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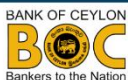
8th International Research Conference

TRInC 
2026

**“Innovate, Integrate, and Evolve Blue and Green:
Towards an Inclusive Sustainable Development”**

BOOK OF ABSTRACTS

17 – 18 September 2026





**Trincomalee Campus
Eastern University, Sri Lanka**

**8th International
Research
Conference**



**“Innovate, Integrate, and Evolve Blue and Green:
Towards an Inclusive Sustainable Development”**

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**Abstracts of the
8th INTERNATIONAL RESEARCH CONFERENCE – 2026
Trincomalee Campus, Eastern University, Sri Lanka**

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Message from the Vice Chancellor

It is with immense pleasure and pride that I extend my warmest greetings to all participants, including scholars, researchers, presenters, and organizers of the 8th International Research Conference - TRInCo 2026, organized by the Trincomalee Campus of Eastern University, Sri Lanka, to be held on 17th and 18th September 2026.

TRInCo 2026 has become a shining testament to the growing research culture of our Trincomalee Campus. What began as a modest initiative has evolved into a significant international academic platform, bringing together researchers, academics, and professionals from Sri Lanka and beyond. Today, TRInCo 2026 reflects our commitment to academic excellence, innovation, knowledge sharing, and meaningful collaboration.

The theme of this year's conference, "Innovate, Integrate, and Evolve Blue and Green: Towards Inclusive Sustainable Development," is not only timely but also deeply connected to the unique identity and geographical setting of the Trincomalee Campus. Located amidst the rich blue environment of the Indian Ocean and the diverse green landscapes of the region, the Campus is uniquely positioned to promote research and innovation that seek to harmonize marine and terrestrial ecosystems and advance sustainable development.

As Vice-Chancellor, I am immensely proud of the achievements of the Trincomalee Campus and extend my fullest appreciation to all those who have contributed to this vibrant research ecosystem. I am confident that the discussions, presentations, and collaborations emerging from TRInCo 2026 will generate innovative and practical approaches towards a more inclusive, resilient, and sustainable future.

I wish to extend my sincere appreciation to the Conference Chair and Organizing Committee, members of the academic and administrative staff, reviewers, presenters, invited speakers, partner institutions, and all supporting stakeholders whose dedication and commitment have made this conference possible.

May TRInCo 2026 be a resounding success, a celebration of knowledge and innovation, a bridge connecting cultures and disciplines, and a catalyst for transformative ideas towards inclusive sustainable development.

Wishing all participants a productive, inspiring and memorable conference experience.

Prof. P. Peratheepan
Vice-Chancellor
Eastern University, Sri Lanka

Message from the Rector

It gives me great pleasure to welcome all scholars, researchers, presenters, invited speakers, delegates, and guests to the 8th International Research Conference – TRInCo 2026, organized by the Trincomalee Campus of Eastern University, Sri Lanka, on 17th and 18th September 2026. TRInCo 2026 has grown over the years into an important academic platform that brings together researchers from diverse disciplines to exchange knowledge, explore new ideas, and develop meaningful collaborations.

As Rector, I am particularly pleased to see our Campus continuing to strengthen a culture in which research, innovation, and interdisciplinary engagement form an integral part of academic life. The theme of TRInCo 2026, “Innovate, Integrate, and Evolve Blue and Green: Towards Inclusive Sustainable Development,” is especially relevant to Trincomalee. Our unique location, where rich marine resources coexist with diverse terrestrial ecosystems and communities, gives us both an opportunity and a responsibility to look beyond disciplinary boundaries and seek innovative solutions that balance economic and social development with environmental sustainability.

The Trincomalee Campus brings together diverse fields of study and intellectual traditions. This diversity gives us a valuable opportunity to connect science, technology, management, communication, indigenous knowledge, health, and environmental perspectives in addressing complex contemporary challenges. TRInCo 2026 should therefore be more than a forum for presenting research; it should be a meeting place where ideas connect, partnerships begin, and research is translated into meaningful impact.

I sincerely appreciate the commitment of the Conference Chair, the Organizing Committee, academic and administrative staff, reviewers, invited speakers, researchers, students, partner institutions, and all those who have worked tirelessly to make this conference possible. I warmly welcome you to the Trincomalee Campus and hope that TRInCo 2026 will provide not only a rewarding academic experience, but also an opportunity to build lasting professional relationships and generate ideas that contribute to a more inclusive, resilient, and sustainable future.

I wish TRInCo 2026 every success and all participants a productive and memorable conference.

Prof. (Dr.) K. T. Sundaresan
Rector
Trincomalee Campus
Eastern University, Sri Lanka

Message from the Conference Co-Chairs

It is our great pleasure and privilege to welcome you to TRInCo 2026 – the 8th International Research Conference of Trincomalee Campus, Eastern University, Sri Lanka. This year's conference, held under the inspiring theme “Innovate, Integrate, and Evolve Blue and Green: Towards an Inclusive Sustainable Development,” provides a distinguished platform for researchers, academics, professionals, and students to share knowledge, exchange ideas, and explore innovative pathways towards a sustainable and inclusive future.

TRInCo 2026 brings together diverse disciplines and perspectives, recognizing that meaningful solutions to global challenges emerge through innovation, integration, collaboration, and shared knowledge. We believe that the research and scholarly contributions presented at this conference will inspire new thinking, strengthen academic partnerships, and contribute to addressing pressing challenges in environmental sustainability, social well-being, technological advancement, and inclusive development.

We extend our sincere appreciation to the university leadership, keynote and invited speakers, researchers, reviewers, session chairs, organizing committee members, staff, students, and all participants for their invaluable contributions and commitment to making TRInCo 2026 a meaningful academic gathering. We warmly welcome you to Trincomalee and wish you an inspiring, enriching, and memorable conference experience.

Dr. S. Janani
Senior Lecturer
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Faculty of Siddha Medicine
Trincomalee Campus,
Eastern University, Sri Lanka

Mr. K. Balashangar
Lecturer
Department of Physical Science
Faculty of Applied Science
Trincomalee Campus
Eastern University, Sri Lanka

Message from the Secretary & Co - Secretary

It is our great pleasure to welcome you to the 8th International Research Conference – TRInCo 2026, organized by Trincomalee Campus, Eastern University, Sri Lanka. This conference provides a valuable platform for researchers, academics, professionals, and students to share their knowledge, research findings, and innovative ideas.

The theme of TRInCo 2026, “Innovate, Integrate, and Evolve Blue and Green: Towards an Inclusive Sustainable Development,” reflects our commitment to promoting interdisciplinary research and sustainable solutions for the future. We sincerely appreciate the contributions and support of all keynote speakers, presenters, session chairs, reviewers, participants, and organizing committee members.

We warmly welcome all participants and wish you a fruitful, inspiring, and memorable conference. We hope TRInCo 2026 will foster meaningful academic collaborations and contribute to the advancement of knowledge and sustainable development.

Dr. (Mrs.) L. Sooriyakumaran
Secretary / TRInCo 2026
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Eastern University, Sri Lanka

Keynote Address

Unlocking Sri Lanka's Blue Economy: Integrating Education, Skills, Research and Innovation

Senior Professor Nalin Ratnayake

Vice Chancellor, Ocean University of Sri Lanka

Sri Lanka, as an island nation strategically located in the Indian Ocean, has enormous opportunities in the emerging Blue Economy. The Blue Economy is about using our ocean and coastal resources to create economic opportunities, employment and improved livelihoods while ensuring the long-term sustainability of the marine environment. It encompasses fisheries and aquaculture, maritime transport and logistics, marine engineering, ocean science, coastal and marine resources, marine biotechnology, tourism and many other emerging ocean-based activities.

However, having access to the ocean alone will not create a Blue Economy. We need knowledge, skilled people, research, technology and innovation to transform our ocean resources and geographical advantages into sustainable economic and social benefits. Universities therefore need to move beyond the traditional boundaries of education and research and bring together higher education, skills development, research, industry and innovation.

At the Ocean University of Sri Lanka, we are working towards this integrated approach by combining marine, maritime and fisheries-related higher education with vocational and professional skills development, research and industry engagement. Our objective is to create pathways from skills development to higher education and postgraduate research while responding to the human-resource and technological needs of the Blue Economy. Trincomalee and the Eastern region have tremendous potential for the future development of Sri Lanka's Blue Economy. I am particularly pleased to see the Trincomalee Campus strengthening its education, research and other initiatives related to marine and coastal resources. There is considerable opportunity for our institutions to complement each other, share expertise and facilities, undertake collaborative research and jointly develop the human resources required for these emerging sectors.

Research should not end with publications. It should contribute to solving real problems and, wherever possible, be translated into technologies, innovation, entrepreneurship and commercialization. Similarly, education and training should create people capable of converting knowledge and skills into value, employment and new opportunities.

My keynote, "From Ocean Knowledge to Blue Economy: Integrating Education, Research, Skills and Innovation," reflects this vision. I hope this conference will further strengthen collaboration among universities, researchers, industry and society in transforming Sri Lanka's ocean potential into sustainable economic and social development.

I wish the 8th International Research Conference of the Trincomalee Campus every success.

Abstract of Plenary Talk

Decoding Classical Siddha Concepts through Scientific Validation: Studies on *Kaya Karpam*, Milk Substitution, and Mercury in Medicinal Plants

Prof. (Dr). S. Sivakkumar MD(s)., Ph.D.

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The Siddha system of medicine, established in ancient times, is a scientifically rich traditional medical system. However, the underlying scientific basis of many of its fundamentals, medicines, and diagnostic approaches remains insufficiently understood. Due to this lack, it is essential to validate Siddha concepts through modern scientific methods. At present, the most research efforts focus primarily on drug validation, while numerous other concepts remain unexplored. These include fundamental principles (e.g., *Viresanathal Vaatham Thalum*), *Kaya Karpam* practices (such as plantation using *Serankottai Uram*), drug resources (e.g., white-flowered plants containing mercury), methods of drug preparation (such as *Aya Veera Chenduram* via frying and *Pudam* methods), drug substitutes (e.g., milk prepared with *Chukku* and *Sirukanjori ver*), and purification of toxic substances. Due to the limited scientific interpretation of its concepts, the Siddha system faces challenges in gaining wider acceptance within the scientific community. Hence, the present study attempts to validate selected Siddha concepts through scientific evaluation. The study includes:

- An estimation and comparison of antioxidant properties of *Vallarai* cultivated using *Serankottai Uram*
- A quantitative and qualitative analysis of Goat's milk and Processed milk prepared from Cow's milk with *Chukku* and *Sirukanjori ver*
- An estimation of mercury content in selected white-flowered herbs

Centella asiatica (*Vallarai*) is one of the *Kaya kalpam* medicinal plants. The traditional cultivation method for *Kaya karpam* herbs is also described in Siddha literature, especially for *Centella asiatica*. In this study, *Centella asiatica* was cultivated by conventional (Sample-A) and traditional methods (Sample-B). The *in-vitro* anti-oxidant assay for both samples A & B were studied through DPPH free radical scavenging assay, Nitric Oxide Radical Scavenging Assay, ABTS assay and Hydrogen Peroxide Radical Scavenging Assays. The results confirm the anti-oxidant property of sample B is higher than sample A. In DPPH radical scavenging activity of Sample, A 7.746 ± 1.797 to 53.79 ± 3.626 and Sample B 16.47 ± 2.983 to 74.7 ± 1.731 when compared with standard Ascorbic acid 45.28 ± 3.244 to 97.08 ± 1.24 . In Nitric Oxide radical scavenging, ABTS radical scavenging and Hydrogen peroxide radical scavenging assays the anti-oxidant property of sample A and B are 7.971 ± 4.641 to 30.46 ± 1.885 , 17.07 ± 3.84 to

39.26 ± 0.8682 ; 14.2 ± 0.3889 to 54.16 ± 7.832 , 3.259 ± 0.974 to 49.32 ± 1.317 ; and 2.94 ± 0.5557 to 27.03 ± 2.569 , 9.888 ± 2.34 to 39.59 ± 4.583 respectively.

The Siddhars recommended a substitute for Goat's milk by processing Cow's milk with *Chukku* and *Sirukanjori* ver. In this study, the Goat's milk and the processed cow's milk were analyzed and compared. The evaluated parameters of Goat's Milk and processed cow's milk including pH value, Fat, Protein, Calcium, Potassium, Vit – D and Vit A were 6.34, 6.70; 4.05g, 3.97g; 3.56g, 3.45g; 134mg, 129mg; 186mg, 179mg; 11 I.U, 33 I.U; and 156 I.U, 149 I.U respectively. This study confirmed that the processed Milk is nutritionally comparable to Goat's Milk. Therefore, in accordance with the classical teachings of the *Siddhars*, processed cow's milk can be used instead of Goat's milk for medicine preparation and as an adjuvant.

According to Siddha fundamentals, plants with White colored flowers contain a high volume of Mercury. To validate this statement, the mercury content of selected herbs was estimated. The concentration of mercury contents in Blue and White variety of *Solanum trilobatum* are 5.41 $\mu\text{g/g}$ and 726.67 $\mu\text{g/g}$ respectively. Whereas in blue and white colour flower of *Vitex negundo* are 12.19 $\mu\text{g/g}$ and 504.66 $\mu\text{g/g}$ respectively. The results confirmed that, the white flowered herbs were found with higher mercury levels compared to different colored flowers within the same species.

Overall, these results provide strong scientific support for classical Siddha concepts and contribute to a better understanding of their underlying principles. Such validation will help strengthen the scientific credibility of the Siddha system and promote its global acceptance.

Abstract of Plenary Talk

Sustainable and Regenerative Destination Development: Integrating Conservation Stewardship, Community Participation and High-Value Tourism

Chinthana Duminduhewa, PhD

*Chairman - Sustainable Tourism Initiatives Lead Trainer - Global Sustainable
Tourism Council Country Coordinator - Green Destinations, Visiting Faculty Lecturer*

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Tourism destinations are increasingly confronted with the challenges of environmental degradation, climate change, cultural commodification, visitor pressure, and unequal distribution of tourism benefits. Addressing these challenges requires a fundamental shift from conventional tourism growth towards integrated and regenerative approaches to destination development. This paper argues that the future competitiveness of tourism destinations depends on the ability to integrate conservation stewardship, meaningful community participation, sustainable destination management, and high-value visitor experiences.

Drawing on international destination experiences, including *Pachmarhi* in India, the Maldives, Dubai Expo City, Singapore's Sentosa Island, and Kamaishi in Japan, the paper examines how destinations can balance tourism development with environmental protection, cultural integrity, innovation, resilience, and community benefits. These cases demonstrate that sustainable destination development does not follow a single model; rather, successful destinations adapt strategies to their ecological, cultural, socioeconomic, and institutional contexts.

For Sri Lanka, the paper proposes a strategic transition from Sustainable Tourism to Conservation Tourism, Regenerative Tourism, and High-Value Tourism. This approach shifts the focus from maximizing visitor numbers towards maximizing destination value, encouraging longer stays, higher local economic retention, authentic experiences, conservation contributions, and stronger community participation. Sri Lanka's biodiversity, marine ecosystems, wildlife, cultural heritage, traditional livelihoods, and local knowledge provide a strong foundation for this transformation.

The paper further emphasizes the role of universities and research institutions in bridging research, policy, industry, and communities. It proposes evidence-based destination planning, community-led enterprises, conservation-linked tourism products, responsible investment, sustainability standards, and innovative visitor experiences as key mechanisms for transformation. Ultimately, the paper advocates tourism as a force for regeneration, creating positive outcomes for ecosystems, communities, visitors, and future generations.

Abstract of Scientific Dialogue

Bridging The Blue–Green Economies with The Siddha Medical System:

Towards Sustainable and Inclusive Health Care

Prof. (Dr) N. Varnakulendran , M.D. (S), Ph.D.

*Department of Siddha Pharmacology, Faculty of Siddha Medicine,
Trincomalee Campus, Eastern University Sri Lanka*

The Siddha medical system, philosophically rooted in the five elements (*Impootham*), conceptualizes the human body (*Kayam-Pindam*) as a microcosm of the universe (*Macrocosm-Andam*). Reinterpreting this traditional framework through contemporary “Blue-Green” infrastructure which integrates marine and aquatic ecosystems with terrestrial green landscapes offers a pathway toward localized, ecologically sustainable public health interventions. Integrating the principles of the “Blue Economy,” centred on sustainable marine-resource use, and the “Green Economy,” focused on terrestrial ecological sustainability, within the Siddha framework may provide an inclusive model for sustainable healthcare. By linking coastal and terrestrial biodiversity, this integrative approach seeks to promote population health while sustaining ecological integrity and preserving environmental boundaries. Preventive Siddha practices, including *Kayakarpam*, *Varmam*, *Yogam*, and therapeutic dietary practices, may further contribute to low-carbon healthcare by emphasizing long-term health promotion and potentially reducing dependence on resource-intensive pharmaceutical interventions. However, their environmental benefits require systematic scientific evaluation. The development of certified Green Siddha Retreats, alongside community-managed medicinal plant gardens and bio-reserves, could integrate ecological conservation, cultural heritage, community livelihoods, and responsible wellness tourism. Finally, transparent collaboration between Siddha medicine, global health systems, and interdisciplinary research institutions is essential for advancing a scientifically rigorous and sustainable model of Siddha Medical healthcare. The Blue Dimension connects marine and aquatic ecosystems with Siddha medicine’s established mineralogical and therapeutic traditions. Historically, Siddha pharmacology has utilized marine-derived resources such as *Kadal Paasi* (seaweeds), *Sangu* (conch), *Muthu* (pearls), *Chippi* (Shells), *Kadal Uppu* (marine salts) and *Pavazham* (coral) in the management of chronic metabolic and respiratory conditions. The Blue Dimension also encompasses ecosystem and water purification. Traditional knowledge involving *Strychnos potatorum* (clearing nut) and aquatic plants may inform low-cost, locally adaptable approaches to water purification, toxicity assessment, and environmentally sustainable sanitation. Advancing this dimension requires a transition from wild harvesting toward restorative and sustainable aquaculture, supported by responsible marine bio prospecting and scientific standardization. Modern pharmacognosy can be applied to characterize and standardize marine-derived *Parpam* and *Chendooram*, ensuring quality, purity, efficacy, and safety while minimizing pressure on vulnerable marine ecosystems. Restorative seaweed

aquaculture offers a sustainable pathway for supplying medicinal marine biomass. By reducing dependence on wild-harvested stocks, community-based ocean farming helps conserve natural marine ecosystems while simultaneously supporting coastal livelihoods and generating a consistent, high-quality raw material base for Siddha pharmaceutical preparations. Aligning Siddha therapies with international coding frameworks, such as the World Health Organization's International Classification of Health Interventions (ICHI), can integrate Siddha practices into a standardized global health language. By strengthening clinical evidence, standardizing traditional medical practices, and expanding sustainable economic opportunities, an ecosystem-based Siddha framework can contribute to the United Nations Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and, through biodiversity and ecosystem conservation, SDG 14 (Life Below Water) and SDG 15 (Life on Land). Accordingly, Siddha medicine should be considered not merely as cultural heritage requiring preservation, but as a potential contributor to sustainable development. This framework proposes a policy-oriented model for positioning Siddha medicine within emerging green and blue economic agendas. The integration of traditional knowledge, biodiversity conservation, digital health, clinical standardization, and sustainable livelihoods provides a potential pathway toward inclusive, climate-resilient, and ecologically sustainable healthcare

Keywords: Siddha medicine, Blue & Green Economy; Sustainable healthcare, Traditional knowledge, Policy frame work, biodiversity conservation.

Abstract of Scientific Dialogue

From Dead Leaves to Clean Water: Green Nanomaterials for Blue–Green Circular Sustainability

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The increasing scarcity of clean water, coupled with the continuous generation of agricultural and plant-based wastes, has created an urgent need for sustainable and affordable approaches to water purification. Among the numerous biomass wastes generated in urban and rural environments, dead leaves represent an abundant, renewable, and largely underutilized resource. Traditionally treated as waste and often disposed of through open burning or landfilling, dead leaves possess significant potential as a carbon-rich precursor for the development of advanced materials for environmental remediation. The present concept explores the transformation of discarded plant leaves into value-added carbon nanomaterials and their application in sustainable water purification, thereby linking waste management with clean-water technologies and the broader goals of inclusive sustainable development. Dead leaves contain cellulose, lignin, hemicellulose, and naturally occurring carbonaceous compounds that can be converted into porous carbon materials and graphene-based nanomaterials through appropriate chemical and thermal processes. In particular, the conversion of selected dead leaves into reduced graphene oxide (rGO) offers an innovative pathway for developing low-cost and environmentally relevant materials for water treatment. The resulting carbon-based materials possess favourable physicochemical properties, including a large surface area, abundant adsorption sites, tunable surface functional groups, and good chemical stability. These characteristics make them promising candidates for the removal of organic dyes, suspended impurities, heavy-metal ions, microorganisms, and other emerging contaminants from water. The waste-to-water approach also provides an opportunity to promote circular economy principles by converting locally available biomass waste into functional purification materials. Instead of considering fallen leaves as an environmental burden, they can be viewed as a sustainable feedstock for developing decentralized and affordable water-treatment technologies. Such approaches are particularly relevant to rural and resource-limited communities, where access to advanced water-treatment infrastructure may be limited. The integration of green nanotechnology with locally available biomass can therefore contribute to inclusive solutions that connect scientific innovation with societal needs. The proposed approach strongly resonates with the theme “Innovate, Integrate, and Evolve – Blue and Green: Towards Inclusive Sustainable Development.” Innovation lies in the development of advanced carbon materials from discarded biomass; integration involves connecting waste management, nanotechnology, environmental science, and water-resource management; and evolution represents the transition from a linear waste-disposal model to a circular and sustainable resource-utilization framework. The blue dimension emphasizes the protection and

sustainable management of water resources, while the green dimension highlights waste valorization, reduced environmental pollution, and the use of renewable raw materials. By transforming dead leaves into functional materials for water purification, this approach demonstrates how simple biological waste can be integrated with advanced materials science to address a fundamental global challenge. It supports the principles of Sustainable Development Goal 6 (Clean Water and Sanitation) while also contributing to responsible consumption and production, climate action, and sustainable communities. Ultimately, the conversion of dead leaves into water-purification materials represents a practical example of how innovation inspired by nature can evolve into inclusive technologies, turning waste into a resource and contributing towards a cleaner, greener, and water-secure future.

Abstract of Scientific Dialogue

People at the Centre: HRM and Management For An Inclusive Blue–Green Future

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The global transition towards sustainable development increasingly requires the integration of the blue economy, centred on the sustainable use of ocean and coastal resources, and the green economy, which promotes low-carbon, resource-efficient and socially inclusive development. This transition is closely aligned with the United Nations 2030 Agenda, which emphasizes the interconnected nature of economic prosperity, social inclusion and environmental sustainability (United Nations, 2015). While technology, infrastructure, environmental policy and investment remain essential, sustainable transformation ultimately depends on a critical factor: people. Accordingly, sustainability is not merely an environmental or technological challenge; it is also a human resource management, leadership and organizational transformation challenge. This presentation examines the human and managerial dimensions of an inclusive blue–green future through the interconnected imperatives of Innovate, Integrate and Evolve. To innovate, organizations and nations must develop future-ready human capital through green and blue skills, digital competencies, continuous learning, reskilling and responsible innovation. Recent evidence highlights the growing importance of integrating green and digital skills development to prepare workforces for sustainable economic transformation (International Labour Organization [ILO], 2025). To integrate, sustainability must move beyond isolated environmental initiatives and become embedded within organizational strategy and HR practices, including recruitment, training, performance management, employee involvement and organizational development (Renwick et al., 2013). To evolve, organizations require ethical and sustainable leadership, adaptive cultures, responsible governance and the capacity to manage continuous change. Importantly, sustainable development must also be inclusive. An inclusive green economy should simultaneously improve human well-being, strengthen social equity and reduce environmental risks (United Nations Environment Programme [UNEP], n.d.). A just transition therefore requires decent work, equitable access to skills and opportunities, and particular attention to workers and communities affected by economic and environmental transformation (ILO, 2025). The presentation argues that HRM must evolve beyond its traditional administrative and operational boundaries to become a strategic architect of sustainable transformation. By developing people, empowering responsible leaders, integrating organizational systems and enabling inclusive participation, HRM and professional management can provide the human infrastructure required to translate blue–green aspirations into sustainable and shared prosperity.

Keywords: Sustainable HRM; Blue Economy; Green Economy; Human Capital; Sustainable Leadership; Green Skills; Inclusive Development; Just Transition

Abstract of Scientific Dialogue

Blue Economy Innovation: Harnessing Oceans and Water for Sustainable Development

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The world oceans cover 71% of the Earth's surface and generate half of the oxygen we breathe, making them central to human survival, economic prosperity and climate stability. They sustain over three billion livelihoods, support global trade carrying 90% of internationally traded goods and generate an estimated USD 3 to 6 trillion annually. Nevertheless, a significant risk exists for both ecological resilience and inclusive growth due to the overexploitation of oceans without a clear strategy for its sustainable use. The concept of the Blue Economy, aligned with the UN's Sustainable Development Goal 14 (Life Below Water), emphasizes the sustainable harnessing of ocean resources for economic growth, jobs and environmental preservation. Within this framework, Blue Innovation significantly represents the transformative application of novel technologies, processes and financial mechanisms to regenerate marine ecosystems while creating equitable economic value. Sri Lanka, with its 1,640 km coastline, an Exclusive Economic Zone eight times its land area and an extended Continental Shelf claim 23 times larger, possesses a strategic significance at the heart of the Indian Ocean shipping lanes connecting the east and the west. Its unique maritime significance is further multiplied with deep-water harbours such as Colombo, Hambantota and Trincomalee. Submarine cable connectivity transiting through Sri Lanka positions it as a digital gateway. Emerging opportunities including offshore wind energy potential of 56 GW, sustainable aquaculture expansion, marine biotechnology and coastal ecotourism, are capable of diversifying the economy while enhancing climate resilience poising the country to become a regional hub for blue innovation. Case studies highlight Sri Lanka's progress: community-led fishery improvement projects for blue swimming crab exports, coral reef restoration initiatives using reef ball technology and large-scale mangrove rehabilitation integrating women's empowerment and alternative livelihoods. These demonstrate how ecological restoration can simultaneously advance multiple SDGs, from poverty reduction to climate action.

Addressing the challenges to Blue Economy Innovation such as resource degradation, fragmented governance, infrastructure gaps and vulnerability to climate change, Sri Lanka is in the process of adopting strategies such as integrated marine spatial planning, a Monitoring, Control and Surveillance (MCS) framework to ensure sustainable fishing, and concessional finance access. When considering the contribution of the Sri Lanka Navy towards Blue Innovation, NAVSTRAT 2030 framework underscores the importance of maritime security, ecosystem protection and multi-stakeholder partnerships in sustaining the Blue Economy. Achieving an inclusive and sustainable blue future requires coordinated action across governance, science, enterprise and communities, supported by international cooperation and innovative finance, aligned with "A Thriving Nation – A Beautiful Life", the National Policy Framework of Sri Lanka.

Keywords: Blue Economy, Blue Innovation, Sustainable, SDG 14, Ocean Governance, Climate Resilience, Sri Lanka Navy

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Comparative Analysis of Coating Stability and Corrosion Performance in Hot-Dipped 6005 and 1000 Series Aluminium-Coated Mild Steel

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Aluminium-coated steel is an important industrial material due to its superior resistance to corrosion, oxidation, and durability in harsh conditions, such as marine and high-humidity conditions. Aluminium forms a stable, self-healing oxide layer, alumina (Al₂O₃), making it highly durable, even in aggressive environments. This study investigates the coating performance of mild steel when hot-dipped in 6005 and 1000 series aluminium alloys. Analysis of coating weight and thickness shows that both parameters are strongly dependent on the immersion temperature and time. While increasing the temperature generally enhances the coating weight owing to intensified diffusion, 800 ± 10 °C was determined to be the optimum condition for stable coating growth, resulting in overall coating thicknesses ranging from 0.05 mm to 0.34 mm. In contrast, samples treated at 900 ± 10 °C showed a decrease in coating weight and thickness with extended immersion (from 0.30 mm to 0.20 mm), attributed to the instability of the Fe–Al intermetallic layer with respect to corrosion-induced weight variations. According to ASTM B117 standard, samples were exposed to a 168 hours salt spray test, 6005 Al-coated specimens exhibited a net weight gain in the range of 0.08–0.18 g due to the formation of a stable and adherent Al₂O₃ scale. In contrast, the 1000 series aluminium coatings exhibited both weight gain and weight loss, suggesting the oxide layers are less stable and more vulnerable to chloride-induced degradation and spallation. To enhance the sustainability of this technology, aluminium from scrap material can be utilized in the coating process. This approach minimizes the usage and mining of alloys for corrosion-resistant materials, directly contributing to a sustainable environment and a circular economy. Overall, the 6005 Al coating applied under optimized conditions demonstrated superior corrosion resistance and greater consistency, making it ideal for protecting steel in aggressive chloride-rich environments.

Keywords: Aluminium-coated mild steel, Al-Fe intermetallics, Corrosion resistance, Coating performance, Hot-dip aluminizing

Highly Featured Smart Glass for Visually Impaired Personnel

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The increasing global population of visually impaired individuals continues to face significant challenges in mobility, environmental awareness, and social interaction. Conventional assistive tools such as white canes and guide dogs provide basic support but often lack the capability to effectively navigate complex and dynamic environments. This project presents the development of a low-cost wearable assistive device, Smart Glass for the Visually Impaired, designed to enhance independence through real-time obstacle detection, object identification, scene description, and emergency communication. The proposed smart glass integrates a Raspberry Pi processing unit with advanced technologies, including YOLOv8-based computer vision for object detection, a LiDAR sensor for precise distance measurement, and Optical Character Recognition (OCR) for text interpretation. Additionally, an onboard GSM (SIM800L) module enables emergency alerts and communication. All components are housed within a lightweight custom 3D-printed frame, while a dedicated power module with dual buck converters regulates 5 V and 4 V outputs from an 11.1 V Li-Polymer battery to ensure stable operation. The methodology involves implementing real-time computer vision algorithms for object and human recognition, LiDAR-based distance sensing, and text-to-speech output delivered via bone conduction audio, allowing users to receive auditory feedback without obstructing environmental sounds. Compared with existing smart glass solutions, the proposed system combines real-time object detection, LiDAR-based obstacle sensing, OCR, and GSM-based emergency communication in a single low-cost wearable platform. Experimental testing demonstrates reliable obstacle detection, accurate object recognition, and efficient communication performance under varying conditions. The results indicate that the proposed system significantly improves, mobility, and overall safety for visually impaired users. In conclusion, the smart glass offers an affordable, portable, and feature-rich assistive solution that addresses the daily mobility and safety challenges faced by visually impaired individuals. Future enhancements will focus on advanced navigation capabilities, improved battery efficiency, and integration with cloud-based and AI-driven services for extended functionality.

Keywords: Computer vision, LiDAR sensing assistive technology, Smart glass, Visually impaired assistance

Digitalised Simple Pendulum for Precise Measurement of Gravitational Acceleration

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The simple pendulum experiment is a fundamental technique used to determine the gravitational acceleration (g). However, conventional approaches that rely on manual measurements of pendulum length and oscillation time are often affected by poor repeatability, limited precision, and human error. This study presents the design and implementation of a digitalised simple pendulum system aimed at enhancing experimental accuracy and usability through an embedded system. The developed system integrates an ultrasonic sensor for accurate measurements of pendulum length, a stepper motor for precise and controlled length adjustment, and an infrared sensor for detecting oscillations. An Arduino UNO microcontroller functions as the central processing unit, coordinating sensor inputs, controlling mechanical components, and computing gravitational acceleration. The system also incorporates a LCD to display the measured and computed values of pendulum length (l), period of time (T), and gravitational acceleration (g), enabling real-time observation and analysis. The experimentally determined value of gravitational acceleration using digitalised simple pendulum system is 9.80 ms^{-2} , corresponding to an error of 0.1 % relative to the theoretical value of 9.81 ms^{-2} . In contrast, the typical error associated with conventional method is approximately 0.4 %. The results demonstrate that the digitalised simple pendulum system reduces measurement uncertainty and improves repeatability compared to traditional approaches. The integration of microcontroller-based automation with traditional physics experimental approaches provides a reliable, user-friendly, and pedagogically effective system, making it well suited for modern laboratory environments.

Keywords: Digitalised simple pendulum, Gravitational acceleration, Microcontroller-based pendulum, Periodic oscillation, Simple harmonic motion

Design of IoT-based fingerprint attendance system for students

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Traditional paper-based attendance methods in educational environments rely on manual signatures and record-keeping, causing proxy attendance, time consumption, paper wastage, and recording errors. Although some institutions have adopted fingerprint-based systems, most of them only record students' presence. The design and implementation of an IoT-based student fingerprint attendance system integrates biometric authentication with cloud-based monitoring and attendance analysis. The proposed system utilizes an ESP8266 microcontroller, AS608 fingerprint sensor, and a 1602 LCD to automate attendance management efficiently. Unlike conventional fingerprint systems, the proposed model enables students to monitor their attendance percentage in real time. This helps students to track their academic participation continuously and identify their eligibility for examination at an early stage. The system incorporates a dynamic timetable mechanism to ensure attendance is recorded during scheduled lecture sessions. In addition, a late-entry threshold is implemented, in which late students are notified via a display message that reads "You are late," along with their current attendance percentage. Attendance records are securely uploaded to the *ThingSpeak* cloud platform for remote access, storage, and monitoring. The prototype can store up to 127 fingerprint templates. It was tested with 10 students, and the prototype achieved 99% fingerprint recognition accuracy with an average attendance recording time of 2 seconds. The developed system provides an effective, secure, and scalable solution for modern smart university environments.

Keywords: AS608 Fingerprint sensor, Biometric attendance, Fingerprint authentication, Smart attendance system, Thing Speak, Internet of Things (IoT).

Thermal and Humidity Performance of Concrete Roof Slabs Incorporating Agricultural and Industrial Waste Materials Under Tropical Outdoor Conditions

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Buildings in tropical climates experience substantial heat gain through roofing systems, resulting in elevated indoor temperatures, reduced thermal comfort, and increased energy demand for cooling. This study investigates the thermal and humidity performance of concrete roof slabs modified with agricultural and industrial waste materials, namely rice husk ash (RHA), coconut fiber, wood powder, and expanded polystyrene (Regi foam), under tropical outdoor conditions. Concrete roof slabs were prepared using a standard concrete mix and incorporated with the selected waste materials. After curing, the specimens were exposed to natural outdoor conditions, and temperature and relative humidity beneath each roof slab were monitored during daytime over a five-day observation period. The collected data were analyzed to compare the thermal and humidity behavior of the modified roofing systems with that of conventional concrete roofing. The results showed distinct differences in thermal performance among the investigated materials. All roof systems exhibited similar diurnal temperature patterns, with temperatures increasing during the morning, reaching peak values around midday to early afternoon, and decreasing towards the evening. Based on the measurements averaged over the five-day observation period, RHA consistently exhibited the lowest temperature beneath the roof slab, indicating the lowest heat accumulation among the tested materials, while coconut fiber generally recorded the highest temperature. Conventional concrete showed intermediate temperature behavior. Relative humidity generally decreased as temperature increased during the morning and midday and subsequently recovered during the later part of the day, demonstrating an inverse relationship between temperature and relative humidity. The averaged results showed differences in humidity behavior among the roof systems, with Regi foam generally exhibiting the lowest relative humidity, while concrete and RHA maintained comparatively higher humidity levels. These findings indicate that the incorporation of selected agricultural and industrial waste materials can influence the thermal and humidity conditions beneath concrete roof slabs. Among the materials investigated, RHA demonstrated the most favorable thermal performance during the five-day observation period. However, the findings are limited to the tested outdoor conditions and five-day monitoring period; therefore, longer-term investigations under different seasonal and climatic conditions are required to evaluate the durability and long-term thermal performance of the modified roof slabs.

Keywords: Concrete roof slabs, Rice husk ash (RHA), Thermal performance, Tropical climate

Modelling the Nonlinear Relationship Between Electronic Parameters and CNT Bundle Density in Liquid-Gated CNT-FETs Using Random Forest Regression

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The modelling of Liquid-gated carbon nanotube field-effect transistors (CNT-FETs) is still a challenge due to the experimental difficulties in characterising the conductivity and work function of carbon nanotube (CNT) bundles, which lead to uncertainties in predicting the device performance. To address this challenge, this study proposes a data-driven Random Forest Regressor (RFR) model to capture the nonlinear relationship between CNT bundle density and the electronic characteristics of liquid-gated CNT-FETs. The proposed model directly learns from previously reported experimental data to predict key electronic parameters such as on-current (I_{on}), off-current (I_{off}), and threshold voltage (V_{th}) with the input features of CNT bundle density without any complex parameter estimation process. On the other hand, the model also estimates the density of CNTs in the bundle from the measured electronic parameters, thus giving a practical alternative to the estimation of difficult-to-measure device parameters. Predicted versus experimental results show good agreement for I_{on} with results points closely approaching the ideal diagonal, while I_{off} and V_{th} have somewhat larger disagreements. For I_{on} prediction, the model yielded low RMSE (52.3665) and NRMSE (0.0614), along with an R^2 of 0.95. I_{off} and V_{th} have R^2 values of 0.78 and 0.71, respectively, which are reasonably good for prediction. Moreover, the value of R^2 was 0.96 for the bundle density prediction and the RMSE and NRMSE obtained were 0.4345 and 0.0533, respectively, indicating that the prediction capability of the model was very good. In summary, the proposed RFR is able to capture the non-linear relationship between CNT bundle density and the electronic parameters of liquid-gated CNT-FETs and is reliable and efficient in terms of computing, which is essential for conventional CNT-FET device modelling and design from the electronic parameters.

Keywords: Bundle density, Carbon nanotubes, Electronic parameters, Field-effect transistors, Random forest regressor

Current Status of Medicinal Plant Diversity in Paalameenmadu, Batticaloa, Eastern Province of Sri Lanka

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Sri Lanka possesses rich medicinal plant diversity that is important for ecosystem conservation and pharmaceutical development. This study aimed to document and evaluate the diversity of medicinal plant species recorded in Paalameenmadu, a mangrove ecosystem located in Batticaloa, Eastern Province of Sri Lanka. The study area was identified using maps, and field surveys were conducted from April 2024 to April 2025 using the Belt Transect Method to identify and record medicinal plant species. Specimens collected during the fieldwork were authenticated using the Herbarium of the Faculty of Siddha Medicine, University of Jaffna. A total of 130 medicinal plant species belonging to 43 botanical families were recorded, with Fabaceae being the dominant family. According to an analysis of growth forms, trees accounted for 42.31% of living forms, with herbs coming in second at 20.77%, shrubs at 18.46%, climbers at 13.84%, and creepers at 4.62%. According to a life cycle study, 66.92% of species were perennials, 20% were annuals, and 13.08% were biennials. Among the recorded medicinal flora, 10 species were identified as mangroves. The most commonly used plant part was leaves (n = 102), which were followed by seeds (n = 75), fruits (n = 49), roots (n = 44), flowers (n = 32), bark (n = 24), whole plants (n = 11), and tubers (n = 9). Exudates such as toddy (n = 2) and milky latex (n = 4) were also utilized. A total of 17 species produced edible fruits, while 18 species were used as edible leafy vegetables. Despite their rich medicinal plant diversity, mangrove ecosystems are increasingly threatened by climate change and human activities such as urbanization, deforestation, aquaculture expansion, pollution, and runoff. These findings provide valuable baseline data for biodiversity conservation, ethnobotanical research, and the sustainable management of mangrove ecosystems in Sri Lanka.

Keywords: Diversity, Mangroves, Medicinal plants

Preliminary Assessment of Seagrass Diversity and Meadow Structure in the Kuchchaveli Coastal Region, Trincomalee, Sri Lanka

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Seagrass meadows are ecologically important shallow coastal ecosystems that support marine biodiversity, stabilize sediments, enhance coastal productivity, and provide essential nursery habitats for fish and invertebrates. However, limited information is available on the species composition and spatial distribution of seagrass communities along the eastern coast of Sri Lanka. This study presents a preliminary field-based assessment of seagrass cover, species diversity, and meadow structure in the Kuchchaveli coastal region, Trincomalee. Five line-intercept transects were established perpendicular to the shoreline at 250 m intervals, with each transect extending 50 m seaward. Quadrat photographs were used to estimate percentage cover. The overall mean seagrass cover was $46.8 \pm 12.4\%$. Among the recorded species, *Oceana serrulata* (formerly *Cymodocea serrulata*) had the highest mean cover ($21.6 \pm 7.8\%$), followed by *Cymodocea rotundata* ($16.4 \pm 6.2\%$) and *Enhalus acoroides* ($8.8 \pm 4.1\%$). Based on relative species-cover proportions, the Shannon-Wiener diversity index (H') was 1.04, and Simpson's diversity index ($1 - D$) was 0.63. Species co-occurrence and variation in meadow form indicate spatially heterogeneous habitat conditions, although the roles of sediment type, depth, and hydrodynamics require further investigation. This study establishes baseline ecological information for a poorly studied seagrass habitat on Sri Lanka's eastern coast. It provides a scientific foundation for long-term monitoring, habitat restoration, and marine spatial planning.

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Keywords: *Cymodocea rotundata*, *Enhalus acoroides*, Kuchchaveli, *Oceana serrulata*, Seagrass diversity

Can Uniform Ocean Laws Govern Unequal Seabeds? Indian Ocean Perspectives on Blue Governance under UNCLOS

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The United Nations Convention on the Law of the Sea (UNCLOS) establishes a comprehensive and formally uniform framework for continental shelf rights and seabed governance. Yet the Indian Ocean seabed is characterised by diverse continental margins, sedimentary systems and physiographic features, raising questions about how uniform legal criteria operate across materially different geological environments. This study examines this interaction through a jurisprudential and interdisciplinary analysis of continental shelf entitlement, delineation and delimitation. It adopts a qualitative doctrinal methodology, complemented by interdisciplinary engagement with marine geological and ocean-governance literature, and analyses UNCLOS, decisions of international courts and tribunals, and materials of the Commission on the Limits of the Continental Shelf and the International Seabed Authority. Particular attention is given to the jurisprudential development of natural prolongation under Article 76 and its relationship with distance and equity. The analysis demonstrates that geological considerations retain significance in contemporary continental shelf law, but that their legal significance varies according to whether the question concerns entitlement, the establishment of outer limits beyond 200 nautical miles, or the delimitation of overlapping maritime entitlements. The Indian Ocean, particularly the Bay of Bengal and its sedimentary environment, provides an important regional context for examining these interactions between geological realities and legal rules. The study argues that effective blue governance requires greater recognition of the relationship between marine geological processes and the differentiated legal functions of UNCLOS institutions and jurisprudence. It concludes that understanding continental shelf governance requires an integrated perspective in which marine science informs, but does not determine, the interpretation and application of international law.

Keywords: Continental shelf, Marine geology, Ocean governance, UNCLOS, jurisprudence

Fishermen's Perceptions of Dugong (*Dugong dugon*) Conservation and Seagrass Ecosystems in the Northern Coastal Region of Sri Lanka

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The dugong (*Dugong dugon*) is a vulnerable marine mammal that depends primarily on shallow coastal seagrass meadows for food. Although dugongs historically occurred throughout the Gulf of Mannar and Palk Bay, baseline population data for northern Sri Lanka remain limited amid concerns about habitat degradation, incidental capture, hunting, coastal development, and vessel traffic. This study investigated fishermen's perceptions and local ecological knowledge of dugongs and seagrass ecosystems along the northern coastal belt from Mannar Island to Jaffna Lagoon. A structured questionnaire was administered to respondents from coastal fishing communities using systematic spatial sampling based on 5 km × 5 km coastal grid cells (n = 60). Most respondents were familiar with dugongs (96%), 92% correctly identified the species, and 48% reported observing dugongs while fishing. Nearly three-quarters (72%) perceived that dugong abundance had declined over time. Ecological knowledge of seagrass was high: all respondents recognized seagrass beds, and 95% identified their importance as dugong feeding habitat. Accidental entanglement in fishing gear was the most frequently identified threat (78%), followed by habitat degradation (61%) and disturbance from motorized boat traffic (44%). The conservation-attitude scale showed strong internal reliability (Cronbach's $\alpha = 0.84$), with a mean score of 4.1 ± 0.63 . Dugong knowledge was positively correlated with conservation attitudes ($r = 0.53$, $p < 0.01$) and was the strongest predictor in the regression analysis ($p < 0.01$). These findings demonstrate that fishermen possess valuable local ecological knowledge that can complement scientific monitoring and support participatory conservation planning and policy development for dugongs and seagrass habitats in northern Sri Lanka.

Keywords: Community knowledge, Conservation, *Dugong*, Fishermen's perceptions, Seagrass ecosystems, Sri Lanka

Comparative nutritional analysis of palmyrah sap-based products (jaggery, treacle and sugarcandy) produced in the Jaffna district to assess suitability to incorporate the values in their packets

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Palmyrah (*Borassus flabellifer*.L.) sap is tapped from male and female inflorescences to produce jaggery, treacle and sugar candy primarily by Palm Development Co-operative Societies (PDCS). Though PDCS are intended to include nutritional composition in packets to attract customers and enhance marketability, they are facing constraints in obtaining nutritional composition batch-wise for each product. In this background, quantitative determination of the nutritional composition of said products was carried out to find suitability to incorporate the values in the nutritional label as common for each product of all PDCS in their respective packets. Five PDCS in Jaffna district were randomly selected for the study. The experiment was assigned in Randomized Complete Block Design (RCBD) as the source of raw materials vary with PDCS. Protein, fat, total sugar, phosphorous, calcium, magnesium and iron contents were determined in AOAC method in dry weight (w/w) basis. Results were analyzed in SAS software and mean separation was done by LSD at $p=0.05$. Protein content of all three products was found 0.62% to 0.86%. Fat content showed wide variation from 0.056% to 0.52% in jaggery. It may be due to the addition of coconut oil for easy removal from molds. Fat content in treacle and sugar candy ranged from 0.012% to 0.018%. Total sugar content found in jaggery, treacle and sugar candy were 78% to 94.6%, 62% to 67%, and 85% to 95% respectively. Though significant differences observed in tested mineral composition of each product from five PDCS, those values are small. Calcium content in jaggery and treacle ranged from 0.34% to 1.02%. Phosphorous, Magnesium and Iron contents of said products were ranged from 0.01% to 0.1%. These variations attributed not only by genetic or regional differences but also by using raw material and production process. It is concluded that inclusion of nutritional composition as range in their packets is suitable.

Keywords: Mineral, Nutritional label, Sap

A Comprehensive Review of Resins and Gums in Siddha Therapeutics

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Siddha Medicine is one of the most ancient traditional system of healing, with its origins rooted in South India, particularly in Tamil Nadu. It is believed to have been developed by the ancient sages known as *Siddhars*, who possessed profound knowledge of medicine, yoga, and spirituality. This medical system primarily relies on natural resources, particularly plant-derived materials and their derivatives such as roots, leaves, resins, and gums for the preparation of therapeutic formulations. However, the utilization of resins and gums remains relatively limited due to insufficient consolidated knowledge regarding their properties and availability. Therefore, an attempt has been made to collect information on resins and gums. The *Siddha* system of medicine predominantly utilizes herbal, metal, and mineral-based formulations. Furthermore, resins and gums obtained from plant and animal sources play a significant role in the treatment of various ailments and in the preparation of many formulations. This review aims to provide a comprehensive collection of various types of resins and gums and their applications in the *Siddha* system of medicine. Information pertaining to resins and gums was reviewed from various *Siddha* literature, palm-leaf manuscripts, research articles, and other relevant sources. In this review more than 20 resins and gums, such as *Guggulu* (*Commiphora mukul*), *Vengai pisin* (*Pterocarpus marsupium*), *Odhiyam pisin* (*Lannea coromandelica*), *Vilam pisin* (*Feronia elephantum*) etc., have been identified and information about their usage in *Siddha practice* has been collected; Notably; From Animal source-*Kombarakku* (*Carteria lacca*) used for tuberculosis, menorrhagia and enhances chest strength; Plant sources-*Karungkungiliyam* (*Canarium strictum*) used for Ear, Nose and Throat disorders; *Parangi sambirani* (*Boswellia serrata*) used for infertility and neurological disorders; *Perungayam* (*Ferula asafoetida*) used as a topical application to alleviate whooping cough in children; *Seemai kungiliyam* (*Shorea robusta*) used as a moisturizing anti-cracking cream for diabetic foot complications. This review highlights the diverse internal and external therapeutic applications of resins and gums and emphasizes the importance of their integration into therapeutic practice. Further integration can be facilitated through preclinical studies and controlled clinical trials.

Keywords: Resins and gums, *Siddha* medicine, Therapeutic applications.

Role of Nutritive Siddha Medicines in Antenatal Care – A Review

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The Siddha system of medicine is an ancient traditional system that emphasizes holistic health care, including maternal care during pregnancy. Pregnant women require proper nutrition for the healthy growth and development of the fetus. However, many women do not receive adequate nutrients during pregnancy. This nutritional deficiency can lead to complications such as anemia and poor fetal development, which increases the risk of maternal death. Approximately 295,000 maternal deaths occur worldwide each year. Hence, it is important to study how Siddha medicine supports antenatal care through natural nutritive substances. This review article is based on data collected from various Siddha classical texts, research articles, and other relevant literature sources. Adequate intake of nutrients such as folic acid, iron, calcium, and other essential minerals is crucial during pregnancy. Siddha medicine highlights the use of natural herbal sources that are rich in these nutrients. In Siddha literature, the maternal regimen during the antenatal period is described to prevent deficiencies of hemoglobin, calcium, and iron. In these regimens, the following herbs are commonly used, and all the ingredients are rich in folic acid, calcium, and iron. This review may motivate Siddha practitioners to promote natural, nutrition-based Siddha management for antenatal care. For example, *Nelumbo nucifera* (lotus seed) contains approximately 0.20 mg of Folic acid, 16.4 mg of iron, 3.13 mg of calcium, 7.86 mg of sodium, and 7.72 mg of zinc per 1 g of seed powder. Similarly, *Zingiber officinale* (ginger) contains folic acid (11 mcg), iron (600 mcg), zinc (340 mcg), vitamin C (5 mg), and calcium (16 mg), and is also effective in reducing nausea and vomiting during early pregnancy. Siddha literature also recommends month-wise dietary and medicinal regimens for pregnant women to ensure maternal and fetal well-being. This article highlights the importance of Siddha medicine in antenatal care by providing natural sources of essential nutrients. The integration of traditional Siddha knowledge with modern nutritional science may improve maternal and child health outcomes. This review may motivate Siddha practitioners to promote natural, nutrition-based Siddha antenatal care.

Keywords: *Nelumbo nucifera*, *Zingiber officinale*, Nutrition, Siddha antenatal care

From Toxicity to Therapeutics: A Comprehensive Review of Schedule E Drugs in Siddha Medicine

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Siddha medicine is an ancient system of medical knowledge that systematically uses natural resources, including herbs, metals, and minerals, for drug preparation. *Siddhars* classified these materials into various categories such as metallic preparations, herbal formulations, antioxidants, and toxic substances known as Schedule E drugs. Important Schedule E drugs include *Semecarpus anacardium* (*Serangkottai*), *Croton tiglium* (*Nervalam*), *Aconitum ferox* (*Nabi*), *Strychnos nuxvomica* (*Etti*), and *Abrus precatorius* (*Kundri*). Although inherently toxic, these substances have long been used in Siddha medicine after specific purification procedures. *Semecarpus anacardium* is traditionally used for skin diseases, chronic arthritis, and cancer; *Croton tiglium* has anti-tumor, anti-inflammatory, and purgative actions; *Aconitum ferox* is used in anti-arthritic therapy; *Strychnos nuxvomica* has been employed in epilepsy and as a central nervous system stimulant; and *Abrus precatorius* exhibits anti-inflammatory, antimicrobial, and anti-tumor activities. The Siddha purification process is designed to reduce toxicity while preserving therapeutic constituents. This is followed by *Paavanai*, a potentiation technique believed to enhance medicinal efficacy. These practices reflect the advanced empirical knowledge of *Siddhars* in safely utilizing toxic natural substances. A notable example is *Semecarpus anacardium*, which contains anacardic acid with anti-inflammatory, antioxidant, and anticancer properties. In its raw form, the compound occurs at relatively high levels (about 5.62%), contributing to toxicity. Research has shown that repeated purification significantly reduces anacardic acid levels, with values reported below detectable limits or reduced to approximately 0.24–3.32%, while retaining beneficial phytochemicals. Thus, Schedule E drugs demonstrate that toxicity and therapeutic benefit depend on proper purification, formulation, and dosage. Scientific validation of these traditional methods is essential to establish their safety and support future research and clinical applications.

Keywords: Poisonous substance, Schedule E drugs, Therapeutic value, Siddha medicine.

Exploring Siddhar Knowledge in Natural Extractive Processes: A Review of Traditional Techniques

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Extraction is the first step to separate the desired natural products from the raw materials. It is carried out in selected solvents at the desired temperature for an optimal period. In the Siddha system, the Siddhars used novel extract preparations called *Uppu* (herbal salt), *Sathu* (essence), and *Sarkkarai* (starchy extract), which are extracted from either individual herbs or polyherbal formulations, metals, minerals, or animal products using traditional extraction methods like burning, calcination, sublimation, distillation, etc. An interesting fact is that Siddhars practiced these extraction methods before the modern techniques were established. The present study was undertaken to collect the various extractive Siddha formulations prepared from traditional Siddha extraction methods. In this review, more than 100 preparations were collected, which come under different categories such as *Uppu* (*Pugayilai uppu*, *Kuppaimeni uppu*), *Sathu* (*Vilvapazha sathu*, *Kadukkai sathu*), and *Sarkkarai* (*Seenthil sarkkarai*) preparations. Extraction of *Velli* (Silver) from *Mirutharsingi* (Galena sulfide), Sublimation of *Valairasam* (Mercury) from *Lingam* (Cinnabar), Distillation processes *Tinir* (*Nandu tinir*, *Oma tinir*), *Tiravakam* (*Senkottai tiravakam*, *Vediuppu tiravakam*) are a few other examples of extraction methods. These extracts are considered as the precursor of higher-order medicines. In current practice, most of the medicinally active compounds are extracted from natural resources by using sophisticated instruments and chemical solvents like ethanol, methanol, ether, etc. These extracts may reduce the therapeutic efficacy and produce harmful effects on the body. To overcome this issue, Siddha extraction methods can be adapted.

The advantages of these methods are that they are cost-effective, reduce harmful effects, require no sophisticated instruments or techniques, enhance therapeutic efficacy even at minimal dosages, and can be used for longer periods. In this regard, the review highlights the need to carry out further scientific studies to validate different extracts prepared from Siddha extraction methods.

Keywords: Extraction, Siddhar Techniques, Siddha medicine

Significance of Synthetic Siddha Drug Preparation (Saraku Vaippu): A Review

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Saraku Vaippu refers to synthetically prepared or processed raw drugs in the Siddha system of medicine, particularly those derived from restricted, toxic, or controlled substances. Modern constraints, including biodiversity conservation, regulatory policies, and safety concerns, have limited access to certain traditional raw drugs. This review aims to examine *Saraku Vaippu* as an adaptive strategy in Siddha pharmacology, focusing on the preparation and use of substitutes for restricted substances. The objective is to explore traditional principles of substitution and their significance in the safe and sustainable utilisation of restricted raw drugs. Relevant information was reviewed from classical Siddha literature, including *Bogarsarakku Vaippu 800*, *Konganavar Sarakku Vaippu 100*, and *Machamuni Vaippu 800*, along with contemporary literature. The review focuses on substitution principles based on *suva*i (taste), *veeriyam* (potency), *pirivu* (post-digestive effect), and therapeutic action. Examples include *Abini Vaippu*, *Perungaya Vaippu*, and *Vediuppu Vaippu*, demonstrating traditional approaches to processing or substituting restricted substances for therapeutic applications. *Saraku Vaippu* offers potential advantages such as availability, cost-effectiveness, emergency preparedness, and reduced dependence on restricted raw materials. The findings highlight the importance of scientific validation, quality control, standardisation, and regulatory compliance in establishing the safety and efficacy of such preparations. In conclusion, *Saraku Vaippu* represents an adaptive pharmaceutico-alchemical practice that may support the sustainable and standardised utilisation of restricted substances while encouraging innovation in Siddha medicine.

Keywords: Drug substitution, *Saraku Vaippu*, Siddha medicine, Standardisation, Synthetic Siddha drug.

Orthopedic Emergency Management in Siddha Medicine: A Review **Dhamayanthi A¹, Sudharevathy S¹, Sivakkumar S¹, Senthilvel G²**

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Orthopedic emergencies such as fractures, dislocations, and ligament injuries are common and contribute significantly to morbidity. The increasing incidence associated with road traffic accidents, occupational hazards, and sports injuries highlights the need to document traditional approaches that are becoming less practiced. This review aimed to compile the Siddha medicine approaches used in the management of orthopedic emergencies and to document their traditional relevance for fracture, dislocation, and associated musculoskeletal care. A narrative review was conducted using classical Siddha texts and relevant literature, focusing on traditional methods of fracture and dislocation management, including alignment, stabilization, home remedies, herbal formulations, and external therapies such as *Varmam*. Siddha literature describes systematic approaches for common fractures and dislocations, including reduction, immobilization, and rehabilitation. Documented approaches include the use of *Cissus quadrangularis* (*Pirandai*), *Aloe vera* (*Katrzhai*), *Cardiospermum helicacabum* (*Mudakathan*), *Bambusa vulgaris* (*Moongil*), *Vigna mungo* (*Karuppu ulundhu*), *Kombukattal*, and *Patru* therapies. Siddha formulations such as *Vasavu ennai*, *Murivu ennai*, *Thirumeni thylam*, and *Kayarajanga thylam* are described in relation to bone healing, while *Varmam* therapy is used to relieve pain and restore function. The review indicates that Siddha provides a holistic approach to orthopedic emergencies, with traditional practices reported particularly in rural settings. Further scientific validation is required to support wider clinical application and to encourage the preservation and responsible practice of these traditional orthopedic techniques.

Keywords: Bone setting, Orthopedic emergencies, Siddha medicine, Varmam

Comparative Study on Quality Parameters of Selected Siddha Medicines *Muthuchippi Parpam* and *Arumuga Chenduram* Procured from Different Siddha Pharmacies

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Siddha Medicine is one of the oldest traditional systems of medicine and employs a wide range of herbal, mineral, and metallic formulations prepared through specialized pharmaceutical procedures. Among these, *Muthuchippi Parpam* and *Arumuga Chenduram* are important calcined preparations traditionally used for their therapeutic benefits. However, variations in raw materials, purification procedures, processing methods, and manufacturing practices among different pharmacies may influence the quality, safety, and consistency of these formulations. The present study was undertaken to comparatively evaluate selected quality parameters of *Muthuchippi Parpam* and *Arumuga Chenduram* procured from different Siddha pharmacies. Four samples of each formulation, namely *Muthuchippi Parpam* (MCP1, MCP2, MCP3, and MCP4) and *Arumuga Chenduram* (ARC1, ARC2, ARC3, and ARC4), were collected from four different GMP-certified Siddha pharmacies. The samples were evaluated for organoleptic characteristics, including colour, odour, taste, texture, and powder fineness. Physicochemical parameters such as loss on drying, pH, ash value, and particle size were also assessed. Traditional Siddha quality parameters, including fineness, floatability, and lustrelessness, were evaluated to determine the quality and consistency of the preparations.

Variations were observed among the samples, particularly in colour, fineness, and pH. The pH values of MCP1, MCP2, MCP3, and MCP4 were 11.67, 10.92, 12.93, and 14.03, respectively, whereas ARC1, ARC2, ARC3, and ARC4 showed pH values of 10.17, 9.71, 6.56, and 9.98, respectively. These findings indicate variability among formulations obtained from different manufacturers. Establishing standardized quality parameters is therefore essential to ensure the identity, purity, safety, consistency, and therapeutic reliability of Siddha medicines.

Keywords: *Arumuga Chenduram*, *Muthuchippi Parpam*, Physicochemical parameters, pH, Quality parameters, Siddha medicine, Standardization

Legiyam as a Potential Functional Food: A Synoptic Review with Compositional Evidence from Lavanga and Nellikkai Legiyam

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Rising global demand for preventive healthcare has positioned plant-based functional foods as a key strategy for disease mitigation and wellness. *Legiyam*, a classical Siddha formulation, sits at a promising intersection of traditional medicine and modern nutrition, yet its nutritional profile remains uncharacterized, limiting evidence-based clinical adoption. This study aimed to evaluate the nutritional composition of *Nellikkai Legiyam* (NL) and *Lavanga Legiyam* (LL) and assess their potential as functional food candidates. The work holds academic and practical significance, offering foundational compositional data to support modernizing Siddha pharmacology alongside contemporary nutritional science. Objectives were to characterize the proximate and elemental composition of both formulations, examine how sugar bases and honey influence nutritional yield, and evaluate the pharmacological basis of their traditional indications. Methodologically, a structured literature review across PubMed, the AYUSH Research Portal, and Shodh Ganga contextualized classical indications against current evidence. Experimentally, three LL variants (refined sugar, cane sugar with honey, cane sugar without honey) were prepared alongside a GMP-certified NL sample and analyzed for macronutrients via proximate methods and nine essential minerals via ICP-OES. Results showed that replacing refined sugar with cane sugar substantially improved mineral density, raising potassium by 88.0% and calcium by 50.1%, while uniquely retaining trace selenium; honey slightly diluted inorganic minerals but added bioactive value and marginally raised protein. NL showed the highest iron concentration (5.23 mg/100g) and energy density, supporting its traditional pediatric and anti-anemic use. Findings also clarified LL's diabetic use, showing minimal carbohydrate contribution alongside strong anti-diabetic activity from its core botanical. Both formulations show credible potential as functional foods, laying groundwork for standardization and clinical validation.

Keywords: Electuary, Functional foods, Preventive healthcare, Siddha medicine, Traditional medicine

Shaping the future of healthcare education: A narrative review of simulation-based learning

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Simulation-Based Learning (SBL) is an active teaching-learning method that replicates real-life clinical scenarios with a guided approach in a structured, safe environment. It enables learners to engage in experiential learning while minimizing risks to patients. In healthcare education, SBL has become a popular learning strategy for its effectiveness in enhancing knowledge, clinical skills, non-technical skills, and overall competence among healthcare professionals. Given its growing adoption, this review aims to provide a comprehensive understanding of SBL and its applications in healthcare education. A literature search was conducted using Google Scholar and PubMed to identify relevant studies published between 2020 and 2025. The search terms included “simulation,” “simulation-based learning,” “simulation-based healthcare,” and “simulation in health care.” Initially, the identified articles were screened based on their titles and abstracts. The studies identified during the initial screening were subsequently subjected to a comprehensive full-text review for eligibility. Finally, 17 relevant articles were extracted and reviewed. The reviewed literature provides a comprehensive overview of SBL in healthcare education. It highlights the role of SBL in bridging the gap between theoretical knowledge and clinical practice. Various simulation methodologies were identified, including partial task trainers, standardized/simulated patients, screen-based programs, virtual reality, and hybrid simulation. Fidelity was recognized as a key factor influencing simulation realism and learner engagement. It ranges from low-fidelity to high-fidelity approaches, each serving distinct educational purposes. The findings consistently demonstrate that SBL enhances knowledge retention, clinical competence, critical thinking, teamwork, and learner confidence by providing a safe and structured environment for skill acquisition. Successful implementation of SBL requires appropriate selection of simulation modalities, optimal use of fidelity, and alignment with intended learning objectives. The evidence supports the continued integration of SBL alongside other teaching strategies within healthcare curricula to maximize benefits for both learners and educators.

Keywords: Experiential Learning, Fidelity, Healthcare education, Simulation-Based Learning, Teaching-learning strategy

Sustainable Probiotics in Traditional Nutrition: A Comprehensive Literature Review of *Palanchortru Thanneer* (Fermented Rice Water) in Siddha Medicine

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Palanchortru Thanneer, often referred to as *Neerakaram*, is a traditional functional dietary intervention deeply rooted in Tamil culture and the Siddha system of medicine. The preparation involves soaking cooked rice (preferably unpolished or parboiled) in water overnight in an earthenware pot and next day morning take with onions, chilli, pickle, salt and buttermilk. Despite its significance as a cooling agent, its nutritional, biochemical and probiotic potential remains emphasized in contemporary clinical literature. This narrative review synthesizes classical Siddha bio-energetics with contemporary microbiological and biochemical literature regarding *Palanchortru Thanneer*. A narrative literature review was conducted utilizing classical Siddha texts, including *Agasthiyar 2000*, *Pathartha Guna Chinthamani*, *Siddha Maruthuvanga Churukkam*, alongside modern scientific databases such as PubMed, Google Scholar, MDPI, IOP Science and ScienceDirect. From a classical Siddha perspective, the 8-to-12-hour fermentation by lactic acid bacteria significantly increases the bioavailability of micronutrients. It transforms rice from a heavy (*Guru*) to a light (*Laghu*) energetic state, specifically pacifying deranged *Pitha* humor and acting as a cooling agent (*Seethaveeryam*), relieving conditions such as *Kunmam* (peptic ulcer disease) and internal heat. From a modern scientific perspective, this process is driven by endogenous lactic acid bacteria, which induce substrate acidification (pH 4.0–4.5) and synthesize microbial phytase. Phytase activity liberates bound minerals (Ca^{2+}) and (Fe^{2+}) and promotes B-vitamin biosynthesis. However, claims regarding immunomodulatory, anti-inflammatory, and mucosal benefits stem from isolated probiotic strain studies or preclinical models rather than direct human clinical trials. It is inexpensive, supports sustainable nutrition, and forms part of the local culture. This research shows that we should include foods like *Palanchortru Thanneer* in our public health plans to make sure that everyone has access to good food for sustainable development. This review highlights integrating traditional food systems into modern public health strategies.

Keywords: Fermentation, Literature review, *Palanchortru Thanneer*, Probiotics, Siddha Medicine

Traditional Siddha Therapy Using *Sivappu Kukkil Thailam* (Topical) and *Athimathura Chooranam* (Oral) for Chronic Plaque Psoriasis: A Single Patient Case Report

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Psoriasis is a chronic inflammatory condition, associated with major quality of life impairment. We describe the case of a 66-year-old man with moderate-to-severe plaque psoriasis (Psoriasis Area and Severity Index [PASI] 15.6, Body Surface Area [BSA] involvement of 18%, Dermatology Life Quality Index [DLQI] 24), pruritus VAS scale 9/10. He was treated under a dermatologist with 12 weeks course of Siddha therapy Topical *Sivappu Kukkil Thylam* [SKT], Oral *Athimathura Chooranam* [AMC] along with serial laboratory monitoring. Remarkable response was achieved (PASI of 1, BSA of 1%, DLQI of 2, pruritus VAS scale of 0/10) and persisted at the patient's checkup nine months later with no side effects. This uncertain case demonstrates that patients may explore alternative medicine choices if they are well guided by clinicians; in our case results were positive. Sequential photography demonstrated marked resolution of plaques with residual mild post-inflammatory dyschromia. But it's important to keep in mind that evidence-based therapy remains the bedrock of treatment for psoriasis. This unsupervised single-case observation does not validate Siddha therapy as the mainstay of treatment, or as an evidence-based alternative to scientific medicine. Rather, these results should be considered exploratory for further validation. More studies, in the form of randomized controlled trials (RCTs) adopting standardized Siddha formulations, are warranted to explore its reinforcement as a 'complementary approach', and not as an alternative, in the existing spectrum of evidence-based medicine.

Keywords: *Adhimadhura chooranam*, case report, chronic plaque psoriasis, Siddha Medicine, *Sivappu kukkil thylam*

Evaluation of Quantitative parameter pH for selected Siddha medicines used in the management of Gunmam (Acid peptic disease)

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Gunmam, clinically correlated with acid peptic disease, is a condition in which gastric acidity plays an important role in disease manifestation. Siddha medicines traditionally used in its management exhibit diverse pharmaceutical characteristics and evaluation of quantitative physicochemical parameters may provide scientific support for their therapeutic application. The present study aimed to evaluate the pH of selected Siddha medicines indicated for the management of Gunmam and to assess their acidic, neutral or alkaline nature. Fifteen selected Siddha formulations representing different dosage forms were evaluated using a calibrated digital pH meter. For each formulation, 1 g of sample was dissolved in 100 mL of distilled water and the pH was measured in triplicate. The evaluated formulations demonstrated a wide range of pH values, from strongly acidic to alkaline. Sanga Dravagam showed the lowest pH (1.78-1.99), whereas Panchalavana Parpam showed a highly alkaline pH (11.53-11.58). Other formulations exhibited intermediate acidic, near neutral and alkaline values, including Gunmakudori Mezhugu (9.29-9.30), Sangu Parpam (10.59-10.76), Sombu Theeneer (7.58-7.69), Vilvathy Ilagam (6.95-7.13) and Bavana Kadukkai (2.55-2.56). The findings demonstrate considerable variation in the pH characteristics of Siddha formulations used for Gunmam. Quantitative pH evaluation may therefore serve as a useful physicochemical parameter for the preliminary assessment and scientific characterisation of Siddha medicines used in the management of acid peptic disease.

Keywords: *Acid peptic disease, Gunmam, pH, Quantitative parameter, Siddha medicine*

The Role of the Principals in Promoting Stakeholders' Participation in Schools of Vadamaradchi Education Zone

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It is difficult for schools to operate in isolation, as social institutions that bear the immense responsibility of receiving children from society, fostering positive changes and development in them, and handing them back to society. Therefore, the participation of stakeholders in schools is highly desirable. The principals continuously face various difficulties in promoting stakeholders' participation in schools in the Vadamaradchi Education Zone. This study aims to identify such problems and their causes while proposing reasonable solutions. Effective participation of stakeholders can enhance a school's performance and the community's perception of the school. This study is important because educational achievement and the quality of the school are ensured through the development of social cooperation. This study aims to examine various issues such as the current situation of stakeholders' participation, the barriers in enhancing effective communication with stakeholders, the resources needed to enhance stakeholder participation, the techniques to increase stakeholder participation and the steps the principals should take to strengthen stakeholder participation. Questionnaires and interviews were used as research tools. The collected data were analyzed using a mixed approach consisting of quantitative and qualitative techniques. Inadequate resources such as physical, financial, and time resources, lack of digital facilities, insufficient ability to handle technology, lack of interest in maintaining positive communication with the community, human resource shortages, lack of transparency and lack of communication strategies are seen as obstacles to improving school stakeholder participation. Maintaining a two-way communication system, frequent interaction with stakeholders, maintaining transparency, exploring strategies to obtain resources and maintaining equality are strategies for overcoming obstacles. When principals find ways to address the barriers and use their leadership role effectively, stakeholder engagement becomes stronger and schools will always move towards success.

Keywords: Communication, Community, Participation, Role, Stakeholders

Risk-Taking in Speech Production: A Sociocultural Analysis of ESL Learners in Sri Lanka

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Speaking is considered the most complex skill to master, as it requires the simultaneous integration of cognitive, linguistic, and socio-interactional processes. In English as a Second Language (ESL) contexts, learners' oral performance is frequently influenced by several affective factors, which significantly shape learners' willingness to communicate and participate in classroom interaction. Among these, risk-taking plays a crucial role in second language (L2) speech production. Despite its importance, previous research has largely treated risk-taking as an individual personality trait, neglecting its socially constructed nature within classroom interaction and the role of contextual and interpersonal factors. Addressing this gap, this study aims to examine learners' perceptions of risk-taking in L2 speech production and explore how risk-taking is socially constructed through classroom interaction and social support from a sociocultural perspective, drawing on Vygotsky's (1978) Sociocultural Theory and the Zone of Proximal Development (ZPD). A mixed-methods design was employed among first-year undergraduates enrolled in a compulsory English course at a Sri Lankan state university, with a target population of over 150 learners from Sinhala- and Tamil-speaking backgrounds. A purposively selected sample of 30 ESL undergraduates completed a Likert-scale questionnaire, while five participated in semi-structured interviews. Quantitative data were analyzed using descriptive statistics and inferential analysis, whereas qualitative data were analyzed thematically. The findings reveal that learners recognize the value of risk-taking in improving speaking ability, while teacher encouragement and peer support emerged as important facilitators. Teacher scaffolding, peer collaboration, and a supportive classroom environment were found to facilitate risk-taking, whereas fear of negative evaluation and restrictive classroom dynamics constrained learners' willingness to communicate. Thus, the study highlights risk-taking as a socially mediated process emerging through interaction and emphasizes the need for supportive, interaction-oriented pedagogies to enhance L2 speaking development.

Keywords: Classroom interaction, ESL learners, L2 speech production, Risk-taking, Vygotsky's Sociocultural Theory

Teachers' Role in Integrating Technological Devices to Enhance Junior Secondary Students' Learning in 1C Schools: A Study based on the Kalkuda Education Zone, Batticaloa District

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In the 21st century, technological advancement has significantly transformed the education sector, making digital tools an essential component of effective teaching and learning. This study examined the role of teachers in integrating technological devices to enhance the learning of junior secondary students (Grades 6–9) in 1C schools in the Kalkuda Education Zone, Sri Lanka. A mixed-method research approach with an explanatory sequential design was employed. Quantitative data were collected from 50 teachers using questionnaires, while qualitative data were gathered through semi-structured interviews were conducted with 25 students and 5 principals. Quantitative data were analyzed using descriptive statistics (frequencies and percentages) in Microsoft Excel, whereas qualitative data were analyzed using thematic analysis. The findings indicated that 84% of teachers expressed positive perceptions regarding the use of technological devices in teaching and learning. However, 44% reported using technological devices only sometimes, while 36% reported never using them in classroom teaching. Furthermore, 82% identified inadequate technological resources as a major challenge, 74% reported insufficient electricity and internet facilities, and 64% indicated a lack of adequate training. The study concludes that although teachers demonstrate positive attitudes toward technology integration, its effective implementation remains limited due to inadequate resources, infrastructure, and professional training. These findings suggest that strengthening technological infrastructure and providing continuous teacher professional development are essential to improve technology integration and enhance students' learning outcomes.

Keywords: ICT integration, Digital competency, Junior secondary education, Teacher role, Technological devices, Technology-enhanced learning.

The Impact of Both Parents' Employment on the Learning Activities of Grade 5 Students

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This study investigated the influence of both parents being employed on the learning process of Grade 5 students. From a total of 44 schools located in the Trincomalee Education Division under the Trincomalee Town and Gravets Divisional Secretariat, 22 schools were selected based on a 50% representation. Excluding Sinhala medium schools, 18 schools were utilized for the final study. The sample comprised 32 teachers, 88 students selected through the Sloven's formula sampling technique, their respective parents, and one official from the Trincomalee Zonal Education Office.

The primary objective of this research was to enhance teaching and learning activities by highlighting the various challenges students face when both parents are engaged in employment. Data analysis was conducted using SPSS software, employing descriptive statistics such as percentage, mean, and standard deviation, as well as thematic analysis and ANOVA. The findings revealed that the type of parental occupation ($p=0.001$), the duration of working hours ($p = 0.001$), parental income ($p = 0.001$), and teacher perceptions regarding the reasons for dual-employment ($M = 4.02$, $SD = 0.72$) significantly impact students' learning. Furthermore, parental responses ($M = 3.88$, $SD = 0.84$) and teacher responses ($M = 3.87$, $SD = 0.71$) regarding the challenges students face due to both parents working further confirmed this impact. Based on these findings, the study recommends the establishment of a digital parent-school communication system and the introduction of electronic reading resources to improve students' general knowledge and reading skills.

Keywords: Digital parent-school communication system, Grade 5 scholarship students, Occupational classification, Parental employment, Parents' occupational income, Working hours

Integrating the DMAIC Cycle into ESL Speaking Pedagogy: Effects on Proficiency and Self-Efficacy among Tertiary Learners in Sri Lanka

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This study explores whether a Process Excellence (PE) framework—operationalized through the DMAIC (Define–Measure–Analyze–Improve–Control) cycle—can address persistent gaps in data-driven ESL speaking instruction at the tertiary level. A quasi-experimental mixed-methods design was employed with a sample of 60 Higher National Diploma in English (HNDE) learners in Sri Lanka, selected through convenience sampling and assigned to an experimental group (n = 30) and a control group (n = 30). The intervention was conducted over 12 weeks, with two structured speaking sessions per week (approximately 2 hours each). The experimental group followed a DMAIC-based instructional cycle: in the Define phase, learners set specific speaking goals; during Measure, baseline performance was assessed using analytic rubrics; in Analyze, learners identified performance gaps through guided reflection; the Improve phase involved targeted speaking tasks with iterative feedback from peers and the instructor; and in Control, progress was monitored through checklists and repeated practice to ensure consistency. The control group received conventional communicative speaking instruction without structured process cycles. A standardized speaking proficiency test—assessing fluency, accuracy, coherence, and pronunciation—was administered as both pre-test and post-test using parallel tasks to ensure comparability. Additionally, a validated self-efficacy in speaking scale was administered at both stages. Qualitative data were collected through weekly reflection journals and a semi-structured focus group interview with experimental participants. Results indicate that the experimental group achieved statistically significant improvements in overall speaking proficiency, with large effect sizes, particularly in fluency and accuracy, compared to both their baseline and the control group. Self-efficacy scores also increased significantly. Qualitative findings suggest that structured feedback, iterative practice, and enhanced metacognitive awareness contributed to improved performance and confidence. While the findings support the effectiveness of integrating DMAIC into ESL speaking pedagogy, they are limited by the context-specific sample and quasi-experimental design. Further research across diverse contexts is recommended.

Keywords: DMAIC, ESL speaking proficiency, Process excellence (PE), Learner self-efficacy

A Comparative Study of Plantation Rural and Plantation Urban Schools in Fostering Higher-Order Thinking Skills (HOTS) through Science Education

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Science is the study of scientific knowledge, scientific skills, scientific curiosity, and scientific attitude. The science subject included in the secondary school curriculum of Sri Lanka is an important subject that has the potential to contribute to the development of Higher-Order Thinking Skills (HOTS). This study examined Tamil-medium schools in the Passara Educational Zone of the Badulla District to evaluate how plantation rural schools and plantation urban schools foster students' HOTS through science learning. Using a mixed-methods research design, data were collected from 120 G. C. E. Ordinary Level Tamil-medium students across 14 schools in the zone, as well as 20 teachers and 14 principals. Data were gathered from students via a closed questionnaire using a 5-point Likert scale, and from teachers and principals through interviews, followed by descriptive statistical analysis. The results of the study showed that students' questioning ability, the use of concept maps and teaching aids to develop students' logical thinking, the development of students' critical thinking through field trips, the involvement of students in developing HOTS, and the creation of a learning environment suitable for science subjects that can foster students' HOTS were found to be higher in plantation urban schools than plantation rural schools. In evaluating the contribution of science subjects to the development of HOTS, the study concluded that student interest in learning science is high across both school types. Student involvement aimed purely at memorizing concepts and answering exam papers is lower in plantation urban schools than in plantation rural schools. It hinders the optimal development of students' HOTS. While science lessons in both settings are generally classroom-based, plantation urban school's classroom environments are better organized to support hands-on learning and subject content and are more likely to conduct field trips and laboratory-based experiments than plantation rural schools.

Keywords: Higher-order thinking skills, Science teaching methods, Science learning environment, Student engagement

Beyond Passive Wellbeing: The Responsibility Anchored Sri Lanka Happiness Index (RASLHI) and Its Universal Replicability

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Conventional wellbeing metrics suffer from a 47.5% structural gap by overlooking active eudaimonic, spiritual, and responsibility focused dimensions. This study addresses these deficits by introducing the Responsibility Anchored Sri Lanka Happiness Index (RASLHI), a novel multidimensional framework. The RASLHI reengineers Maslow's Hierarchy of Needs by superimposing seven collective responsibility levels onto three core personal need based domains. Further to that philosophically grounded in multi-faith scriptural values namely Buddhism's Santutthi, Hinduism's Nishkama Karma, Christianity's divine grace, and Islam's Hayat Tayyibah. Contrasting difference and the strength is that configuration with an innovative UN 17 Sustainable Development goals plus seven 07 Sri Lanka SDG matrix demonstrating pragmatic, high policy relevance. Methodologically, using a sequential exploratory mixed methods design and Alkire-Foster counting, the model evaluates a representative sample of 1,200 individuals across six ethnically diverse Grama Nildhari divisions. Crucially, it quantifies institutional drag, demonstrating that Sri Lanka's 1.2 m lawsuit backlog distresses 43.6% of the population and drains Rs. 120 b from households. By shifting the paradigm from passive contentment to active mutual accountability between citizens and the state, the RASLHI with its theoretical basis and pragmatic design uniquely primed for Sri Lanka and global replication, offering immediate readiness for development as a Universal Responsibility Anchored Happiness Index (URAH) as an extension to happiness studies by the Author.

Keywords: Responsibility Anchored Sri Lanka Happiness Index (RASLHI), Universal Responsibility Anchored Happiness Index, Maslow's Hierarchy of Needs, 17+7 SDGs, Judicial Backlog, Eudaimonic Wellbeing.

Men's Experiences of Intimate Partner Violence in Bangladesh

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Intimate partner violence (IPV), often framed as a gendered issue in which women are viewed as victims and men as perpetrators, remains a major social, public health, and human rights concern worldwide. This dominant narrative has contributed to the neglect of female-perpetrated IPV against men, particularly in South Asia, including Bangladesh, where male victimization remains largely overlooked in research and policy. Addressing this gap, this study explores the lived experiences of men who have experienced IPV perpetrated by their female intimate partners, focusing on the nature of abuse, its consequences, and victims' coping and help-seeking strategies.

Guided by the family violence perspective and gender symmetry theory, the study employs a qualitative phenomenological approach. Data are being collected through semi-structured interviews with approximately 30 male participants recruited through men's rights organizations. Braun and Clarke's thematic analysis framework is used to identify key themes and develop illustrative case studies.

Preliminary findings from the first 10 interviews indicate that participants experience multiple forms of abuse, including physical, emotional, financial, and sexual violence. Some also reported being denied contact with their children and experiencing legal and administrative disadvantages. These experiences adversely affect their physical and mental health, psychological well-being, and social relationships. Stigma, societal disbelief, and traditional masculine norms discourage formal help-seeking, leading many participants to rely on informal coping strategies.

This study provides the first qualitative evidence in Bangladesh on men's lived experiences of female-perpetrated IPV. The findings contribute to the development of more gender-inclusive IPV policies, equitable support services, and legal reforms, while advancing progress toward Sustainable Development Goals (SDGs) 5 and 16.

Keywords: Bangladesh, IPV against Men, Masculinity, Qualitative Research, South Asia.

Determinants of Voluntary Disclosure in the Banking Sector in Sri Lanka

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Voluntary disclosure has become increasingly important in the banking sector due to growing stakeholder demand for transparency, accountability, and reliable non-financial reporting. Among various forms of voluntary disclosure, intellectual capital (IC) disclosure has gained considerable attention because banks rely heavily on knowledge-based resources, technological capabilities, and organisational expertise to sustain competitive advantage. Despite its importance, limited empirical evidence exists regarding the determinants of IC disclosure in Sri Lankan listed banks. Therefore, this study examines the influence of firm-specific governance and financial attributes on IC disclosure practices in the Sri Lankan banking sector. Using a quantitative research design, secondary data were collected from the annual reports of 13 commercial banks listed on the Colombo Stock Exchange from 2015 to 2024 (130 firm-year observations). Quantitative content analysis was applied to construct the IC disclosure index, while correlation and fixed-effects regression analyses were used to evaluate the empirical relationships. The findings reveal that board independence has a statistically significant positive impact on IC disclosure, suggesting that stronger independent oversight enhances transparency and reduces information asymmetry. In contrast, earnings per share demonstrates a significant negative relationship with IC disclosure, indicating that highly profitable firms rely less on voluntary disclosure as a signalling mechanism. Other variables—including board size, board diversity, audit committee characteristics, return on assets, return on equity, Tobin's Q, and firm size—show statistically insignificant relationships. The study concludes that governance quality, particularly board independence, is a key driver of voluntary disclosure. These findings offer practical insights for regulators, policymakers, and financial institutions seeking to enhance corporate transparency within emerging financial markets.

Keywords: IC disclosure, Board independence, Commercial banks, Financial performance, Sri Lanka

Impact of Emotional Intelligence on Mental Health of Married Working Women in the Healthcare Sector in Vavuniya District

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The main aim of this study is to analyse the impact of emotional intelligence on the mental health of married working women in the healthcare sector in Vavuniya district. In this research, mental health is the dependent variable, and emotional intelligence is the independent variable. This research examines the crucial issue of the mental health of married working women in the healthcare sector in Vavuniya district, with an emphasis on the impact of emotional intelligence. Therefore, the research problem is: “Does emotional intelligence have an impact on the mental health of married working women in the healthcare sector in Vavuniya district?” The objectives of this research are to determine whether emotional intelligence has an impact on the mental health of married women in the healthcare sector in Vavuniya District; to examine whether emotional intelligence has an impact on the home and workplace atmosphere of married women in the healthcare sector in Vavuniya District; and to examine whether emotional intelligence has an impact on the family and social issues of married working women in the healthcare sector in Vavuniya District. To obtain primary data for this study, respondents were given questionnaires to complete using a purposive sampling method. Data analysis methods include regression analysis, correlation analysis, and descriptive statistics. The findings of this study show a positive correlation between emotional intelligence and the mental health of married women in the healthcare sector in Vavuniya district over a long period.

Keywords: Emotional Intelligence, Family and Social Issues, Mental Health, Workplace Atmosphere

Mediating Role of Employee Well-Being between Laissez-Faire Leadership and Innovative Behaviour in Sri Lanka's Handicraft Sector

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Laissez-faire leadership is characterized by the absence or minimal involvement of leaders. Even in urgent situations, leaders avoid intervention and bypass issues that require direction or guidance. They leave decisions as well as problem-solving to the staff, demonstrating limited ability to drive the organization in overcoming challenges. Leaders who use laissez-faire leadership may be ineffective, which leads to reduced work engagement and puts organizations at risk. When leaders provide autonomy, it may enhance psychological well-being. Without timely decisions and guidance, however, employees' autonomous actions may reduce innovative work behavior and overall performance. Therefore, this study argues that laissez-faire leadership can generate positive results in the handicraft sector. Furthermore, the mediating role of employee well-being between laissez-faire leadership and innovative work behavior remains underexplored in this context. A quantitative, cross-sectional survey design was adopted in this study. The population consists of employees working in the handicraft sector across Sri Lanka. The handicraft sector includes soft and wooden toys, ceramic and porcelain ornaments, wood crafts, handloom products, bags, table mats, coasters, wall hangings, lampshades, household accessories, furnishings, terra-cotta pots and vases, paper crafts, baskets and wickerware, artificial flowers, hand embroidery, lace products, candles, wrapping papers and packaging, and wellness and spa products. There are 200,000 employees in the sector, and a sample size of 385 was chosen according to the Yamane formula, with data collected from key players (13 organizations) in Sri Lanka. The response rate was 77.9% (300 respondents). Due to practical limitations and response availability, 300 valid responses were collected and used for analysis. The sampling technique employed was convenience sampling, which was used to select employees in organizations that possess a degree of organizational structure and employee involvement in decision-making, aligning with the study's focus on laissez-faire leadership practices and well-being. The variables and measurements of the study were adopted from previous studies, and all constructs were measured using a 5-point Likert scale. The indicators of laissez-faire leadership practices were decision-making autonomy, role clarity, and self-organizing teams. Employee well-being was measured using job satisfaction, emotional well-being, and work comfort. Innovative behavior was measured by capturing creativity, initiative-taking, and process-improvement activities. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. The analysis included assessments of reliability and validity, including Cronbach's alpha and composite reliability, Average Variance Extracted, the Fornell-Larcker criterion, the HTMT ratio, structural model testing, and mediation analysis. The findings

highlighted that laissez-faire leadership positively impacts employee well-being and innovative behavior. The findings also indicated that employee well-being partially mediates the connection between laissez-faire leadership and innovation, showing that happy and healthy employees are more likely to transform autonomy into creative outcomes. The findings are integrated with Self-Determination Theory, which signifies autonomy as a factor of intrinsic motivation, as well as the Job Demands–Resources model, which indicates the role of a better work environment in fostering innovation. The practical implications suggest that providing flexible work structures, decision-making autonomy, and trust can strengthen employee well-being and innovative behavior. Therefore, future studies can investigate other industries and various leadership styles in relation to employee well-being and innovation to enhance understanding of laissez-faire leadership outcomes.

Keywords: Employee well-being, Handicraft sector, Innovative behavior, Sri Lanka, Laissez-Faire leadership

Examining the Impact of Learning Agility on Career Readiness among Undergraduates at the University of Jaffna, Sri Lanka: The Mediating Role of Employability Skills

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The ability to prepare undergraduates for a labor market that is becoming more dynamic and uncertain has become a priority for higher education institutions. Although previous studies have examined graduate employability and work readiness, limited research has investigated how learning agility influences career readiness through employability skills, particularly within the Sri Lankan higher-education context. Hence, this study was conducted among undergraduates of the University of Jaffna, with support from Career Construction Theory and Human Capital Theory, to examine the impact of learning agility on career readiness and explore the mediating role of employability skills. Career Construction Theory defines learning agility as an adaptive personal capability that facilitates students' learning from experience and effective adjustment to changing career needs, while Human Capital Theory is concerned with how employability skills are developed from that adaptive personal capability to make students more employable. The research method was quantitative and cross-sectional, and data were obtained from 195 final-year undergraduate students from each faculty selected using a purposive sampling technique. Descriptive statistics were used to analyse the data, followed by correlation analysis, regression analysis, and Hayes' PROCESS Macro. Results showed that learning agility had a statistically significant positive relationship with career readiness. In addition, the mediation analysis confirmed that the relationship between learning agility and career readiness was partially mediated by employability skills. These results suggest that learning agility can positively affect career readiness both directly and indirectly through its ability to improve key workplace competencies. The study underscores the need to incorporate experiential learning, career-development programs, employability-skill development, and university-industry engagement into the higher education curriculum to better prepare undergraduates for a successful transition to employment.

Keywords: Career Readiness, Career Construction Theory, Employability Skills, Human Capital Theory, Learning Agility, Undergraduates, University of Jaffna

The Impact of Mindful Leadership on Deceptive Knowledge Hiding: Evidence from the Mediating Role of Positive Affect in Sri Lanka's IT Sector

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In the Sri Lankan IT industry, where knowledge sharing is essential for organizational performance, leadership behaviors play a key role in shaping employee behavior. Based on Affective Events Theory (AET), this study examines mindful leadership as an antecedent to employees' deceptive knowledge hiding. Specifically, it examines the mediating role of employees' positive affect in the relationship between mindful leadership and deceptive knowledge hiding. Following a hypothetical, quantitative research design, time-lagged data were collected from 272 IT professionals working in Sri Lanka. Structural equation modelling was used to test the proposed relationships. The results show that mindful leadership is negatively related to employees' deceptive knowledge hiding ($\beta = -.34$, $p < .001$). That is, when leaders demonstrate mindfulness, impartial awareness, and emotional sensitivity, employees are less likely to engage in deceptive behaviors. Furthermore, mindful leadership is positively related to employees' positive affect ($\beta = .42$, $p < .001$), which is negatively related to deceptive knowledge hiding ($\beta = -.29$, $p < .001$). Mediation analysis confirms that employees' positive affect significantly mediates this relationship (indirect effect = $-.12$, 95% CI $[-.21, -.06]$). These findings highlight the importance of leadership-driven emotional processes in reducing implicit, counterproductive behaviors in knowledge-intensive environments. This study contributes to the literature by examining deceptive knowledge hiding as an integrated construct and by extending AET within the Sri Lankan IT sector. In practice, these results emphasize the need for organizations to develop mindful leadership practices and foster positive emotional environments to enhance knowledge-sharing behaviors. Given the sectoral context, the generalizability of these findings may be limited; future research should draw on multidisciplinary sources and longitudinal designs to further validate the proposed relationships.

Keywords: Affective Events Theory, Deceptive Knowledge Hiding, IT Sector, Mindful Leadership, Positive Affect, Sri Lanka

The Influence of Behavioral Biases on Investment Performance: The Mediating Role of Investment Decision-Making and the Moderating Role of Financial Literacy among Colombo Stock Exchange Investors in the Central Province of Sri Lanka

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This study investigates the behavioural biases influencing individual investors' decisions at the Colombo Stock Exchange in the Central Province of Sri Lanka while examining their relationship with investment performance, considering the mediating role of investment decision-making and the moderating role of financial literacy. Addressing the limited studies on behavioural finance in the Sri Lankan context, the study employs a quantitative approach using questionnaire data collected from 368 individual investors. The data were analysed using SmartPLS. The findings indicate that herding, heuristics, framing effects, and marketing factors significantly impact investors' decision-making. These behavioural biases do not have a direct significant relationship with investment performance; however, investment decision-making positively impacts investment performance and fully mediates the relationship between behavioural biases and investment performance. Financial literacy significantly moderates the relationships among behavioural biases, investment decision-making, and investment performance. The findings highlight the importance of improving financial literacy to enhance the quality of investors' decisions and investment performance.

Keywords: Behavioural Finance, Behavioural Biases, Investment Decision-Making, Investment Performance, Financial Literacy

Impact of Digital Literacy on Sustainable Investment Intention: A Gender-Based Multigroup PLS-SEM Analysis

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Grounded in the Theory of Planned Behaviour (TPB), this study examines the impact of digital literacy on sustainable investment intention among university students and tests whether gender moderates this relationship. Within the TPB framework, digital literacy is positioned as a background cognitive factor that shapes behavioural intention towards sustainable investment. The study population comprised undergraduates of the Faculty of Management Studies and Commerce at the University of Jaffna, Sri Lanka. A stratified random sampling technique was employed, with the student population stratified by study year and respondents drawn in proportion to each stratum, yielding a usable sample of 332 students. Data were collected through a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4. The measurement model demonstrated strong reliability, convergent validity, and discriminant validity. Results show that digital literacy has a strong, statistically significant positive influence on sustainable investment intention, with predictive relevance confirmed through PLSpredict. After establishing measurement invariance (MICOM), a bootstrap multi-group analysis revealed that the path from digital literacy to sustainable investment intention is significant for both female and male students, with the effect notably stronger among males. The gender-based path difference was significant under a one-tailed test, though the two-tailed test approached but did not reach conventional significance. These findings suggest that while digital literacy strongly drives sustainable investment intention, its translation into intention is not gender-neutral, underscoring the need for gender-responsive digital financial education to promote sustainable investment among young investors.

Keywords: Digital Literacy, Gender, Multi-Group Analysis, PLS-SEM, Sustainable Investment Intention, Theory of Planned Behaviour

Enhancing Onion Productivity in Sri Lanka: A Comparative Study of Deep Transfer Learning Models for Pre-Plantation Bulb Quality Classification

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Onions represent a critical commercial crop in Sri Lanka's agricultural landscape. Achieving optimal yields is heavily dependent on the quality of the parent bulbs used during plantation. Manual inspection of bulbs is labor-intensive, subjective, and impractical for large-scale operations, which often leads to the accidental cultivation of diseased or poor-quality onions. This research proposes an automated classification system to distinguish between good and bad onion bulbs using deep transfer learning. A custom dataset comprising more than approximately 900+ high-resolution images (equally distributed between high-quality and diseased and damaged bulbs) was manually collected and curated. We evaluated the performance of over fourteen state-of-the-art convolutional neural network (CNN) architectures, including Xception, InceptionV3, VGG16, ResNet variants, DenseNet variants, and the EfficientNet family, to determine the most effective model for this specific domain. The models were fine-tuned using transfer learning techniques to improve generalization suitable for binary classification. Preliminary results indicate that the Xception model achieved the highest F1-score of 0.98, demonstrating the potential for integrating AI-driven computer vision into Sri Lankan seed sorting workflows. This study provides a foundational framework for developing automated sorting systems, ultimately empowering local farmers to maximize crop yield through precision agriculture.

Keywords: Crop Yield optimization, Deep learning, Onion classification, Precision agriculture, Transfer learning.

Smart Marine Safety System for Coastal Fishermen Using Real-time Tracking and Weather Intelligence

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Small-scale fishing communities face significant risks due to unpredictable marine conditions, limited communication infrastructure, and the absence of real-time monitoring systems. Existing maritime tracking solutions, such as those based on the Automatic Identification System, are often expensive and unsuitable for small fishing vessels. This study addresses the critical need for a cost-effective, integrated system to enhance maritime safety for coastal fishermen. The main objective of this research is to design and implement a smart marine safety system that provides real-time location tracking, geofence monitoring, and weather-based risk detection. The system adopts a three-tier architecture consisting of an Android mobile application, a backend server developed using the Flask framework, and a web-based dashboard for monitoring authorities. Location data is continuously collected and transmitted using secure APIs, while JSON Web Token (JWT) authentication ensures secure communication between the client and server. The backend processes incoming location updates to evaluate geofence breaches using distance calculations and assesses environmental risks through external API integrations. The results demonstrate that the system can successfully track vessel movements in near real time, generate automated alerts for geofence violations and hazardous weather conditions, and provide centralized monitoring through a web dashboard. The mobile application also supports offline data storage and synchronization, significantly improving reliability in low-connectivity environments. In conclusion, the proposed system offers a practical and scalable solution for enhancing maritime safety among small-scale fishermen by bridging the gap between affordability and functionality within a single unified platform.

Keywords: Geofencing, Maritime safety, Mobile application, Real-time tracking, Weather monitoring

Impact of Speech Elicitation on Representation Learning for Speech-Based Depression Detection Using Wav2Vec 2.0

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Speech-based depression detection has emerged as a promising non-invasive tool for mental health assessment, leveraging acoustic and temporal features present in human speech; however, the influence of speech elicitation method—that is, the way participants are prompted to speak—on the resulting representation of their emotional state remains poorly understood. This study aims to address this gap by examining how different speech elicitation strategies affect the representations learned by wav2vec 2.0 when used as a feature extractor for depression detection, with the broader goal of informing more effective dataset design and model performance in mental health assessment applications. The specific objectives were to compare representations derived from reading speech using structured, fixed-text prompts, free speech using open-ended, spontaneous responses, and a combined condition, using participant recordings from the DAIC-WOZ dataset. A classification pipeline was developed in which wav2vec 2.0 served as the feature extractor and a lightweight neural network served as the classifier, trained and evaluated across the three elicitation conditions. The results showed that free speech produced the most discriminative representations, achieving the highest accuracy of 0.500 and F1-score of 0.500, followed by the combined condition with an accuracy of 0.471 and F1-score of 0.455, while reading speech performed the weakest with an accuracy of 0.368 and F1-score of 0.358. These findings suggest that spontaneous, emotionally expressive speech carries stronger cues for depression detection than structured reading tasks, and that combining elicitation types may dilute rather than reinforce useful signals. The study concludes that elicitation design is a critical factor in speech-based depression detection, and recommends prioritizing free speech elicitation, potentially in multimodal or comparative frameworks, in future dataset construction and model development.

Keywords: DAIC-WOZ, Representation learning, Speech-based depression detection, Speech elicitation, Wav2vec 2.0

A Comprehensive Review of Edge-AI Integration into Ingestible Smart Capsules for GI Tract Diagnostics

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An ingestible smart capsule is an important advancement in diagnosing and treating conditions of the gastrointestinal tract (GIT). They provide a non-invasive replacement to conventional endoscopic methods. Even though they have evolved over the years, those conventional devices continue to face problems with power management, limitations of the memory and data transmission. With the evolution of these smart capsules, edge-AI integration has been identified as the best solution for all these consequences. This review explained the integration of novel AI technology, specifically edge-AI, to make real-time, autonomous, internal health monitoring of the GIT. To achieve that, a comprehensive review was conducted via Google Scholar, PubMed and ScienceDirect following PRISMA guidelines. The results indicate an evolution from basic imaging to multi-parameter sensing such as pH, pressure and temperature. Also, the long-lasting power supplies, as well as the emergence of the self-powered systems, were identified. The integration of edge-AI was identified as an important pathway to real-time monitoring and transferring data selectively, which can reduce the clinical workload and power consumption. Deep neural networks (DNN), convolutional neural networks (CNN) and supportive vector machines (SVM) were identified as mostly used AI models in these smart capsules. Even though the existence of changes in the environment and limitations of hardware, the combined use of microelectronics with on-board intelligence represents the evolution of smart capsules into autonomous diagnostic tools. However, these edge-AI integrated systems are limited by the power, memory, size and the GIT conditions. Therefore, future developments should be aimed at self-powered, miniaturized edge-AI integrated smart capsules.

Key words: Autonomous detection, Edge-AI, Power management, Smart pills

A Hybrid CNN With Channel Attention And Generative Data Augmentation For Multi-Class Brain Tumor Classification From MRI Images

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Accurate classification of brain tumors using Magnetic Resonance Imaging (MRI) is essential for effective clinical diagnosis and treatment planning; however, existing deep learning approaches often suffer from data scarcity and limited feature representation. This study proposes a Sequential Multi-Scale Parallel Channel Attention Convolutional Neural Network (SMSPCA-CNN). MRI images are resized to 256×256 pixels, converted to grayscale, and normalized to the range [0,1]. The proposed architecture processes grayscale T1 and T1CE MRI images using three sequential 3×3 convolutional blocks for preliminary feature extraction, followed by a multi-scale parallel block featuring four kernel branches ($1 \times 1, 3 \times 3, 5 \times 5, 7 \times 7$) to capture diverse spatial representations. A channel attention mechanism is subsequently applied after feature fusion to adaptively weight discriminative tumor characteristics. To overcome data scarcity, a two-stage augmentation strategy is employed: StyleGAN2 generative modeling doubles the dataset size from 5,040 to 10,080 balanced images across four classes (glioma, meningioma, pituitary tumor, and no-tumor), and on-the-fly conventional transformations, including rotation, translation, zooming, horizontal flipping, and brightness adjustment further expand training exposure to approximately 20,160 effective samples. Evaluated on a test set, the SMSPCA-CNN model achieves a high classification accuracy of 94.29% and a macro F1-score of 0.9439. The results demonstrate that combining sequential multi-scale feature extraction, adaptive channel attention, and generative data augmentation significantly enhances model generalization, establishing SMSPCA-CNN as a robust computer-aided decision-support framework for radiological diagnosis.

Keywords: Brain tumor classification, Convolutional neural network, Channel attention, Generative data augmentation, StyleGAN2

A Conceptual Shard-Based Blockchain Framework for Fake Content Mitigation in Social Media

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The rapid spread of misinformation and fake content on social media has become a major problem that affects public trust, decision-making, and the reliability of online information. Existing centralized moderation systems and artificial intelligence-based methods still face several challenges, including limited scalability, lack of transparency, difficulty in understanding context, and vulnerability to manipulation. To address these issues, this study proposes a shard-based blockchain framework for mitigating fake content in decentralized social media platforms. The proposed system divides users into interest-based shards that process and validate content independently and in parallel, aiming to improve scalability and reduce validation latency. A reputation-based validator selection mechanism is used to select trustworthy users for content validation, while validator reputation is dynamically updated based on validation behavior. The framework employs the Federated Byzantine Agreement (FBA) consensus mechanism to enable efficient agreement among trusted validators without requiring participation from the entire network. A cross-shard communication mechanism is incorporated to facilitate the validation and propagation of content involving multiple interest-based shards. In addition, a hybrid model is adopted, where metadata and validation results are maintained on the blockchain, while large multimedia files are stored off-chain to reduce storage overhead. The framework also incorporates reward and penalty mechanisms to encourage honest participation and mitigate malicious and Sybil-based behavior. The proposed framework was implemented as a small-scale agent-based simulation in NetLogo to evaluate its operational feasibility and performance. The simulation examined the effects of different numbers of shards and validator configurations on key performance measures, including validation latency, throughput, validator participation, and content-validation efficiency. The simulation results indicate the potential of shard-based parallel validation to improve the efficiency of decentralized content moderation. In addition, concept-level validation was conducted through qualitative analysis of open-ended interviews, which identified concerns related to misinformation, lack of transparency, and centralized control in existing social media platforms. The combined simulation and qualitative findings provide initial empirical support for the feasibility of the proposed framework, while highlighting the need for further evaluation of cross-shard communication, reputation scoring, and resistance to Sybil attacks. The proposed framework provides a foundation for developing scalable, transparent, and decentralized mechanisms for fake-content mitigation in social media environments.

Keywords: Blockchain, Decentralized systems, Fake content detection, Federated byzantine agreement, Netlogo simulation

Design and Development of an AI-Powered Learning Management System (LMS) for Personalised Adaptive Learning Using Gemini AI

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The rapid advancement of digital education technologies has heightened the demand for intelligent and adaptive Learning Management Systems (LMS) that support personalised learning experiences. Traditional LMS platforms primarily deliver static content, offer limited interaction, and follow generalised learning pathways, often failing to address individual learner requirements, engagement, and performance monitoring. This study aimed to design and develop an AI-powered Learning Management System, Gemini LMS, integrating Gemini AI to deliver personalised adaptive learning, with academic significance in addressing key gaps in existing LMS platforms: limited real-time AI personalisation, fragmented system integration, and minimal engagement tools, and practical significance in reducing instructor workload while improving learner engagement. The specific objectives were to design a scalable AI-driven LMS architecture, implement automated educational content generation and adaptive study pathways, and evaluate the resulting system's usability and effectiveness. The system was developed using a cloud-based architecture, with Next.js and Tailwind CSS for the frontend, Strapi CMS for content management, Neon PostgreSQL for the database, Clerk for authentication, One Pay for payments, and Inngest for workflow automation, while Gemini AI served as the core engine generating quizzes, flashcards, summaries, and study notes, and adapting learning paths based on each learner's progress. A pilot evaluation with 20 participants recorded a System Usability Scale score of 76, indicating above-average usability, an average learning outcome improvement of 3.7 points out of 5 between pre- and post-test quizzes, AI-generated content accuracy of 87%, an average AI content generation time of approximately one minute, and an average system response time of 1.1 seconds. The findings indicate that Gemini LMS successfully integrates real-time AI personalization, adaptive learning pathways, and workflow automation within a single unified platform, addressing limitations identified in existing LMS solutions and demonstrating the feasibility of AI-driven adaptive learning as a direction for future digital education environments.

Keywords: Adaptive learning, Artificial intelligence, Gemini AI, Learning management system, Personalised education

Deep Learning based Rice Type Classification using Convolutional Neural Networks and Image Processing

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Rice is one of the most important staple foods in Sri Lanka and plays a significant role in the country's agriculture and economy. However, traditional rice classification methods are often manual, time-consuming, inconsistent, and dependent on expert knowledge. This paper presents a deep learning-based rice type classification system that automates the classification of rice varieties using image processing techniques. The proposed solution uses a Convolutional Neural Network (CNN) to classify rice grains using visual characteristics such as shape, texture, size, and colour. The system was developed as a user-friendly web application using Streamlit for the frontend and TensorFlow/Keras for the backend implementation. A dataset containing rice grain images of four rice types Arborio, Basmati, Japonica, and Red Aromatic was used for model training and evaluation. Image preprocessing techniques, including resizing, normalization, and data augmentation, were applied to improve model performance and reduce overfitting. The dataset was divided into training, validation, and testing subsets to ensure reliable evaluation.

Experimental results demonstrated good model performance, achieving training, validation, and testing accuracies of 96.3%, 91.7%, and 90.5%, respectively. The system successfully provided real-time predictions with confidence scores, showing robustness under varying lighting and background conditions. This solution offers a cost-effective and accessible approach for farmers, agricultural officers, exporters, and food quality inspectors to identify rice types quickly and accurately. Overall, the study highlights the potential of artificial intelligence and deep learning technologies in modernizing agricultural processes, improving quality control, and supporting data-driven decision-making in the rice industry.

Keywords: Convolutional neural network (CNN), Deep learning, Image processing, Precision agriculture, Rice classification

Applying Vinay and Darbelnet's Model to Medical Translation: English to Tamil

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Medical translation is a specialized form of technical translation that requires linguistic competence and sufficient knowledge of medical terminology. Translating medical terms from English into Tamil presents particular challenges because of terminological inconsistency, lexical gaps, differences in linguistic structure, and the absence of direct equivalents. This study aims to examine the problems encountered in translating English medical terminology into Tamil and to identify the translation procedures and strategies used to address these problems, with particular attention to the application of Vinay and Darbelnet's translation model. The study adopts a qualitative, descriptive, and comparative approach. The data were collected from the book "*Biology of Essential Human Diseases*" and its corresponding Tamil translation, focusing on seven disease categories: cancerous, deficiency, digestive system, environmental, fungal, general, and genetic diseases. The analysis compares selected source-text terms with their Tamil equivalents and examines translation problems related to medical terminology, affixation, compounds, eponyms, and contextual meaning. The findings indicate that a range of translation procedures is required to address the linguistic and terminological challenges encountered in English–Tamil medical translation. Borrowing, literal translation, and transliteration are used for certain medical terms, while formal and dynamic equivalence and descriptive translation are employed where direct equivalents are inadequate. The study also identifies difficulties associated with medical prefixes and suffixes, compound terms, and eponyms, demonstrating the importance of understanding the morphological and semantic structure of medical terminology. In some cases, omission and addition are used to convey the intended meaning more effectively in Tamil. Overall, the findings suggest that no single translation procedure is adequate for all medical terminology and that appropriate equivalents must be selected according to context. The study contributes to the limited research on English–Tamil medical translation and highlights the importance of accurate, context-sensitive medical terminology for effective communication, particularly in multilingual healthcare settings.

Keywords: English–Tamil translation, Medical translation, Medical terminology, Translation procedures, Vinay and Darbelnet

Complications in effective communication in English: A phenomenological study of Tamil-speaking businessmen

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This research studies language complications in effective communication in speaking English among Tamil-speaking businessmen of the Ampara district in Sri Lanka. The study looks at various language complications to sustain effective speaking communication between businessmen who do not understand each other's language. Sixty Tamil-speaking businessmen are chosen to collect qualitative data for the research through semi-structured interviews. The data is explored with the background of the theoretical framework of Braun & Clarke (2006). The results expound that the language complications in effective communication in speaking English play an active part in their tasks connected to the development of business. Furthermore, the findings suggest that these complications need opening of hypermedia-based English language communication classes; states to enable the learning with graphics, images, animation, sound and hypertext at divisional level offices for businessmen to increase their English language communication skills to meet future challenges in communication in English language.

Keywords: Business community, Effective communication, English language, Language complication

The Psychological Paradigms of Behavioral Modification in Theravāda Buddhist Monastic Culture: A Study Centered on the Mahāassapurasutta of the Majjhimanikāya

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The Middle Length Discourses play a vital role in the literature of *Theravāda* Buddhist culture due to their unique and versatile interpretations of the world's true essence, depicting its impermanent nature. The *Majjhimanikāya*, *Mahāassapurasutta* can be emphasized as a significant discourse within the *Theravāda* Buddhist literature, where the Buddhist monastic cultural perspective on the psychological paradigms can be clearly exposed, in relation to Behaviour Modification. In this study, Behavioural Modification is understood as the process of changing and cultivating behavioural patterns, which is examined in relation to Buddhist ethical conduct, mental cultivation, and liberation. The primary objective of this study is to explore the nature of the Buddhist monastic cultural attitude towards Behaviour Modification, as expounded by the Buddha, while also examining how Behavioural Modification gradually directs individuals towards liberation through *Theravāda* Buddhism. A rich repository of data is gathered by referring to the Primary Sources. Moreover, Secondary Sources, Encyclopaedias, and Dictionaries have been used in searching for information on the paradigms of Behaviour Modification. In this context, this research can be identified as a Qualitative Textual and interpretive approach based on the Buddhist texts. In the *Theravāda* Buddhist literature, certain discourses have received extensive scholarly attention, whereas the *Mahāassapurasutta* has comparatively attracted limited academic focus. This gap highlights the need for focused academic exploration into its teachings, particularly regarding Behavior Modification. The *Mahāssapurasutta* elaborates how mental purity and cognitive development should be cultivated by considering the proper conduct in bodily and verbal behaviours, which function in a cultural context. Thus, this study contributes to an interdisciplinary understanding of behavioural modification by applying Buddhist concepts of ethical conduct that lead towards emancipation.

Keywords: Behaviour modification, Culture, *Mahāassapurasutta*, Mind, *Theravāda*

The Impact of Intercultural Communication on Social Cohesion among University Undergraduates in Sri Lanka

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This study examines the impact of intercultural communication on social cohesion among university undergraduates in a multi-ethnic Sri Lankan context. As universities increasingly bring together students from diverse ethnic, linguistic, and cultural backgrounds, understanding how communication across these differences shapes trust, connectedness, and belonging is essential for building an inclusive academic community. While prior research has examined intercultural competence and social cohesion largely as separate outcomes, few studies have quantitatively tested their relationship, particularly within South Asian, multi-ethnic university settings. This study addresses that gap by investigating three dimensions of intercultural communication frequency, competence, and openness as predictors of social cohesion, guided by Intergroup Contact Theory (Allport, 1954) and Anxiety/Uncertainty Management Theory (Gudykunst, 1995). A quantitative, cross-sectional survey design was adopted. Data were collected from 200 undergraduates selected through stratified random sampling across faculties and academic years, using a structured, self-administered questionnaire distributed via Google Forms. Data were analyzed using SPSS through descriptive statistics, Pearson correlation, and multiple regression analysis. Descriptive results indicated moderate levels of intercultural communication and social cohesion. Correlation analysis revealed statistically significant positive relationships between all three communication dimensions and social cohesion, with competence showing the strongest association, followed by openness and frequency. Regression analysis confirmed that the three variables jointly explained a substantial proportion of the variance in social cohesion, with competence emerging as the strongest predictor, followed by openness and frequency. The findings indicate that the quality of intercultural communication, rather than mere frequency of contact, plays the most decisive role in fostering social cohesion among undergraduates. Students who communicate competently and remain open to different cultural perspectives are more likely to build trust and a sense of belonging within their university community. The study recommends that universities implement structured intercultural training, inclusive communication practices, and curriculum-based interventions to strengthen cohesion among culturally diverse student populations, contributing to a more united campus environment.

Keywords: Intercultural communication; Intercultural competence; Multi-Ethnic universities; Social cohesion; Undergraduates

Silence as a Cultural Expression in “The Forsaken Land (2005)”

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This study examines silence as a cultural expression in Vimukthi Jayasundara's *The Forsaken Land* (2005), set against the backdrop of Sri Lanka's prolonged civil conflict. Produced during the war period, the film reflects the psychological and social impact of conflict on individuals and communities. Film discourse often prioritizes dialogue and sound, while the cultural significance of silence remains underexplored, particularly in Sri Lankan wartime narratives, and this study addresses that gap. The main objective is to analyze how silence functions as a cultural expression in the film and contributes to meaning-making within its narrative structure. A secondary objective is to examine how silence reflects trauma, isolation, and emotional suppression in a wartime context. The study adopts a qualitative approach using content analysis, focusing on scenes such as the film's opening sequence, in which a wide shot reveals a barren, unpopulated landscape with a single figure, establishing silence and absence as the film's visual grammar. Selected scenes are examined for visual composition, camera distance, and the absence of dialogue, supported by film semiotics and slow cinema theory. The findings show that silence in *The Forsaken Land* is a deliberate aesthetic and narrative strategy rather than a mere absence of sound. It conveys emotional fragmentation, symbolizes fear and psychological tension, and reinforces the film's contemplative, realist style, allowing meaning to emerge through visual storytelling rather than verbal exposition. The study concludes that silence operates as a significant cultural expression in the film, offering insight into wartime Sri Lankan cinema and expanding the understanding of non-verbal communication in film narrative.

Keywords: Content analysis, Cultural expression, Silence, Sri Lankan cinema, Wartime representation

Urban Migration and Social Mobility Among Upcountry Youth: A Sociological Study of The Deltota Divisional Secretariat

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Urban migration has become an important socio-economic process shaping the life opportunities of youth in Sri Lanka, particularly within plantation communities characterised by persistent structural inequalities. This study aimed to examine the determinants of urban migration, analyse its relationship with social mobility, and explore its socio-cultural consequences among upcountry youth in the Deltota Divisional Secretariat. The study contributes to sociological understanding of migration as both an economic strategy and a mechanism of social transformation while providing evidence for youth and rural development policies. A mixed-methods research design was employed using a purposive sample of 50 youth aged 18-35 years, comprising both migrants and non-migrants. Quantitative data were collected through structured questionnaires and analysed using descriptive statistics, while qualitative data from in-depth interviews and field observations were analysed thematically. The findings revealed that employment opportunities were the principal driver of migration, with 66% of respondents identifying economic factors as their primary motivation. Furthermore, 58% reported increased income, 60% experienced upward occupational mobility from plantation labour to urban service-sector employment, and 46% gained improved access to education and skills development. Qualitative findings indicated that migration enhanced financial independence and social aspirations but also contributed to weakened family cohesion, reduced community participation, changing cultural identities, labour shortages, and population ageing in plantation communities. The study concludes that urban migration is a significant pathway to upward social mobility among upcountry youth while simultaneously transforming the social and cultural fabric of plantation society.

Keywords: Education, Plantation communities, Social mobility, Upcountry youth, Urban migration

Sinhala and Tamil New Year Representation in Sri Lankan Television; A Comparative Study of Sri Lanka Rupavahini Corporation and Hiru TV (2026)

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The Sinhala and Tamil New Year (*Aluth Awurudda*) is an important cultural festival in Sri Lanka, encompassing rituals, traditions, family practices, and community values. Television plays a significant role in presenting and shaping the cultural meaning of such events. However, limited research has specifically examined how Sri Lankan television represents *Aluth Awurudda* through a comparison of state and private broadcasters. Therefore, this study investigates the question: How do Sri Lanka Rupavahini Corporation and Hiru TV construct and differentiate the representation of the Sinhala and Tamil New Year in their television programmes in 2026? The study employed a content analysis of *Sirilakapiri Awurudu Siri 2026 Awurudu Nakath Charithra Wishesha Sajeewa Wikashaya* broadcast by Sri Lanka Rupavahini Corporation and *Soorya Sinhalee – Hiruth Ekka Thun Helaye Awurudu* broadcast by Hiru TV on 14 April 2026. Although the programmes had different total durations, the analysis specifically focused on the common 2hour and 34min *Awurudu Nakath* period, from 9:32 a.m. to 12:06 p.m. The programmes were analysed using predefined categories including type of content, representation of traditions, programme structure, language style, cultural symbols, participant roles, and purpose of content. The findings reveal a clear difference in the construction of *Aluth Awurudda*. Sri Lanka Rupavahini Corporation predominantly constructed the New Year as a cultural, ritual, educational, and community-based event through detailed explanations of rituals, traditional symbols, family practices, cultural experts, and authentic cultural settings. In contrast, Hiru TV constructed *Aluth Awurudda* primarily as a contemporary entertainment experience through frequent dancing, celebrity participation, informal presentation, and audience-oriented content, while providing comparatively less attention to historical and cultural explanations. Drawing on Stuart Hall's Representation Theory, the study concludes that both channels actively construct different meanings of the same cultural festival through selective content and presentation practices.

Keywords: Content analysis, Cultural representation, Media representation, Sinhala and Tamil New Year, Sri Lankan television

Line, Form, and Rhythm: Buddhist-Hindu Visual Dialogues in the Mural Painting Grammar of Lepakshi and Central Kandyan Temples

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The mural traditions of South Asia bear witness to the complex cultural exchange that characterized the region's history over time. This paper compares the visual grammar of Lepakshi and Central Kandyan murals to explore shared artistic conventions in South Asian mural traditions. In this study, visual grammar refers to the formal principles that organise line, form, rhythm, colour, composition and narrative structure within a painting. The Lepakshi murals painted during the rule of the Vijayanagara Empire are representative of the harmonious interplay between ornamental aesthetics and rhythmical depiction of Hindu mythical stories. Similarly, the Central Kandyan style, which flourished in the 17th-18th centuries, is characterized by the use of stylization, linearity, planar colors and organized movements to depict the *Jātaka* stories and incidents in the life of Buddha. Much literature is available on their subject matters and stylistic origins but there is limited evidence about the comparative grammar of these traditions. This study addresses that gap by comparing the visual language of the two traditions rather than treating them as isolated artistic developments. This analysis compares the ways in which Hindu and Buddhist mural systems employ identical syntactical rules to depict sacred narratives and convey spiritual emotion. The study uses a comparative visual analysis of line, form, rhythm, colour, composition and narrative structure in selected murals, supported by semiotic interpretation and art historical sources. Despite theological differences, the two mural traditions appear to be structurally alike and are informed by earlier pan-Indic artistic conventions and transoceanic artisan networks. However, these similarities cannot be explained solely through direct imitation, and there is limited evidence that one tradition was inspired by the other. Instead, they arise from a shared aesthetic imagination in the Indo community that enables unity despite diversity.

Keywords: Buddhist art, Central Kandyan style, Lepakshi murals, South Asian aesthetics, Vijayanagara painting, Visual grammar

Humour Translation from English to Tamil: A Case Study of “Kung Fu Panda 4” Animated Film

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This study investigates the translation of humour from English into Tamil in selected scenes from the “Kung Fu Panda 4” film. A qualitative case study approach is adopted, in which humorous dialogues are extracted and analysed through a comparative framework comprising the original English voice, Artificial Intelligence (AI)-generated Tamil captions, and human-produced Tamil translations. The analysis focuses on how humour is transformed across these layers of translation and how meaning, tone and comedic effect are preserved or altered. The study applies Humour Theory, particularly Attardo’s General Theory of Verbal Humour, to explain the role of incongruity, exaggeration, and situational mismatch in humour construction. In addition, audiovisual translation theories such as Peter Newmark’s communicative translation approach and Lawrence Venuti’s concepts of domestication and foreignization are used to examine translation strategies. The findings indicate that AI-generated translations tend to preserve literal meaning but often fail to maintain humour due to a lack of cultural and pragmatic adaptation. In contrast, human translations effectively reconstruct humour through colloquial Tamil expressions, cultural idioms and conversational tone, thereby enhancing audience engagement. The study contributes to audiovisual translation research by highlighting the importance of cultural adaptation in humour translation and demonstrating how humour is reconstructed rather than directly transferred in Tamil dubbing contexts. It also emphasises the role of human creativity in maintaining comedic effectiveness in contrast to literal machine-based translation approaches.

Keywords: Audiovisual translation, Animated movies, Cultural adaptation, Humour translation, Tamil dubbing, Translation strategies

Crisis, Control and Power: The Politics of Fabrication in Sri Lanka

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This study analyzes the semiotics of the discourse of creating crisis in contemporary Sri Lankan politics, focusing particularly how narratives of instability are strategically constructed, circulated, and planted intentionally for power consolidation. Adapting Slavoj Žižek's idea of "shock therapy," this study conceptualizes crisis not as an objective rupture but as a discursively constructed phenomenon enabling ideological reconfiguration and public consent. Within this framework, the role of National People's Power (NPP) is analyzed with their fabrications such as the IMF crisis, representations of the Rajapaksa regime, allegations of corruption, controversies involving the fabrication of academic credentials among political figures between 2020 and 2025. Through this qualitative analysis, political speeches, media statements, parliamentary debates, and digital content is critically analyzed to demonstrate how these narratives function as "shock events" that disorient public perception, delegitimize opposition, and produce a hyperreal political environment where the distinction between truth and falsehood becomes increasingly irrelevant. The findings suggest that political fabrication operates not merely as incidental propaganda but as a systemic strategy embedded within neoliberal governance, where crisis is continuously reproduced to sustain hegemonic control. By mobilizing affective intensities such as fear, outrage, and moral indignation, the NPP's discourse exemplifies a Žižekian logic wherein ideology persists precisely through the exposure of its own inconsistencies. This paper contributes to the interdisciplinary fields of political science, sociology, philosophy, and language studies by advancing a theoretically grounded model for understanding fabrication as a constitutive mechanism of contemporary political praxis, thereby offering a critical lens to decode the epistemic instability of post-truth democracies.

Keywords: National people's power, Political fabrications, Shock therapy, Slavoj Žižek

Anuk Arudpragasam's *A Passage North*: An Unanswered Question of Thirty-Year Civil War

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This paper examines Anuk Arudpragasam's *A Passage North* as a literary meditation on the unresolved questions left by the Sri Lankan thirty-year civil war (1983-2009). While the war officially ended, its socio-political, economic, and psychological aftermath remains unsettled, marked by disappearances, unaccounted deaths, militarization, displacement, fractured ethnic relations, and unresolved demands for justice as pointers towards graveyard peace. Situating the novel within this historical background, the study utilizes contextual analysis as the descriptive and analytical tool of the text as its primary methodology to explore how Anuk Arudpragasam transforms private memory into political testimony. Through Krishan's journey to attend Rani's funeral, Rani's trauma, the nostalgia of ex-girlfriend Anjum, the memory of the disappeared inhabitants, migration, and fragmented recollections of violence, the novel foregrounds unanswered questions surrounding war crimes, loss, mourning, exile, and post-war silence. This paper argues that these unanswered questions are not merely historical mysteries but continue as systematic structures of suffering that shape contemporary Sri Lankan society. The research further investigates how the text reveals the social marginalization, economic devastation, ethnic ruptures, and psychological trauma produced by unresolved conflict. By reading the novel as a post-war archive of memory and ethical inquiry, this study demonstrates how *A Passage North* critiques reconciliation narratives and represents the enduring human consequences of the civil war that remains unanswered as a part of hegemonic coexistence between two ethnic groups. The present study is vital to understanding the vastness of the field of war literature, diasporic writing and its representations of war.

Keywords: A passage north, Civil war, Ethnic conflict, Migration, Post-war politics



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