP1A*), which served as a potent and independent classifier of patient risk stratification. Finally, single-cell transcriptomics and DNA methylation analysis reveal the mosaic nature of LOY and localized the expression of our prognostic genes primarily within myeloid populations and the epigenetic modifications of LOY related prognostic gene signature. We conclude that LOY may have less aggressive tumor profile in pRCC, and the gene signatures might be potential LOY-related biomarkers.

Keywords: LOY, pRCC, TME, prognostic gene signature, single-cell RNA sequencing

Comparative analysis of XYH₃ (X= K,Ca,Mg) ternary hydride cubic perovskites for hydrogen storage properties: A computational approach

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Abstract: Hydrogen storage materials are gaining increasing attention as promising candidates for clean energy technologies, particularly in solid-state systems where stability and reversibility are critical. In this work, density functional theory (DFT) calculations within the generalized gradient approximation (GGA-PBE) framework are employed to investigate the structural, electronic, optical, mechanical, and thermodynamic properties of the heavy-metal ternary hydrides CaYH₃, KYH₃, and MgYH₃. Structural stability trends, evaluated using **Goldschmidt tolerance factors** of 0.922 (KYH₃), 0.835 (CaYH₃), and 0.745 (MgYH₃), indicate that all three compounds fall within the perovskite-formable range, with KYH₃ exhibiting the highest geometric stability. **Electronic structure** analysis reveals that all compounds display semiconducting behavior, as confirmed by band-structure and density-of-states calculations, with a clear depletion of states at the Fermi level separating the valence and conduction bands. Comparative analysis shows that KYH₃ possesses the widest band gap, CaYH₃ exhibits an intermediate gap, and MgYH₃ shows a relatively narrower gap, reflecting systematic electronic variation across the series. **Mechanical property** analysis indicates that all compounds are mechanically stable but brittle in nature, with KYH₃ being the stiffest and MgYH₃ the softest. The calculated Debye temperatures correlate well with lattice rigidity, supporting these mechanical trends. **Optical absorption** spectra demonstrate activity in both the visible and ultraviolet regions, suggesting potential optoelectronic applicability. Finally, **gravimetric hydrogen storage** capacities are found to be comparable among the three hydrides, with MgYH₃ exhibiting a relatively higher capacity of 2.60 wt%, compared to 2.31 wt% for KYH₃ and 2.29 wt% for CaYH₃, indicating its modestly enhanced suitability for hydrogen storage applications.

Keywords: Hydrogen Storage; Density Functional Theory (DFT); Ternary Hydrides; Electronic Structure; Mechanical Stability.



A study on the Association between Social Connectivity and Mental Health with the Mediating Role of Adolescent Violence: A Structural Equation Approach for Ordinal Logistic Regression

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Abstract

Objective: The main objective of this study is to analyze the mediating role of Adolescent Violence on the association between Social Connectivity and Mental Health among the married female adolescents in Bangladesh.

Methodology: This research utilizes of ordinal mediation analysis by Structural Equation Modeling (SEM) approach to understand the complex relationship between social connection and mental health by violence to exposure using Bangladesh Adolescent Health and Wellbeing Survey (BAHWS) 2019-20.

Results: Around 55.20% of married female adolescents in Bangladesh suffer from mental issues and 14.30% of them have a severe level of depression. Additionally, almost one out of every three married adolescent girls appears a victim of adolescent violence in Bangladesh. The bivariate analysis shows that mental health is significantly associated with adolescent violence and social connection. In multivariate analysis, the SEM shows that violence is a key determinant of depression and the social connection enhances the mental health by reducing the exposure to violence among adolescents.

Recommendation: The policymakers should take necessary steps for raising awareness about emotional intelligence, stress management, and conflict resolution. The government should tackle the root causes of adolescent violence by addressing socioeconomic inequality, lack of opportunities, and family dysfunction.

Keywords: Mental Health, Adolescent Violence, Proportional Odds Model, Non-proportional Odds Model, Partial Proportional Odds Model.

Phage Therapy for the Elimination of Food-Borne Pathogens: Identification and Formulation of Phage Cocktail

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Abstract: Foodborne illnesses caused by pathogens like *Salmonella typhi* and *Listeria monocytogenes* cause major public health challenges. Bacteriophage represents promising biocontrol method for improving food safety while maintaining beneficial microbme. This research showcases preliminary results from an ongoing project focused on isolating and characterizing lytic phages targeting foodborne pathogens. Environmental samples were collected and 11 bacterial hosts were isolated, including eight *S. typhi* and three *L. monocytogenes* strains, using selective media. PCR was used to identify the virulence genes *invA* and *hlyA*. Antimicrobial resistance profiling (MDR) showed 66.7% of *L. monocytogenes* isolates were resistant to ciprofloxacin and 75% of *S. typhi* isolates were resistant to ampicillin. By using overlay tests to extract host-specific phages, it was possible to find three phages that could lyse two *Salmonella* hosts each, one phage that could lyse four *Salmonella* strains, and three *Listeria* phages that were effective against all three host strains. Current work



focuses on morphological and stability characterization, high-throughput genome sequencing, bioinformatics annotation to identify genes related to host specificity, resistance, and therapeutic potential. The final phase will evaluate a phage cocktail against biofilm-associated pathogens on meat samples. These findings will support the development of targeted phage-based interventions for improving food safety.

Keywords: Bacteriophage, Food-borne pathogens, Phage cocktail, Overlay assay, Biofilm

Construction of Homicorcin variants with enhanced productivity and activity through *in silico* and *in vivo* techniques

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Abstract: Homicorcin, novel class I lantibiotic from *Staphylococcus hominis* MBL_AB63 exhibiting potent antimicrobial activity against Gram-positive pathogens including MRSA. This study aimed to enhance the biosynthesis rate and antimicrobial potency of homicorcin through *in-silico* NNK mutagenesis. Molecular Operating Environment (MOE) tool was used to dock wild-type Homicorcin to its cognate biosynthetic enzymes (HomB, HomC, HomP and HomT) to establish baseline interaction profiles. *In-silico* site saturation mutagenesis generated a comprehensive mutant library, identifying three superior variants: K52R, K52W, and D54W. Interaction with HomB increased by 2.7, 9.1, and 3.2 kcal/mol and with HomC by 1.12, 5.64, and 7.02 kcal/mol for K52R, K52W, and D54W mutant variants respectively. The binding affinity of K52R and D54W increased with HomP by 0.1658 and 0.1310 kcal/mol respectively. Notably, D54W exhibited maximum interaction with Lipid II by an increment of 0.0381 kcal/mol). The structural stability and interaction dynamics were validated by performing molecular dynamics simulation of the complexes using GROMACS. The simulation results revealed that, the mutants demonstrated enhanced enzyme recognition and processing efficiency while maintaining stable conformations. These carefully crafted mutants serve as attractive candidates for experimental validation and establish a framework for building lantibiotics with improved biosynthesis rates and therapeutic efficacy against a broad spectrum of antibiotic-resistant bacteria.

Keywords: Antimicrobial Peptides, Lantibiotics, Site-directed mutagenesis, NNK mutagenesis, Molecular dynamics simulation, Peptide Engineering.

Exposure-Driven Risk Assessment of Acrylamide and Heavy Metals in Cereal-Based Baby Food Samples Coupled with Physicochemical and Microbial Analyses

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Abstract: Commercial cereal-based baby food products are consumed for their convenience and nutrient density, yet concerns remain regarding chemical contaminants, heavy metals, and microbial safety. To address these issues, fifteen products (ten international and five local) from Dhaka, Bangladesh, were analyzed for physicochemical, toxicological, and microbial parameters. Moisture content, measured by oven drying to assess stability, ranged from $2.44 \pm 0.02\%$ to $4.42 \pm 0.05\%$ in international samples and $5.17 \pm 0.02\%$ to $7.22 \pm 0.01\%$ in local ones. Ash content, determined through dry ashing to estimate mineral residue, ranged from $1.99 \pm 0.02\%$ to $3.58 \pm 0.01\%$ in international and $2.18 \pm 0.02\%$ to $3.35 \pm 0.02\%$ in local products. Soluble dietary fiber, analyzed by



acid extraction, varied from 0.25 ± 0.01 to 4.34 ± 0.11 g/100 g in international samples and 2.34 ± 0.11 to 3.59 ± 0.07 g/100 g in local ones. Acrylamide, quantified by GC-ECD, was detected in all samples. Heavy metals assessed by ICP-MS showed elevated levels, with THQ, HI, and CR exceeding infant limits. Microbial testing indicated higher TABC in local samples and yeast and mold in three products. Overall, results emphasize the need for stricter manufacturing and regulatory control to ensure baby food safety.

Keywords: Cereal-based baby food products, Target Hazard Quotients (THQ), Hazard Index (HI), and Carcinogenic Risk (CR).

Green Synthesis and Characterization of ZnO Nanoparticles from *Dalbergia candenatensis* (Dennst.) Prain Leaves and Evaluation of Antioxidant, Antibacterial and Anticancer Potentials along with *in-silico* Studies

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Abstract: Zinc oxide nanoparticles (ZnO NPs) were synthesized using an aqueous leaf extract of *Dalbergia candenatensis* (Dennst.) Prain through a green synthesis approach. The nanoparticles were characterized using UV-Visible spectrophotometry, Fourier transform infrared, X-ray diffraction, field emission scanning electron microscopy, and energy-dispersive X-ray spectroscopy analysis. The UV-Vis spectrum exhibited a distinct absorption peak at 375 nm, while FTIR spectrum revealed characteristic Zn-O stretching vibrations. XRD confirmed a hexagonal wurtzite crystalline structure with an average crystallite size of 28.81 nm. FESEM displayed predominantly hexagonal shaped particles with an average size of 61.70 nm, and EDX confirmed high elemental purity. ZnO NPs exhibited notable antioxidant potential, along with substantial antibacterial activity against the selected bacterial strains. Notably, *E. coli* showed the highest susceptibility, exhibiting a zone of inhibition of 17 ± 0.44 mm at 100 $\mu\text{g}/\text{well}$ concentration. Cytotoxicity studies against HeLa cells revealed a dose-dependent cytotoxic response ($\text{IC}_{50} = 120.69 \mu\text{g}/\text{mL}$), compared to the standard doxorubicin. Gas Chromatography-Mass Spectrometry profiling of the crude extract identified 31 phytoconstituents, among which several compounds demonstrated notable binding affinities toward target receptors in molecular docking studies, compared to standards. The findings support the biomedical relevance of *D. candenatensis*-mediated ZnO NPs and their phytoconstituents, underscoring their potential for multifunctional therapeutic applications in nanomedicine.

Keywords:

antioxidant activity, antibacterial activity, cytotoxicity, *Dalbergia candenatensis*, ZnO NPs.

Synthesis and Exploration of Biological Potentials of Two Chalcone Compounds

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Abstract: Chalcones, belonging to the α,β -unsaturated ketone family, are important scaffolds in medicinal chemistry due to their structural simplicity and broad spectrum of biological activities including antimicrobial, anticancer, anti-inflammatory, and antioxidant activities. In the present study,



3-nitrochalcone called (*E*)-3-(3-nitrophenyl)-1-phenylprop-2-en-1-one was synthesized via Claisen–Schmidt condensation reaction and subsequently converted into a pyrazole derivative called 5-(3-nitrophenyl)-3-phenyl-4,5-dihydro-1*H*-pyrazole through cyclization with appropriate hydrazine reagent. The compounds were purified using P-TLC, column chromatography, and subsequently characterized with spectroscopic techniques like FTIR and ¹H-NMR. Antioxidant and anticancer properties of the compounds were evaluated. Results revealed anticancer property of both the compounds, since they lowered the survival rate of HeLa cell line below 5%. However, DPPH free radical scavenging activity assay suggested that pyrazole derivative possessed more potent antioxidant activity (IC₅₀ = 8.56 μg/ml) than the parent one, which was also supported by TAC and FRAP tests. Further comprehensive study must be required to establish them as potential lead pharmacological compounds.

Keywords: Chalcone, Antioxidant, DPPH, Anticancer, HeLa Cell Line

Urbanization-induced Changes in Surface Temperature and Ecosystem Carbon Dynamics in Sylhet and Sundarban Regions, Bangladesh

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Abstract: Urban expansion often leads to a decline in green spaces and a rise in land surface temperature (LST), intensifying local climate change and the ecosystem carbon dynamics. This study examines the spatio-temporal effects of urban expansion on surface temperature and ecosystem carbon dynamics in the Sylhet, Bangladesh analyzing skin temperature, normalized difference vegetation index (NDVI), net primary productivity (NPP), net ecosystem exchange (NEE), relative humidity (RH), and CO₂ emissions. By integrating multi-year satellite observations, the research quantifies the relationship between urbanization, vegetation loss, and thermal environment changes. Preliminary findings show elevated skin temperatures with decreased NDVI and NPP, indicating vegetation loss and reduced productivity. Increased RH and shifts in NEE suggest a transition from carbon sink to source, whereas other forested areas (Near the Sundarban Regions) maintain lower temperatures and stronger carbon sequestration. These results highlight the link between urban-induced warming, vegetation degradation, and ecosystem carbon balance. Conserving and restoring urban green spaces is essential for mitigating surface heat and sustaining ecosystem functions in rapidly developing regions

Keywords: Urbanization, Land Surface Temperature, NDVI, Net Primary Productivity, Net Ecosystem Exchange, Heterotrophic Respiration, Carbon Dynamics, Sylhet Division.

Synthesis of Cerium Oxide (CeO₂) Nanoparticles and Their Application in Textile Wastewater Treatment for Heavy Metal Removal and Dye Degradation

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Abstract: The textile industry is a major source of wastewater containing toxic heavy metals and persistent synthetic dyes, which cause severe environmental pollution and health hazards. This study reports the synthesis of cerium oxide (CeO₂) nanoparticles and explores their potential application in textile wastewater treatment for heavy metal removal and dye degradation. CeO₂ nanoparticles were



synthesized using a simple, low-cost wet chemical precipitation method followed by calcination to improve crystallinity and stability. The synthesized nanoparticles were characterized by X-ray diffraction, Fourier transform infrared spectroscopy, scanning electron microscopy, and UV-Visible spectroscopy to confirm their phase purity, surface morphology, and optical properties. The treatment performance of CeO₂ nanoparticles was evaluated through batch adsorption and photocatalytic degradation experiments. Results demonstrated that CeO₂ nanoparticles exhibit high adsorption efficiency toward heavy metal ions such as Pb²⁺ and Cd²⁺ due to their large surface area and reversible Ce³⁺/Ce⁴⁺ redox behavior. In addition, significant degradation of textile dyes was achieved under UV and visible light irradiation, attributed to oxygen vacancies and enhanced generation of reactive oxygen species. The effects of pH, contact time, and nanoparticle dosage on removal efficiency were systematically investigated. The findings indicate that CeO₂ nanoparticles are an efficient, reusable, and environmentally friendly material with strong potential for sustainable textile wastewater treatment applications.

Keywords: CeO₂ nanoparticles; Textile wastewater; Heavy metal removal; Dye degradation; Photocatalysis

Chaperones as a novel therapeutic avenue in Glioblastoma multiforme: results from a multi-faceted computational analysis

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Abstract: Glioblastoma multiforme (GBM) is the most aggressive, Grade IV astrocytic glioma, characterised by poor prognosis, extensive heterogeneity, and resistance to conventional therapies like temozolomide (TMZ) with a dismal median survival of only 12–15 months. In this study, we employed a comprehensive in silico approach to identify key chaperones involved in GBM pathophysiology and to explore drug repurposing strategies targeting these proteins. Transcriptomic analysis of 220 human molecular chaperones across publicly available datasets revealed that ERP27 (PDIA8), a non-catalytic member of the protein disulfide isomerase (PDI) family, is consistently upregulated in both primary and recurrent GBM. Protein–protein interaction network analysis demonstrated that ERP27 interacts with multiple PDI family members and ER-associated chaperones implicated in tumour survival. To identify potential modulators of ERP27, DrugBank compounds were screened for central nervous system compatibility, followed by AI-based interaction prediction using the LIGHTHOUSE platform and molecular docking analysis. Several FDA-approved or clinically relevant compounds, including Latrunculin A, Capmatinib, Repotrectinib, and Selitrectinib, exhibited strong predicted binding to ERP27. These findings highlight ERP27 as a promising therapeutic target and demonstrate the utility of AI-driven drug repurposing for identifying novel GBM treatment strategies.

Keywords: Glioblastoma multiforme (GBM), ERP27, molecular chaperones, drug repurposing, tumor survival



Probiotics as a Tool to Enhance Gut Homeostasis for Female Specific Microbiome Health in Bangladesh

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Abstract: Gut homeostasis is essential for digestive health, immune balance, metabolic stability, urinary tract health and acid-hormone balance in women. In Bangladesh, low dietary diversity and reliance on refined carbohydrates contribute to lower microbial diversity; leading to gastrointestinal imbalance, e.g. heart-burn, chest pressure, acidity and Irritable Bowel Syndrome (IBS). Probiotics represent an important dietary intervention to restore and maintain gut health. Data were compiled from regional and international studies (2015-2025) assessing the effects of culturally accessible probiotic-rich food on microbial diversity and gut barrier function in urban and rural female populations. Among 1,131 Bangladeshi women, 33.8% reported recurrent upper abdominal pain and 46.6% experienced regular heartburn. However, regular intake of naturally probiotic-rich foods increased *Lactobacillus* and *Bifidobacterium* abundance by 15-40%. Improvements in stool regularity and reduced bloating were reported among Bangladeshi women. These suggest that microbial metabolites from probiotic-rich foods enhance mucosal integrity and promote a more resilient gut ecosystem without reliance on commercial supplements. Naturally probiotic-rich foods represent a low-cost, accessible strategy to support gut homeostasis in Bangladeshi women. Further female-focused studies in Bangladesh are needed to refine diet, health and long-term outcomes.

Keywords: Bangladesh, gastrointestinal, homeostasis, microbiota, women

Valorization of Leather and Plant Biomass Waste for the Development of Biodegradable Packaging Films

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Abstract:The increasing environmental impact of conventional plastic packaging has driven the search for sustainable and biodegradable alternatives derived from renewable and waste-based resources. This study aims to develop a biodegradable and active packaging material using gelatin extracted from leather industry waste, nanocellulose derived from *Manilkara hexandra* leaves and *Terminalia arjuna* bark, and silver nanoparticles (AgNPs). Gelatin was recovered through controlled acid or alkaline extraction methods, while nanocellulose was isolated using environmentally friendly chemical and mechanical treatments. Silver nanoparticles were synthesized using both conventional chemical methods and green synthesis routes employing plant-based reducing agents. Biodegradable packaging films were prepared by incorporating nanocellulose and AgNPs into a gelatin matrix at varying concentrations to enhance functional performance. The developed films were characterized for their structural, mechanical, thermal, and barrier properties using standard analytical techniques. Antimicrobial activity, biodegradability, and environmental safety were evaluated through microbial inhibition and soil burial studies. The results are expected to demonstrate improved mechanical strength and barrier performance due to nanocellulose reinforcement, along with effective antimicrobial activity imparted by AgNPs. This research presents a sustainable waste-valorization strategy for producing eco-friendly packaging materials and supports circular economy and environmental sustainability.

Keywords: Biodegradable packaging, gelatin, silver nanoparticles, circular economy, sustainability



***MTHFR* Promoter Methylation and Homocysteine Metabolism: Exploring an Epigenetic-Metabolic Axis in Breast Cancer**

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Abstract: Breast cancer is a biologically heterogeneous disease in which genetic regulation and epigenetic mechanisms jointly contribute to disease initiation and progression. Among epigenetic processes, DNA methylation plays a critical regulatory role by modulating gene expression without altering the underlying DNA sequence. Aberrant methylation patterns are increasingly recognized as key contributors to oncogenic pathways, particularly those involved in genomic stability and cellular metabolism [1]. The methylenetetrahydrofolate reductase (*MTHFR*) gene is a central component of one-carbon metabolism, which influences folate utilization and homocysteine homeostasis, and dysregulation of this pathway has been implicated in cancer susceptibility [2].

This study employs a combined molecular and biochemical approach to investigate the association between *MTHFR* gene promoter DNA methylation and homocysteine metabolism in breast cancer. The promoter methylation status of *MTHFR* gene will be assessed using bisulfite-treated DNA isolated from formalin-fixed, paraffin-embedded (FFPE) breast tumor tissues, followed by methylation-specific real-time PCR, further validated by pyrosequencing analyses (Figure 1). Circulating homocysteine levels will be quantified from fasting plasma samples using enzyme-linked immunosorbent assay (ELISA) (Figure 2). Appropriate methylated and unmethylated DNA controls will be included to ensure analytical validity.

It is anticipated that aberrant promoter methylation of the *MTHFR* gene may be more prevalent in breast cancer compared with non-malignant conditions and that such epigenetic alterations could be associated with elevated homocysteine levels. These expected findings may provide insight into how disrupted one-carbon metabolism and epigenetic regulation contribute to breast cancer pathogenesis and may support the potential utility of *MTHFR* methylation and homocysteine status as biomarkers in breast cancer risk assessment.

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Validation of an Integrated Multi-Antigen with DIVA-Compatible Diagnostic Kit for Foot-and-Mouth Disease Virus (FMDV)

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Abstract: Foot-and-Mouth Disease Virus (FMDV) remains one of the most contagious and economically devastating pathogens affecting cloven-hoofed animals worldwide. FMDV is endemic in South Asia, including Bangladesh, where serological surveillance is often compromised by the performance of imported diagnostic kits, which frequently fail to detect antibodies against locally circulating viruses. Furthermore, the lack of affordable, field-adaptable assays capable of detecting multiple serotypes while differentiating vaccinated from naturally infected animals (DIVA)



necessitates the need for a locally optimized diagnostic platform. In this study, an integrated protein-based diagnostic system was developed using five recombinant antigens derived from local FMDV strains, including serotype-specific VP1 proteins for serotypes O, A, and Asia1, a serotype-independent VP2 protein, and the non-structural DIVA marker protein 3AB. Antigenic performance was evaluated by indirect ELISA using a total of 147 sera from infected, vaccinated, and naïve cattle. Assay reproducibility and diagnostic reliability were assessed, and the performance was validated through comparative analysis with a commercially available Asia1-specific ELISA kit. Statistical correlation analysis showed a high degree of agreement ($r > 0.95$) between the two systems. All recombinant proteins were successfully expressed and confirmed for antigenic integrity. The developed multi-antigen ELISA demonstrated high diagnostic sensitivity and specificity, effectively distinguishing infected, vaccinated, and naïve animals. Comparative validation using the commercial assay kit revealed strong concordance between the two systems, confirming the robustness and reliability of the in-house assay. Overall, this study validates a locally optimized, multi-antigen, and DIVA-compatible ELISA platform for FMDV, providing a cost-effective and reliable tool for improved serological surveillance and control of foot-and-mouth disease in endemic settings.

Keywords: Foot-and-Mouth Disease Virus (FMDV), Recombinant antigen, Indirect ELISA, DIVA diagnostics, Serological surveillance

Spatial Pathogen Profiling and Phenotypic Characterization of Multidrug-Resistant Pathogen from Beach Water of Cox's Bazar

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Abstract: Coastal recreational waters are increasingly recognized as reservoirs of multidrug-resistant (MDR) bacteria, posing emerging public health risks. This study investigates the spatial distribution and pathogen profiling of MDR Enterobacteriaceae from four major recreational beaches of Cox's Bazar, Bangladesh. They are Sugondha, Kolatoli, Laboni, and Patuarterk. Marine water samples were cultured on selective and differential media (mTEC, MacConkey, and TCBS agar), yielding a total of 61 bacterial isolates. Presumptive identification was performed using standard biochemical assays including oxidase, catalase, MIU, and citrate utilization tests, revealing the presence of diverse enteric and potentially pathogenic bacterial groups.

Beach-wise pathogen profiling is being conducted to compare the distribution of dominant bacterial groups, resistance phenotypes, and adaptive traits among the four sites. The ongoing phase focuses on antimicrobial susceptibility testing, biofilm formation, and salinity and temperature tolerance assays to identify highly adaptive and high-risk MDR phenotypes. Selected potent isolates will subsequently undergo whole-genome sequencing for comprehensive virulome and resistome characterization.

This study aims to construct a spatial pathogen risk profile of Cox's Bazar beaches and establish a genomic baseline of marine MDR bacteria, supporting environmental surveillance, antimicrobial resistance monitoring, and evidence-based public health risk assessment.

Keyword: Recreational marine water, Pathogen profiling, Public health, Multidrug-resistant, Enterobacteriaceae



Microbial Profiling of Vaginal Microbiota in BV-Positive and BV-Negative Infertile Women Using 16S rRNA Metagenomics

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Abstract:

Background: Bacterial vaginosis (BV) is a dysbiosis of the vaginal microflora linked to female infertility. It involves depletion of *Lactobacillus* and overgrowth of anaerobic bacteria.

Methods: Vaginal samples from BV-positive (n=2) and BV-negative (n=2) infertile women were analyzed via 16S rRNA gene sequencing. Microbial composition was assessed at phylum, family, genus, and species levels. Alpha diversity (richness and evenness) and beta diversity (Bray-Curtis dissimilarity) were calculated. Differences between groups were evaluated using PERMANOVA.

Results: BV-positive samples were dominated by *Lactobacillus iners* (52–75%), with detectable *Gardnerella swidneskii*, *Ureaplasma urealyticum*, Prevotellaceae, and Peptoniphilaceae, reflecting transitional dysbiosis. BV-negative samples were primarily dominated by *Lactobacillus crispatus* with minimal BV-associated taxa. Alpha diversity was higher in BV-positive samples, indicating reduced *Lactobacillus* dominance and increased microbial heterogeneity. Beta diversity analysis revealed clear clustering between BV-positive and BV-negative groups (PERMANOVA, $p < 0.05$).

Conclusion: 16S metagenomic profiling highlights microbial shifts in BV-positive infertile women, characterized by *L. iners* dominance and emerging anaerobes. These results provide insights into microbiota-mediated mechanisms of infertility and may guide targeted interventions to restore a healthy vaginal ecosystem.

Key Words: Infertility, Bacterial Vaginosis, Alpha diversity, Beta diversity, PERMANOVA



Part 2: Social Science

Reinforcing or Challenging Tradition: Gender Roles in Bangla Secondary Education Textbook

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Abstract:As Bangladesh prepares to implement a new curriculum, it is important to critically examine existing textbooks to ensure that gender disparities are not carried forward. This study focuses on Class 6–10 Bangla textbooks to explore how gender roles are represented and reinforced in the national curriculum. A mixed-methods approach was employed: quantitative analysis measured the ratio of male to female authors, protagonists, and figures in illustrations, while qualitative analysis applied feminist critical discourse analysis to textbook narratives. The results reveal that male characters dominate as central figures and in visual space, while female characters are limited to domestic or victimized portrayals. These patterns reinforce traditional hierarchies and reduce women’s visibility as agents of change. The study suggests that future textbooks should aim for balanced representation so that students grow up with a fairer and more critical understanding of gender roles.

Keywords:Educational equity, Textbook analysis, Gender roles, Secondary education, Curriculum

A study on the impact of different teaching methods on the academic performance of hearing-impaired students of Government Deaf schools in Bangladesh

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Abstract: Hearing impairment poses significant challenges to communication and learning, with over two million individuals affected in Bangladesh. Government Deaf schools play a vital role in providing education and support, yet teaching practices and resources vary widely, influencing student outcomes. Despite increased awareness, there remains limited empirical research comparing the effectiveness of different teaching methods for hearing-impaired students. This study aims to assess the impact of diverse instructional strategies such as direct instruction, sign language, visual aids and peer tutoring on the academic performance of students in government deaf schools across Bangladesh.

Adopting a mixed method approach, the research combines quantitative assessment of students' achievement in mathematics and language with qualitative insights from teacher and student interviews, focus groups and classroom observations. Stratified random sampling will be used to select students from Grade 4 to 8 across seven schools, ensuring representative coverage. Data analysis will involve statistical comparison of test scores between teaching-method groups and thematic coding of qualitative data to capture classroom practices and challenges. The study is expected to identify which instructional approaches most positively affect comprehension and performance, while also highlighting barriers teachers face in implementation.

Findings will provide evidence-based recommendations to inform policy, teacher training and resource allocation, ultimately enhancing educational outcomes for hearing-impaired learners in Bangladesh.



The Effects of Relational Social Capital on the Vulnerability Reduction of Female Workers in the RMG Industry

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Abstract: Violence and harassment against women workers and their vulnerability are common phenomena in the ready-made garments (RMG) industry in Bangladesh. Although financial capital or livelihood pattern of female workers in RMG industry is being somewhat improved but they don't get proper support from their colleagues, supervisors, and owners during the trouble situation. Literature in prior studies shows that the sustainable livelihoods approach of workers provides an alternate means of determining vulnerability using capital assets such as relational social capital. The presence of these assets like trust, norms, reciprocity, support and respect enables female workers to pursue diverse livelihood strategies which ultimately serve to reduce their vulnerability. However, the lacking of empirical studies focusing on the effect of social capital on the female workers vulnerability reduction in the RMG industry is still evident in literature. Therefore, this study is aimed at measuring the attributes of relational social capital in the RMG industries and their role in the reduction of vulnerability among female RMG workers. The study was conducted in the context of RMG industry in Bangladesh. The study is qualitative in nature. A focus group discussions and in-depth interviews with the KII were conducted to collect the data especially exploring the key determinants relating to the social capital and their effect on female workers vulnerability reduction. The findings revealed that there is a high degree of the lacking of social capital practices in RMG sector of Bangladesh. This study recommends that it is high time to apply the social capital practice properly to reduce the vulnerability issues among the female workers in the RMG industry of Bangladesh. It can also reduce verbal abuse, sexual harassment, work related stress, job insecurity, health hazards, turnover, discrimination, deprivation etc. in the RMG sector.

Keywords: Social Capital, Vulnerability, Female Workers, RMG Industry

Integrating Palliative Care into Public Health: Pathways to Holistic Healthcare in Bangladesh

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Abstract: Palliative care is an essential component of comprehensive healthcare, yet in Bangladesh it remains underdeveloped and insufficiently embedded within the public health system. This study, titled "Integrating Palliative Care into Public Health: Pathways to Holistic Healthcare in Bangladesh," seeks to i) examine the current status of palliative care services in public sector, ii) Identify key barriers to integration- including policy gaps, workforce shortages, and socio-cultural constraints – and iii) propose recommendations for incorporating palliative care into national health planning. A qualitative research approach was adopted, combining document and policy review with semi-structured interviews involving 25 participants, including healthcare professionals, policymakers, and family caregivers. Participants were selected through purposive sampling from public hospitals and community health centers in Dhaka. Data were analyzed thematically, guided by frameworks from the World Health Organization (WHO,2018) and the Worldwide Hospice Palliative Care (WHPCA,2020). The findings emphasize the need for workforce development, community-based service models, and policy-level commitment to ensure equitable access to holistic, culturally sensitive palliative care across Bangladesh.



Keywords: Palliative Care, Public Health Integration, Holistic Healthcare, Bangladesh. Submitted By
The Blooming Transformation: Floriculture and Post-Green Revolution Shift in Peasant Livelihoods in Godkhali, Jashore

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Abstract: Godkhali, known as the “Flower Capital” of Bangladesh has a great transition through Green Revolution, which introduced technological intensification and commercialized agriculture but the rise of floriculture represents a new phase of market-centered diversification shaped by digital connectivity. This study investigates the emergence of floriculture in Godkhali and its role in the post-Green Revolution transformation of the aspects (economic, cultural, social) of peasant society. The study looks at how rural livelihoods, economic relationships, and social dynamics have changed as a result of this agricultural shift in Godkhali. Drawing on qualitative field interviews, participant observation, and secondary data analysis, the study explores the processes through which floriculture has diversified income sources, strengthened women’s participation in productive activities, and integrated small-scale producers into regional and national markets through the use of the internet and social media. The findings suggest that flower farming has not only elevated living standards but also redefined the peasantry’s identity—from subsistence-oriented cultivators to market-oriented entrepreneurs. However, challenges are present such as market volatility, unequal digital access, and environmental pressures. The study argues that floriculture in Godkhali reflects a transition in peasant society - where technological modernization, commercialization of agriculture, and digital media intersect to reshape the identity and agency of rural producers in a globalizing economy. There is also a theoretical discussion from peasant scholar A. Chayanov and Teodor Shanin.

Key Words: Floriculture, Green Revolution, Godkhali, Peasant Economy, Agrarian Transition

Maternal Deprivation Causing Effects on Children's Development: A Study on Employed Mothers and Children in Dhaka City

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Abstract: The changing relationship between mothers and children has significantly transformed the way children are raised in Bangladesh, departing from the traditional form. This paper focuses on how women's engagement in outdoor work has reshaped the future of children in the modern era. By using John Bowlby's attachment theory, Pierre Bourdieu's habitus concept, and social exchange theory, this study investigates damaging secure bonds, emotional instability, attachment insecurity, and intellectual disability. A qualitative approach was used to understand the consequences of maternal deprivation. By conducting in-depth interviews through purposive sampling on 15 children aged 5-15 years and 15 mothers who were involved in full-time work, and Focus Group Discussions (FGDs) on 35 mothers and substitute carers. The key findings had negative impacts on cognitive development, such as psychological risks, loneliness, anxiety, and disobedience. At the same time, the interviews explored relational constraints like poor emotional bonds, maternal aggression, repeated separation, and excessive anxiety. This study contributes to the causal relationship between employed mothers and deprived children and the effects of maternal deprivation on children’s growth in Dhaka City.

Key Words: Maternal deprivation, children's development, Employed mothers, Dhaka city.



Impact of Social Media on Mental Health: A Study of University Students in Dhaka city

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Abstract: Social media has a central role in the everyday lives of University students in Dhaka, and plays a role in communication, learning, identity formation, and emotional regulation. These platforms impact on the both support and the stress of the student's life, having a complex impact on wellbeing. This study investigates the relationship between certain social media platforms and mental health outcomes among university students such as stress, sleeping disturbance, attention challenge and social comparison. Using a mixed-methods approach, surveys were distributed among 80 students across five universities in Dhaka and 10 in-depth interviews were carried out with psychologists. Two important analyses are involved: (1) platform-wise usage patterns and screen time averages, and (2) correlation between the usage intensity and mental health indicators. Findings indicate that visually oriented and socially interactive social media such as Instagram and Facebook display strong associations with psychological strain while YouTube and WhatsApp are more frequently related to educational help ,peer support. The study depicts the importance of promoting balanced and healthy digital habits in students.

Key words: Social media, University students, mental health, Dhaka, digital wellbeing.

Implementation of The Miyawaki Method to Enhance Urban Green Spaces in Bangladesh

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Abstract: In recent decades, the urban areas in Bangladesh are experiencing a decline in forest cover and green space because of rapid urbanization, population growth and so on. Consequently, these cities are dealing with both man-made and natural disasters, which have adverse effects on local communities and climate change. To address this alarming issue immediate and effective measures are required. While traditional urban planning has mostly concentrated on infrastructural developments and overlooked the importance of integrated green solutions, this study presents the Miyawaki Urban Forest Method as a solution for restoring urban green spaces. This is an afforestation and reforestation technique of planting fast-growing native species to create dense and biodiverse urban forests. A mixed-method research approach is adopted to both collect and analyze data through field observations, interviews, surveys, and to evaluate implementation strategies, community engagement and biodiversity outcomes. Previous findings indicate that the Miyawaki Method is more effective in maintaining the global environment, reducing climate change, restoring indigenous ecosystems and preventing disaster compared to conventional afforestation methods. This study demonstrates the potentiality of implementing the Miyawaki Method to enhance urban green spaces, mitigate climate change, and to guide in urban planning and policy making in Bangladesh and other developing countries.

Key Words: Miyawaki Method, Urban Green Spaces, Afforestation, Biodiversity, Urban Planning



From Policy to Practice: Digital Governance and Public Service Delivery through Union Digital Centres in Bangladesh: A Qualitative Multiple Case Study

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Abstract: Bangladesh is practising decentralization for ensuring public service delivery at the grassroots level and a citizen-focused governance system where the local communities get access to government services conveniently. For ensuring better public service delivery, Bangladesh has taken some digital initiatives at the grassroots level, Union Digital Centres (UDCs) are one of them. However, the main goal of UDCs is to reduce bureaucratic inefficiencies and improve public service delivery, but expected outcomes from their given services vary from area to area. This systematic study explores how UDCs actually work and the experiences of service providers and recipients for assessing the effectiveness of digital service delivery. Applying a qualitative multiple case study design, the study uses semi-structured interviews with UDC entrepreneurs, local government officials, and service recipients from selected UDCs in rural Bangladesh along with the document analysis of relevant policy guidelines. The findings show that the contribution of UDCs in improving convenience for citizens as well as decreasing transaction costs is really noteworthy. But some challenges (lack of digital literacy, institutional limitations) shape service outcomes. The study claims that, to achieve their goals, digital government initiatives (UDCs) need stronger institutional support, transparency, and accountability mechanisms. By highlighting the gap between policy goals and real implementation, this research contributes to the literature on digital governance and public administration in developing country contexts along with policy-relevant insights for ensuring effective and inclusive public service delivery in Bangladesh.

Keywords: Union Digital Centres; Digital Governance; Local Government; Public Service Delivery; Bangladesh

Human-AI Interaction and Social Lives of Bangladeshi Youth

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Abstract: As artificial intelligence increasingly enters the intimate spaces of everyday communication, concerns about the weakening of human connection have escalated. Among Bangladeshi youth, AI chatbots provide non-judgmental interaction, yet they challenge conventional understandings of relationships. This study examines the social and emotional significance of human–AI interactions among young people in Bangladesh. Despite global debates on AI and intimacy, empirical evidence on how Bangladeshi youth experience emotional and social engagement with chatbots remains limited. To address this gap, the study employed a quantitative cross-sectional design using a structured, anonymous survey that enabled participants to respond candidly. The findings indicate that chatbot use is primarily motivated by curiosity and entertainment. Levels of trust, intimacy, and perceived control over conversations remain low. Although chatbots are perceived as less judgmental, this does not translate into emotional closeness, meaningful self-disclosure, or increased confidence in real-life social relationships. Participants reported neither a sense of empowerment in social interactions nor improvement in offline social confidence, suggesting limited relational depth. These results suggest that developers may need to reconsider claims regarding AI's



capacity for emotional support and instead prioritize enhancing its reliability, minimizing controlling tendencies, and promoting the development of real-life social skills alongside digital engagement.

Keywords: human-AI intimacy, chatbot, emotional engagement, youth, Bangladesh

Academic Pressure and Mental Health: A Comparative Study of Public versus Private University Students

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Abstract:The academic pressure as a determinant of mental health problems among university students is varied and shaped by institutional contexts. This study is aimed at comparing levels of academic pressure as well as their effects on the concerned aspects of mental health namely stress, anxiety and depression among students studying in public and private universities in an urban setup. This research is also intended to identify the role of variables such as class sizes, availability of resources as well as student services. A mixed-method design will be used where quantitative data from a cross-sectional survey of 200 undergraduate students will be collected equally from public and private universities and qualitative data from semi-structured interviews with 20 students to explore their lived experiences and coping strategies through purposive sampling. Data analysis will be done through independent sample t-tests, correlation analyses, and thematic analysis. It is hypothesized that students attending public universities will report stressors associated with overcrowding and resource limitations, whereas students attending private universities may report stressors associated with tuition costs and academic competition. The findings will be used to provide context-specific mental health interventions and policy recommendations at higher education institutions.

Keywords: Academic pressure; Mental health; University students; Public and private universities; Stress management

Embodied Hygiene, Climate Stress, and Everyday Survival: An Anthropological Social Work Study in Urban Slums of Dhaka and Rajshahi

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Abstract:In the crowded lanes of Dhaka and Rajshahi's urban slums, climate stress is not an abstract future threat but a daily struggle written on people's bodies, routines, and dignity. The general objective of this paper is to understand how climate induced environmental stress reshapes everyday hygiene practices, embodied vulnerability, and social protection needs, through the combined lenses of anthropology and social work. This qualitative study uses purposive sampling to conduct 20 in depth case interviews and 5 focus group discussions with women, men, and adolescents living in selected slums. Anticipated findings include gendered hygiene insecurity under water scarcity, unsafe and overcrowded sanitation that heightens risks of violence and illness, heavy invisible care labour for women and girls, and climate driven trade offs between maintaining hygiene and sustaining precarious livelihoods. Data will be analyzed using thematic and verbatim analysis, alongside SWOT analysis to map strengths, weaknesses, opportunities, and threats in existing WASH practices and support systems, and an anthropological interpretive approach to situate meanings of cleanliness, dignity, and shame within local cultures and power relations. By connecting these lived experiences to



gaps in urban WASH, climate adaptation, and social protection policies, the study will generate realistic, rights based recommendations to guide high impact projects in low income urban contexts.

Keywords: slums, SWOT, WASH, hygiene, anthropological

Exploring the Impact of Father's Involvement on Children's Physical Healthcare

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Abstract: Introduction: This study explores fathers' involvement in their children's physical healthcare by highlighting the knowledge, perceptions, barriers and self efficacy of fathers shape their involvement in healthcare practices.

Methodology: 384 fathers are interviewed with at least one child aged under 5 using a structured questionnaire. Data were analyzed using frequency distribution and chi square to acknowledge the participation patterns and influencing factors.

Result: Findings show that normally fathers possess strong knowledge about child's healthcare practice and express positive views on their role in participating and maintaining child's healthcare. Most fathers are actively involved in a child's daily healthcare routine, acknowledge the importance of their involvement and understand the negative consequences of nonco-operation. Several factors motivate their participation, while time limits and sociocultural beliefs create notable barriers.

Discussion: The results highlight that fathers have a positive attitude towards their participation in child healthcare. But there are some structural and socio-cultural barriers that influence their involvement pattern.

Conclusion: Fathers illustrate strong awareness to support their child's physical health by specifying strengthening future paternal involvement through family support and work environment.

Keywords: Fathers involvement, Child healthcare, Early childhood, sociocultural barriers, self efficacy.

Education in Isolation: Assessing Socioeconomic Barriers to Primary and Secondary Educational Access Among Low-Income Families on Saint Martin Island, Bangladesh

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Abstract: This qualitative study examines socioeconomic barriers preventing educational access among low-income families on Saint Martin Island, Bangladesh. Despite free primary education policies, children from impoverished households face significant obstacles to schooling. This research investigates how economic constraints, cultural factors, and livelihood patterns, particularly within fishing communities, influence household decisions between children's education and labor force participation. Using purposive sampling, the study engages 30-40 families earning below Tk 12,000 monthly, alongside students, teachers, and community stakeholders. Data collection includes in-depth interviews, focus groups, home observations, and document reviews over 5-6 weeks. Thematic analysis will identify patterns in hidden educational costs, survival-versus-schooling trade-offs, gender-based educational disparities, and coping mechanisms of families maintaining educational continuity despite poverty. The research emphasizes the critical primary-to-secondary transition period and vulnerabilities of fishing-dependent households facing seasonal income fluctuations. Findings will provide evidence-based insights for policymakers and NGOs to design targeted



interventions addressing actual barriers facing impoverished families. By centering lived experiences of Saint Martin Island's most vulnerable residents, this study bridges the gap between educational policy intentions and ground-level realities in geographically isolated communities.

Keywords: Educational barriers, Poverty and education, Island Literacy, Gender disparity, Social Stigma

Perceptions and Expectations of Dhaka University Students regarding State Reform in Bangladesh.

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Abstract: The July 2024 mass uprising in Bangladesh sparked a nationwide call for comprehensive state reform, leading the interim government to establish several reform commissions. While universities worldwide often study student perspectives on governance and institutional reforms, Bangladesh has lacked such systematic efforts. To address this gap, the Dhaka University Research Society conducted a study titled “*Opinions and Expectations of Current Students of Dhaka University on State Reforms.*” The study employed a mixed-methods design, combining an online survey of 1,568 students with Key In-Depth Interviews to capture both measurable trends and deeper insights. Results indicate that a significant majority of students support non-partisan, issue-based student politics over party-driven agendas, with 63.7% endorsing the reinstatement of an interim non-party government and nearly 80% emphasizing constructive policy debate. Students prioritized judicial reform, electoral transparency, decentralization, and anti-corruption measures, with strong demands for accountability and institutional checks on executive overreach. While disillusionment with entrenched political practices - such as family-dominated politics - was widespread, students expressed a strong desire for meaningful democratic participation and youth representation in policymaking. Despite limitations of self-reported data and purposive sampling, the study offers timely insights into student expectations, contributing to both academic discourse and policy considerations for state reform in Bangladesh.

Key Words: Student Politics, Constitutional Reform, Electoral System, Accountability, Proportional Representation.



Part 3: Arts & Business Studies

Temporal Dynamics and the English-Driven Internationalization of Higher Education in Bangladesh: Coloniality, Commodification, and Power Structures

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Abstract: This research examines the role of English in the internationalization of higher education in Bangladesh, exploring its historical, cultural, and economic implications. It analyzes how colonial history, globalization, and development shape English's dominance in universities, revealing its impact on power structures and social inequalities. Using semi-structured interviews with 10 university administrators, 25 faculty members, and 5 policymakers, alongside surveys of 100 students, the study investigates English as a symbol of prestige and a tool for academic success and economic mobility, while highlighting the marginalization of non-English proficient students. The findings show that the dominance of English perpetuates colonial power structures, commodifies education, and deepens social inequality. However, resistance to English dominance exists, particularly in efforts to preserve the Bengali language and cultural knowledge. The study contributes to understanding how language policies reflect broader socio-political dynamics, with implications for institutional practices, student experiences, and national development. It raises critical questions about who benefits from English-driven internationalization and how it affects marginalized groups. The research offers insights for policy-making, curriculum development, and language reforms to promote inclusivity and reduce inequality in higher education.

Key words: English-driven internationalization, coloniality, commodification, higher education, and social inequality

Beyond ineffective Ecocentrism : A Virtue-Ethical Approach for Environmental Ethics.

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Abstract: The rise of non-anthropocentric environmental ethics, championed by Richard Routley, emerged as a response to the failure of the Western human-centered traditions in addressing environmental degradation. Despite the progress made with ecocentrism, we still see accelerating ecosystem loss, highlighting the flaws of anthropocentrism and the need for theories that appreciate nature's intrinsic value without inflicting harm. Various theories have tried to tackle this challenge—like Routley's ecocentrism, Singer and Regan's animal ethics, Naess' Deep Ecology, Rolston's intrinsic value theory, and Taylor's non-anthropocentric approach based on inherent worth—but they've faced criticism for being too abstract, unrealistic, or even misanthropic. Taylor's five principles based stance on the conflict between humans-nature differentiates it from non-anthropocentric ideals, but compromises principle's spirit. This opens the door for a practical, character-driven ethic that lead to a harmonious relationship between humans and nature by inspiring behavioral change. This study proposes a virtue-ethical approach that harmonizes human and environmental interests. It critiques existing theories and applies virtue ethics to redefine environmental harm as both harming nature and



loss of virtues. It suggest that protecting nature is closely linked to human flourishing (eudaimonia), presenting a virtue-focused model that blends theory and practice on a non-misanthropic environmental ethics.

Keywords:Environmental Ethics, Anthropocentrism, Non-anthropocentric, Non-misanthropic, Virtue-Ethical approach

Altmetrics in Academia: A quantitative research on Usage and Impact at the University of Dhaka

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Abstract:This study addresses a significant geographical gap in literature by investigating the awareness, usage, and perception of altmetrics within a major South Asian academic context. While traditional bibliometrics have well-documented limitations and altmetrics offer a broader view of engagement, their adoption is not globally uniform. This quantitative research surveyed 230 undergraduate and Master's students at the Department of Information Science and Library Management, University of Dhaka. The findings reveal a profound lack of awareness, with 76.1% of students unfamiliar with the term 'altmetrics' and heavily reliant on social media over institutional databases for scholarly information. The primary barrier to adoption was a fundamental lack of understanding (57.4%), not ideological opposition, which corresponds with strong student demand (66.1%) for formal education on the topic through workshops. The study also found that students with prior research experience engage more with altmetrics but are more critical of their reliability. This research provides the first quantitative evidence of the altmetrics knowledge gap in this context, concluding with a call for academic libraries in the Global South to develop interventions that bridge students' digital habits with the evolving landscape of scholarly communication.

Keywords:Altmetrics, Scholarly Communication, South Asian Academia, Knowledge Gap, Academic Libraries

Critical Digital Literacy Competencies of University Library Professionals in Dhaka City

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Abstract:This study aims to explore the critical digital literacy (CDL) competencies of university library professionals in Dhaka, focusing on their ability to assess information credibility, identify misinformation, and their understanding of the influence of digital systems on knowledge access and dissemination. A quantitative, descriptive survey design was used to collect data through structured questionnaires from 67 librarians across eight public and private universities in Dhaka. The data were analyzed using descriptive statistics and cross-tabulations. The study reveals that while a significant number of librarians regularly encounter misinformation, only about one-third consistently engage in fact-checking. Awareness of digital rights and responsibilities was moderate. However, awareness of complex issues such as algorithmic bias and filter bubbles was limited. Demographic factors, such as age and experience, influenced the librarians' digital confidence and critical behaviors. This study is



one of the first empirical investigations of critical digital literacy among academic librarians in Bangladesh. The findings provide insights into their strengths and challenges, informing the development of targeted training programs and institutional strategies. The study emphasizes the need for targeted CDL training to enhance librarians' competencies and support their role as educators and facilitators of informed digital citizenship in higher education.

Keywords: Critical Digital Literacy, Misinformation, Information Credibility, Library Professionals, Dhaka.

Workplace Information Literacy: An Exploratory Study of Public Library Professionals in Bangladesh

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Abstract: This exploratory study investigates information literacy competencies among public library professionals, focusing on how they perceive information literacy in their daily professional practices. In today's information-intensive work environments, public librarians are required to make informed decisions, manage digital resources, and support diverse user needs which demand strong information literacy competencies. The study aims to explore how information literacy skills are perceived, developed, and applied in the workplace context of public libraries. Data were collected through open-ended questions using a google form and semi-structured interviews were conducted among the public library professionals. The findings will provide insights into the current state of IL among public library professionals in Bangladesh and identify areas for improvement. The findings will be crucial for enhancing the quality of library services, supporting lifelong learning initiatives, and meeting the diverse information needs of public library users in Bangladesh.

Keywords: Information literacy, Workplace literacy, Information management, Library professional, Public Libraries.

Empowering Bangladeshi University Students Through Qard al-Hasan and Waqf-Based Education Financing

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Abstract: This study explores an Islamic-based education financing model in Bangladesh through the integration of Qard al-Hasan (interest-free benevolent loans) and Waqf (endowment funds). Rising higher education costs limit opportunities for many talented students, while conventional, interest-bearing loans conflict with Shariah principles. To address this gap, the research proposes an "Education Waqf Fund" that aligns with Islamic ethics and supports students from financially constrained backgrounds. Using a mixed-method approach, data were collected from students, university administrators—including provosts and department chairs—and institutions that already provide Qard al-Hasan loans. This helps evaluate awareness, feasibility, and institutional readiness, as well as understand how such interest-free loans are structured and the challenges these institutions



face. The analysis highlights how Islamic social finance can serve as a practical tool to promote financial inclusion, educational equity, and social justice. Ultimately, the study aims to develop a collaborative framework among universities and alumni networks to create a revolving, interest-free education fund—empowering students and strengthening Bangladesh’s human capital.

Keywords: Islamic Finance, Qard al-Hasan, Education Waqf Fund, Financial Inclusion, Higher Education

হাসান হাফিজুর রহমানের কাব্যে ভাষা আন্দোলন ও স্বদেশ- চেতনার স্বরূপ

The Language Movement and homeland consciousness in the Poetry of Hasan Hafizur Rahman

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Abstract: In Bengali poetry Hasan Hafizur Rahman (1932-1983) is renowned as an important and talented poet. His achievement is unique in the multi-dimensional consonance of Bengali poetry. His family environment contributed to the formation and development of his unique mentality. His writings and personality were strongly influenced by the turbulent socio-economic, political and cultural environment of the contemporary world. From the language movement to the independence movement, he has made an tremendous contribution. This contribution was through his active movement, participation in processions and the writing of his emotive poetry. As a result, the language movement and homeland consciousness got an artistic form in his poetry. In socio-economic, political terms, he has highlighted the conflict and the endangered life of people of all classes of society with a finer responsibility and free spirit in the poem. The image of unswerving responsibility towards the homeland, self-society and society emerges in his poetry with intense concent. In the mix of autobiographical experiences he expressed the beauty of his motherland, language, the poverty of rural life or the harsh reality of city life in an innocent manner. In this article, tried to reveal the nature of language movement, Liberation war and homeland- consciousness in Hasan Hafizur Rahman’s poetry.

Keywords: ভাষাআন্দোলন, মুক্তিযুদ্ধ, স্বদেশ- চেতনা, কবিতা

Enhancing English Speaking Skills through Collaborative Tasks: A Study on the Secondary Level Students in Bangladesh

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Abstract: This paper investigates the effectiveness of collaborative tasks in enhancing the English-speaking skills of secondary-level students in Bangladesh. It particularly addresses (1) the nature of collaborative undertakings that are carried out in the classroom, (2) obstacles that are faced by teachers and learners during the process, and (3) ways of overcoming those barriers. The qualitative research design was used, where semi-structured interviews with four English teachers, focus group discussion with thirty students, and two classroom observations were used to collect data. The research results show that the activities, including pair and group work, debates, and storytelling are usually practiced but they are not organized regularly. According to both teachers and students, some



of the limitations were student shyness, limited vocabulary, uneven participation, large class size, and insufficient instructional time. Regardless of such challenges, the participants admitted that properly organized group activities can go a long way to enhance the level of confidence, fluency, and interaction among learners. The paper highlights the importance of professional growth, ongoing evaluation of speaking and incorporation of audiovisual aids to reinforce cooperative learning activities.

Keywords: Collaborative learning, development in English, learning in secondary classes, qualitative investigation, classroom interaction.

A Semiotic Analysis of Gen Z's Slogans in the 2024 Movement of Bangladesh

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Abstract: This article presents a semiotic analysis of fifteen slogans of Bangladesh's 2024 political movement which are collected from street protests, social media and graffiti. By examining five slogans from each domain, the study explores how linguistic signs and cultural references collectively construct meanings in protest discourse. It applies a combined theoretical framework integrating Saussure's diadic model of signifier and signified, Barthes' two levels of signification and Peirce's triadic model (Representamen, Object and Interpretant), including the application of his ideas about icon, index and symbol. Using a qualitative semiotic framework, the analysis investigates how Gen Z employs language, particularly slogans, as both a symbolic tool and a performative act to ensure equality, challenge the authority and mobilize collective emotion. The findings reveal that these slogans are not only linguistic utterances, but complex sign systems and the semiotic meanings of these slogans are context-dependent. It also illustrates the interactional nature of meaning-making, where interpretation relies on collective semiotic competence within a community of practice. Overall, this study demonstrates how Gen Z reshapes the landscape of political communication of Bangladesh by using slogans as dynamic cultural signs

Keywords: Semiotics, Gen Z, Slogans, Saussure-Barthes-Peirce Models, Bangladesh 2024 Movement

English Language Proficiency among Bangladeshi Learners: Challenges and Pedagogical Implications

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Abstract: Although English has been introduced through formal education, learners in Bangladesh from secondary to tertiary levels are persistently struggling with limited English proficiency. This research scrutinizes the major causes of learners' skills by applying a mixed-methods approach that consolidates not only quantitative but qualitative techniques. Quantitative information was collected using questionnaires disseminated among secondary and tertiary students aiming at language abilities, learning contexts and teaching methods. The data underwent analysis to disclose common trends and



relationships whereas qualitative information was accumulated via structured interviews including students and English instructors enabling a thorough investigation of perspectives and classroom experiences. The repercussions reveal that exam-oriented instructions debar chances for practice, insufficient teacher preparation and socio-economic restrictions remarkably hinder learners' skill improvement. Furthermore, learners' anxiety, reluctance, lack of motivation and excessive reliance on memorization worsen the issue. A comprehensive understanding is highlighted by triangulating quantitative trends with qualitative insights and advocates the necessity for pedagogical reforms including CLT, teacher professional development, and learner-centered instructional strategies to improve English language proficiency among Bangladeshi learners.

Keywords: English language proficiency, Mixed-methods approach, Exam-oriented instruction, Communicative Language Teaching (CLT), Learner motivation

The Pluralism concept and its Shari'ah Rulings in Islam: What are the impacts of both to create Religious Harmony in Contemporary Bangladesh

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Abstract: This study inspects the vital relationship between pluralism, the peaceful togetherness and acceptance of multiple beliefs and the implementation of Shari'ah rulings within the socio-political factors in Bangladesh. Therefore, Bangladesh has the historical tradition in maintaining religious toleration and unification, which is based along with the spirit of pluralism and view of Islamic jurisprudence that endorse justice and protection for minorities (known as Jhimmi rights in traditional fiqh).

Anyway, Bangladesh has a constitutional rigidity, in one site glorifying secularism and equal rights for all citizens, in another hand, Islam is mentioned as the state religion generates a complex social and lawful perspective. The aftermath of pluralism is normally balanced, strengthening the cultural atmosphere of joint celebration and harmonious coexistence in Bangladesh. On the contrary, explanations of Shari'ah, especially regarding Muslim personal law and arguments contextualising its political use, raise challenges to absolute legalised impartiality and can be utilised to create polarisation. The study concludes that promoting religious harmony needs an undertaking to the liberal and pluralistic rituals built in Bengali culture, reinforced by constitutional safeguards and interfaith dialogue, constructively balancing minority rights with religious identity of majority under a structure of justice compatible with the wide-ranging, philanthropic principles of Islamic law.

Keywords: Pluralism, Shari'ah, Religious Harmony, Minority Rights, Secularism

The Evolution of the Bengali Script: A Palaeographical Study of Selected Sena Inscriptions

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Abstract: The Sena period is an important stage in the history of the Bengali script, as inscriptions from this time preserve its early forms. Previous studies have mainly discussed the development of the Bengali script from a theoretical perspective. Still, clear comparisons between the letter shapes



found in Sena inscriptions and those of the modern Bengali script remain limited. To address this gap, the present study examines selected Sena-period inscriptions through a palaeographical approach. Individual letters from these inscriptions are identified and compared with their corresponding forms in the modern Bengali script. The study also points out differences between letters that appear similar in shape within the inscriptions. The primary sources used for this research include the Deopārā Inscription and the Barrackpore Copper-plate of Vijayasena, the Govindapur Copper-plate of Lakshmanasena, the Madanpārā Copper-plate of Viśvarūpasena, and the Bāgbāri Inscription. Letters were carefully separated from each inscription for comparison. The results show that about twenty-eight letters from Sena inscriptions have complete or partial similarities with modern Bengali letters. Several letters have more than one form, and some letters look very similar to one another, which can make identification difficult. This study helps clarify the early forms of the Bengali script and supports future research on the reading and interpretation of ancient inscriptions.

Keywords: Bengali script, Sena-period, Inscription, Copper-plate, Palaeography

Assessing Multi-Stakeholder Readiness and Requirements for a Learning Management System (LMS): A Case Study of the University of Dhaka

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Abstract: In today's rapidly digitalizing higher education landscape, the absence of a Learning Management System (LMS) poses a major barrier to efficient academic communication and coordination. At the University of Dhaka, where information exchange largely relies on manual channels through class representatives and social media, delays, inconsistencies, and data fragmentation have become pressing concerns. Before implementing an institutional LMS, it is essential to assess readiness, perceived needs, and system requirements of primary stakeholders—students and faculty—to ensure successful adoption and effective use. Grounded in the Technology Acceptance Model (TAM) and Technology Readiness Index (TRI), this study employs a mixed-methods approach to capture both psychological readiness and behavioral intention. Quantitative data will be collected through surveys of students to assess technological preparedness, perceived usefulness, ease of use, and users' optimism, while qualitative insights from the faculty and project administrators' interviews will identify teaching, communication, and technical feasibility challenges. Comparative analysis will reveal readiness gaps and shared priorities for system design. Expected outcomes include a comprehensive requirement map outlining desired LMS features, communication pain points, and strategic insights for effective implementation. By integrating social and technological perspectives, the research aims to guide university administrators toward an evidence-based, user-centric LMS infrastructure.

Keywords: Learning Management Systems, LMS readiness, Technology Acceptance Model, Technology Readiness, Higher Education Digital Transformation

Eco-Leadership and Readiness in Determining Net-Zero HRM Adoption: A Socio-Technical Analysis of the RMG Sector of Bangladesh

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Abstract: The Ready-Made Garments (RMG) sector of Bangladesh lacks specified micro-foundations for Net-Zero human resource management (HRM), understood as HR practices that operationalize credible decarbonization targets and scope-linked accountability. Guided by socio-technical systems theory, this quantitative study models how eco-leadership shapes readiness capabilities and, in turn, Net-Zero HRM adoption. A cross-sectional survey of 211 factories was analyzed with variance-based PLS-SEM, PLSpredict for out-of-sample diagnostics, Necessary Condition Analysis (NCA), and a feed-forward Artificial Neural Network (ANN) trained with k-fold cross-validation and early stopping. Upon satisfying measurement model met reliability and validity thresholds, the structural model explained 47% of variance in Net-Zero HRM. Eco-leadership strongly predicted people readiness ($\beta=.60$, $p<.001$) and resource readiness ($\beta=.57$, $p<.001$). Net-Zero HRM was driven by resource readiness ($\beta=.39$, $p<.001$) and people readiness ($\beta=.21$, $p=.006$), alongside a smaller direct leadership effect ($\beta=.18$, $p=.006$). PLSpredict indicated positive cross-validated predictive relevance ($Q^2_{\text{predict}}\approx.27-.35$). The ANN corroborated the ordering of predictor salience under nonlinear learning and demonstrated generalization (mean testing RMSE \approx 0.44 vs training RMSE \approx 0.55). NCA identified noncompensatory thresholds for high Net-Zero HRM (people $d=.34$; resources $d=.27$; leadership $d=.18$). This research specifies a leadership-to-readiness-to-practice mechanism that implies impending managerial priorities of resolving resource platform bottlenecks after consolidating workforce capability and participation.

Keywords: Ready-made Garments (RMG) Bangladesh; Sustainability; Net-Zero Human Resource Management; Eco-leadership and Readiness Capabilities; Socio-Technical theory

Identifying Convenience-Oriented Grocery Co-Purchase Patterns Using Market Basket Analysis

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Abstract: This study applies the Apriori algorithm for market basket analysis using transaction-level sales data to find low-involvement grocery co-purchase patterns. The methodology was validated from an accessible grocery dataset and association rules were assessed using support, confidence, and lift metrics. The analysis revealed that low purchase rates for most item combinations but specific convenience-oriented product pairs show strong associative connections which were confirmed by high lift values. These findings suggest that grocery purchasing is largely situational and the presence of certain anchor products increases the likelihood of buying complementary items concurrently. The study shows the practical usage of association rule mining for optimizing in-store layouts and product placement strategies particularly for frequent, low-involvement items. Despite data limitations, the study offers insights for retailers to improve customer centric decisions.

Keywords: Market Basket Analysis, Apriori Algorithm, Convenience-Oriented Purchasing, Association Rule Mining, Grocery Retail Analytics



Poster Presentation

Part 1: Science

Simulation of Hailstorm Events over Bangladesh Using WRF-ARW Model and Validation with ERA5 Reanalysis Data

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Abstract: This study simulates two severe pre-monsoon hailstorm events over Bangladesh using the ARW dynamic core of the Weather Research and Forecasting Model (WRF) v4.6 with a two-way nested domain (9km and 3km) setup. The model uses 6-hourly NCEP-FNL initial and lateral boundary conditions to simulate the 20 April 2022 (Case 1) and 19 April 2023 (Case 2) hailstorm events affecting Dhaka, Sylhet, and Chittagong. A higher Significant Hail Parameter (SHIP) in Case 2 (2.96) indicated greater hail potential compared to Case 1 (1.63). Enhanced values of 0–6 km shear (24 m s^{-1}), MuCAPE (3281 J kg^{-1}), and CIN (91 J kg^{-1}) further supported this. Sensitivity analysis identified the Milbrandt-2 moment microphysics and MYNN2 PBL schemes as optimal, minimizing rainfall and wind RMSE to 4.88 mm and 10.25 m s^{-1} . RMSE and MAE validation showed good agreement with ERA5, with variables such as surface temperature ($1.4\text{--}1.6 \text{ }^\circ\text{C}$), dew point ($2\text{--}2.2 \text{ }^\circ\text{C}$), latent heat flux ($42\text{--}50 \text{ W m}^{-2}$), and sensible heat flux ($30\text{--}32 \text{ W m}^{-2}$). Long-term analysis (1987–2025) revealed a weak positive but statistically insignificant hailstorm trend. The findings confirm the model's effectiveness although further optimization and long-term assessment are recommended to advance its operational value.

Keywords: WRF-ARW, Hailstorm, Simulation, Sensitivity Test, ERA5 Reanalysis.

Shaping Career Aspirations in Bangladesh: The Role of Family, Extracurricular Engagement, and Socio-Political Context

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Abstract: Career aspiration development among Bangladeshi students faces significant challenges due to the persistent gap between academic preparation and employment opportunities. Despite rising higher education enrollment, many students make inadequately informed decisions shaped more by social pressures than personal interest. This study examines how family influence, extracurricular engagement, and contemporary events interact within structural and cultural constraints to shape career mindsets.

A cross-sectional survey of 604 students was conducted using both online and field-based data collection. Statistical analyses included Pearson correlation, Spearman rank correlation, and Kruskal-Wallis tests. Findings show clear gendered patterns: engineering and business dominated among high school males, while medicine and teaching were the leading preference for females. Most students (83.2%) chose their fields independently, yet career confidence remained moderate. At the university level, strong major–career alignment (68.3%) was observed, with extracurricular activities positively linked to both career specificity and international orientation.



Family influence was more pronounced among females, while children of working mothers reported higher extracurricular participation and global aspirations. Contemporary events, including the July Revolution 2024 and COVID-19, significantly shaped career perspectives. The findings underscore the need for structured career counseling, institutional transparency, and systematic support to strengthen student career readiness in Bangladesh.

Keywords: Career aspirations, Bangladesh, family influence, extracurricular activities, socio-political context

Numerical Investigation of Chemically Reacting Fluid Flow in and Inclined Trapezoidal Wavy Enclosure with a T-Shaped Fin

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Abstract: This study presents a numerical investigation of chemically reacting ethanol–oxygen fluid flow inside an inclined trapezoidal wavy enclosure with a T-shaped fin attached to the right wall. The objective is to examine how geometric modifications affect heat transfer and fluid flow of a reacting fluid. Governing equations for continuity, momentum, energy, and fuel/oxidizer distribution are solved with suitable boundary conditions. Parametric studies include variations in Reynolds number, Frank–Kamenetskii number, fin height and position, and wall waviness. Higher Reynolds numbers enhance fluid motion and heat transfer, while increased Frank–Kamenetskii number raises maximum temperature and flow intensity. Fin geometry significantly modifies flow patterns: larger fins reduce temperature by disturbing thermal layers, and shifted positions improve mixing. Wall waviness influences vortex formation and thermal uniformity. The results provide insights into the combined effects of geometry and chemical reactivity, useful for designing efficient enclosures in energy, combustion, and thermal management applications.

Keywords: Ethanol–air reaction; Wavy enclosure; T-shaped fin; Fuel–Oxidizer distribution; Natural convection

Impacts of Time-Varying Aspiration on Vaccination Behavior and Epidemic Control

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Abstract: Individual aspiration plays a central role in shaping vaccination decisions and epidemic outcomes. Recent work has shown that higher aspirations toward immunity can increase vaccine uptake and reduce the social efficiency deficit (SED). However, aspiration in reality is rarely constant. People’s motivation to vaccinate can rise during outbreaks, when the risk of infection becomes salient, and decline when cases fall or vaccine fatigue develops. To address this limitation, we extend the aspiration-based vaccination model within a SEIRS epidemic framework by introducing *time-varying aspiration*. Two simple mechanisms are considered: (i) **prevalence-driven aspiration**, where aspiration increases with the number of infectious cases, and (ii) **time-decaying aspiration**, where aspiration gradually declines in the absence of strong risk perception. Using mean-field analysis and numerical simulations, we investigate how dynamic aspiration influences epidemic prevalence, vaccination coverage, and the SED compared to fixed aspiration levels. Our findings reveal that prevalence-driven aspiration can generate rapid increases in vaccination during outbreaks, effectively suppressing infection peaks, while time-decaying aspiration may lead to delayed responses and higher long-term infection burdens. These results highlight the importance of incorporating dynamic



behavioral motivation into vaccination game models and suggest that public health strategies could benefit from actively sustaining aspiration levels over time.

Keywords: Mathematical epidemiology; Time-varying aspiration; Vaccination game; Behavioral dynamics; Social efficiency deficit (SED)

Gender-Differentiated Effects of Chronotype on Mood: A Chrono-biological Analysis Among Bangladeshi Young Adults

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Abstract:Background: Circadian rhythm preference (chronotype) is increasingly recognized as a determinant of emotional functioning; however, gender-specific variations in this association remain underexplored, particularly in South Asian populations. This study examines whether gender moderates the relationship between chronotype and mood states among Bangladeshi young adults.

Objectives: To investigate – (1) The association between chronotype and mood states and (2) The moderating effect of gender on this relationship.

Methods: A cross-sectional online survey was conducted with 224 participants (108 males, 116 females; $M_{age} = 23.7 \pm 4.1$). Chronotype was measured using the Reduced Morningness–Eveningness Questionnaire (rMEQ), and mood states were assessed using the Brunel Mood Scale (BRUMS). Pearson correlation, ANOVA, ANCOVA, and hierarchical regression were performed ($\alpha = .05$).

Results: Morningness showed a significant positive association with favourable mood outcomes ($r = .18, p < .05$). Gender significantly moderated this association (ANCOVA $F(1,222) = 2.56, p < .05$), with females displaying a stronger chronotype–mood linkage ($\beta = .29, p < .01$) than males ($\beta = .11, p = .12$).

Conclusion: The findings highlight the importance of incorporating gender-sensitive chronobiological markers into psychological assessment and intervention frameworks.

Keywords: Chronotype; Circadian Rhythm; Mood; Gender Moderation; Affective Science

Spatial Distribution, Source Apportionment, and Pollution Threat of Organochlorine Pesticides in sediments of Shitalakshya River, Bangladesh

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Abstract: The Shitalakshya River, a major Brahmaputra tributary in Bangladesh, is increasingly affected by industrial, and agricultural discharges, resulting in organochlorine pesticides (OCPs) contamination. This study evaluated the concentrations, distribution, and associated risks of 20 selected OCPs in sediments from ten stations along the river, from Kalagachhiya to Kapasia. Sediments were analyzed for OCPs by using validated liquid-liquid extraction method and GC-ECD. Concentrations were generally low, with Heptachlor epoxide ($28.09 \mu\text{g kg}^{-1}$ at Kapasia), δ -BHC ($4.95 \mu\text{g kg}^{-1}$ at Kapasia), and Endosulfan II ($12.65 \mu\text{g kg}^{-1}$ at Charshindur) being most prominent. PCA and hierarchical cluster analysis indicated two main sources: legacy agricultural residues (δ -BHC, aldrin, heptachlor epoxide) and ongoing urban-industrial inputs and degradation products (DDE, Dieldrin, Endosulfan, cis-Chlordane). Ecological risk assessment showed OCPs exceeded standard thresholds at Kapasia, Nobiganj, and Charshindur. HI values indicated no immediate non-carcinogenic risk but higher exposure in children. Total carcinogenic risk ranged 2.26×10^{-6} - 3.16×10^{-4} (children) and 3.35



$\times 10^{-6}$ - 4.69×10^{-4} (adults), with hotspots exceeding 10^{-4} , suggesting long-term cancer risks. Comparisons with the Buriganga and Meghna rivers show that while overall contamination is lower, localized hotspots in Shitalakshya pose significant ecological and health concerns, emphasizing the need for monitoring, effluent control, and targeted mitigation.

Evaluation of Genetic Polymorphisms in GSTM1 and GSTT1 Genes as Predictive Biomarkers of COPD Severity in the Bangladeshi Population

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Abstract: Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death globally. Although cigarette smoking is the primary etiological factor, only ~15% of chronic smokers develop symptomatic COPD, suggesting a substantial genetic component in disease susceptibility. Variations in detoxification enzymes, particularly those involved in neutralizing cigarette smoke derived oxidants, may influence individual risk. The GSTM1 and GSTT1 genes encode key phase II detoxification enzymes, and their null polymorphisms have been linked to heightened COPD risk in diverse populations. However, data from Bangladesh remain limited. This case-control study investigates the frequency of GSTM1 and GSTT1 deletion polymorphisms in 130 individuals, comprising 65 confirmed COPD patients and 65 healthy controls. Peripheral blood samples were collected, and genomic DNA was extracted and genotyped using PCR. The forthcoming statistical analysis will compare genotype distributions, examine associations with COPD susceptibility, and explore correlations with smoking history, environmental exposure, and GOLD-classified severity. By characterizing these polymorphisms, this research aims to determine their potential as predictive genetic biomarkers and to support future risk-stratified and personalized COPD management strategies in Bangladesh.

Keywords: COPD, GSTT1, GSTM1, Polymorphisms, Genetic susceptibility

Unraveling the Role of Mosaic Loss of Y Chromosome in Acute Leukemias: Molecular insights and clinical implications in AML and ALL

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Abstract: Mosaic Loss of Y chromosome is most commonly occurring somatic event in different types of cancer and associated with poor survival outcome for both hematological malignancies and solid tumors. Though it is an age-related phenomenon, some studies have also confirmed it as hematological event due to genomic alterations. For this reason, it is also relevant in hematological malignancies. The study is designed to dissect the molecular mechanisms and predict the potential reasons behind this phenomenon. The pathway enrichment analysis, hallmark analysis and tumor microenvironment analysis elucidate further molecular mechanisms of LOY in hematological malignancy. LOY is associated with more immune aggressiveness and immune checkpoint inhibitor pathways. The hallmark analysis also has shown enrichment of cancer related hallmarks such as KRAS signaling upregulation. Notably, SLE related hallmark pathway is consistently enriched in both AML and ALL. From differential gene expression analysis, some Y chromosome genes are shown significantly downregulated in Y-low groups and among those genes two significant genes are targeted for developing LOY detection assay in invitro by using qPCR and checking the incidence of LOY and its outcome in Bangladeshi population which leads to developing personalized therapeutic approach and LOY related biomarker development.



Keywords: Mosaic Loss of Y (LOY), Hematological Malignancy, Tumor Microenvironment, Pathway Enrichment, Biomarker Development.

Evaluation of Phytochemical and Bioactive Properties of *Ageratum conyzoides* Flower extracts

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Abstract: *Ageratum conyzoides* (Asteraceae) is a medicinal herb widely recognized for its anti-inflammatory, antimicrobial, and antioxidant properties. The present study examined the phytochemical constituents and biological activities of flower extracts from *A. conyzoides*, focusing on antioxidant capacity, cytotoxicity, and antimicrobial effects. Flower samples were extracted with methanol and subsequently fractionated using solvents of increasing polarity, including n-hexane, dichloromethane, ethyl acetate, and water. The fractions were subjected to fatty acid profiling, determination of total phenolic and flavonoid contents, antioxidant assays, cytotoxicity testing, and antimicrobial evaluation. Gas chromatographic analysis confirmed the presence of both free and bound fatty acids, with stearic and octanoic acids occurring as the major components. Cytotoxicity assessment using HeLa and Vero cell lines revealed no significant toxic effects, suggesting minimal anticancer activity. Antioxidant evaluation using DPPH, ABTS, and FRAP methods showed that the ethyl acetate and aqueous fractions possessed the strongest radical-scavenging and reducing abilities, consistent with their higher phenolic and flavonoid concentrations. Among the tested fractions, the ethyl acetate extract demonstrated the most notable antimicrobial activity, exhibiting moderate inhibition against Gram-positive and Gram-negative bacteria as well as *Candida albicans*. These results indicate that *A. conyzoides* flowers are a promising source of bioactive compounds with antioxidant and antimicrobial potential, warranting further investigation to isolate and characterize the active constituents.

Keywords: *Ageratum conyzoides*; antioxidant activity; antimicrobial activity; cytotoxicity evaluation; fatty acid profiling

HPLC Method Development and Validation for Simultaneous Analysis of Rosuvastatin and Ezetimibe: Application to Stress Degradation Study

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Abstract: Rosuvastatin and Ezetimibe are two widely used lipid-lowering drugs that are often used in combination to treat coronary heart disease by controlling cholesterol level. A precise and reliable RP-HPLC method was developed for their simultaneous estimation at 235 and 245 nm using a C18 column (Luna 5 μ , 250 \times 4.6 mm) with an isocratic mobile phase of 0.05 M phosphate buffer (pH 2.5) and acetonitrile (40:60 v/v) at 1.0 mL/min. The method was validated according to ICH guidelines, showing excellent system suitability, specificity, linearity ($R^2 = 0.9991$ for both drugs), accuracy (recoveries within 98–103%), precision (%RSD < 2%), robustness, and low LOD and LOQ values for both drugs. Stress degradation studies were performed under acidic, alkaline, oxidative, thermal, and photolytic conditions following ICH guidelines and analyzed by the validated method. Both drugs showed varying degrees of degradation with significant degradation at photolytic and oxidative stress



conditions. This method can be used to separate the drugs from their degradation products, which also confirm its stability indicating capability. The validated method was successfully applied to bilayer tablet analysis and can be used for routine quality control and stability determination of Rosuvastatin and Ezetimibe.

Keywords: Rosuvastatin, Ezetimibe, RP-HPLC, ICH guidelines, Stress degradation Study

Formulation and Evaluation of Sustained-Release Mucoadhesive Tablets of Aceclofenac

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Abstract: The present study aimed to develop and evaluate sustained-release mucoadhesive tablets containing aceclofenac, a non-steroidal anti-inflammatory drug (NSAID) to provide prolonged drug action and minimize gastrointestinal side effects. A total of eight formulations were prepared by the direct compression method, varying the ratios of hydroxypropyl methylcellulose (HPMC), carbopol (CP), and sodium carboxymethylcellulose (SCMC) as polymers to optimize drug release and enhance mucoadhesive properties. Pre-compression parameters of all formulations were found within acceptable limits, confirming good flow and compressibility characteristics. Post-compression evaluation included tests for weight uniformity, hardness, friability, mucoadhesive strength, and in vitro drug release. The mucoadhesive strength, measured using freshly excised bovine intestinal mucosa, increased proportionally with polymer concentration, with CP and SCMC demonstrating superior adhesion. Dissolution studies up to 6 hours revealed that formulations containing higher SCMC ratios exhibited faster drug release, whereas HPMC-based formulations achieved sustained release, maintaining controlled drug delivery over an extended period. FTIR analysis confirmed the absence of chemical interactions between drugs and excipients, indicating formulation stability and compatibility. Among all formulations, the optimized batch exhibited satisfactory mucoadhesive strength, sustained release behavior, and desirable physicochemical characteristics.

Keywords: Aceclofenac, Mucoadhesive tablets, Sustained release, HPMC and Carbopol, Drug delivery system.

Process development for the heterologous expression of the novel lantibiotic, Homicorcin

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Abstract: Ribosomally synthesized antimicrobial peptides (lantibiotics), characterized by thioether cross-links, confer high stability, offer a promising alternative to existing antibiotics. They mainly target lipid II of Gram-positive bacteria, exhibiting its bactericidal effect. Homicorcin, a novel class I lantibiotic from jute endophyte *Staphylococcus hominis* MBL_AB63, has strong activity against antibiotic-resistant pathogens such as MRSA. Its biosynthetic gene cluster includes eight genes: homO (reductase), homI (immunity), homA (structural peptide), homP (protease), homB (dehydratase), homC (cyclase), homT1 (transporter- ATP binding domain), and homT2 (transporter-permease), forming a complete and distinct pathway (Figure 1). Instead of using its native producer, *Staphylococcus hominis* MBL_AB63, which is mildly pathogenic and unsuitable for industrial-scale applications, heterologous expression of homicorcin in *Lactococcus lactis* NZ9000, a food-grade and GRAS (Generally Recognized as Safe) organism, offers a safer and more convenient option. Hence, the objective of this study is to develop a heterologous expression system of homicorcin gene clusters



in *L. lactis* NZ9000 followed by expression analysis of all the biosynthetic genes through qPCR and in vivo expression assay against suitable indicator strain. This approach will help address antimicrobial resistance by enabling the safe and scalable production of the novel lantibiotic homiocorcin in a food-grade host. Figure 1: Homicorcin biosynthetic gene cluster consists of eight genes for its synthesis, post-translational modifications and transportation outside the cell.

Keywords: Antibiotic-resistant bacteria, Lantibiotics, Homicorcin, Heterologous expression, *Lactococcus lactis* NZ9000

Highly efficient MnOX/TiO₂@NH₂-ZIF-8 composite for the removal of toxic textile dyes from water

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Abstract: The physicochemical properties of Metal-organic frameworks (MOFs), including high surface area and tunable porosity, allow MOFs to remove pollutants from water and purify wastewater through adsorption and photocatalysis. In this study, a series of nanoparticle (NP; MnOx/ TiO₂) doped amino-functionalized MOFs (NH₂-ZIF-8) composites are synthesized for removing cationic methylene blue (MB) and anionic dye direct red 81 (DR81) from aqueous solution. The NPs are doped on the NH₂-ZIF-8 using several weight ratios (5 %, 10 %, and 15 %). The synthesized NP@NH₂-ZIF-8 is characterized by FTIR, XRD, XPS, SEM, and UV-vis DRS spectra. The doping of NPs on NH₂-ZIF-8 improves the photocatalytic activity by lowering the band gap. Among the synthesized composites, 10 %NP@NH₂-ZIF-8 showed 98.5 % removal efficiency for MB dye with a contact time of 30 min at pH ~8.0 and 95.89 % removal efficiency for DR81 dye at pH ~5.5 with a contact time of 40 min in the presence of sunlight. The synergistic function of adsorption and photocatalytic activities of 10 %NP@NH₂-ZIF-8 is responsible for the high performance. In the reusability test, 10 %NP@NH₂-ZIF-8 shows a high removal efficiency of up to five cycles for both MB and DR81 dyes.

Keywords: Dye, adsorption, photocatalysis, Metal-organic frameworks, NP@NH₂-ZIF-8,

Social Support, Resilience, Well-being, and Academic Achievement among University Students in Bangladesh

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Abstract: Academic achievement encompasses both objective performance and students' subjective evaluations of their academic progress. This study examined the associations among perceived social support, resilience, well-being, and academic outcomes in a sample of 250 Bangladeshi university students. Using a cross-sectional design, participants completed standardized self-report measures of psychosocial resources, while cumulative grade point average (CGPA) was used as an indicator of objective academic performance. Results indicated that perceived social support was strongly associated with resilience and emerged as a significant predictor of psychological well-being. Subjective satisfaction with academic achievement was more closely linked to students' well-being and social support than to objective academic performance. In contrast, CGPA showed only modest associations with psychosocial factors, highlighting a distinction between predictors of subjective and



objective academic outcomes. These findings support stress-buffering and broaden-and-build perspectives, suggesting that psychosocial resources primarily enhance students' academic satisfaction and adaptive functioning rather than directly influencing grades. The study underscores the importance of strengthening social support systems and promoting mental well-being within higher education settings to foster positive academic experiences among university students.

Keywords: Social support, Resilience, Well-being, Academic outcome, University students

Comprehensive Chemical Analysis and Risk Assessment of Acrylamide and Heavy Metals in Breakfast Cereals

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Abstract: Breakfast cereals have become an indispensable component of modern diets, prized for their convenience, extended shelf life, and nutritional versatility, yet concerns about processing induced contaminants and compositional quality remain. In this study, twenty commercially available maize- and oat-based breakfast cereal samples collected from different markets were comprehensively evaluated for acrylamide content and multi-elemental heavy metal profiles via GC-ECD and ICP-MS analysis, including toxicological risk characterization. Acrylamide, quantified by gas chromatography with electron capture detector (GC-ECD), ranged from 74.29–1112.90 µg/kg in maize based cereals and 40.53–58.29 µg/kg in oats, with risk assessment indicating that some products approach carcinogenic concern thresholds. Heavy metals in the samples were quantified by inductively coupled plasma mass spectrometry (ICP MS) and were in the range from 0.043–7.621 ppm for Pb, 0.002–0.146 ppm for Cd, 0.653–12.293 ppm for Cr, 0.004–0.107 ppm for As, 0.124–1.379 ppm for Ni, 0.733–6.023 ppm for Cu, 9.075–87.871 ppm for Zn, 2.462–32.245 ppm for Mn, 0.008–0.112 ppm for Co, 0.557–25.128 ppm for Al and Hg up to 5.722 ppm. Be and V were at trace levels in both maize and oat based cereal samples. Risk assessment revealed heavy metals in several cereal samples have Target Hazard Quotients (THQs) and Hazard Indexes (HIs) above 1, indicating non cancer health risks in children and adults. Carcinogenic risk from Cr and Ni reached above EPA thresholds in some maize and oat based cereals. Overall, the findings provide vital scientific data to guide manufacturers, regulatory agencies, and consumers toward safer and more nutritious breakfast cereal consumption, enhancing public health outcomes in Bangladesh and beyond.

Key Words: Acrylamide; heavy metals; breakfast cereals; GC-ECD; ICP-MS

In Silico Analysis of Polyphenols from *Trapa natans* Targeting NLRP3-ASC Inflammasome in Alzheimer's

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Abstract:

Background: Alzheimer's disease (AD) is a progressive neurodegenerative disorder characterized by neuronal loss and cognitive decline. Accumulation of amyloid-β and tau proteins induces neuroinflammation through activation of the NLRP3 inflammasome, which promotes IL-1β and IL-18 secretion and accelerates disease progression. The NLRP3 inflammasome, composed of NLRP3, ASC, and caspase-1, represents a highly specific and promising therapeutic target. **Method:** This in silico study investigated the interactions of two novel polyphenolic tannins from *Trapa natans* with the NLRP3 complex. **Results:** Molecular docking revealed strong binding affinities of compounds C₁ (1,6-di-O-galloyl-2-O-E-caffeoyl-β-D-glucopyranoside) and C₂ (1,6-di-O-galloyl-2-O-nicotinoyl-β-D-



glucopyranoside) to NLRP3, with binding energies of -11.3 and -10.3 kcal/mol, respectively, surpassing the control inhibitor RM5 (-9.3 kcal/mol). Protein–protein docking demonstrated significant disruption of NLRP3–ASC complex formation in the presence of both compounds. Molecular dynamics simulations confirmed stable ligand–protein interactions and notable conformational changes in the inflammasome complex. **Conclusion:** Overall, these findings suggest that *Trapa natans*–derived tannins may effectively inhibit NLRP3 inflammasome assembly and represent promising candidates for targeted therapeutic development in AD.

Keywords: Alzheimer’s disease, neuroinflammation, NLRP3 inflammasome, molecular docking, protein-protein docking.

Role of Candidate Gene Panels in Varying Severity of COVID-19 Patients: A Host Genetic Appraisal in Bangladeshi Population

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Master of Science (Thesis)

Genetic Engineering and Biotechnology

Abstract: The COVID-19 pandemic, caused by SARS-CoV-2, has posed an unprecedented global health challenge, with clinical outcomes ranging from asymptomatic or mild disease to severe illness characterized by acute respiratory distress syndrome and multi-organ failure. This wide spectrum of disease severity can not be explained solely by viral factors and is increasingly attributed to host genetic variation that influences the host-virus interaction, inflammatory pathways, and innate and adaptive immune responses. In this study, we developed a custom AmpliSeq panel comprising 24 candidate genes implicated in SARS-CoV-2 pathogenesis and immune regulation to investigate the host genetic determinants of COVID-19 severity. Targeted next-generation sequencing was performed using the Ion Torrent platform on 61 individuals stratified into four cohorts: control, mild, moderate, and severe disease. Comprehensive bioinformatics analyses, including variant calling, statistical association testing, and functional enrichment, were conducted to identify the genetic variants associated with disease severity in the Bangladeshi population. Characterizing the host genetic factors underlying variable COVID-19 outcomes will improve the understanding of susceptibility to respiratory viral infections and inform personalized risk stratification and therapeutic strategies for future pandemics.

Keywords: COVID-19 severity, Targeted next-generation sequencing, Host genetic variation, SARS-CoV-2, Immune response genes

Harnessing a Lytic Bacteriophage to Control *Salmonella* in Poultry Settings

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Abstract: *Salmonella enteritidis* is a major foodborne pathogen frequently associated with poultry products and is increasingly resistant to antibiotics, posing serious public health concerns. Bacteriophages offer a safe and targeted alternative for controlling *Salmonella* contamination in poultry settings. This study investigates the biological characteristics and biocontrol efficacy of a lytic bacteriophage isolated from poultry farm waste. The phage was isolated using enrichment techniques and purified by repeated plaque assays. Host range analysis, thermal stability assessment, one-step growth curve analysis and turbidity reduction assays were performed to evaluate phage activity. The



phage exhibited strong lytic activity against *Salmonella enteritidis* and *Salmonella Typhimurium*, remained stable up to 60°C and demonstrated a short latent period with a high burst size. To assess practical applicability, phage efficacy was further evaluated on chicken skin tissue artificially contaminated with *Salmonella enteritidis*. Phage treatment resulted in a significant reduction in bacterial load compared to untreated controls. These findings highlight the potential of the isolated bacteriophage as an effective biocontrol agent for reducing *Salmonella* contamination in poultry products and enhancing food safety.

Keywords: Bacteriophage therapy, *Salmonella* control, Poultry food safety, Sustainable biocontrol, Antimicrobial resistance.

Synthesis of Metal Organic Framework and It's environmental application for carbon di oxide and heavy metal adsorption.

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Session:2020-21

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Abstract: Metal-Organic Frameworks (MOFs) are porous materials with high surface area, making them excellent candidates for capturing pollutants. In this study, MOFs were synthesized using a simple solvothermal method and tested for their ability to adsorb CO₂ and heavy metals from air and water. Characterization confirmed their crystalline structure and porosity. Adsorption experiments showed significant removal efficiency, demonstrating MOFs' potential as effective and sustainable materials for environmental remediation.

Concentration and Health Risk Evaluation of Particle Phase Organic Compounds and PAHs in Urban Air

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Abstract: Urban air pollution contains a complex mixture of particle phase organic compounds, including polycyclic aromatic hydrocarbons (PAHs), which pose significant threats to human health. This study evaluates the concentration levels, composition, and associated health risks of particle-phase organic compounds and PAHs in urban ambient air. Airborne particulate matter samples were collected from representative urban locations and analyzed to identify major organic constituents and priority PAHs. The results indicate elevated concentrations of PAHs, with high-molecular-weight compounds dominating the particle phase, suggesting strong contributions from traffic emissions, fossil fuel combustion, and other anthropogenic sources. Diagnostic ratios were used to infer potential emission sources. Health risk assessment, based on toxic equivalency factors, revealed that several PAHs contribute substantially to carcinogenic risk, exceeding recommended safety thresholds in densely populated areas. The findings highlight the potential long-term health implications of chronic exposure to particle-bound organic pollutants in urban environments. This study underscores the need for continuous monitoring, stricter emission control strategies, and effective air quality management policies to mitigate health risks associated with particle-phase organic compounds and PAHs in urban air.



Photocatalytic Degradation of Methyl Violet Using SnO₂/ZnO Nanocomposite Synthesized by Facile Sol-Gel Method

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Abstract Water pollution caused by industrial dyes is a serious environmental problem. Among these dyes, methyl violet is highly toxic and difficult to remove. In this study, SnO₂, ZnO, and SnO₂/ZnO nanocomposites were prepared using a simple and low-cost sol-gel method. The structural and morphological properties of the samples were analyzed using X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM), and high-resolution transmission electron microscopy (HR-TEM). The surface area and pore size were measured by BET analysis. Chemical composition and bonding were studied using X-ray photoelectron spectroscopy (XPS). The optical properties were examined using UV-visible spectroscopy, and the band gap energies were calculated using Tauc plots. The photocatalytic performance of the prepared materials was tested by degrading methyl violet dye under light irradiation. The SnO₂/ZnO nanocomposite showed significantly higher degradation efficiency compared to pure SnO₂ and ZnO. This improved performance is mainly due to better charge separation and reduced recombination of electrons and holes in the nanocomposite system. Therefore, SnO₂/ZnO nanocomposites can be considered a promising and cost-effective photocatalyst for wastewater treatment.

Keywords: Photocatalyst, Sol-gel, Methyl violet, Nanocomposite, Dye-degradation.

Psychometric Properties and Predictive Validity of the GAD-7 Score: Evidence from BDHS 2022

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Abstract: GAD-7 score is a high-stakes self-report scale for screening, measuring severity of anxiety disorder, tracking changes over time and supporting diagnosis. Despite its prevalent application in clinical and research settings, national-level psychometric evaluations in Bangladesh are limited. This study used secondary data from the Bangladesh Demographic and Health Survey (BDHS) 2022, conducted by NIPORT with international partners. After checking assumptions by performing exploratory factor analysis, Cronbach's alpha and Item Response Theory were used to assess the reliability and dimensionality of the score on the sample of 19,969 reproductive aged women. Non-parametric tests supported a single-factor structure, and a graded response model was evaluated via posterior predictive p-values. Cronbach's alpha was 0.83, indicating strong reliability. IRT parameters were all significant ($p < 0.001$), and the estimates showed greater variability at mild to moderate anxiety levels although Item Information Function (IIF) curves depicted that the last two items were less informative, suggesting the need to refine the score by weighting the first five items more heavily.

Keywords: GAD-7 score; Exploratory Factor Analysis; Cronbach's alpha; Item Response Theory; Item Information Function curve



Eco-Friendly Fabrication and Nanostructural Optimization of Collagen Capsule Shells Derived from Bovine Hide Trimmings via Plant-Based Enzymatic Processing

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Abstract: Leather is a high-value, renewable natural resource with significant economic potential; however, the sector's growth is hindered by the extensive generation of solid waste and its environmentally harmful disposal. This study aims to address these challenges by integrating principles of sustainability, green chemistry, and circular resource utilization. The research focuses on reusing bovine hide trimmings—one of the major solid wastes from leather processing—for collagen extraction, supported by an eco-friendly enzymatic approach using another commonly discarded biomass, banana peel. The proposed method begins with the collection of fresh banana peels, followed by the extraction of plant-based proteolytic enzymes in distilled water with controlled heating. Enzyme activity will be evaluated through protein content analysis, storage stability tests, and optimization procedures to determine the most effective conditions for application on delimed pelt. The extracted collagen and gelatin will subsequently be utilized for the preparation of medicinal capsule shells. To enhance the structural and functional performance of the capsule shells, nanotechnology will be incorporated through the addition of suitable nanoparticles, aiming to improve mechanical strength, stability, and overall usability. The expected outcome of this research is a sustainable fusion of the leather and pharmaceutical sectors, contributing to environmental improvement while supporting value-added product development. A potential limitation of the process may be the relatively lower collagen yield associated with water-based extraction techniques; however, the study prioritizes maximizing collagen recovery through greener, resource-efficient approaches. Overall, this work is designed to reduce solid waste burdens, promote environmentally responsible practices, and advance sustainable materials development through innovative chemical engineering solutions.

Keywords: Sustainable collagen extraction, Banana Peel Proteolytic Enzyme, Nanotechnology-Enhanced Capsule Shells, Solid Waste Valorization, Green Chemistry Approaches

Innovative Glycerol-Mediated Tanning for The Development of Translucent Leather

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Abstract: This study explored a novel method to stabilize rawhides and skin, creating a distinctive type of leather that had not been observed previously. The aim was to explore the possibility of producing a material for the leather industry to replace chrome tanned leather. Translucent leather is a specific form of leather that incorporates the optical characteristics of collagen to create a material that allows light to pass through it. Glycerol was used to produce translucent leather, resulting in a highly satisfactory level of light transmission in the finished product. The properties of produced translucent leather were identical to conventional Chrome tanned leather, which is noteworthy considering its unique tanning method. Physical test results such as tensile, tongue, baumann, and simple tear strengths were all within the acceptable limits. However, translucent leather's shrinkage temperature was lower than the chrome-tanned leather's, suggesting that glycerol had less tanning power. This establishes a platform for the future optimization of glycerol-based tanning systems by controlling processing parameters to improve thermal stability. Thus, the study suggests that this particular type of leather may serve as an alternative to chrome tanned leather; however, significant enhancements are necessary before it can be utilized on an industrial scale.

Keywords: Translucent leather, Glycerol, Chrome-free alternative



Waste-to-Wealth Water Remediation: A Circular Economy Strategy Using Bio-based adsorbent synthesized from Leather Fleshing–derived Collagen Hydrolysate and Graphene Oxide

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Abstract: The increasing demand for sustainable wastewater treatment technologies has driven interest in circular economy–based material development for environmental remediation. In this study, a novel and eco-efficient adsorbent was developed through the circular valorization of leather fleshing waste, a major by-product of the tannery industry. Graphene oxide has oxygen-containing groups like hydroxyl (-OH), carboxyl (-COOH), and epoxy groups and hydrophobic regions allow for strong π - π stacking with aromatic organic pollutants (like dyes). Graphene oxide-collagen hydrolysate (GO-CH) adsorbent was prepared and used as a low-cost and bio-based adsorbent to remove Acid Red 73 (AR73) dye from synthetic solution. GO-CH adsorbent was characterized using various techniques such as FTIR, XRD, SEM and BET. The optimum pH, adsorbent dose, time, and percentage of removal were found 2.0, 1.0 g/L, 60 min, and 95.37% at an initial concentration of 100 ppm at room temperature. The Langmuir isotherm model was configured properly with experimental data and maximum capacity was found 95.37 mg/g. This research presents a sustainable and circular approach by converting industrial leather waste into value-added functional materials, thereby reducing environmental burden while contributing to efficient water purification.

Keywords: Industrial biowaste utilization, Graphene oxide, Water remediation, Adsorption Isotherm, Environmental sustainability

Utilization of keratinous waste generated from beamhouse operation for multipurpose application

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Abstract: A huge amount of solid waste is generated daily through beamhouse operation globally for leather production. Due to the slow degradation nature of keratin, the wastes produced impacts greatly to the environment. In Bangladesh, goat is slaughtered at many for both food industry and leather industry. This, especially in leather industry, after unhairing a huge amount of hair is disposed. Due to the presence of keratin, this hair slowly degrades and creates harmful impact on the environment. In this project, a total utilization of the keratinous waste is shown. The study involves converting the keratin so that the waste can be managed in an eco-friendly way. The extracted keratin hydrolysate can be used in many applications, one of which is copolymerizing with PVA to make a bioplastic film. The keratinous residue that was obtained while preparing keratin hydrolysate was also used as a bio composite and showed ample result in promoting germination and growth of spinach seed. The aim of the project is to imply a zero-waste method while managing the keratinous waste, therefore reducing its harmful impact on environment as well as human body and promoting sustainability through circular economy.

Keywords: Keratinous waste; Eco-friendly waste management; Biopolymer; Circular economy; Zero waste approach



Remediation of Allura Red Dye (Red 40) Using Activated Carbon Derived from Water Hyacinth Roots

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Abstract: Allura Red AC (Red 40) is a widely used synthetic azo dye in the food, pharmaceutical, and cosmetic industries. It was chosen for this study due to growing concerns about its negative health and environmental effects. The dye is recognized for its high chemical stability and biodegradation resistance, which contribute to prolonged effluent coloration as well as potential harmful, allergic, and carcinogenic effects on humans and aquatic creatures. Thus, effective removal of Allura Red from aquatic systems is critical for the environment. This study looks at the adsorption potential of activated carbon obtained from water hyacinth roots, an abundant and invasive aquatic biomass. Converting water hyacinth roots into activated carbon provides a sustainable and low-cost adsorbent while also resolving environmental issues connected with the plant's uncontrolled proliferation. Activated carbon has a porous structure and a wide surface area, making it ideal for dye adsorption. Allura Red's functional groups include azo (-N=N-), sulfonate (-SO₃⁻), and aromatic rings, while activated carbon surfaces have hydroxyl (-OH), carboxyl (-COOH), and carbonyl (C=O) groups. These functional groups enhance adsorption by electrostatic attraction, hydrogen bonding, and π - π interactions. The combined physicochemical features are expected to result in excellent removal effectiveness, which justifies the use of Allura Red as a model dye for adsorption investigations.

Keywords: Allura Red, Activated carbon, Water hyacinth root, Adsorption, Wastewater treatment

Maternal Health Analysis and Prediction Using Hash-based Randomized Cross Validation Technique in Machine Learning

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Abstract: Maternal health is a significant concern for women. Women are half of human civilization. During pregnancy, they require more attention for their health, with various physical condition data, like blood pressure, sugar, body temperature, and heart rate. In the era of technology and IT revolution, this issue can be analyzed through cross-validation with the Machine Learning model. This study proposes a hash-based random mathematical formula to handle the cross-validation fold that is random in nature. This investigation aims to analyze our proposed formula regarding crossvalidation and also compare three prominent cross-validation schemes to our proposed algorithm. Based on blood pressure, Sugar, heart rate, age and body temperature, this study paves the way to forecast the health condition of a pregnant woman. Additionally, which feature is most significant for health conditions is also analyzed in this work. The cross-validation estimate was 62.31%. Compared to the other three, the proposed estimation CV score is near to the established scheme. This study follows the quantitative correlational approach, and there are 1014 instances in the dataset. This work also tracks the time and memory measurements for investigating the data.

Keywords: Cross Validation, Machine Learning, Randomized Hash, Maternal Health, Women Health



Supervised Neural Networks for Nonlinear Volterra Integro-Differential Equations: Boundary Condition Embedding and Higher-Order Derivatives

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Abstract: In this work, a new supervised artificial neural network approach is proposed for solving Volterra integro-differential equations with high accuracy and efficiency. The new model utilizes a strong boundary condition incorporation technique in which both function and slope boundary conditions are incorporated with machine-level accuracy. The proposed model mainly utilizes a cubic polynomial transform technique and smooth envelope function with a float64 arithmetic highprecision learning technique and an L-BFGS optimization technique. In this work, thorough simulations were performed in which near-exact solutions of analytical solutions were obtained with an absolute error of order 10^{-6} in a cubic polynomial transform technique with a float64 arithmetic learning technique and derivative calculation up to order four with very minimal error. Furthermore, in post-training operator residuals were calculated with high accuracy and conduct Gauss Legendre quadrature tests. A robust results were obtained with different resolutions by this test, making this model highly efficient in solving Volterra integro-differential equations and providing a platform for future studies in higher-dimensional systems with VIDE equations.

Keywords: Volterra Integro-differential Equation; Supervised Artificial Neural Network; Hard Boundary Condition Enforcement; Cubic Polynomial Transformation; Gauss–Legendre Quadrature

Surrogate-Assisted Artificial Neural Network Framework for Airfoil Aerodynamic Performance Optimization

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Abstract: This work presents an ANN-based surrogate modeling framework using XFOIL and Python for efficient prediction and optimization of airfoil aerodynamic performance. A large parametric data set was obtained through systematic XFOIL simulations for multiple airfoils in wide ranges of angles of attack and Reynolds numbers. Geometry-aware ANN models were trained to predict lift, drag, and moment coefficients from airfoil shape parameters and flow conditions. Additional training constraints are introduced that enforce physical trends, such as smooth coefficient variation with Reynolds number, monotonic lift in the pre-stall regime, and non-negative drag predictions. The ANN surrogate is then combined with a routine to maximize the lift-to-drag ratio through the tuning of airfoil geometric parameters. Numerical results have shown that the proposed ANN model accurately reproduces XFOIL predictions while reducing drastically the computational cost and maintaining robust performance for unseen airfoil shapes and operating conditions. With the present approach, it becomes practical to perform rapid aerodynamic analyses and data-driven airfoil design optimizations.

Keywords: Airfoil aerodynamics; Surrogate modeling; Artificial neural networks; Aerodynamic optimization; XFOIL

Utilization of Tanning Industry Waste (Shaving Dust and Raw Trimmings) as a Protein Supplement for Sustainable Poultry Feed Formulation



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Abstract: The leather tanning industry generates a significant volume of collagen-rich solid waste, particularly shaving dust and raw trimmings, which pose serious environmental concerns due to improper disposal and potential chromium contamination. This ongoing research aims to valorize tannery waste through microbial enzymatic hydrolysis to produce a sustainable protein supplement for poultry feed. Proteolytic bacteria are being isolated from tannery-associated environments and screened for high protease activity to hydrolyze proteinaceous waste under optimized conditions. Preliminary laboratory characterization of the enzymatically treated hydrolysate indicates a high crude protein content (73.08% for shaving dust, 99.87% for raw trimmings), improved in vitro protein digestibility exceeding 80%, and a substantial reduction in total chromium concentration to levels considered safe for animal feed applications. Poultry feed formulations incorporating 5%, 10%, and 15% hydrolysate substitution are currently under preparation, and controlled feeding trials are planned to evaluate growth performance parameters including body weight gain, feed conversion ratio, and nutrient digestibility. The study is expected to demonstrate the feasibility of converting hazardous tannery waste into a value-added feed ingredient, supporting circular bioeconomy principles while reducing environmental pollution, chromium contamination and contributing to sustainable poultry production.

Keywords: Tannery waste valorization; Circular economy; Enzymatic hydrolysis; Dechroming; Sustainable poultry feed.

Gene editing by knockdown of the SD1 gene in *Oryza coarctata* for improvement of its wild plant architecture

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Abstract: Climate change is a major concern of the 21st century and poses a serious threat to food security. Salinity is one of the most significant abiotic stress which affects plant growth, physiological functions and ultimately reducing grain yield. As a halophytic wild rice species, *Oryza coarctata* offers a valuable genetic resource for developing resilient rice varieties that can withstand salinity amid rising sea levels. This study aimed to knockdown the SD1 gene to develop a semi-dwarf trait in *O. coarctata*, which will be more likely to cultivable rice. A target specific guide RNA was designed & cloned into a CRISPR based vector, successful cloning was confirmed by PCR & sequencing. The results showed that the guide RNA was correctly inserted into the vector, demonstrating that the cloning method was effective. This validated construct will be used for in planta transformation of *O. coarctata*. Then SD1 gene expression level & detailed study of plant growth and architecture will be performed. Understanding the role of SD1 gene will help in developing semi-dwarf plants with improved architecture. Overall this work highlights the value of wild rice genetic resources & provide the foundation for future strategies to improve plant architecture, productivity & supporting the potential domestication of *O. coarctata*.

Keyword: CRISPR vector, guide RNA, gene knockdown, domestication, semi-dwarf trait.

Validation of Salt tolerance and yield performance in CRISPR/Cas9- edited IR29 rice through knockdown of ion transporter genes *OsAKT1* and *OsABC7*



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Abstract: Salinity is one of the major abiotic stresses that significantly hampers rice productivity in Bangladesh and other coastal areas. Ion transporter genes are essential for preserving ionic homeostasis in saline environments. In previous work, the ion transporter genes OsAKT1 and OsABCB7 were independently knocked down in the IR29 rice variety via Agrobacterium-mediated transformation using CRISPR/Cas9-mediated single-gene editing. It was found that these genes were down regulated in salt tolerant but lowyielding salt tolerant traditional rice. The present work focuses on validating advanced generations of these edited lines for salinity tolerance and yield performance. In addition, the project outlines a future strategy to develop multiplex CRISPR/Cas9 constructs targeting both OsAKT1 and OsABCB7 simultaneously to further improve salinity tolerance. Edited lines in advance generation will be subjected to seedling-stage salinity screening under controlled conditions to identify tolerant phenotypes. Molecular characterization of putative edited plants will be carried out using RT-PCR to assess transcript levels, Sanger sequencing to confirm targeted mutations, and restriction enzyme digestion assays to distinguish edited alleles from wild-type. These approaches enabled reliable confirmation of CRISPR-induced gene knockdown events. Since no foreign DNA is introduced, transgene-free, non-GM, highyielding, and salt-tolerant plants can be selected for release, supporting sustainable agriculture and food security in salt-affected regions.

Keywords: CRISPR/Cas9, OsAKT1, OsABCB7, Salt tolerant, non-GM

Inside the Genome: Decoding the Virulence Blueprint of Clinical *Staphylococcus aureus*

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Abstract: One of the biggest challenges in treating *Staphylococcus aureus* infections is the emergence and spread of antibiotic-resistant strains, particularly methicillin-resistant *S. aureus* (MRSA), which is resistant to multiple classes of antibiotics. This study determined the virulence gene profile of one multi-drug resistant (MDR) *Staphylococcus aureus*, isolated from a clinical sample. The isolate was retrieved from the urine sample and cultured on the differential media Mannitol Salt Agar (MSA) to isolate *S. aureus*. Phenotypic characterization and antibiotic susceptibility testing were done, followed by 16S rRNA gene sequencing. Whole genome sequencing (WGS) was performed and virulence gene identification was done by using established bioinformatics pipelines and databases. *S. aureus* produced differential small, yellow colonies on MSA. The isolate showed resistance to 15 different types of antibiotics and the MAR index was 0.68. The genome length was 2841854 bp, which revealed the presence of multiple virulence-associated genes involved in biofilm (e.g., *icaA*, *icaR*), efflux pump (e.g., *BceA*, *NorA*), antibiotic resistance (e.g., *BlaZ*, *gyrA*) and toxin production (e.g., *seI*, *eta*). The genomic findings from the study are crucial for understanding pathogenic mechanisms and for designing strategies and guidelines to prevent *S. aureus* infections.

Keywords: WGS, virulence, MDR, virulent gene.



Development of ‘Al-Ti-Oligosaccharides’ Based Leather Tanning agent by Utilizing Sugarcane Bagasse Biomass

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Abstract: This work employs a new alternative chrome free leather manufacturing process which is consisted with ‘Al-Ti Oligosaccharides’ derived from Sugarcane Bagasse biomass. A reaction system used to degrade and oxidize of hemicellulose of sugarcane bagasse biomass with $AlCl_3$ and H_2O_2 respectively. This mixture is applied on leather as a pioneering tanning agent to produce environment friendly chrome free tanned leather. In the oxidation steps, H_2O_2 oxidizes hydroxyls group of the hemicellulose in sugarcane biomass and converts into -CHO group which acts as a aldehydic tanning agent. Then it is also degraded with $AlCl_3$ with suitable concentrations and temperatures. Although there are produced some undesirable species and the formation of chromaticity with negative influencing on the tanning performance. But this affects can be lowered by controlling these affecting parameters by using these at optimum level like 55 Mm $AlCl_3$ and 5 vol % of H_2O_2 at 120-130°C temperature. Application of this advanced tanning agent on the leather enhances hydrothermal stability to a satisfactory level and increases the shrinkage temperature of tanned leather up to 94°C and tensile strength 545kg/cm² after tanning that is the highest shrinkage value compare to the previous studies. Because the developed tanning agents acts as ‘advanced tanning agents’ due to the robust crosslinking of aldehydic -CHO with collagen and the coordination linkage by ‘Al-Ti Oligosaccharides’. Thus, conference the desired necessities of the leather commerce to achieve the landmark of the sustainable goals for the sector by reducing environmental concerns with eco-friendly approach.

Keywords: Sustainable leather processing, Hemicellulose oxidation, Eco-friendly tanning, Shrinkage temperature, Biomass-derived tanning agent

Fluid Flow and Heat Transfer of a Non-Newtonian Ferrofluid in an Irregular Shaped Enclosure

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Abstract: Efficient thermal management under strong buoyancy and magnetic environments is critical in advanced energy and process systems such as nuclear reactor cooling channels, magnetic heat exchangers, electronic packaging, and metallurgical processes. In this study, a numerical investigation of natural convection of a non-Newtonian ferrofluid has been carried out. The fluid is inside a two-dimensional partially heated crown-shaped enclosure containing a fully heated wavy inner cylinder. The dimensionless governing equations are solved using the finite element method based software. The impacts of Rayleigh number (3 5 10 10 –), Hartmann number (0 20 –), nanoparticle volume fraction (0.00 0.09 –), power-law index (0.6 1.4 –), and inner wave number are analyzed using streamlines, isotherms, velocity fields, and average Nusselt number. Results show



that increasing Rayleigh number and inner waviness significantly enhances buoyancy-driven circulation and heat transfer. A higher power-law index weakens the flow due to increased effective viscosity, whereas shear-thinning behavior promotes thermal convection. The applied magnetic field suppresses fluid motion and heat transfer through Lorentz forces, providing a controllable mechanism for thermal regulation and safety. These findings demonstrate that combined control of geometry, ferrofluid rheology, and magnetic field can optimize heat transfer in advanced thermal applications.

Keywords: Ferrofluid, Irregular shape, Natural convection, Magnetic field, Partial heat.

Domain General vs Domain Specific Role of Working Memory on Error Monitoring.

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Abstract: Working memory, which can be defined as a temporary storage system, is important for ensuring performance efficiency, while error monitoring is defined as our ability to detect and signal errors. The domain-specific vs. domain-general role of working memory is an area of interest in error monitoring. However, no research to date has examined whether the relationship between working memory and error monitoring is domain-general or domain-specific. In the current study, we will address this research gap by designing two numeric vs. non-numeric error-monitoring tasks and investigating their relationship with phonological vs. visuospatial working memory. For this purpose, a total of 60 participants will be recruited. Based on previous literature, it is hypothesized that the relationship between error monitoring and working memory would be domain-general, with stronger positive relationships when the working memory and error-monitoring tasks share a common domain, and weaker—but still positive—relationships for cross-domain pairs.

Keywords: working memory, error monitoring, domain-general processing, domain-specific processing

Investigating Imagery and Context-Based Learning on Metacognitive Awareness of Semantic Processing

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Abstract: Semantic encoding is an essential process in learning and memory, especially when coming across novel lexical items, and multimodal learning integrates visual, auditory, and contextual elements to enhance memory performance (Massa & Mayer, 2006). Metacognitive awareness is when people consciously monitor their performance during the learning process. Zheng et al. (2025) demonstrated that multimodal inputs enhance metacognitive awareness in semantic tasks. However, there is a significant gap in understanding how multimodal semantic encoding influences metacognitive awareness in semantic categorization tasks. This study will examine how 130 Bangladeshi undergraduates' conceptual learning accuracy and metacognitive awareness are affected when contextual semantic sentences are incorporated into multimodal training. Data will be analyzed using a 2×2 ANCOVA, testing whether context-based multimodal learning improves semantic recall and metacognitive awareness over no-context learning, controlling for working memory capacity.



These findings would suggest that contextual semantic information supports more effective learning and self-monitoring by strengthening the link between semantic processing and metacognitive regulation.

Keywords: metacognitive awareness, semantic processing, multimodal learning, contextual learning, working memory

Electrospun Collagen-Based Nanofibers as Carriers for Curcumin Delivery in Bioactive Wound Dressing

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Abstract: Curcumin has various biological functions, including antioxidant and antimicrobial properties, but the functions are limited by its low aqueous solubility. This study investigates the fabrication of collagen (Col)-based electrospun nanofibers as a potential drug delivery platform for curcumin (Cur) in wound dressing. Collagen was extracted from bovine hides via acid-enzyme solubilization, while curcumin was isolated from *Curcuma longa* rhizomes using microwave-assisted extraction in acetone. The electrospun nanofibrous mats were obtained from a selected ratio of PVA and Col under optimized electrospinning parameters, followed by UV-assisted crosslinking. The as-prepared mats were used for loading different wt% of curcumin, and the release behavior was monitored. The cumulative release of Cur after 72 h from 80:20, 70:30, and 60:40 PVA-Col nanofibers loaded with 10% Cur was found to be 83 %, 71 %, and 57 % at pH 7.4, respectively. At 80:20 (PVA: Col), a burst release profile was observed initially, wherein about 70 % of the Cur was released during the first 5 h. While increasing the ratio of Col resulted in a more sustained release of Cur, whereby the 60:40 (PVA: Col) exhibited a sustained release of Cur up to 57 % was followed throughout to 72 h. The nanofibers were also characterized using FTIR, SEM, and DSC analyses. Mechanical properties, wettability, swelling ratio, and degradation behavior were also evaluated. FTIR spectra confirmed the presence of characteristic Col and Cur peaks and their interaction within the nanofibrous matrix. Furthermore, antibacterial assays demonstrated that the Cur-loaded nanofibers exhibited significant inhibitory activity against *Escherichia coli* and *Bacillus subtilis*. Overall, this work highlights the potential of electrospun PVA-Col nanofibers as an efficient and biocompatible drug delivery system for curcumin, providing a foundation for future exploration of collagen-based nanofibrous materials in therapeutic applications.

Whole Genome Analysis of a *Listeria innocua* Isolate Recovered from a Cattle Farm Environment

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Abstract:

Introduction: *Listeria innocua* is generally regarded as a non-pathogenic species; however, increasing genomic evidence suggests the presence of virulence- and stress-associated determinants that may contribute to environmental persistence and potential public health relevance.



Methodology: In this study, whole genome sequencing (WGS) was performed to comprehensively characterize a *Listeria* isolate (LD-1-2-1) recovered from a cattle farm. De novo genome assembly was conducted using MEGAHIT, followed by quality assessment with CheckM and downstream genomic analyses including taxonomic identification, multilocus sequence typing (MLST), antimicrobial resistance (AMR), virulence factor profiling, and phylogenetic analysis.

Result: The draft genome comprised approximately 2.77 Mb with a GC content of 37.44% and showed high completeness with minimal contamination. Taxonomic analysis identified the isolate as *Listeria innocua*, and sequence typing assigned it to sequence type ST2156. Genome based screening revealed the presence of multiple genes associated with stress tolerance, protein quality control, cell wall modification, and environmental persistence, suggesting an enhanced ability to survive under farm-associated conditions. Antimicrobial resistance analysis identified intrinsic resistance related genes linked to fosfomycin, fluoroquinolone, and lincosamide tolerance, while no acquired or high-risk resistance genes were detected. Classical virulence regulators and major pathogenicity associated genes were absent.

Conclusion: Overall, this whole genome analysis provides insight into the adaptive genetic features of *L. innocua* circulating in cattle farm environments and highlights the importance of genomic surveillance for understanding environmental persistence of *Listeria* species.

Keywords: Whole genome sequencing; cattle farm; stress response genes; antimicrobial resistance

Targeted knockdown of rice *Deep Green Panicle 1* gene using CRISPR/Cas9 to enhance photosynthetic efficiency and yield

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Abstract: Climate change poses increasing threats to rice productivity in Bangladesh. Genetic regulation of photosynthesis can be a promising way to improve plant resilience and yield. Research has shown that maize *Golden2-like (GLK)* genes enhance photosynthesis in C3 rice. The *A. thaliana* transcription factor *AtBPG4* is known to negatively modulate activity of *GLK* homologues through mutation research. Our study aims to utilize this suppression by targeting the rice homolog of *AtBPG4*, the *Deep Green Panicle 1 (DGPI)* gene for knockdown, using CRISPR/Cas9 technology.

We have analyzed the *DGPI* gene expression under heat stress in selected rice varieties: BRRI dhan98, BRRI dhan101, and BRRI dhan67. To achieve *DGPI* gene knockdown, guide RNAs targeting the *OsDGPI* gene were designed and cloned, followed by *in planta Agrobacterium*-mediated transformation. Transformed T₀ and selfed T₁ plants will be confirmed by PCR. Thereafter, mutation in T₂ plants will be searched by targeted gene-amplification, cloning and Sanger sequencing. Knockdown of targeted gene and agronomic traits in T₂ plants will be quantified by real-time PCR.

Edited rice lines are expected to exhibit enhanced photosynthetic efficiency, increased vegetative biomass and improved agronomic traits. High-performing selected non-transgenic edited lines will be suitable for breeding programs, contributing to climate-resilient rice production.

Keywords: Golden2-like (GLK) genes, *Deep Green Panicle 1 (DGPI)*, *in planta*, CRISPR/Cas9, photosynthesis.



Part 5: Social Science

Role of Geospatial Technologies in Achieving SDGs: A Review

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Abstract: The 2030 Agenda for Sustainable Development is inherently spatial since most of the social, economic and environmental challenges are embedded in geographic contexts. Geospatial technologies such as remote sensing, GIS, Earth Observation and spatial data infrastructures are now central to monitoring and evaluating progress toward the SDGs. Recent Earth observation data highlights their transformative roles as evidence directly supports 30 of the 231 unique SDG indicators, yet global progress remains slow because of gaps in data use and institutional adoption. A case study in Deqing County, China, showed that 70% of localized indicators outperformed national and global standards and proved the effectiveness of geospatial approaches for grassroots SDG monitoring. Similarly, applications in megacities like Dhaka reveal how land use modeling links directly with SDG metrics, providing critical insights for adaptive planning. This review synthesizes recent applications, innovations, and challenges, emphasizing the urgent need to mainstream geospatial intelligence into strategic frameworks to accelerate SDG achievement before 2030.

Keywords: Geospatial technologies, Sustainable Development Goals, Earth Observation, Remote sensing, Spatial data infrastructures

Do Microfinance Institutions Benefit the Poor in Bangladesh? Evidence from the HIES 2022 Survey

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Abstract: This study explores how microfinance institutions (MFIs) influence poverty in Bangladesh. It uses data from the Household Income and Expenditure Survey (HIES) 2022, which provides updated poverty measurements. While existing literature suggests that the impact of microfinance varies across socioeconomic groups, its effectiveness in driving sustained economic growth and improving living standards remains inconclusive. The study applies descriptive analysis and logistic regression to examine links between microfinance access and factors such as education, region, monthly expenditure, and social security benefits. The study finds mixed effects of microfinance on poverty reduction. The findings of the logistic regression indicate that rural households have less access to microfinance institutions compared to urban households, putting them at a disadvantage. The financial landscape shows a clear divide between rural and urban borrowers, with urban borrowers accessing larger loans through alternative channels. Additionally, female-headed households that receive microcredits are at a higher risk of falling into poverty. The effectiveness of microfinance is limited by the absence of complementary interventions that address socioeconomic disparities. While the study cannot establish causal relationships due to its limitations, the findings provide valuable insights for enhancing financial inclusion strategies for policymakers.

Keywords: Microfinance, Poverty, Development, Financial Inclusion, Gender Inequality



Exploring the Protection and Enforcement of Victim's Rights in Violent Crimes within Criminal Justice System of Bangladesh

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Abstract:Victims of violent crimes face major challenges such as bureaucratic delays, lack of legal awareness, inadequate support services, social stigma within the criminal justice system. Countries worldwide established numerous victim protection policies including Swedish Crime Victim Authority and the Restraining Order Act (1988), UK's Code of Practice for Victims of Crime (2004), India's POCSO Act (2012), CrPC (1973) Section-357, 357(A), USA's state-based programs, though debated, President's Task Force (1982) and the Victims of Crime Act (1984), while Bangladesh has not yet approved any comprehensive framework of victim rights or for the protection of victim rights or reparation, and the definition of a victim is not legally codified. This study examines the protection and enforcement of victim rights within the criminal justice system of Bangladesh utilizing procedural justice theory and restorative justice framework. Employing a qualitative approach, 30 victims of violent crimes (Bangladesh and Overseas) and 10 key informant interviews with law enforcement, judiciary officials, and academicians will be conducted using in-depth semi-structured interview guidelines. Ultimately, the study aims to identify challenges faced by victims, compares national practices with international standards and seeks to provide actionable insights to inform the formulation of a comprehensive, victim-centered legal framework in Bangladesh.

Keywords: Victim Rights, Violent Crimes, Criminal Justice System, Procedural and Restorative Justice, Bangladesh

The Unseen Violence: Examining Hate Crimes & Systemic Discrimination against Female Sex Workers in Bangladesh

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Abstract:Female Sex working in Bangladesh exists in a contradictory position: Although there are currently 11 licensed brothels in Bangladesh, female sex work is still socially stigmatized and often associated with human trafficking, despite not being completely illegal for adult women. This tricky situation exposes female sex workers (FSWs) to systemic harm, including hate crimes such as physical assaults and harassment, which are rarely reported in the mainstream media or acknowledged by the society and the state. Legal ambiguities further enhance vulnerability. Although sex working itself are not clearly criminalized, but the Suppression of Immoral Traffic Act (1993) and the Oppression of Women and Children (Special Enactment) Act (1995) criminalize managing or soliciting from sex work. This creates a paradoxical structure where FSWs can work in semi-legal brothels but are faced with arbitrary arrests and harassment for other associated acts. The religious and political opposition to the recognition of female sex workers worsens such stigma, which makes them face further discrimination and violence reinforce discrimination and violence driven by prejudice. This study attempts to address these neglected human rights violations within the larger social, cultural, and legal framework of Bangladesh, while simultaneously linking them to global commitments such as SDG 5 (gender equality) and SDG 16 (peace, justice, and strong institutions).

Keywords: Female Sex Workers (FSWs), Systemic Discrimination, Hate Crime, Legal Ambiguity, Human Rights Violation



Role of AI in Bangladeshi Creative Book Production: An SEM-Based Cross-Sectional Analysis of Publishing Student's Perceptions

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Abstract: Despite global efforts to improve female education, significant variations in labor force participation among tertiary-educated women persist worldwide, indicating a need for a deeper understanding of these determinants. The objective of this study is to identify and analyze the key economic, demographic, educational, labor market, and sociocultural factors that influence labor force participation among women with tertiary education. The study employs two-way fixed effect panel data regression technique, analyzing data from 2006 to 2018. This approach captures the influence of broad structural factors and accounts for country-specific and time-specific influences. Key variables include GDP per capita, child-woman ratio, female tertiary education rate, unemployment rate, service sector value added, and measures of gender-based disparities. The findings reveal that economic development, child-woman ratio, and sectoral composition significantly influence labor force participation of females with tertiary education. Additionally, there is a significant interaction effect between female tertiary education and the reduction in gender-based discriminations which shows that these two factors work together to boost labor force participation of tertiary-educated females. Overall, this study provides crucial insights to the policymakers to design effective policies that can harness the potential of highly educated women, thereby promoting economic growth, social development, and gender equality globally.

Keywords: female labor force participation, tertiary education, cross-country analysis, gender discrimination, fixed-effect panel regression

Determinants of Labor Force Participation of Females With Tertiary Education: A Cross-Country Analysis

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Abstract: Despite global efforts to improve female education, significant variations in labor force participation among tertiary-educated women persist worldwide, indicating a need for a deeper understanding of these determinants. The objective of this study is to identify and analyze the key economic, demographic, educational, labor market, and sociocultural factors that influence labor force participation among women with tertiary education. The study employs two-way fixed effect panel data regression technique, analyzing data from 2006 to 2018. This approach captures the influence of broad structural factors and accounts for country-specific and time-specific influences. Key variables include GDP per capita, child-woman ratio, female tertiary education rate, unemployment rate, service sector value added, and measures of gender-based disparities. The findings reveal that economic development, child-woman ratio, and sectoral composition significantly influence labor force participation of females with tertiary education. Additionally, there is a significant interaction effect between female tertiary education and the reduction in gender-based discriminations which shows that these two factors work together to boost labor force participation of tertiary-educated females. Overall, this study provides crucial insights to the policymakers to design effective policies that can harness the potential of highly educated women, thereby promoting economic growth, social development, and gender equality globally.



Keywords: female labor force participation, tertiary education, cross-country analysis, gender discrimination, fixed-effect panel regression

Unreported Student Victimization in Bangladeshi University Campuses: Prevalence, Contributing Factors, and Policy Implications

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Abstract: University campuses are often assumed to be safe spaces for students, but a significant amount of student victimization remains concealed because of underreporting. This study examines the prevalence of unreported victimization among Bangladeshi university students, identifies crimes most likely to go unreported, and explores the socio-demographic and situational factors influencing disclosure. A mixed-methods approach will be adopted, combining social survey and case study methods. Quantitatively, data will be gathered through an online survey of 400 students from public, private, and national universities, selected via random and snowball sampling to ensure institutional representation. Qualitatively, in-depth interviews will be conducted using semi-structured interview guidelines with 20 survey participants who consent to further discussion, and 10 key informants, including guardians, law enforcement officials, student advisors, and members of university proctorial bodies. Anticipated findings suggest that fear of re-victimization, mistrust in authorities, social stigma, and ineffective dispute resolution contribute to the ‘dark figure of crime’ in the campuses. Gendered and intersectional dimensions, particularly those affecting female students, will also be addressed. By systematically analyzing these factors, the study aims to highlight the urgent need for supportive reporting channels, trust-building initiatives, and effective policy interventions to enhance safety and ensure student-friendly environments inside Bangladeshi universities.

Keywords: Unreported Victimization, University Campuses, Dark Figure of Crime, Underreporting Factors, Student Safety

Japan's Economic Diplomacy in South Asia: A Strategic Business Tool

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Abstract: The changing nature of Japanese involvement in Bangladesh is one of the most remarkable instances of long-term diplomatic, sustainable bilateral collaboration in South and Southeast Asia. In the following research paper, the political, economic and strategic aspects of Japanese involvement in Bangladesh have been critically analyzed with reference to its Official Development Assistance (ODA), infrastructural investments, and industrial and human capital development. With Bangladesh on the verge of ceasing to be a least developed country (LDC) by 2026, the Japanese partnership has taken on a new significance in line with the Tokyo vision of Free and Open Indo-Pacific (FOIP) and the Dhaka Vision 2041 development agenda. This paper uses qualitative data of policy documents, scholarly literature and reports of both the JICA and MOFA to understand the difference between the development model of Japan, which focuses on quality infrastructure, transparency and institutional capacity building, with other players in the region like China. It claims that Japanese participation has led to economic diversification, connectivity and resilience of Bangladesh and at the same time promoted Japanese strategic interests in the Bay of Bengal region. Nevertheless, the paper also recognizes structural issues, such as the sustainability of debt, environmental effects, and a disproportional developmental effect. Locating the relations between Japan and Bangladesh in the context of the larger global picture of Indo-Pacific geopolitics and sustainable development, the study



offers a subtle insight into how bilateral cooperation can act as a guide to fair development and balanced strategy in the Global South.

Keywords:Japan–Bangladesh Relations; Official Development Assistance (ODA); Indo-Pacific Strategy; Sustainable Development; Foreign Policy; Infrastructure Development; Economic Cooperation

Climate Shocks and Remittance Inflow:- a HIES Data analysis of the coastal belt

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Abstract:Based on an analysis of Household Income and Expenditure Survey (HIES) 2022 data, this study investigates the relationship between climate shocks, remittances, and household consumption in the climate-vulnerable Meghna Estuary Belt of Bangladesh, specifically the districts of Lakshmipur, Feni, and Noakhali.

The findings reveal that climate shocks, such as floods and cyclones, have a statistically significant negative impact on household consumption expenditure. Conversely, remittance inflows have a direct positive effect, increasing consumption. Crucially, the analysis introduces an interaction term between climate shocks and remittances. The positive and statistically significant coefficient for this term demonstrates that remittances act as a buffer, significantly mitigating the negative consumption effects of climate shocks. In essence, when households face environmental disasters, remittance income helps stabilize their consumption levels.

The study notes that among the three districts, Noakhali receives the highest remittances, followed by Lakshmipur and Feni. The conclusion underscores those remittances serve as a vital form of informal insurance for households in these vulnerable regions. Consequently, the research recommends that policymakers should design strategies to maximize the positive benefits of foreign migration, thereby enhancing the resilience of communities against the adverse impacts of climate change.

The Sociopolitical Construction of an Epidemic: Deconstructing the 'War on Obesity' in Bangladesh

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Abstract: Obesity is often portrayed from a medical perspective, carefully avoiding other socio-political factors behind it. Obesity is not only a biological condition, but it's constructed by power, governance, and capitalism. Moving beyond such a biomedical framework, this paper critically examines obesity in Bangladesh as a socio-political construction. Applying a sociological lens, it is observed that obesity is not just a health issue; multiple social, political, and economic factors, including rapid urbanization, the transnational marketing of processed foods, and the capitalistic system influence it. Media, national and international health campaigns often blame individuals for obesity, ignoring the actual structural factors. Through a critical analysis of secondary data, media reports, policy analysis; this paper reveals how the concept 'obesity' is solely blamed on individuals to shift attention from the underlying socioeconomic drivers. Findings show that the most prescribed



solutions for obesity are centred on individual lifestyle changes that are actually shaped by neoliberal ideologies. These prescribed solutions fail to address the structural reasons in the Bangladeshi context. To conclude, this study demands a new approach showing that public health policy must focus on the socioeconomic structure to combat obesity in Bangladesh; instead of blaming individuals.

Keywords: Obesity, medical perspective, socio-political factors, sociological lens, capitalism.

The Role of Family in the Mental Wellbeing of University Students: A Study

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Abstract: Mental wellbeing has become a pressing concern among university students, particularly in developing countries like Bangladesh, where academic stress, social transitions, and financial constraints often lead to psychological challenges such as anxiety and depression. Despite the growing awareness, limited research has explored the role of family support in promoting students' mental health within the Bangladeshi context. This study investigates how different forms of family involvement emotional, financial, and communicative affect the mental wellbeing of university students. Using a mixed-methods approach, data were collected from students across three major public universities in Bangladesh through surveys and in-depth interviews. The findings reveal that consistent emotional encouragement, financial stability provided by families, and regular communication significantly enhance students' psychological resilience and overall wellbeing. Conversely, family conflicts or lack of communication contribute to elevated stress and mental distress. The study underscores the pivotal role of familial support systems in nurturing the mental health of university students and calls for integrating family-based awareness programs within student wellbeing initiatives in higher education institutions in Bangladesh.

Intergenerational Gender Attitude Shifts: Mothers and Daughters Negotiate Conflicting Values Around Marriage, Employment and Autonomy in Globalizing Bangladesh

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Abstract: Nowadays globalization is reshaping women's opportunities and aspirations in Bangladesh, nevertheless little qualitative research explores how these transformations are negotiated within families across generations. This study explores intergenerational dynamics by analyzing how mothers and daughters possess different and occasionally conflicting with norms and values concerning three critical life domains: marriage, occupation and independence. Through in-depth interviews and focus group discussions with 30-35 mother-daughter pairs in rural Bangladesh, the research examines how mothers and daughters in globalizing Bangladesh develop and mediate gender and exploring the areas where their values agree or contradict and the dynamic family processes through which such contradictions are actively managed and resolved. The study demonstrates that daughters seek to education and financial independence which were not accessible to their mothers. However, in this globalizing world everyone is independent; hence, mothers show ambivalence, supporting their daughters' educations with maintaining traditional roles. These negotiations indicate tensions between



globalization and cultural norms around female esteem and family honor. By centering women's own voices, this study provides the perception of how gender identity develops intergenerationally and how local families navigate competing values and social change.

Keywords: Globalization, Independence, Employment, Marriage, Intergenerational gender attitudes

Analyzing the Credibility of News Media Outlets Among University Students During the Internet Blackout Amid the July Mass Uprising (18–28 July, 2024)

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Abstract: In democratic societies, media credibility is essential for ensuring accurate information and shaping public understanding. This study examines how Bangladeshi university students perceived the credibility of news media during the 10-days internet blackout imposed in July 2024 amid nationwide student protests. The research explores the extent of students' trust in mainstream media, the types of outlets they relied on and the reasons behind varying levels of confidence. Using a qualitative approach, interviews were conducted with 12 students from 16 universities across eight divisions. Findings show that most students did not consider news reports published during the blackout to be credible. They frequently cited political influence, biased reporting and lack of transparency as major factors behind their distrust. Students also reported relying more on offline communication networks and interpersonal exchanges when digital sources were unavailable. By analyzing media trust in a tightly controlled information environment, the study highlights deeper structural concerns regarding the credibility of Bangladeshi news outlets. The results offer valuable guidance for media organizations seeking to strengthen trust, accountability and public engagement in crisis situations.

Keywords: Bangladesh, Internet Blackout, News Media, Credibility, University Students.

How do the socioeconomic status of the household, overage status of students, and parents' education levels affect the likelihood of learning poverty among primary school students in Bangladesh?

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Abstract: This study investigates how the socioeconomic status of households, overage status, and parents' education predict the learning gap among primary school students in Bangladesh. Drawing on data from the Multiple Indicator Cluster Survey (MICS) 2019, which covers 8,542 children enrolled in grades 1–5, the analysis employs a binary logistic regression model to assess the determinants of learning poverty. Learning poverty is defined as the inability of a child to correctly read at least 64 out of 72 words in a given text, reflecting inadequate reading proficiency. The findings show that children from poorer households are significantly more likely to experience learning poverty compared to those from wealthier households, with the incidence declining steadily across wealth quintiles. Parental education also emerges as a strong predictor: students whose mothers and fathers attended school perform considerably better than those whose parents never received formal education. Furthermore, overage students—those older than the expected age for their grade—are disproportionately disadvantaged, indicating that age-related delays in schooling compound the



risk of underperformance. These results highlight the critical role of household poverty, parental education, and overage status in shaping learning outcomes at the primary level. The study emphasizes the importance of integrated education policies that reduce socioeconomic disparities, promote adult literacy, and provide targeted support for overaged children to close the learning gap and enhance the quality of primary education in Bangladesh.

Keywords: learning poverty, student performance, overage status, literacy skills, and educational inequality.

Cyber Security Vulnerabilities in Bangladesh: The Role of Cyber Diplomacy in Strengthening National Cyber Governance.

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Abstract: This research exploring the cyber security vulnerabilities facing Bangladesh, gives focus on the critical role of international cooperation and cyber diplomacy that can strengthen the national cyber governance. From the very beginning of the 21st century, Bangladesh has been experiencing rapid digitalization in different sectors like finance, banking, energy, education, medical, military, e-governance and so on. But the country remains exposed and vulnerable to growing cyber threats and attacks like phishing, ransomware, Distributed Denial of Service (DDoS), misinformation and so on. Not only the technical issues but also the limited engagements in global cyber security frameworks and diplomatic efforts in international relations are responsible for cyber security vulnerabilities of this country. So, this study aims to address the gaps of cyber security governance of Bangladesh, emphasize the role of cyber diplomacy for enhancing cyber resilience, and draw the lessons from the experience of the cyber diplomacy of Estonia, which has successfully integrated cyber diplomacy with national cyber governance to enhance cyber resilience. This study involves a qualitative methodology which includes report and document analysis, expert interviews and case study analysis. The study also seeks to recommend for actionable policy to strengthen Bangladesh's cyber governance through international cooperation and cyber diplomacy.

Key words: Cyber security, cyber governance, cyber diplomacy, cyber resilience, Bangladesh.

From Victim to Voice: A Comparative Analysis of Survivor – Led Justice Movements

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Abstract: This research focuses on how female survivors of severe gender-based violence turn their own trauma into strategic forms of public advocacy. The research analyses five internationally known advocates; **Malala Yousafzai, Nadia Murad, Tarana Burke, Mukhtar Mai, and Leymah Gbowee against a backdrop of the Bangladesh-based survivor-led Advocacy Ecosystem.** The study uses an overview of the advocates' autobiographies, institutional reports, and media narratives to ascertain the similarities and differences in the pathways taken by these advocates to go from victim to activist, i.e., narrative recreation, resilience, and institutional failure as a catalyst for their activism. This research highlights the five advocates' different models of advocacy from global diplomacy to digital mobilizing and includes the Bangladesh examples to further illustrate the complex nature of the layered survivor support system in Bangladesh that includes ASF, BRAC, and BLAST. Ultimately, by foregrounding the lived realities of these women, I assert survivor-led advocacy is not just an object of research, but a valuable source of criminological knowledge. I offer a final critique of structures



patriarchy and signal a need to center survivor voices in victim-centered policy and legal reform globally.

Keywords: Survivor-led Advocacy; Gender-Based Violence; Victimology; Feminist Criminology; Grassroots Human Rights Advocacy.

Amplifying Cultural Backlash: The Role of Social Media in Spreading Toxicity and Stereotypes against Women's Rights in Bangladesh

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Abstract: Social media has become a contested space in Bangladesh where women's rights activists and patriarchal forces engage in ideological conflict. This research investigates how digital platforms amplify cultural backlash against women's rights, reinforcing misogynistic narratives, stereotypes, and online harassment. Through thematic analysis of female activists' social media experiences and qualitative content analysis, the study identifies mechanisms of gender-based discrimination, including victim-blaming, stereotype enforcement, trolling, and misinformation. Reactionary groups exploit these platforms to undermine activism, fostering hostility and fear among women participating in online discourse. Drawing on Radical Feminist Theory, Media Effect Theory, and Cultural Backlash Theory, the research highlights the dual role of social media as both a site of oppression and resistance. While toxic narratives perpetuate discrimination, digital spaces also enable counter-narratives, feminist activism, and empowerment. Findings demonstrate that despite risks of backlash, online platforms have facilitated solidarity, mobilization, and challenges to patriarchal dominance. The study underscores the urgent need for policy interventions, digital literacy programs, and stronger regulations to combat online misogyny and foster inclusive digital environments.

Keywords: Social Media, Cultural Backlash, Women's Rights, Digital Misogyny, Online Harassment

Impact of Foreign Remittances in Household Health Expenditure in Bangladesh

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Abstract : This paper examines the influence of foreign remittances on household health expenditures in Bangladesh, focusing specifically on gender-based disparities. This study utilizes nationally representative data from the Household Income and Expenditure Survey (HIES) 2022, applying the Heckman selection model to mitigate potential sample selection bias and employing Propensity Score Matching (PSM) to determine causal effects. The findings indicate that households receiving remittances allocate a substantially greater portion of their expenditures to healthcare than non-recipient households, with more pronounced effects noted in male-headed households. The illness ratio, which quantifies the proportion of ill members, is identified as the primary determinant of health expenditure. In contrast, socioeconomic and regional factors, including employment status, land ownership, and divisional location, have relatively minor effects. The analysis indicates that health expenditure for males increases more significantly than for females in households receiving remittances, suggesting that women continue to access fewer healthcare resources despite the



beneficial impact of remittances. This disparity illustrates persistent gender inequalities in the distribution of healthcare resources within households. The findings highlight that remittances act as a financial safeguard for out-of-pocket expenses and promote health investment, stressing the importance of gender-sensitive health financing and better rural healthcare access for achieving equitable health outcomes in Bangladesh.

Keywords: remittance, health care expenditure, male, female, Heckman Selection, propensity score matching.

Horror of Auschwitz and Gaza Strip: History's Greatest Mistakes and Unlearned Lessons

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Abstract: Various forms of crimes against humanity being performed in the Gaza Strip automatically remind the horrors of Holocaust: one of the most terrifying genocides ever committed in human history. Violence has been used as a tool for survival since the emergence of human civilization. However, the terms to define atrocity crimes, their categorization and characteristics were not coined until very recently. Although different in incipience, climax and culmination, parallels can be drawn between the two phenomena - Holocaust and Israel-Palestine dispute - based on human suffering, discrimination, breach of basic human rights and apathy of the outside world to their ratification. This paper acknowledges the horrors committed during World War II, brings forth the greatest mistakes of history that resulted in the dooms of entire civilizations, and sheds light on the repetition of aforementioned mistakes which still continue to take place. Simultaneously, it analyzes the lessons humankind should have learned, but failed to, after Holocaust in order to prevent a similar predicament such as the one occurring in the Gaza Strip. This paper also illustrates how these two separate chains of events are interconnected through the lens of intergenerational trauma, lack of impactful international intervention and abuse of capitalist colonial power culture.

Keywords: Crimes against Humanity, Atrocity Crimes, Holocaust, Human Rights, International Intervention

Strategic Responses of Japanese Investors to Growing Chinese Competition in Bangladesh

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Abstract: This study examines the strategic adaptations and competitive positioning of Japanese investors in Bangladesh where slowly Chinese intervention is rising and investigates importance of government policy of Bangladesh to drag more Foreign Direct Investment (FDI) and create an idle eco-system of investment and business after the LDC graduation of Bangladesh. This thesis adopts interpretivism as a research philosophy. This qualitative study, with its inductive approach and case study strategy, analyses data collected from 20 interviews and many documents to address research questions. Apart from the interview data, secondary data was collected from various scholarly articles and official documents. Thematic analysis techniques were used to analyze the data by using Nvivo software. Key findings of this thesis portray that recent scenario of



Japanese investment in Bangladesh. Another aim of this study to identify future competitiveness and creating a level playing field for both Chinese and Japanese investors in Bangladesh. This study contributes to the literature in the areas of Japanese studies, business studies, international business, economy and investment. It also provides valuable insights for policymakers and business leaders aiming to create more investment friendly environment for a developing country like Bangladesh.

Keywords: Bangladesh, Japan, China, FDI, Policy framework

Household Waste Segregation in Dhaka: Determinants of Behavioral Intentions with Lessons from Japan's Sustainable Waste Management Model

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Abstract: The first stage in attaining sustainable waste management is waste segregation at the source. Households generate the largest amount of solid waste worldwide. The effectiveness of subsequent recycling procedures is greatly increased by starting waste segregation at the household level, which lowers the amounts of materials that end up in landfills and thus saves important resources and prevents contamination. Dhaka is a heavily populated city in Bangladesh that generates enormous waste every day, however, waste segregation practice at source is often seen non-existent. The aim of this study is to determine the psycho-social and moral factors that drive Dhaka residents' intentions toward waste segregation, with the integration of TPB and NAM theories. The study utilized quantitative approach and PLS-SEM model to analyze the survey data. The findings reveal that residents' attitude, subjective norms, perceived behavioral control as well as awareness of consequences, sense of responsibility and lastly, personal norms are significantly related with their intention for waste segregation. The study underscores scope for improvement through necessary policy implications accompanied by valuable insights from Japan's renowned waste management and segregation system, which may elevate residents' intentions to segregate waste in order to ensure resource conservation as well as environmental protection in Dhaka.

Keywords: Waste segregation intention, solid waste management, recycling, Theory of Planned Behaviour, Norm Activation Model, PLS-SEM model.

Bangladesh Paradox: A Story of Delayed but Rapid Shift in TFR

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Abstract: Classical Demographic Transition Theory (DTT) posits that fertility decline follows industrialisation and sustained economic growth. Bangladesh, however, presents a demographic paradox. Despite a delayed transition shaped by colonial neglect, post-independence disruption, and persistent poverty, the country experienced one of the fastest fertility declines among low-income nations. This study examines why and how Bangladesh underwent a delayed yet rapid demographic transition. Using an explanatory document-analysis approach, the study draws on secondary data from national censuses, Bangladesh Demographic and Health Surveys, World Bank and United Nations databases, and peer-reviewed literature covering 1970–2022. Guided by DTT, demographic trends are interpreted within historical and policy contexts. Findings indicate a compressed transition, with total fertility declining from 6.8 births per woman in the 1970s to near-



replacement level (2.3) by 2022, alongside sharp mortality reductions and increased life expectancy. Fertility decline preceded major economic growth and was driven by state-led family planning, improved child survival, female education, delayed marriage, and urbanisation. The study concludes that Bangladesh represents a policy-driven, socially mediated transition that challenges classical DTT assumptions.

Keywords: DTT, Fertility Decline, Family Planning Policy, Bangladesh, Socio-economic Transformation

Bicameralism in Bangladesh: The Feasibility of the ‘U.S. Congress’ Model

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Abstract: The unicameral legislature of Bangladesh bears the imprint of the British colonial period and later the Pakistani rule. Its unicameral parliamentary system gives the Prime Minister unlimited power, makes parliament authoritarian, reduces public participation in law-making, and makes the President a nominal head of state. The purpose of this article is to analyse these problems from the structural and functional perspective of its unicameral model and the ways to solve them through a bicameral legislature. This article attempts to demonstrate the suitability of the U.S. Congress model, along with its benefits and limitations, for Bangladesh. It will also compare it with the UK Parliament. While the UK model could be an alternative, the weakness of the democratic foundation of the UK parliament, the lack of proper representation, and the fact that its upper house plays only an advisory role keep it behind the American Congress. This article uses a qualitative methodology and prioritizes secondary data sources. The final findings of this research paper explore the importance of a bicameral legislature like the U.S. Congress in Bangladesh in ensuring the democratic rights of the people, establishing good governance in the state, and creating a balance in the government.

Keywords: Bangladesh, U.S., Legislature, Unicameralism, Bicameralism.

The Relationship between Media and State during Political Crisis: In the context of the July Uprising of Bangladesh

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Abstract: The study investigates the narratives propagated by the government in the mainstream media. It illustrates how the government shapes public opinion based on in-depth interviews with editors and reporters from an English-language daily, an online portal, and a Bangla-language newspaper. The study also operates a public survey for the public perceptions. Using the cascade activation model and critical media theory, the findings examine how the media responded to public demands, state censorship, and pressure throughout this political crisis. Through the analysis of the media, the study has shown that in crisis communication, it plays a critical role, as it had to strike a



difficult balance between suppressing the resistance and fostering the endurance. This paper examines how media constitute and reflect social realities at moments of political transformation and, in turn, informs about media autonomy, governmental control, and public engagement in transitional democracies.

Keywords: Media-state relations, Political crisis, July Uprising, Government narratives, and Public perception.

When Climate Becomes Catastrophe: Institutional Capacity and Human Security in Deltaic Regions

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Abstract: Climate change poses fundamentally different security threats across the Global North and Global South predominantly because of divergent institutional capacities and available state resources to mediate environmental catastrophes. This study argues, in line with Biswas (2005), resource constraints cause diminished capacity of climate consequence management. This argument is applied to a comparative analysis of two deltaic regions, a few Louisiana parishes (US) and Bhola (Bangladesh), to examine how institutional capacity and economic resources transform similar climate-driven environmental hazards into markedly different human security outcomes. The research is set to find answers to the question: How and to what extent mediation of climate vulnerability is determined by differences in institutional capacity? Despite both regions experiencing intensified flooding, storm surge, and coastal erosion, Louisiana's sophisticated institutional infrastructure such as federal disaster response mechanisms, technological adaptation capacity and substantial state resources enable effective post-disaster recovery and mitigation planning. Conversely, Bhola's limited institutional capacity, constrained state resources, and weak institutional coordination result in chronic vulnerability, where climate-induced hazards translate directly into displacement, livelihood loss, and long-term human insecurity. The study employs two complementary theoretical frameworks, Human Security and Neoliberal-Institutionalism, to understand this divergence. Human Security enables a people-centric lens that captures the vulnerability of individuals and communities most exposed to climate hazards, particularly their experiences of displacement and livelihood disruption. Neoliberal-Institutionalism, on the other hand, underscores the institutional mechanisms designed to address environmental risks, yet simultaneously reveals why such mechanisms often prove inadequate in contexts of structural inequality and asymmetrical power relations. The study demonstrates that institutional capacity functions as a critical variable that determines whether climate hazards produce manageable economic challenges (as in Louisiana) or existential human security crises (as in Bhola).

Keywords: Climate change, institutional capacity, human security, neoliberal-institutionalism, deltaic vulnerability

Legacy of Unsettled Blood Guilt: Assessing Bangladesh's Claims of Reparation Against Pakistan under International Law

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Abstract: The bloody birth of Bangladesh in 1971 witnessed mass atrocities and widespread violations of international law (IL), culminating in death, displacement, and destruction. Five decades later, despite Bangladesh's recent renewed demand, its pursuit of reparations from Pakistan remains contested, shaped by post-conflict settlements and evolving IL norms. This paper examines the Bangladesh–Pakistan reparations question within its historical and diplomatic context, with particular reference to the 1974 Tripartite Agreement between Bangladesh, India, and Pakistan and its implications for the settlement of inter-state claims. The paper then analyzes Bangladesh's legal position under IL, drawing upon the IL Commission's Articles on Responsibility of States for Internationally Wrongful Acts, and the principle of full reparation articulated in the Chorzów Factory case. It further considers treaty-based obligations under the Genocide Convention and relevant jurisprudences of the ICJ, including *Bosnia v. Serbia*, to assess whether claims arising from grave breaches of international law may survive post-conflict political settlements. The paper concludes by evaluating the options available to Bangladesh under IL, including state-to-state adjudication, negotiated reparations settlements, and hybrid or commission-based mechanisms, underscoring that while legal avenues exist, their application is closely intertwined with political and diplomatic processes.

Keywords: Bangladesh-Pakistan, Reparations, State Responsibility, International Law, Genocide.

Exploring Public Health Impacts of Water Insecurity among Slum Dwellers in Dhaka: A Qualitative Study in Mohammadpur

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Abstract: Water insecurity is a profound issue in Dhaka's slum areas, where most of the dwellers suffer from inadequacy of water. Despite regional development, access to safe water in comparatively smaller slum areas has not changed notably. In most of the slums in Dhaka city, the dwellers depend on vended water for drinking or the whole community depends on a single tube well for their livelihood. This paper analyses how water insecurity effects on public health in slum areas of Dhaka city. We used a qualitative explorative method. Using Focus Group Discussion, In-depth Interview and Observation, a qualitative study was conducted to explore access of water sources, water scarcity and the consequences of water insecurity in Mohammadpur. The findings highlight that the slum dwellers of Dhaka city mostly rely on water vending machine and traditional tube well for water which are very limited over their demand. Also fetching water from distant sources impacts their water usage in sanitations and consumption. These lead them to many waterborne diseases including communicable diseases like Fever, Cough, Flu, Cholera, Typhoid, Diarrhea, Dysentery, Covid-19 and non-communicable diseases like Malnutrition, Gastrointestinal diseases, chronic kidney diseases which impacts their overall health and wellbeing. This study concludes with Government and NGO interventions seeking to improve water security in slum areas including access to household taps, increasing the number of water vending machine and tube well. This study also provides insights for research, policy and practice, especially for ensuring access to safe water.

Keywords: Water Insecurity; Public Health; Vended Water; Waterborne Disease; Communicable Disease; Dhaka



From Welfare Provision to Human Dignity: An Analysis of the Impact, Challenges, and Way Forward of Government's Disability Allowance in Bangladesh.

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Abstract: This paper examines the impact, challenges, and way forward of the allowance program for persons with disabilities (PWDS) implemented by department of social services under the ministry of social welfare in Bangladesh by reviewing secondary sources, including government reports, academic studies, and policy analyses. A qualitative literature based review method is employed, analyzing policy documents, national budget reports published between 2005-2025. The paper aims to describe the program's aims and structure, and examines its social, economic, and psychological impacts on beneficiaries. Introduced in 2005-06 fiscal year, the indigent allowance program aims to provide constitutional and legal commitments made to PWDs by providing financial support and social security. Findings from the reviewed literature reveal that the allowance contributes to improving the economic independence, social inclusion and better health care facilities for PWDs. However, challenges such as low allowance, corruption, limited coverage, and irregular distribution persist. To address these issues, the paper recommends increasing the allowance amount and integrating healthcare and community-based support services. Overall, the study concludes that the indigent disability allowance program remains a vital social protection tool in Bangladesh, but further reforms are essential to enhance its inclusiveness, transparency, inadequate monitoring mechanisms and long-term sustainability.

Keywords: Disability Allowance, Persons with Disabilities (PWDs), Social Protection, Ministry of Social Welfare; Bangladesh; Social Inclusion.

Constructing “Wife Material”: A Critical Analysis of Facebook Discourses in Bangladesh (2020–2025)

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Abstract: This study examines the construction and contestation of the term “wife material” within Bangladeshi Facebook discourse between 2020 and 2025, situating the concept within broader cultural negotiations of femininity in digitally mediated public life. While often framed as humour or praise, such discourse functions as a normative mechanism through which gendered expectations are articulated and

naturalised, raising questions about how social media platforms participate in the reproduction of patriarchal values. The study aims to analyse how humour, mockery, and admiration operate as forms of gendered instruction, and to assess the extent to which Facebook facilitates or constrains counter-hegemonic interpretations of womanhood. Methodologically, the research combines qualitative content analysis with feminist critical discourse analysis of 123 Facebook posts, memes, and reels. The findings indicate that modesty, religious piety, domestic competence, and emotional restraint are consistently valorised as desirable feminine traits, whereas assertiveness, ambition, and visible markers of modernity are frequently ridiculed or delegitimised. These patterns constitute a form of symbolic violence, intensified through algorithmic amplification that privileges conservative gender norms while marginalising dissenting voices. Nevertheless, the analysis also identifies emergent counter-publics that challenge dominant definitions through irony, humour, and subtle acts of refusal. Overall, the study demonstrates that digital spaces in contemporary Bangladesh simultaneously reinforce and destabilize cultural codes of femininity, revealing Facebook not as a neutral platform but as an active participant in gendered meaning-making.



Keywords: Wife material, Gender norms, Facebook discourse, Symbolic violence, Digital feminism

Framing The Teesta River Conflict: A Comparative Analysis of Media Frames in Bangladeshi & Indian News Coverage

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Abstract: The Teesta river is a major bone of contention between Bangladesh and India given its highly sensitive geopolitical setting. The news media of both countries have been playing a vital role in framing the Teesta conflict. Though existing literature has widely covered the issue from a realist approach of power involving hydro politics and geopolitical lens, the role of news media is not widely acknowledged and explained. This study tries to address this aspect while covering the dominant framing pattern of the four different newspapers from Bangladesh and India. It adopts a multi theoretical approach combining framing theory and strategic narrative theory to identify, explain and compare the dominant frames emerging from the news articles examined for the study. Findings show that there is a major difference in framing pattern and rationale in the news media of the two countries that reflects distinct national interest, public opinion and justification of action. Therefore, this study argues the dominant frames reflected in the news media covering the Teesta conflict and searches for similarities and differences between those frames to understand the public opinion, action of elite actors and national interest.

Keywords: News media, framing, Teesta river, conflict, strategic narrative.

Sacrificing Women for Stability: Gendered Blame and Political Crisis in South Asia

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Abstract: Political crises are usually understood as a failure of state institutions. Yet, when a woman becomes associated with this crisis, whether through their actual participation or simply through their symbolic presence— state failures fade from the view and women are recast as the problem itself. In political instability, women’s bodies, morality, and voices are drawn into public debates, often as symbol of legitimacy and order. While most of the literatures see gendered narratives as structural or ideological, this study will analyze how these gendered narratives can be strategically mobilized during political crisis. The research examines three cases where women became focal points of political struggle: Bangladesh’s Hefazat-e-Islam rally, India’s Shaheen Bagh protest, and Pakistan’s Aurat March. Combining discourse theory (Laclau&Mouffe) with feminist and postcolonial perspectives (Tickner, Shepherd, Mahmood), it analyzes 120 systematically collected Facebook and X/Twitter posts through qualitative discourse analysis. Data were coded in NVivo under six categories, including “Women as Threat” and “Counter-Discourse.” Findings reveal that women are consistently constructed as threats to morality, nation, or cultural authenticity. Overall, the study argues that gendered blame and narratives are not incidental but strategically mobilized that advocate women’s exclusion from power structure.

Keywords: Gendered Blame; Political Crisis; Women and Politics; South Asia; Discourse Analysis



Implementation of Outcome-Based Education (OBE) Curriculum at Tertiary Education in Bangladesh: Opportunities and Challenges

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Abstract: Outcome-Based Education (OBE) has been introduced in the landscape of tertiary education in Bangladesh in recent years; however, research on the opportunities and challenges associated with its implementation remains highly scarce. This study examines the implementation of the OBE curriculum, focusing on both existing and untapped opportunities, as well as challenges encountered at institutional and personal levels. Using a basic qualitative design, in-depth data were gathered through semi-structured interviews with five faculty members from various disciplines, along with key informant interviews with two experts from the University Grants Commission (UGC) and Institutional Quality Assurance Cells (IQAC). The findings revealed several promising opportunities for effective implementation, including alignment with industry standards, enhanced accountability, diversified and innovative teaching methods, and greater compatibility with global educational frameworks. Nevertheless, significant barriers were also identified, such as inadequate infrastructure, limited resources, inconsistent administrative support, insufficient faculty development training, unsatisfactory pay scale, rigid assessment systems, and faculty resistance due to cultural inertia. The study suggested the need for robust professional development, clear policy directives, adequate resource allocation, and effective monitoring mechanisms. Recommendations underscore context-based strategies to enhance institutional readiness, empower educators, and ensure curriculum reforms are aligned with Bangladesh's educational and socio-cultural realities.

Keywords: Outcome-Based Education (OBE), tertiary education, curriculum implementation, institutional challenges, opportunities, and personal challenges.

Structural Violence and Human (In)Security in Post-Accord CHT: A Study on Indigenous Youth from Bandarban in Dhaka University

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Abstract: As 21st century is witnessing a paradigm shift in the domains of security where the traditional state-centric security approach is being altered by the ongoing need to secure the lives of the individuals, persisting structural violence in different parts of the world creates a huge hindrance in the way of achieving it. As UNDP's Human Development Report of 1994 brings forth the need of protection from damaging disruptions in the patterns of daily life, this research examines the lived experiences of indigenous youth from Bandarban who have migrated to Dhaka for tertiary education and analyzes how structural violence in their home region shapes their human (in)security. Using a qualitative-interpretivist approach, the study draws on interviews with young university students to apply and empirically validate the theoretical frameworks of Johan Galtung's structural violence and the UNDP's human security paradigm. The findings reveal that the absence of overt armed conflict in the post-accord CHT does not equate to peace; rather, a state of violent peace persists, where systemic injustices silently undermine human security. The study finds that structural violence in the CHT- through land dispossession, militarization, and socio-economic inequality- creates enduring human insecurity that extends into students' lives in Dhaka, affecting them- psychologically, socially and economically. These insecurities are intensified by intersecting identities like- being first-generation students or members of smaller indigenous groups. Despite these challenges, students display resilience through academic ambition, self-improvement and community solidarity. The study concludes that lasting peace in the CHT requires moving beyond state-centric



military approaches toward people-centered solutions that address structural violence and ensure justice, dignity and genuine security for all.

Keywords: Structural Violence, Human (In)Security, Indigenous Youth, Lived Experience, Violent Peace.

Evaluating Government and Non-Governmental Health Programs and Services in Enhancing Household Resilience and Community Wellbeing in the Char Areas of Sirajganj

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Abstract: This qualitative study looks at how effective government and non-governmental health programs are in improving household resilience and community wellbeing in six char areas of Sirajganj Sadar along the Jamuna River. Using 32 detailed case studies, two focus group discussions, and ten key informant interviews, the research evaluates how accessible these services are, how they are used, and the experiences of char dwellers dealing with health systems that are often fragmented and limited. The findings align with other studies on how vulnerable populations view health services. They show that geographical isolation, poor infrastructure, and economic challenges influence health-seeking behavior and access to care in marginalized areas. Participants described a complex relationship between the health initiatives available from the government and NGOs and their actual use of these services. Many relied on local NGO clinics or informal care due to perceived gaps in public services and lack of trust. Key themes include awareness of program benefits, barriers to using services, the role of institutional support in developing coping strategies, and varying levels of resilience among households facing health risks. Evidence suggests that community-focused health interventions improve perceived wellbeing when they meet local needs, though systemic challenges still exist.

Keywords: Char areas, health programs and services, service accessibility, utilization patterns, household resilience, community wellbeing.

Experiences and Challenges Faced by Urban Slum Dwellers in Receiving Government Welfare Support in Bangladesh

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Abstract: Urban slum dwellers in developing cities face significant hurdles in accessing government welfare support, despite targeted programs like cash transfers, food subsidies, and housing schemes. This study explores real-life experiences of 150 residents from slums in Dhaka city, drawing on in-depth interviews and focus group discussions to uncover barriers and coping strategies. The paper aimed to analyze major government initiatives benefiting slum dwellers such as Asrayan Project, Urban Social Services Program, City Corporation Slum Upgrading and Rehabilitation Projects to identify the existing challenges. The study reveals key challenges such as bureaucratic red tape, missing identity documents, inadequate monitoring mechanism and complex application processes, which exclude 60% of eligible households. Corruption at local distribution points leads to bribes or favoritism, while poor outreach exemplified by unannounced verification



camps and many of slum dwellers are unaware of schemes. Women and migrants report heightened discrimination, with stories of denied rations due to "irregular" status. The paper recommends simplified, tech-enabled delivery, coordination among government and non-government initiatives and grassroots partnerships to bridge gaps and empower slum voices revealing pathways for inclusive welfare.

Keywords: Slum dwellers, Urban development program, government housing programs, slum upgradation.

Generational Stratification, Technology and the Silent Crisis of Peasant Continuity in Bangladesh

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Abstract: Peasant communities of Bangladesh, historically served and yet serving as the backbone of the nation's agrarian economy, are currently undergoing a deep, yet largely unnoticed, social transformation. These communities are often characterized by intergenerational households, small-scale landholdings and deeply rooted agricultural traditions, where elders traditionally transmit knowledge, social norms and cultural practices to younger generations. This intergenerational transfer of knowledge and authority has ensured the continuity of peasant life, creating a social structure where identity, occupation and community roles are preserved across generations. For example, in small villages of Bogura, Sirajganj, Tangail or Rajshahi, grandfathers or elders are used to be seen often with young family members in the fields, explaining rice irrigation techniques, the application of fertilizers, pest control methods and the cyclical patterns of cropping based on seasonal changes. However, the rapid entry of modern technologies like mobile phones, information and communication technology (ICT), digital agricultural tools, and online market platforms – has begun to introduce new dynamics, gradually reshaping social relations, cultural norms and generational hierarchies within these communities. Many youths now access market information, fertilizer prices and pesticide brands through phones or apps, often bypassing the advice of their elders. Teenagers and young adults watch agricultural videos online and adjust their practices independently, which gradually undermines the traditional authority and knowledge transmission processes. Most existing research emphasizes the economic or productivity-oriented impacts of technology adoption in rural Bangladesh. However, very few studies examine how technology creates social stratification, redefines authority and roles and subtly threatens the continuity of peasant life. For instance, in a village in Narsingdi, a young adult may make decisions about fertilizing a small home plot based on information from a digital app, while the elder grandfather observes, realizing that his traditional experiential knowledge is being sidelined. This "silent crisis" is subtle, yet it profoundly affects cultural and social structures. This situation also raises deeper social questions: Is technology merely a tool of development and modernization or can it act as a force gradually eroding rural social structures? The energy and digital skills of youth, while empowering, increasingly challenge the authority, knowledge and cultural practices of the older generation. As a result, traditional peasant identity, community norms and daily work continuity are slowly fragmenting, even though agricultural productivity or income may remain stable or even increase. In a village in Kurigram, an elderly grandfather carrying a bag of seeds might observe a young man demonstrating the "correct seeding method" on a phone screen, smiling as the youth says, "Grandfather, the app says this is the best way." This small scene captures the subtle shifts in power, knowledge and authority between generations, showing how technology mediates social dynamics.

Key words: Peasant Community, Intergenerational Knowledge, Technology, Authority, Social Transformation



Enforced Disappearance as an Instrument of Competitive Authoritarianism: Evidence from Bangladesh

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Abstract: Why do enforced disappearances continue in political settings that hold formal democratic institutions such as legislature, constitution, media, judiciary and elections? The study addresses this enigma by contending that enforced disappearance acts as a strategic weapon of competitive authoritarian governance, rather than counting as a rambling human rights violation and institutional catastrophe. Studying on Bangladesh, the research locates enforced disappearance within a competitive authoritarian regime where the government perpetuates all frames of democratic settings while strategically undermining political opposition through unconventional and deniable compulsion. This study adopted a qualitative mechanism-based research design combining case analysis supported by empirical pattern comparison based on widely available documentary sources including human rights reports, court case files, political timelines and media records considering the period from 2009 to 2024 and illustrating the literature on competitive authoritarianism and strategic repression. The study finds five interconnected mechanisms through which enforced disappearance functions: (1) selective targeting of opposition-allied individuals, (2) repudiation of custody and creating legal ambiguous frame, (3) diffusion of fear among broader political networks, (4) strategic deployment of disappearances during the heightened moments of electoral competition, and (5) institutional fragmentation. These mechanisms qualify repression while diminishing the legitimacy costs of domestic and international level but strategically entrenched within the regime's broader arrangements of authoritarian control. Conceptualizing enforced disappearance as a form of illegal coercion with democratic-institutional deniability intentionally created for competitive authoritarian regime and analyzing how democratic and formal institutions can coexist with strategic and persistent repression.

Keywords: Enforced disappearance, competitive authoritarianism, selective repression, deniable coercion, electoral competition, Bangladesh

A Revolution in Movement Strategies: A Two-Path Analysis of Narrative Fidelity to Mobilization Potency in Bangladesh's July Movement (2024)

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Abstract: The July Uprising of 2024 in Bangladesh is a significant event of collective action following a long evolution. It shifted the culture of party-led strikes, mostly seen in the 1990s uprising against Ershad's regime and others, to a decentralized 'Neo-Movement Culture'. This study investigates the strategic alignment of narratives, defined as narrative fidelity contributed to the movement's mobilization potency. The investigation proposed a dual-pathway model by using Frame Resonance of Snow and Benford's (1988) and Gamson's (1992) Collective Action Frame. Following a qualitative-dominant mixed-methods approach that analyzes digital artifacts (red profile picture), linguistic innovations ("36th July" and "Bangla Blockade"), and elite interviews with key movement coordinators, analysts, journalists, and a survey. Preliminary findings from an ongoing survey indicate that the movement potency was significantly boosted by high narrative fidelity. The narrative fidelity had a remarkable success in diagnosing the problem (brutal crackdown), prognosing the solution (one-point), and motivating the audience. This was the role of the coordinators for mobilizing the action. The participants' view was collected to analyze the



cognitive resonance of the narrative fidelity (how they received it). The catalyst for the identity component ('Razakar' remark), the death of innocents as an injustice component, and the agency component, 'a sense of possibility' by the government losing immutability. The research concluded that evolved movement strategy or 'Neo-Movement Culture' is the root of the mobilization potency required for such a high-risk participation of people.

Keywords: July Movement, Narrative Fidelity, Mobilization Potency, Frame Resonance, Collective Action Model.

Framing the Iran–Israel War (2025) in Bangladeshi Newspapers: A Content Analysis Based on Semetko & Valkenburg's Typology

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Abstract: This study investigates how the coverage of the 12-day war between Iran and Israel in 2025 was framed in the mainstream media of Bangladesh. Six mainstream newspapers in Bangladesh were selected, three of which were Bengali and three were English-language newspapers. The framing of the war-related events in Bangladesh was analyzed in light of the type of reporting the selected newspapers made during the war (Jun 14, 2025 – Jun 25, 2025). The data was collected through a census method where the research was conducted on 140 reports published in the newspapers during the selected period on the related topic. The concepts of framing theory were followed to analyze the reports. In addition, A Content Analysis Based on Semetko & Valkenburg's Typology was followed to identify the positions taken by the Bangladeshi media on the war-related events and the type of framing emphasized. The study found that Bangladeshi newspapers are highly dependent on foreign or international media agencies for foreign events. Where there is a noticeable tendency to frame their own positions in light of the positions of powerful Western media agencies. Overall, although the media in Bangladesh strive to maintain their own sense of independence and position of promoting the relevant content with great importance, the influence of powerful Western agencies or information delivery media on them is visible.

Keywords: Iran-Israel War (2024), Framing, Bangladeshi Newspaper, Semetko & Valkenburg's Typology, Content Analysis

Perception of Generative AI Among STEM Students in Higher Education

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Abstract: The rapid emergence of Generative Artificial Intelligence (GenAI) is transforming higher education, particularly in Science, Technology, Engineering, and Mathematics (STEM) disciplines. This mixed-methods study investigates the adoption patterns, perceived benefits, and challenges of GenAI use among higher education STEM students at a leading public university in Bangladesh. Guided by the Technology Acceptance Model (TAM) and Task–Technology Fit (TTF) theory, data were collected through a structured questionnaire administered to 200 students and four focus group discussions involving 24 participants.



Findings reveal universal adoption of GenAI tools, with most students using them frequently for academic tasks such as clarifying concepts, summarizing literature, coding assistance, and assignment preparation. ChatGPT emerged as the dominant tool, although students strategically combined multiple platforms based on task requirements. While GenAI is widely valued for its efficiency, accessibility, and time-saving benefits, students expressed notable concerns regarding information reliability, plagiarism, subscription costs, and the potential erosion of critical thinking and learning autonomy. Importantly, the study uncovers an active process of student self-regulation, where learners consciously verify AI outputs and limit usage to mitigate perceived cognitive risks. The absence of clear institutional guidelines further intensifies uncertainty. The study underscores the urgent need for coherent policies and pedagogical strategies to ensure responsible and educationally sound integration of GenAI in higher education.

Keywords: Generative Artificial Intelligence, STEM education, higher education, student perception, technology adoption

Goffman Goes to Campus: A Dramaturgical Study of Pressure and Relief within the Campus Environment

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Abstract: Long-established universities—Dhaka University, Rajshahi University, Chattogram University, and Jahangirnagar University—are emotional landscapes, not just mere academic institutions for their students, as stress and relief from stress coexist. Intense academic pressure, along with political disruption and overall unpredictable nature, causes stress, whereas calming natural spaces, corners, cultural activities, entertainment facilities, and different clubs provide relief from stress and regain motivation. Again, these provide practical knowledge, skills, and scopes for earning and utilizing creativity for the students. With the help of Goffman’s dramaturgical theory, this study explores how students perform ‘stress’ publicly while restoring mental peace (relief) privately. Finally, this study highlights how the perpetual tension between intense pressures and calming sanctuaries of these university campuses helps in acquiring adaptive behavior, emotional intelligence, informal leading qualities, and impromptu decision-making power. Findings from interviewing 13 students and field observations showed how the social, physical, cultural, and political ambience of university campuses have their own dynamic ecosystems—stressful yet refreshing, structured yet pliable—shaping students’ growth and overall well-being. This study may help to anticipate the lives of students on university campuses that have similar dynamic and ecological patterns.

Keywords: campus ecology, Goffman’s dramaturgy, sociology of education, student well-being

The Integrated Fiscal Architecture: Real-Time Wealth Identification, Dynamic Tax Rate Determination, and Targeted Subsidy Delivery

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Abstract: Bangladesh is currently navigating a significant fiscal challenge where robust economic growth has not translated into a proportional increase in the tax-to-GDP ratio. While the existing Value Added Tax framework utilizes multiple rates for essential goods, the system remains regressive because tax reliefs are tied to products rather than the financial capacity of the consumer. This paper provides an introductory assessment of a Personalized VAT system which transitions from product-based to person-based tax determination. Grounded in the principles of Mechanism Design, the model proposes a dual-utility framework that uses digital identity to identify a buyer's wealth decile at the point of sale. This architecture allows the state to get more out of the rich by applying a fiscal premium on luxury consumption while delivering more to the needy through a negative tax or instant rebate mechanism. The study identifies critical research gaps in data integrity and institutional trust that currently hinder the adoption of such a system. By exploring the specific conditions required for implementation, the research outlines a future direction for an equitable fiscal state that balances extractive efficiency with distributive justice.

Keywords: Personalized VAT (P-VAT), Mechanism Design, Fiscal Justice, Digital Identity Integration, Targeted Social Protection.



Part 6: Arts & Business Studies

From Khānqāh to Statecraft: The Enduring Impact of Hazrat Nūr Qutbul Alam on the Religious and Political Landscape of Medieval Bengal

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Abstract: This study delineates the biographical sketch of Hazrat Nur Qutbul Alam, focusing on the critical analysis of his pivotal role in the socio-political and religious transformation of medieval Bengal in the early 15th century. Born in Pandua around 1350 CE as a successor of Shaykh Alauddin Alaul Haq, Nur Qutbul Alam's influence extended far beyond his khānqāh into the political landscape during the instability of the Bengal sultanate. By meticulously reviewing primary sources, including *Riyaz-us-Salatin*, and other historical chronicles, doctoral theses and academic papers as secondary sources, this article analyzes Nur Qutbul Alam's strategic interposition during Raja Ganesh's Hindu revivalist regime (1410-1414 CE). The paper also elucidates the spiritual influence of Nur Qutbul Alam that helped Raja Ganesh's son, Jadu, convert to Islam, who later became known as Sultan Jalaluddin Muhammad Shah. Moreover, the study underscores a number of Sufi-dervish link-ups that were essential to maintaining Muslim political hegemony, particularly through the mediation of Nur Qutbul Alam. The study further illustrates the indispensable role of Sufis in safeguarding Muslim dominance during times of existential crisis in the medieval Bengal sultanate.

Keywords: Nur Qutbul Alam, Medieval Bengal Sultanate, Sufi-state Relations, Raja Ganesh, Jalaluddin Muhammad Shah

Language as A Tool of Deception and Power Practice in Tree Without Roots

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Abstract: Syed Waliullah's writing consistently explores the societal apocalypse, portraying a common scenario in rural Bengal. The *Tree Without Roots* is highly acclaimed for its dynamic and diverse phenomena, which attract critics and writers to delve into. This project examines the linguistic aspects of this novel by analyzing specific dialogues, situational overtones and undertones, and colloquial dialects that serve as tools of deception and power practice. This study aims to scrutinize the linguistic calculation of the protagonist *Majeed*, who establishes his position as an uncompromising and unbeatable entity in Mohabbatpur village by employing favorable rhetoric centered around the *mazar*. Employing a Foucauldian framework of discourse and power, the paper analyzes the dynamics between speech and social control in postcolonial rural Bengal. A detailed discussion reveals how religious performativity, myth-making, and epistemic control through language operate to sustain deceptive power structures. The findings highlight the novel's relevance in postcolonial discourse, rural politics, and the ethics of spiritual authority. In terms of method, this paper adopts a qualitative and close reading approach.

Key Words: Apocalypse, Discourse, Control, Power



Unmasking the Monster: An Ecocritical Perspective on the Representation of Monsters in Film and Literature

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Abstract: Since the 20th century, monsters have been present in films. Although, in literature, monsters have been a solid part since 2000BC. The horror and spectacle of a monster has fascinated men throughout history. The purpose of the creature feature genre has sometimes been used as a corrective force or as a warning for human's anthropocentric nature. Monsters have from time to time proved that human beings are not the apex. Both in films and literature, monsters have set a reminder what ecocritics have been trying to convey since the beginning of ecocritical studies, that humans are not masters but members of the biotic community. The ignorance on this subject has confirmed the arrival of the geographical epoch; Anthropocene. Extravagant displays like natural calamities, now represented by Monsters, have always been an eye opener for humans to realize the consequences of their environmental damage. Monsters play the role of the great spectacle. The necessity for the creation of a non-human entity to penetrate the veil of human denial is portrayed in both films and literature. By examining creature feature film and literature, this article will unmask the purpose of creating monsters as representative of monstrosity and how it reveals the atrocity of human actions.

Keywords: anthropocene, creature feature, monsters, anthropocentrism, inherent evil

The setbacks in higher studies: A feminist overview

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Abstract: This study examines the challenges faced by the female students in Bangladesh when they think of seeking higher studies abroad. Using a qualitative method, this research reveals the prevailing risk of hegemonic masculinity among the culture, especially in the education sector, that often views women not as 'students' rather just 'women'. Alongside the qualitative findings, a quantitative assessment was conducted among 20 students to get into the depth of this situation. The report illustrates that the potentiality of the female students is undermined by their guardians and such a visionary dream is often thought as a threat to their authoritative mindset. As a result, the lack of guidance and unpreparedness leads many students to experience significant mental trauma even before deciding to which country and to which discipline they should be enrolled in. This helplessness leaves them confused and uncertain about their future goals and profession. Besides, financial constraints are also a significant barrier in choosing their higher study path. Therefore, this paper recommends addressing gender biases and focusing on individuality to ensure equity in pursuing higher studies abroad.

Keywords: higher studies, hegemonic masculinity, authoritative mindset, gender bias, equity.



Investigation and Analysis of Folk-Tradition in the Paintings of Qayyum Chowdhury and Samarjit Roy Chowdhury

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Abstract: Qayyum Chowdhury and Samarjit Roy Chowdhury have skillfully combined modernism and folk traditions in Bangladeshi painting. The intricacies and designs of folk art are reflected in both the subject matter and form of their artworks. This research aims to investigate how these two artists integrated folk heritage with modernist approaches in their paintings. The study will analyze various folk elements present in their artistic expressions.

Their body of work shows extensive experimentation with subject, style, medium, and color. Both artists aimed to depict the stories of the land and its people using local colors and motifs. Qayyum Chowdhury's artistic identity was multifaceted and deeply rooted in the traditional arts of rural Bengal. On the other hand, Samarjit Roy Chowdhury initially worked in a figurative style but later leaned towards folk and geometric forms. His artworks capture the beauty and essence of Bengal — flowers, vines, trees, people, and natural landscapes are rendered with expressive patterns, bold colors, and light-shadow interplay, opening up traditional thoughts within Western formats. Both artists applied the principles of graphic design in their fine art practices and used elements and motifs from nature and folk life of Bangladesh as core components of their artistic creations.

This study will employ both narrative and analytical research methodologies. A comparative review approach will also be used to identify the distinctiveness of Qayyum Chowdhury and Samarjit Roy Chowdhury in relation to their contemporaries.

Keywords: Folk-Tradition, Bengal, Paintings, Qayyum Chowdhury, Samarjit Roy Chowdhury

Reimagining AI-Mediated ELT in Bangladesh Through Critical Digital Pedagogy

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Abstract: The rapid expansion of AI tools in English Language Teaching has reshaped pedagogical practices, raising concerns about linguistic equity and teacher agency, especially in Global South contexts like Bangladesh. Although the existing literature explores AI bias in ELT and examines critical digital pedagogy in language education, little research analyses how CDP can be used in ELT spaces, particularly in Bangladeshi classrooms. Addressing this gap, this paper explores how critical digital pedagogy can empower Bangladeshi ELT teachers to mitigate algorithmic bias in AI-mediated classrooms. It introduces the ACT model- acknowledge, critique, and transform- as a strategic pedagogical tool to equip Bangladeshi ELT instructors to practice agency and make informed decisions to navigate AI critically. This framework will encourage educators to acknowledge biased outputs, critique technology-generated content through a critical lens and transform classroom spaces through inclusive, context-sensitive practices. By linking critical theory with classroom action, this paper advocates for the necessity of teacher agency and multilingual, human-centred classrooms in an age of rapid technological advancements.

Keywords: AI in ELT, Algorithmic Bias, Critical Digital Pedagogy, Teacher Agency, Bangladesh



A Study on Elicitation as a Tool to Enhance Speaking Skills in Secondary-level ELT Classrooms in Dhaka

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Abstract: When it comes to acquiring speaking skills in English, or any other language, elicitation can play a significant role by allowing the students to practice their speaking skills while also being conscious of the language they are using. This study investigates the role of elicitation as a pedagogical tool to enhance speaking skills in secondary-level English Language Teaching (ELT) classrooms in Dhaka. Incorporating a mixed-methods approach, the data were collected via semi-structured teacher interviews, a student questionnaire, and classroom observations for data triangulation. The study found that although teachers deem elicitation as crucial for developing spoken English, its application in actual classroom situations faces significant constraints. Key elicitation strategies used by teachers include display questions and collaborative activities like pair and group work. However, these efforts are impeded by challenges such as students' lack of proficiency and confidence, a predominant reliance on Bengali, and insufficient class duration. The study discerns a considerable gap between teacher intent and classroom practice, and follows it up with probable recommendations regarding the issue.

Keywords: Elicitation, tool, speaking skills, secondary-level, ELT classrooms

The Awareness about E-resources: a Study on Undergrad Students' of Faculty of Arts, University of Dhaka, Bangladesh.

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Abstract: Introduction: Electronic resources are an integral part of higher education worldwide. Students' knowledge and practical use of e-resources are inconsistent, especially in developing regions like Bangladesh. This study investigates the awareness, accessibility, usage patterns and barriers related to e-resources among undergraduate students of the Faculty of Arts, University of Dhaka.

Methodology: A quantitative descriptive survey with simple random sampling was conducted using a structured questionnaire distributed to 323 undergraduate students from Faculty of Arts. The responses were analyzed using descriptive statistics.

Result: The results indicated that 81.4% of students recognized the term "e-resource", although 66.6% had no practical experience in using them. Awareness of institutional repositories (21.7%) was very low. The sources of initial awareness were the Internet/social media (48.9%) and teachers (24.5%), while library contributions were minimal (12.7%). Only 20.4% students indicating successful login to library e-resource from off-campus. The main barriers were unreliable internet-connectivity and inadequate training.

Conclusion: This study reveals a disparity between awareness and actual usage of electronic resources. The inadequate promotion as-well-as training and low digital literacy hinder usage. This study will assist library and university administration in implementing measures for effective usage of e-resources.

Keywords: E-resources, E-resource Awareness, Usage Patterns, Digital Literacy, E-journals



AI-giarism and Academic Integrity: A Study on Dhaka University Students' Perception and Practices

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Abstract: The integration of artificial intelligence (AI) systems in educational settings has generated both opportunities and challenges for higher education, particularly with academic integrity. This study aims to examine students' perspectives, habits, and understanding around the use of AI, with a specific focus on "AI-giarism" (AI-generated plagiarism). The research was conducted at Dhaka University using a quantitative survey method, with a structured questionnaire distributed to 387 students enrolled in undergraduate and master's programs across four faculties: Arts, Social Sciences, Science, and Business.

We employed descriptive statistics, Mann-Whitney U tests, and Kruskal-Wallis tests to analyze the variations in data according to gender, academic level, and faculty. The findings indicated that students predominantly believe AI tools are beneficial when utilized ethically (M=4.19) and that they facilitate responsible learning (M=4.16). Nonetheless, there were significant concerns over the potential detrimental impact of excessive dependence on AI on critical thinking (M=4.28). The majority of students indicated that they utilized AI due to academic pressure rather than dishonesty. They emphasized the necessity for institutions to provide explicit ethical guidelines (M=4.15) and to train educators in identifying AI-generated content.

Significant disparities were among the groups: males emphasized academic integrity, females highlighted citation procedures, master's students shown greater caution regarding misuse, and science students focused on AI's potential for educational enhancement. The findings indicate that individuals perceive AI in two ways: as a beneficial academic resource and as a potential danger to integrity if misapplied. The research indicates that higher education institutions must strike a balance between adopting new technologies and maintaining ethical norms. This necessitates the incorporation of AI awareness into their academic integrity rules.

Keywords: AI-giarism, Academic Integrity, Higher Education, Student Perceptions, Ethical AI Utilization, Dhaka University

The Inevitability of the Emergence of Authoritarian Regimes in post-chaotic Societies: Portrayed in William Golding's *Lord of the Flies* and Neamat Imam's *The Black Coat*

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Abstract: This paper aims to critically examine the emergence of authoritarian dictatorship in post-chaotic societies, comparing the power dynamics illustrated in William Golding's novel *Lord of the Flies* (1954) and Neamat Imam's novel *The Black Coat* (2013). Set on an imaginary island, *Lord of the Flies* explores the political praxis of a group of apolitical children who initially take steps to institute parliamentary democracy to protect the "civilization" while gradually lean towards establishing totalitarian rules, leaving a question towards the development of their psyche. However, *The Black Coat*, framed in post 1971 Bangladesh, shows the rise of a dictatorial, quasi-fascist state after a long struggle for independence, where the oppressed imitate the former oppressors, marking a question to the mindset that remains unchanged. Despite focusing on two contradictory periods of the biological development of human beings, both texts scrutinize the domains of power where the victims, ironically, resonate the voice of the victimizers while they struggle to reconstruct the established system for greater good. Based on a postcolonial-psychoanalytical framework led by Fanon, Fromm and Mamdani, this paper will evaluate the causes and the consequences of their actions that ultimately lead towards the rise of authoritarianism.

Keywords: Authoritarian, Colonial, Psyche, Power, Dystopia



Challenges of English Medium Instruction (EMI) for Bangla Medium Undergraduates: Language proficiency gaps, psychological barriers, and institutional support issues

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Abstract: English Medium Instruction (EMI) is an acknowledged policy in the tertiary level of education in Bangladesh, yet its implementation reveals significant gaps between policy and practice. This article explores those prevailing gaps drawing attention on the academic, psychological and institutional challenges faced by the undergraduate students of Bangladesh, especially those from Bangla-medium background. By implementing mixed-method approach combining surveys and in-depth interviews, this study scrutinizes how limited exposure to academic English affects the proficiency level of the students and thus shapes their EMI experience and academic performance. Besides, the paper delves into the psychological attributes such as motivation, anxiety, identity conflict and linguistic insecurity- all interconnected with the linguistic struggles, while examining the insufficiency of institutional support and effective curriculum. Findings of the study illustrate the reality of the EMI policy underscoring the co-relation among the proficiency gaps, psychological barriers and institutional support issues with an aim to initiate more inclusive and effective EMI practices in the tertiary level of Bangladeshi education system.

Keywords: EMI policy, Linguistic insecurity, Proficiency gaps, Psychological barriers, Tertiary level education

The Effect of AI on Academic Writing proficiencies for EFL students at Dhaka University

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Abstract: The cumulative integration of Artificial Intelligence (AI) tools is significantly shaping the academic writing proficiency of EFL students. Despite growing research on AI in language learning, a focused investigation into its specific effect on academic writing proficiency and learner experience within the Bangladeshi higher education context is lacking. This study aims to investigate the effect of AI tools on the academic writing skills of EFL students at Dhaka University by exploring their usage, perceived benefits, and challenges. Using a mixed-methods approach, data were collected from 100 EFL students (aged 20-25) via an online survey and triangulated with semi-structured interviews and focus group discussions (FGDs). Findings show that students primarily use AI tools for error detection and paraphrasing, resulting in a high perception of increased editing efficiency and grammatical accuracy. It is recommended that institutions establish explicit AI guidelines and overhaul assessments to genuinely test critical thinking, rather than basic recall. Long-term studies are also needed to understand the impact of AI reliance on students' fundamental linguistic competence. This study concludes that structured pedagogical integration is essential to maximize AI's benefits while actively mitigating its potential negative effect on the development of writing autonomy among EFL students at Dhaka University.

Key words: AI Tools, Academic Writing Proficiency, EFL Students, Dhaka University, Pedagogical Integration



The 21st Century Leader: Expectations from Generation Z

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Abstract: This study aims to understand the perception of Generation Z regarding what constitutes an effective leader. This demographic group holds significantly different values and mental models on social hierarchy from the previous generations due to the influence of the digital era in their upbringing. To identify and measure the traits, characteristics, and behaviors that Generation Z believes a successful or effective leader should have, this study employs a mixed-method approach. First, the research will capture qualitative data from 15 respondents of Generation Z through semi-structured interviews and identify the common themes and patterns using thematic analysis. Then, 80 survey responses will be collected through a structured questionnaire based on the themes to do a combination analysis employing the fuzzy-set Qualitative Comparative Analysis (fsQCA). The findings will help construct the ideal combinations of leadership prototypes for Generation Z on desired leadership attributes. The study, based on the foundation of implicit leadership theory, will have multifaceted implications for organizational policy-making, political leadership profiling, and youth leadership emergence theories.

Keywords: Generation Z, Implicit Leadership Theory, Leadership Prototype, Thematic Analysis, fsQCA

Gig Work Beyond Tuition? Exploring the Nature and Motivations of Student Gig Work in Bangladesh

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Abstract: The study aims to investigate the emerging trends among the student gig workers in Bangladesh, focusing on investigating the existence of shifts beyond conventional gig work engagements such as private tutorship. The research attempts to identify the types of gig works students pursue in Bangladesh and explore the underlying motivations for pursuing such gig works. It examines how these gig work activities are related to their career aspirations. To conduct the study, a qualitative approach was employed through semi-structured interviews with 20 undergraduate students from diverse educational backgrounds at the University of Dhaka. The interview data was analysed through thematic analysis to identify patterns and themes pertaining to work practices, motivational factors, and student perceptions of gig works. The Findings provided insights that indicate that students are increasingly participating in a broad spectrum of different types of gig works, including freelancing, content creation for digital platforms, market research, event management, and other creative and informal engagements. Motivation encompasses financial necessity, need for skill achievement, autonomy of work, and inspiration for entrepreneurial exploration. The findings also revealed a nuanced connection between chosen gig work and personal development objectives of the students. The study provides a foundation for understanding the evolving nature of student gig work in Bangladesh and identifying the factors shaping the choice of work made by the students of Bangladesh.

Keywords: Student Gig work, Freelancing, Content Creation, Skill Development, Micro-entrepreneurship, Qualitative Analysis



Price Psychology: The way Price perception Influences the Behavior of Target Customers

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Abstract: Pricing is one of the most powerful instruments in marketing as it directly affects consumer behavior, brand image, and company profitability (Ali and Anwar, 2021). Beyond its economic purpose, pricing shapes how consumers perceive value and quality (Kotler & Keller, 2022). It is a strategic message that conveys the company's market position and value proposition rather than just a number attached to a product. This article examines the relationship between pricing and consumer psychology, focusing on how perceptions, motivations, and value judgments affect consumers' choices. It also investigates several psychological pricing strategies (Image pricing, Reference pricing, Charm pricing), that affect buyers' responses through both cognitive and emotional pathways (Nagle et al., 2021). Despite extensive research on price elasticity and market competition, relatively few studies have examined how psychological processes guide consumer price interpretations. Therefore, the main purpose is to integrate marketing and psychological perspectives to build a comprehensive framework that explains how psychological factors shape consumer purchasing behavior.

Keywords: Pricing, Brand Image, Consumer Psychology, Price Elasticity, Value Proposition

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