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Proceedings of the

2nd International Conference on Emerging Trends in Multidisciplinary Research

"Breaking Boundaries: Multidisciplinary Approaches to Global Challenges"

07th - 08th October, 2026 | **Kuala Lumpur,** Malaysia

In Association with

STRAITS TRIBE

RAFFLES EDUCATION INSTITUTE

ISBN : 978-81-996400-6-1

2nd ICETMR – 2026

2nd International Conference on Emerging Trends in Multidisciplinary Research

Kuala Lumpur, Malaysia

07th - 08th October 2026

Jointly Organized by

ZEP Research, India
Sultan Kudarat State University, Philippines
Asia Pacific Society of Educators,
Researchers and Professionals, Philippines
Straits Tribe Sdn. Bhd, Malaysia
Raffles Education Institute, Singapore
Bukidnon State University (BukSU), Philippines

Publisher: ZEP Research

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Acknowledgement

ZEP Research is hosting the 2nd ICETMR-2026: 2nd International Conference on Emerging Trends in Multidisciplinary Research in Kuala Lumpur, Malaysia, on 07th - 08th October, 2026. The main objective is to provide an incredible platform to explore transformative ideas in sustainable tourism, discuss challenges in the hospitality industry with like-minded professionals, and foster significant professional growth and development.

The conference will offer continuous networking opportunities and enriching sessions led by respected experts in the field. These sessions are designed to deliver valuable insights and stimulate meaningful dialogue. Connecting with fellow professionals and sharing your institution or organization's success stories is a powerful way to build lasting relationships and position yourself as a thought leader in the industry.

I express my heartfelt gratitude to all my colleagues, staff, professors, reviewers, and members of the organizing committee for their dedicated support in making this conference a success. I am equally thankful to all our delegates for their commitment and effort in traveling from afar to participate in this event.

Warm Regards,



Mrs. Priyanka Sahu
Director,
ZEP Research, India

Editorial

Dear Readers,

In an era defined by rapid global change and urgent sustainability challenges, the **2nd International Conference on Emerging Trends in Multidisciplinary Research (2nd ICETMR-26) will *"Explore the cutting-edge advancements and interdisciplinary connections shaping the future of research across diverse fields".*** This gathering of esteemed scholars, researchers, industry leaders, and policymakers underscores the collective commitment to fostering sustainable solutions within tourism and hospitality through innovation and forward-thinking strategies.

As the world faces complex challenges such as climate change, resource depletion, and shifting societal needs, the International Conference on Emerging Trends in Multidisciplinary Research provides a critical platform to explore innovative, cross-disciplinary solutions. This conference seeks to highlight groundbreaking research, integrated approaches, and transformative practices that can drive sustainable progress across sectors including tourism, healthcare, education, technology, and the social sciences.

Through insightful keynote addresses, rigorous academic presentations, and dynamic panel discussions, this event aspires to generate meaningful conversations that bridge disciplines and sectors. The knowledge and innovations shared here will undoubtedly contribute to shaping policies, guiding industry standards, and inspiring communities toward a more sustainable and resilient future in tourism and hospitality.

We invite all participants to actively contribute to this vital exchange of ideas. By working together across disciplines, we can shape a future where innovation not only addresses today's challenges but also paves the way for a more resilient and inclusive tomorrow.

Warm Regards,



Dr. Mosharrof Hosen
Keynote Speaker,
2nd ICETMR- 2026

Preface

ZEP Research is proud to host the 2nd International Conference on Emerging Trends in Multidisciplinary Research (2nd ICETMR 2026) in Kuala Lumpur, Malaysia, on 07th-08th October, 2026. This edition is being conducted in both onsite and online modes, ensuring accessibility and convenience for participants around the globe.

It is our pleasure to have **Ms. Nor Nazeranah Haji Omar Din, Dr. B. Vasumathi, Dr. Amila Gamage, Dr. Surbhi Saroha** and **Dr. Dr. Mohd Zaki Awang Chek** as our Session Chairs and the **Keynote Speakers – Dr. Atty. Cyrus E. Torreña, Dr. Gira Bhatt, DPA, MNSA, Mr. Vijayanand Premnath, Dr. Mosharrof Hosen, Prof. Dr. S Sivanesan, CIA, CISA, CRISC, Dr. Md. Uzir Hossain Uzir, Prof. Ts. Dr. Md Munir Hayet Khan, Dr. Sivarajasingam Mahendran** and **Dr. Catalino Noceja Mendoza.** The **ICETMR** Conferences aim to promote interdisciplinary collaboration and is dedicated to fostering cross-disciplinary collaboration and driving innovation at the intersection of diverse fields. With a strong focus on addressing contemporary global challenges, ICETMR provides a dynamic platform for exploring integrated solutions in areas such as sustainable tourism development, green hospitality practices, and technological advancements in travel, climate-responsive strategies, tourism economics, and education in tourism studies.

By bringing together thought leaders, researchers, and practitioners from across the globe, the conference encourages dialogue that transcends traditional academic boundaries. Through keynote presentations, technical sessions, and hands-on workshops, participants will engage with the latest developments, critical issues, and future directions in multidisciplinary research with direct applications to tourism and hospitality.

We are honored to welcome a global community of experts, innovators, and emerging scholars—each contributing valuable perspectives that will shape the future of sustainable and technology-driven development.

Our heartfelt thanks go to all participants, sponsors, and organizers whose dedication has made this collaborative effort possible. Together, let us explore, innovate, and pave the way toward a more resilient, inclusive, and interconnected world.

2nd International Conference on Emerging Trends in Multidisciplinary Research

Kuala Lumpur, Malaysia

07th - 08th October 2026

Organizer's Message



Mrs. Priyanka Sahu
Director,
ZEP Research, India

Dear All,

It is with great pleasure that we present the proceedings of the **2nd *International Conference on Emerging Trends in Multidisciplinary Research (2nd ICETMR* 2026).** This compilation of scholarly contributions represents the collective efforts of researchers, academicians, industry experts, and practitioners who are dedicated to advancing knowledge and fostering innovation in their respective fields.

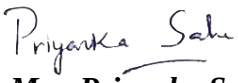
The 2nd ICETMR-2026 serves as a vibrant platform for interdisciplinary exchange, thought-provoking discussions, and the dissemination of pioneering research that bridges diverse domains such as sustainability, innovation, healthcare, education, technology, and the social sciences. The papers presented in this volume showcase a wide range of cutting-edge studies, integrated methodologies, and real-world applications designed to address the complex challenges of our time.

We extend our sincere gratitude to all the authors, reviewers, keynote speakers, and participants for their invaluable contributions to the success of this conference. Special thanks go to the organizing committee, technical team, and advisory board for their dedication and hard work in bringing the 2nd ICETMR-2026 to life.

As we move forward, we hope the insights, knowledge, and collaborative spirit captured in these proceedings will inspire continued innovation,

interdisciplinary partnerships, and meaningful progress across sectors. We look forward to building on this momentum in future editions of the conference.

Warm Regards,



Mrs. Priyanka Sahu
Director,
ZEP Research, India

Conference Co-Chair



Dr. Jugindar Singh
Associate Professor,
Asia Pacific University of Technology & Innovation (APU),
Malaysia

Message

Dear Esteemed Delegates, Scholars, and Collaborators,

It is my great pleasure to welcome all participants to the 2nd International Conference on Emerging Trends in Multidisciplinary Research (2nd ICETMR 2026). This conference brings together distinguished scholars, researchers, industry experts, and innovators from around the world to exchange ideas and foster meaningful collaborations.

I hope this event inspires insightful discussions, knowledge exchange, and innovative solutions to global challenges.

Welcome, and I wish you a rewarding and enriching conference experience.

Warm Regards,

Jugindar Singh

Assoc. Prof. Dr. Jugindar Singh
Conference Co-Chair,
2nd ICETMR-2026

Keynote Speakers



Dr. Atty. Cyrus E. Torreña, DPA, MNSA
University President
Sultan Kudarat State University (SKSU), Philippines

Message

Warm greetings to the organizers, distinguished guests, presenters, researchers, and participants of the 2nd International Conference on Emerging Trends in Multidisciplinary Research 2026.

I extend my sincere congratulations to the organizers for bringing together scholars, educators, innovators, and leaders on a meaningful platform for collaboration and knowledge exchange. I also thank all participants for your presence, engagement, and commitment to advancing research that responds to the needs of our time.

In an era when technology and artificial intelligence are rapidly reshaping education, governance, and society, we must ask not only what these innovations can do, but what they must do for people and communities.

Technology and AI should not remain mere tools of convenience. They should serve as platforms for peace, inclusive development, and sustainable communities. Their real value lies in how they expand opportunities, strengthen public service, and bring meaningful progress to communities facing poverty, exclusion, and conflict.

In areas where conflict persists, innovation must become a transformative vehicle for hope, learning, livelihood, dignity, and social cohesion. Government and institutions must continue to prioritize these communities through sustained, people-centered efforts that protect peace and build resilience.

May this conference inspire us to use research, technology, and AI not only to advance knowledge, but also to create solutions that are humane, inclusive, and responsive to the realities of every community.

Warm Regards,



Dr. Atty. Cyrus E. Torreña, DPA, MNSA
Keynote Speaker,
2nd ICETMR-2026



Dr. Mosharrof Hosen
Senior Lecturer, Faculty of Business and Law
Taylor's University, Malaysia

Message

Warm greetings to the distinguished organizers, esteemed guests, fellow keynote speakers, presenters, researchers, and participants of the 2nd International Conference on Emerging Trends in Multidisciplinary Research (ICETMR 2026).

It is a great honor and privilege to join this international gathering of scholars and professionals in Kuala Lumpur, Malaysia, on 7–8 October 2026. I extend my heartfelt congratulations to the organizers and collaborating institutions for creating a meaningful platform that brings together diverse perspectives, innovative ideas, and scholarly expertise to address contemporary global challenges.

As researchers, we are entrusted with a responsibility that extends beyond producing publications. Our research should generate knowledge that advances society, informs policy, strengthens institutions, and creates meaningful impact. In an increasingly competitive academic environment, publication success should not be measured solely by the number of articles published, but also by their originality, methodological rigor, theoretical contribution, and relevance to the communities we serve.

Through my keynote address, “Research Article Publication Success: What Matters Most?”, I look forward to sharing insights into the essential elements of successful scholarly publishing, including identifying meaningful research gaps, developing compelling theoretical contributions, strengthening research methodology, selecting appropriate journals, and navigating the peer-review process.

I firmly believe that impactful research begins with meaningful questions and succeeds through intellectual curiosity, academic integrity, perseverance, and collaboration. Rejection and revision are not the end of a research journey; they are often essential steps towards producing stronger and more influential scholarship.

May this conference inspire researchers, particularly early-career scholars, to think beyond disciplinary boundaries, pursue research excellence, and transform their ideas into publications that contribute to knowledge and make a lasting difference in society.

I look forward to engaging with you all and wish the organizers and participants a highly successful and intellectually rewarding conference.

Warm Regards,



Dr. Mosharrof Hosen
Keynote Speaker,
2nd ICETMR-2026



Mr. Vijayanand Premnath
Director Technical Competence
Worldline Global Services Pvt. Ltd., India

Message

It's an honor to be part of the World Conference on Learning and Education Research—a platform that reflects my belief in innovation, collaboration, and progress in education.

Across 21 years in software architecture, cloud, and enterprise transformation, I've learned one key truth: technology doesn't drive change—people do. This insight has shaped how I approach both systems and learning.

As Technical Director at Worldline, I've led digital transformation initiatives and learning programs totalling 15K+ training hours. A proud milestone was contributing to India achieving the #1 global ranking in Associate Cloud Engineer certifications—showing what learner-focused design can achieve.

Today, I'll share a concept I call Customer-Centric Education—shifting from one-size-fits-all models to adaptive, learner-first ecosystems. Drawing from Generative AI, enterprise architecture, and talent development, I'll explore how personalization, co-creation, and experiential learning can transform outcomes. When we place the learner at the centre, education becomes not just effective—but transformative.

I look forward to engaging with you all and exchanging ideas that shape the future of learning.

Thank you. And I hope this conference sparks ideas, connections, and conversations that stay with you long even after the Conference.

Warm Regards,



Mr. Vijayanand Premnath
Keynote Speaker,
2nd ICETMR-26



Dr. Catalino Noceja Mendoza
Vice President Consultant
AGP Elevator Inc.
Tri-Asia Electrical and Control Supply
Well-Grant Electrical Supply and Manufacturing, Philippines

Message

Distinguished colleagues and fellow researchers,

We gather today under the theme Emerging Trends in Multi-Disciplinary Research, a reminder that the future of knowledge lies not in isolated silos but in the intersections where disciplines meet. In this spirit, I share a perspective that bridges technology and humanity: the role of social entrepreneurship models in the age of artificial intelligence efficiency.

Artificial Intelligence has become the emblem of modern progress. It promises speed, predictive power, and cost reduction. Yet efficiency alone is not enough. Too often, AI projects fail to deliver meaningful transformation, or worse, they risk sidelining the human spirit—displacing workers, privileging profit over dignity, and reducing communities to data points.

Social entrepreneurship offers a counterbalance. It insists that business must serve society, not merely shareholders. Built on principles of sustainability, inclusivity, and empowerment, it demonstrates how innovation can uplift rather than exclude. Imagine microfinance institutions using AI to extend fair credit to the underserved, or social enterprises applying AI to improve healthcare delivery in rural areas. In these cases, efficiency becomes a tool for equity, not exploitation.

The challenge before us is to design research and business models where AI and social entrepreneurship converge. We must measure not only return on

investment but also social return on investment. We must ask: does this innovation uplift communities, protect the environment, and preserve human dignity?

The future of business research lies in this balance—efficiency with empathy, innovation with inclusion, progress with purpose. As José Rizal once reminded us, "The youth is the hope of our future." Today, I say: AI is powerful, but it is our values—our social mission—that remain the true hope of our future. Efficiency without empathy is empty. Let us ensure that in this age of artificial intelligence, humanity remains at the center of progress.

Warm Regards,



Dr. Catalino Noceja Mendoza
Keynote Speaker,
2nd ICETMR -2026



Dr. Gira Bhatt
Anti-Financial Crime Specialist
United Kingdom

Message

It is a privilege to contribute to this conference and engage with professionals committed to strengthening the global fight against financial crime. As risks continue to evolve through technology, changing human behaviour, and regulatory transformation, collaboration and knowledge-sharing are more important than ever.

Warm Regards,



Dr. Gira Bhatt
Keynote Speaker,
2nd ICETMR-2026



Prof. Ts. Dr. Md Munir Hayet Khan
Professor,
Faculty of Engineering & Quantity Surveying (FEQS)
INTI International University, Malaysia

Message

It gives me great pleasure to extend my warmest greetings to everyone gathered for the 2nd International Conference on Emerging Trends in Multidisciplinary Research 2026. To the organizers, distinguished guests, researchers, academics, and students joining from near and far: welcome.

Every great advance in human history began with a question that refused to stay within one discipline. The printing press changed religion and politics; the microscope transformed both biology and medicine; the internet reshaped commerce, education, and culture all at once. Today, we stand at a similar turning point, and conferences such as ICETMR are where the next chapter is written.

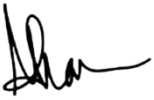
The problems facing our world, from climate change and public health to food security and the responsible use of artificial intelligence, are complex and interconnected. They demand that engineers speak with economists, that scientists work alongside educators, and that technologists listen to the communities they serve. When knowledge flows freely across boundaries, innovation becomes not only possible but inevitable.

Yet innovation alone is not enough. As researchers, we carry a responsibility to ask whom our work serves and what future it helps to build. Let our findings be rigorous, our methods ethical, and our outcomes sustainable, so that the benefits of progress reach every corner of society.
To the students and early-career researchers here, I offer a simple

encouragement: never be afraid to cross into unfamiliar territory. Some of the most rewarding discoveries are waiting at the meeting point of two fields that have never been introduced.

I congratulate the Organizing Committee for their vision and dedication in bringing this event to life. May the conversations begun here grow into lasting collaborations, and may the ideas shared over these days travel far beyond this conference. I wish you all an inspiring and fruitful conference.

Warm Regards,



Prof. Ts. Dr. Md Munir Hayet Khan
Keynote Speaker,
2nd ICETMR-2026



Dr. Md Uzir Hossain Uzir
Senior Lecturer-I
Taylor's University, Malaysia

Message

Warm greetings to the organizers, distinguished guests, fellow speakers, researchers, and participants of the **2nd International Conference on Emerging Trends in Multidisciplinary Research 2026**.

It is a great pleasure and honour to be part of this meaningful platform that brings together scholars, educators, practitioners, and innovators to exchange knowledge and explore emerging solutions to contemporary challenges.

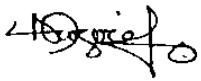
As artificial intelligence and digital technologies increasingly reshape markets and society, our focus should extend beyond access and efficiency. We must also ask whether these technologies strengthen **customer agency, voice, dignity, protection, and meaningful choice**, particularly for people who experience economic, digital, social, geographic, linguistic, or accessibility-related barriers.

AI offers significant opportunities to make markets more accessible, responsive, and inclusive. At the same time, it can create new forms of exclusion, algorithmic discrimination, opacity, privacy risks, and dependency. Therefore, meaningful consumer empowerment requires not only technology, but also responsible innovation, stakeholder collaboration, effective protection, and accessible redress.

May this conference inspire us to move from **designing for marginalised customers to designing with them**, and from simply digitising services to creating digital markets that genuinely empower people and communities.

I wish the conference every success and hope our collective research and collaboration will contribute to a more inclusive, responsible, and human-centered digital future.

Warm Regards,



Dr. Md Uzir Hossain Uzir
Keynote Speaker,
2nd ICETMR-2026



Dr. Sivarajasingam Mahendran
Director,
Raffles Education Institute, Singapore

Message

Welcome to ICETMR 2026! Warmest congratulations and a very hearty welcome to all our distinguished speakers, delegates, researchers, participants, and guests at ICETMR 2026.

It is a pleasure to have you with us as we explore the timely theme:
"Navigating the AI Revolution: Innovation, Risk, Sustainability and Leadership in a Changing World."

As Artificial Intelligence continues to reshape our world, may this conference provide a vibrant platform for sharing knowledge, exchanging innovative ideas, building meaningful connections, and inspiring responsible leadership for the future.

We warmly invite everyone to participate actively, engage openly, and make ICETMR 2026 a truly enriching and memorable experience. Congratulations to all involved, and once again, a very warm welcome to ICETMR 2026!

Warm Regards,



Dr. Sivarajasingam Mahendran
Keynote Speaker,
2nd ICETMR -2026

Session Chair



Dr. Amila N.K.K. Gamage
Associate Professor
Signum Magnum College, Singapore

Message

In a world where complex challenges increasingly transcend disciplinary boundaries, multidisciplinary research has an important role to play in expanding how we understand problems and how we develop solutions. Bringing together different areas of knowledge, perspectives and methodologies can create connections that may not emerge within the boundaries of a single discipline.

The 2nd International Conference on Emerging Trends in Multidisciplinary Research 2026 reflects the value of creating such a space for intellectual exchange. International academic gatherings are not only opportunities to present research; they provide a meeting point for ideas, perspectives, experiences and conversations that can extend well beyond the conference itself.

What makes such gatherings particularly meaningful is the diversity of people and perspectives they bring together. Researchers, academics and professionals from different disciplines, institutions and countries can learn from one another, challenge established ways of thinking and discover possibilities for collaboration and further inquiry.

I am delighted to be part of this academic gathering in Kuala Lumpur, Malaysia, and look forward to engaging with researchers from diverse backgrounds, exchanging perspectives and contributing to meaningful conversations on emerging trends in research and innovation.

I wish the organizers, speakers, researchers, and participants a productive, inspiring, and memorable conference.

Warm Regards,



Dr. Amila N.K.K. Gamage
Session Chair,
2nd ICETMR -2026



Dr. B. Vasumathi
Associate Professor
Department of Computer Science & Applications
S-Vyasa Deemed to be University, India

Message

It is my pleasure to be associated with the 2nd International Conference on Emerging Trends in Multidisciplinary Research, centered on the theme "Breaking Boundaries: Multidisciplinary Approaches to Global Challenges."

In an era of rapid technological and societal transformation, meaningful solutions to global challenges require collaboration across disciplines, institutions, and communities. The convergence of emerging technologies, innovative research, sustainability, and social perspectives provides new opportunities to address complex real-world problems.

I believe this conference will serve as a valuable platform for researchers, academicians, industry professionals, and innovators to exchange knowledge, share emerging ideas, explore collaborative opportunities, and contribute to impactful research.

I extend my best wishes to the organizers, participants, researchers, and delegates for a successful and enriching conference. May the discussions and collaborations initiated through this event lead to innovative ideas, meaningful partnerships, and solutions that create a positive impact on society.

Warm Regards,



Dr. B. Vasumathi
Session Chair,
2nd ICETMR -2026



Ms. Nor Nazeranah Haji Omar Din
Senior Lecturer & Program Leader
Asia Pacific University of Technology & Innovation (APU)
Malaysia

Message

It is a great honour and privilege to be part of the 2nd International Conference on Emerging Trends in Multidisciplinary Research (ICETMR 2026). In an increasingly interconnected world, multidisciplinary research plays a crucial role in addressing complex global challenges, fostering innovation, and creating sustainable solutions for the benefit of society.

I would like to extend my sincere appreciation to the conference organisers for providing a valuable platform that brings together researchers, academics, industry professionals, and policymakers from diverse backgrounds to exchange knowledge, share best practices, and establish meaningful collaborations. Through research, innovation, and collective effort, we can contribute towards advancing sustainable development and creating positive impact for future generations.

I hope that ICETMR 2026 will inspire insightful discussions, foster new partnerships, and encourage impactful research that transcends disciplinary boundaries. I wish all participants a productive, enriching, and memorable conference experience, and I look forward to the valuable knowledge and collaborations that will emerge from this conference.

Warm Regards,



Nor Nazeranah Haji Omar Din
Session Chair,
2nd ICETMR-2026

Organizing Committees

- **Charlie T. Anselmo**
  Faculty Member (Physics & Chemistry Instructor)
  Isabela State University, Philippines

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  Philippine College of Criminology (PCCR), Philippines

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  Associate Professor
  Zamboanga Peninsula Polytechnic State University
  Philippines

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2nd International Conference on Emerging Trends in Multidisciplinary Research

ABSTRACTS

Edge-Intelligent Wearable IoT Framework for Anxiety-Aware Smart Inclusive Classroom

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Abstract

The usage of wearable stress detection, TinyM-based device and their inference have matured considerably recently, but both fields have developed largely in isolation. There is a need for a system that works end-to-end in a real classroom-one that handles inference on the wrist, keeps biometric data off the network, and gives teachers something actionable in real time. This paper describes a wearable IoT framework built around those three requirements. A four-layer architecture runs a quantized neural network directly on an ESP32 microcontroller, fires a compact MQTT alert over TLS only when an anxiety threshold is crossed, and surfaces the event on a teacher dashboard. We built and tested a hardware prototype and measured 98.1ms end-to-end latency- about 78% faster than a comparable cloud-routed pipeline-while per device bandwidth dropped by over 99.9% relative to continuous streaming. A TinyMl classifier trained on the WESAD multimodal dataset reached 87.3% accuracy and an AUC-ROC of 0.924, occupying 18.4 KB of flash. The design is aimed specifically at inclusive classrooms where students with anxiety-related conditions, including those on the Autism spectrum, are often the last to receive timely support.

Keywords*: Anxiety Detection, Edge computing, Inclusive Education, Secure MQTT, Smart Classroom, TinyML, Wearable IoT.*

Intelligent Cyber security Systems: Leveraging Autonomous AI For Real-Time Threats Detection and Response

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Abstract

The rapid advancement and emergence of autonomous Artificial Intelligence (AI) have significantly transformed the field of cyber security, enabling both defensive mechanisms and cyber attacks to operate at machine speed with minimal human involvement. Modern cyber threats are increasingly driven by Al-powered systems capable of automatically Identifying vulnerabilities, generating advanced and adaptive malware, and executing rapid, large-scale attacks. This paper explores the dual role of autonomous Al in cyber security, emphasizing its capability to both exploit and defend digital systems within modern infrastructures such as cloud, Internet of Things (IoT), and distributed networks. In response to these challenges, the study proposes an intelligent and adaptive cyber security framework that integrates machine learning, deep learning. and real-time threat intelligence to effectively detect and counter Al-driven cyber attacks.

The proposed system incorporates behavior-based anomaly detection, automated intrusion detection mechanisms. Furthermore, the research highlights the concept of "machine-speed cyber warfare," where both attack and defense processes occur autonomously, necessitating equally advanced and automated defensive strategies. Experimental analysis conducted in simulated environments demonstrates that Al-driven defense mechanisms significantly improve detection accuracy, reduce response time, and enhance scalability when compared to conventional approaches. The findings underscore the growing need for adaptive, fully automated cyber security solutions capable of addressing continuously evolving cyber risks.

Overall, this research contributes to the development of next-generation intelligent security systems designed to safeguard critical digital infrastructures against increasingly autonomous and sophisticated cyber adversaries.

Keywords*: Cyber security, cyber attacks, Autonomous artificial intelligence, Malware, AI driven attacks, Intrusion Detection System, Machine Learning, Deep learning, Digital Infrastructure, Cloud Environment*

Intelligent Triage in Mental Health Chatbots: A Dual-Axis Classification Framework for Emotion Type and Severity-Based Support Routing

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Abstract

The growing global burden of mental health disorders, combined with a critical shortage of accessible mental health professionals, necessitates scalable, intelligent systems capable of providing early-stage psychological support and timely clinical referrals. Existing mental health chatbot systems predominantly rely on single-dimensional sentiment analysis or binary distress detection, lacking the clinical granularity required to make meaningful and differentiated triage decisions. This paper proposes a dual-axis classification framework that simultaneously identifies the user's emotion type — spanning anxiety, depression, loneliness, grief, and burnout — and the severity level — categorized as mild, moderate, or acute — from free-form conversational text inputs. The intersection of these two axes drives a structured routing decision matrix that maps each emotion-severity pair to the most contextually appropriate support tier: self-directed coping resources, peer support facilitation, or escalation to a licensed mental health professional. The proposed system employs Natural Language Processing techniques including TF-IDF feature extraction and multi-label classification using Support Vector Machines and Naive Bayes classifiers, evaluated on publicly available mental health text datasets including CLPsych and annotated Reddit community posts. Experimental results demonstrate that dual-axis classification achieves superior routing accuracy and a statistically significant reduction in the misclassification of high-severity users when compared against single-axis baseline models. The framework is designed to be computationally lightweight, interpretable, and deployable in real-world environments such as university wellness portals, corporate employee assistance programs, and clinical intake systems. This work contributes a reproducible triage architecture that bridges the critical gap between conversational AI-based mental health support and timely human professional intervention, with direct implications for improving mental healthcare accessibility in resource-constrained settings.

Keywords: *mental health chatbot, triage classification, emotion detection, severity classification, natural language processing, support vector machine, Naive Bayes, dual-axis classification, clinical routing, conversational AI, mental healthcare accessibility*

University-Based AI-Driven Security Operations Center: Prototype Development and Evaluation

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Abstract

Philippine Higher Education Institutions face an asymmetric threat landscape in which adversaries deploy agentic Artificial Intelligence (AI) and automated malware, while traditional signature-based Security Information and Event Management (SIEM) systems produce alert fatigue, delayed response, and compliance risk under the Data Privacy Act of 2012 (R.A. 10173). Following Design Science Research Methodology, this study developed and evaluated a university-based, AI-driven Security Operations Center (SOC) prototype for the University of Luzon. Guided by an AI Security Engineering Lifecycle, the prototype added User and Entity Behavior Analytics (UEBA), a Cyber Threat Intelligence platform, Security Orchestration, Automation and Response (SOAR), and a locally served large-language-model analyst copilot to a replica of the institution's open-source stack. Efficacy was benchmarked against the legacy baseline through a paired 50-scenario adversarial suite, fourteen-day telemetry analysis, automated compliance testing, and expert evaluation. The prototype detected 96% of attacks crafted to evade known hashes and indicators of compromise, against 28% for the baseline ($\chi^2(1) = 32.0$, $p < .001$). Because the suite was composed of signature-evading behavior by construction, this is evidence of a behavioral-detection advantage against novel threats rather than blanket superiority. Analyst-facing alert volume fell by 86.7%. Automated detection-to-trigger latency averaged 2.4 seconds against an analyst-driven manual-correlation workflow estimated at roughly 145 minutes; these are different workflows, not a like-for-like measurement. Filing-ready breach-notification drafts were compiled in 3.2 minutes, and fifteen professionals returned a grand mean of 4.38 of 5.00 across six ISO/IEC 25010 items. Because the evaluation ran in a single-college prototype environment against simulated attacks over bounded windows, these figures characterize that environment and the tested workload rather than production-scale performance. The contribution is the artifact itself, documented for replication, placing behavioral detection and machine-speed response within reach of institutions that cannot absorb commercial licensing.

Keywords: *artificial intelligence, behavioral analytics, security operations center, security orchestration and automation*

Mathematical Theory of Configuration, Protein Folding and Vibrational Dynamics

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Abstract

This paper develops a mathematical framework for describing protein dynamics in three- dimensional space, with particular emphasis on the coupled relationships among protein configuration, mechanical energy, folding dynamics, and vibrational modes. The proposed coarse-grained theory repre- sents a protein configuration as a point on a configuration manifold equipped with a Riemannian metric. A configuration-dependent energy functional is introduced, from which a generalized gradient-flow equation governing the evolution of the protein configuration is derived. The vibrational behavior associated with each configuration is then formulated as a generalized spectral problem involving a configuration-dependent differential operator and a mass operator. Through this formulation, the framework provides a mathematical pathway linking protein configuration and folding dynamics to configuration-dependent eigenvalues, eigenmodes, and vibrational frequencies.

The theory is systematically developed through a sequence of definitions, a mathematical pipeline, a master equation, and supporting theorems with proofs that establish key mathematical properties of the proposed framework. Particular attention is given to the consistency of the variational formulation, the existence of the Riemannian gradient, energy dissipation under generalized gradient flow, characterization of equilibrium configurations, spectral properties of the linearized operator, modal representation, and the coupling between configurational evolution and vibrational dynamics.

The resulting formulation is intended to be computationally implementable through numerical and programming-based methods, allowing the proposed framework to be evaluated against established ap- proaches for describing protein dynamics, including Normal Mode Analysis (NMA), Elastic Network Models (ENMS), Molecular Dynamics (MD), and related methods.

Keywords: *configuration manifold, protein folding, vibrational dynamics, Riemannian metric*

Artificial Intelligence in Pharmacogenomics-Guided Medication Optimization: Scoping Review

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Abstract

Background

The use of Artificial Intelligence (AI) has become more and more popular when it comes to processing pharmacogenomic, clinical, and drug response data. Possible areas for AI application include the prediction of drug dosage, drug response modelling, the prediction of adverse drug reactions, mining of pharmacogenomic data, and clinical decision support. This paper categorises these applications.

Objective

To create a map of applications of AI in pharmacogenomics-driven drug optimization using genomic data and drug-related activities.

Methods

In the review, the Population-Concept-Context model was applied, and Joanna Briggs Institute criteria and PRISMA-ScR guidelines were used to guide the search. Reconciliation of the ODS library provided and enrichment with Europe PMC and Crossref were used for the identification of eligible citations. The included records involved use of an AI technique in combination with the pharmacogenomic, pharmacogenetic, genomic, or drug-gene interaction for the purposes of medication selection, dose optimization, treatment response prediction, toxicity, prescribing, or clinical decision support.

Results

The reconciled database consisted of 100 parent records, which included 90 journal papers and 10 conference papers. Forty-seven full texts were extracted, 45 satisfied the working inclusion criteria while two were animal only studies. There were 53 unreconciled records since there were no available full texts. Out of the 45 records that satisfied the inclusion criteria, 32 were related to drug response/sensitivity, eight for dose optimisation, three for decision support/recommendations and two for toxicity. Preclinical and clinical (human) context accounted for 16 studies, clinical (human) alone had 12 studies, preclinical alone (cell/other preclinical studies) had 11 studies while 6 studies involved secondary data from humans. Validation externally/independently was found in 25 records while prospective evaluation was in one record.

Conclusions

The use of AI in pharmacogenomics involves predicting drug efficacy and sensitivity on a retrospective basis; however, this does not imply that the predictions obtained in preclinical research can be applied to other clinical situations. Further research should concentrate on external validation, the diversity of the population, calibration, interpretation, cooperation, workflow, and prospective studies.

Keywords*: artificial intelligence, pharmacogenomics, pharmacogenetics, medication optimization, machine learning, drug response, clinical decision support*

Ethnomathematics and Geometric Mastery: *Quantitative Analysis of Sand Drawing in Vanuatu Secondary Schools*

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Abstract

Mathematics education in Vanuatu secondary schools predominantly relies on Western-centric curricula, resulting in a cultural relevance gap and limited integration of indigenous practices like traditional sand drawing. While sand drawing involves rich informal concepts such as symmetry, transformations, and spatial reasoning, empirical evidence validating its direct impact on academic achievement remains sparse.

This quantitative study evaluated the empirical impact of traditional sand drawing instruction versus standard curricula on Year 9 junior secondary students' mastery of geometric transformations, specifically reflection and symmetry. Grounded in Freudenthal's mathematization framework, a 3-day quasi-experimental intervention was conducted where the experimental group engaged in continuous-line sand drawing tasks (e.g., double-sided canoe motifs) to bridge cultural practice with formal geometry, while the control group received conventional instruction.

Data were analyzed using descriptive and inferential statistics, including the Shapiro-Wilk normality test, Mann-Whitney U test, and student survey evaluations. The experimental group demonstrated a significant 55% score improvement (pre-test mean = 6.78, post-test mean = 10.52), outperforming the control group's 23% increase (pre-test mean = 6.67, post-test mean = 8.19). The Mann-Whitney U test confirmed a statistically significant performance difference ($p < 0.001$) with a large effect size ($r = 0.703$). Survey findings further indicated higher affective engagement, spatial reasoning, and problem-solving confidence among experimental students, though both groups highlighted systemic resource constraints.

This study provides crucial quantitative evidence that ethnomathematical interventions enhance geometric mastery through horizontal and vertical mathematization. It highlights the significance of integrating indigenous practices into national mathematics curricula to foster culturally responsive pedagogy in Oceania.

Keywords: *Ethnomathematics, Sand Drawing, Geometric Transformations, Mathematization*

An AI-Agent-Driven Digital Twin Framework for Intelligent Lifecycle Management of Underground Infrastructure

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Abstract

Digital twins for underground infrastructure commonly integrate geometry, sensors, and visualization, but many remain passive dashboards with limited capability for autonomous reasoning, uncertainty management, and lifecycle decision support. This paper proposes an AI-agent-driven digital twin (AgentDT) framework that embeds a thermodynamically consistent neural constitutive model (Paper 1) and a cross-site geotechnical foundation model (Paper 2) into a closed-loop cyber–physical system for intelligent lifecycle management of tunnels and underground stations. Seven specialized agents—Data Steward, State Estimator, Diagnosis Agent, Simulation Agent, Risk Agent, Planning Agent, and Reporting Agent—collaborate through a shared lifecycle knowledge graph to perform continuous data quality control, physics-informed state estimation, anomaly diagnosis, scenario simulation, risk-constrained planning, and evidence-linked reporting. A four-level governance layer separates automated actions, assisted recommendations, and mandatory human approvals according to risk class, with full provenance logging of all agent decisions. The framework is validated across six scenarios covering progressive convergence, sensor fault diagnosis, construction-induced ground loss, long-term deterioration, tunnel fire, and degraded-mode operation. In Scenario S1, AgentDT issues convergence alerts 1.82 days earlier than a rule-based system with a false-alarm rate of 4.2%. In Scenario S2, diagnosis rank-1 accuracy reaches 91.7% compared with 61.4% for the rule-based baseline. In Scenario S4, maintenance cost relative to the oracle policy is 105.3% versus 131.8% for a rule-based comparator. The framework demonstrates that physics-informed, uncertainty-quantified, and governance-embedded AI agents can improve decision quality and traceability in underground infrastructure management beyond what is achievable with passive monitoring or rule-based systems.

Keywords: *digital twin; AI agents; underground infrastructure; lifecycle management; predictive maintenance; physics-informed state estimation; geotechnical risk; human-in-the-loop governance*

Bridging Disciplines: A Pattern of Collaboration Across Fields of Science in Processing Wood Waste into Interior Products Worth Selling

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Abstract

Sawdust and wood shavings produced by the wood processing industry have generally only been production residues, even though their potential as raw materials for value-added products is still rarely worked optimally. The difficulty often lies in how knowledge from various fields of science, ranging from materials engineering, product design, to circular economy principles, is brought together into a coherent workflow, instead of running separately at their respective stages. This study aims to identify patterns of collaboration across fields of science that have proven to be effective in processing wood powder and shavings into interior accessories and decoration products that are suitable for sale. With a qualitative approach in the form of a literature study, this study traces and compares publications in three interrelated areas: wood waste material engineering, sustainable craft design, and circular economy. A synthesis of the literature shows that collaborations that bring together the disciplines of materials, design, and sustainability from the early stages of design tend to produce products that are more market-ready, because the technical characteristics of waste are considered along with their form, function, and environmental impact. In contrast, work patterns that separate the material stage from the design stage, with aesthetic considerations only after the material is considered "finished", more often result in products that are visually immature or technically less durable. The management of organic waste such as wood chips and shavings, therefore, is highly dependent on how knowledge from various fields of science is managed and brought together deliberately from the design stage; the availability of processing technology alone is not enough to guarantee it. Conceptually, this study is expected to contribute ideas to efforts to bridge scientific barriers in responding to waste management issues globally.

Keywords: *wood powder waste; cross-disciplinary collaboration; sustainable craft design; circular economy; value-added products*

Emotion Exchange in Education: Effects of Emotional Labor and Contagion on Well-Being

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Abstract

While there has been considerable research focusing on general well-being, there is scant research providing a fresh perspective on subjective well-being in educational contexts. Following the logic of emotion cycle model, the purpose of this study is to examine how teacher and student emotions reciprocally influence each other, which can determine students' satisfaction and well-being. We additionally test the role of emotional labor in fostering positive emotional contagion and hindering negative emotional contagion. We conducted a survey on 89 professors and 152 students at National Economics University in Hanoi, Vietnam. They have completed the pre-, during- and post-teaching session questionnaires. We used R software to analyze data. The results show that the sequential indirect effects through teacher during-class emotion and student post-class emotion were not significant for either the positive or negative path. However, the indirect effect from student pre-class positive emotion to student satisfaction through student post-class positive emotion was significant, suggesting that positive emotions before class influenced satisfaction primarily through students' own post-class positive emotional state. For the negative path, the indirect effect through student post-class negative emotion was not significant, although the total negative effect remained significant. The sequential indirect effects through teacher during-class emotion and student post-class emotion were not significant for either the positive or negative path. However, the indirect effect from student pre-class positive emotion to student well-being through student post-class positive emotion was significant. In contrast, neither the indirect effect through student post-class negative emotion nor the total negative effect reached significance. We suggest future publications to examine how the contagion of various discrete emotions differs and how emotional labor targeting these discrete emotions might facilitate positive student outcomes. Further research is needed to look at why the moderating effects of emotional labor vary with the valence of emotions.

Keywords: *positive emotions, student satisfaction, student well-being.*

Behavioural and Connectivity-Aware Feature Engineering for Social Media User Interest Analysis Using Twitter Network Metadata

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Abstract

The explosive growth of the social media ecosystems has produced huge amounts of semi-structured user metadata that hold the useful information on behavioural patterns, dynamics of interactions, or tastes of the topics. Raw social media data, however, are inherently noisy, heterogeneous, and cannot be directly modelled using an analytic model without processed to systematise them. The current paper hypothesizes an extensive preprocessing and feature engineering model to convert raw Twitter user metadata into configured behavioural and connectivity-aware data. The dataset has more than 40000 Twitter user profiles with follower information, friendship networks, and hashtag related features. An effective cleaning and parsing pipeline was created to handle corrupted entries, missing values and semi-structured list based attributes. New engineered features like Follow Ratio, Activity Score, Hashtag Engagement, and Network Interaction Size were unveiled to measure latent behavioral features that are outside standard measures of popularity. Exploratory visualization and statistical analysis prove to be better to interpret the user interaction structure. The experimental evidence shows that engineered behavioral representations play a crucial role in increasing the level of analytical preparedness and can be used in downstream applications such as influence prediction, recommendation systems, and user interest modeling.

Keywords: *Social Media Analytics, Feature Engineering, Twitter Network Analysis, Behavioral Modeling, Network Intelligence etc.*

How Do Socio-Cultural Determinants Shape Consumer Behavior in Bangladesh? Theory-Driven Insights from Rajshahi City

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Abstract

This paper is a secondary review of literature on socio-cultural effects on consumer behavior in Bangladesh and specifically in the Rajshahi City. The review integrates theoretical knowledge using a matrix methodology, plotting the theoretical constructs and dimensions of consumer behaviour. The sociodemographic variables are studied with respect to social influences, family structures, prestige consumption, gender, religion, values and traditions. The paper combines several theoretical perspectives Veblen conspicuous consumption, Baudrillard consumer society, Bourdieu theory of practice, Bauman consumer identity, Rational Choice Theory, and MacDonalization, to bring out the similarities and differences in consumer motives. New directions like environmental critique, cultural commodification, hybridization, and the influence of Artificial Intelligence (AI) on the perception of trust, efficiency, and privacy are evaluated critically. The consumption of food in the Rajshahi City is presented as one of the examples of socio-cultural embeddedness where the festivals, traditions, telemarketing, and local market structures collide with the larger cultural capital. Through the use of a literature review matrix, this article can systematize different findings into thematic blocks, which can be regarded as the structured synthesis of how global consumer theories overlap with local realities. The contribution of the review to the academic discussion is the facilitation of the theoretical overlaps, gaps, and the consolidated framework on the future studies and policy-making.

Keywords: *Consumer Behavior, Prestige consumption, Rational choice, Socio-Cultural impact.*

Predictive Policing for Cyberbullying Against Women in Social Networks

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Abstract

In this new digital era, rapid increase in the use of social media results in a corresponding increase in the number of cybercrimes. The cyber-bullies have chosen this media as a ground to increase these types of crimes. Nowadays, women and children are the main victims of cyberbullying. The aftermath of these may be far beyond what we perceive. In our work, we are presenting a model for automatic detection of bully traces, their behavior and future crime over social network. For overcoming this issue, we are conducting a study on Twitter platform and proposing an intelligible model for identifying the intention of the abuser using the techniques derived from Natural Language processing (NLP) and Machine Learning (ML). We are developing a model inspired by Predictive Policing, which can analyze the pattern and will be able to reduce the victimization of future crimes mainly towards women and children through cyberbullying.

Keywords: *Cyberbullying; Sentimental analysis;Intent analysis; Clustering; Predictive-Policing*

The Shift from Clicks to Conversations: A Review of Voice Commerce and its impact on Customer Experience

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Abstract

The new phygital era is advancing at a faster pace. Comfort is becoming a new normal than sophistication. Digital space and advancements are reducing the available free time of the users of digital technology. This time constraint is leading to idleness in customers and expectations starts there. The introduction of Voice communication makes the search faster without looking onto the screen and the effort for typing is reduced. This study is done intensively through literature reviews to understand applications of voice commerce. This study is majorly concentrated to explore the applications of voice commerce and to understand the customer experience on the same. The study also focuses on the future applications of voice commerce. This literature review study helps to identify the technologies like Automatic Speech Recognition (ASR), Natural Language Processing (NLP), Natural Language Generation (NLG) and data integration. It explored the factors like trust, privacy concerns, and perceived usefulness that affects adoption of voice commerce. There was also a major gap that was found as no existing research focuses on combined customer experience frameworks to Voice commerce as per the literature survey. To surpass the gap, suggestions are made to the retailers that multiple options of voice search can be given as a pop-up option to customers.

Keywords: *Voice commerce, Voice assistant, Customer experience, Natural language processing.*

Navigating the Green Investment Landscape: An Empirical Investigation of Investor Awareness Across Sustainable Financial Instruments

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Abstract

The exponential growth of sustainable finance markets has created an imperative to understand investor awareness across diverse green investment alternatives, yet systematic empirical evidence examining awareness patterns remains limited. This study investigates investor familiarity with sustainable financial instruments and examines the influence of advisory services, environmental values, and financial literacy on awareness levels. Employing a quantitative cross-sectional survey design, data were collected from 112 active individual investors who rated their awareness of seven distinct categories of sustainable financial instruments on five-point Likert scales. Awareness was assessed across green bonds, sustainability-linked bonds, ESG-integrated mutual funds and exchange-traded funds, thematic environmental equity funds and impact investment vehicles. Environmental values and financial literacy were measured using validated composite scales and objective knowledge assessments respectively. Data analysis employed repeated measures analysis of variance, one-way analysis of variance, and Pearson correlation procedures to test hypothesized relationships. Results revealed significant heterogeneity in awareness across product categories, with renewable energy stocks demonstrating highest familiarity and sustainability-linked bonds exhibiting lowest recognition. Advisory service utilization exerted substantial influence on awareness levels, with full-service advisory clients demonstrating significantly higher familiarity compared to self-directed investors. Strong positive correlations emerged between environmental values and awareness, as well as between financial literacy and awareness, collectively explaining substantial variance in investor knowledge. These findings establish that financial literacy constitutes a foundational cognitive prerequisite for sustainable finance engagement, while environmental values serve as motivational catalysts for information acquisition. The substantial relationship magnitudes suggest that the complexity inherent in sustainable financial instruments integrating traditional financial metrics with environmental, social, and governance considerations amplifies the importance of both financial capability and values alignment. Implications for financial education curriculum development, advisory practice enhancement, and regulatory disclosure

frameworks are discussed. The study contributes empirical evidence illuminating determinants of sustainable finance awareness and identifies strategic pathways for accelerating market democratization.

Keywords: *sustainable finance awareness, green investment alternatives, financial literacy, environmental values, advisory services.*

Proposing a Competency Management and Professional Development Plan to Enhance the Competency Levels of Senior High School TVL Teachers: A Case Study in SDO1 Pangasinan

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Abstract

This qualitative research sought to build a competence management and professional development strategy to elevate the competency levels of Senior High School Technical-Vocational-Livelihood (TVL) instructors in SDO1 Pangasinan. The research employed a case study methodology, collecting data via comprehensive interviews and focus group talks with TVL educators, administrators, and industry stakeholders. The results identified numerous critical elements affecting the competency levels of TVL teachers, such as their educational background, professional experience, and availability of continuous training opportunities. Numerous educators expressed concerns of inadequacy regarding their competences, mostly attributed to restricted professional development opportunities and the swiftly changing requirements of the vocational education sector. The proposed competency management strategy highlighted the necessity for a systematic framework that links professional development programs with instructors' specialized skills and the abilities demanded by the industry. The plan included tactics including regular needs assessments, customized training programs, and mentorship opportunities to promote ongoing growth and adaptation. The study emphasized the significance of a comprehensive approach to teacher development, which promotes individual capabilities and eventually improves student results in TVL programs, by promoting collaboration between educational institutions and business partners. This research advanced the discourse on teacher professional development in the Philippines, providing pragmatic recommendations for policymakers and educational leaders to enhance the quality of vocational education.

Keywords: *Professional development strategy, competency level, TVL teachers, training opportunities, teacher development*

Matrix Acidization Volume Optimization in Well Stimulation

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Abstract

Matrix acidization is a critical well stimulation technique used to enhance reservoir productivity by removing near-wellbore damage and improving permeability. One of the most important aspects of treatment design is the optimization of acid volume, which directly influences both technical effectiveness and economic efficiency. Insufficient acid volumes may result in limited penetration and incomplete damage removal, while excessive volumes can lead to unnecessary costs, corrosion risks, and instability.

This study presents an integrated approach for optimizing matrix acidizing volumes by incorporating reservoir properties, mineralogical composition, and fluid–rock interaction mechanisms. Key parameters such as porosity, permeability, initial skin factor, and damage radius are evaluated alongside acid reaction kinetics and transport behavior. The methodology combines analytical models with sensitivity analysis to determine the optimum acid volume required for achieving maximum stimulation efficiency. Special attention is given to the balance between acid spending rate and penetration depth, particularly in heterogeneous formations.

The results demonstrate that optimized acid volumes significantly improve treatment performance by enhancing wormhole propagation in carbonate reservoirs and promoting uniform dissolution patterns in sandstone formations. Furthermore, the application of diversion techniques and real-time monitoring is shown to improve acid distribution and overall treatment effectiveness. The proposed optimization framework reduces chemical consumption, minimizes environmental impact, and improves productivity and economic returns.

This study provides practical insights for designing cost-effective and efficient matrix acidizing treatments across a wide range of reservoir conditions.

Keywords: *Matrix acidization, acid volume optimization, reservoir stimulation, wormhole propagation, skin factor, carbonate reservoirs, sandstone acidizing, reaction kinetics, formation damage, productivity enhancement*

Optimization of Water Alternating Gas (WAG) Injection with Modelling Techniques

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Abstract

Water Alternating Gas (WAG) injection is a widely implemented enhanced oil recovery (EOR) technique aimed at improving displacement efficiency and controlling adverse mobility during gas injection processes. By cyclically injecting water and gas, WAG mitigates gas channeling, reduces gravity override, and enhances macroscopic sweep efficiency in heterogeneous reservoirs. The technique is particularly effective in mature fields where primary depletion and secondary water flooding have resulted in declining production rates and increasing water cut.

A notable real-field application of WAG injection modelling was implemented in oil field, located in the Azerbaijan area of the Caspian Sea. The reservoir is characterized by complex faulting, good reservoir characterization, and strong heterogeneity within fluvial sandstones. Continuous water injection initially led to early water breakthrough and poor sweep efficiency. The introduction of miscible WAG injection improved conformance control by stabilizing the mobility ratio and reducing gas override. Field performance monitoring indicated improved oil production rates, delayed gas breakthrough, and incremental recovery gains estimated at 2–3 % of original oil in place (OOIP). Reservoir simulation studies and surveillance data confirmed that optimized WAG cycle timing and water–gas ratio significantly influenced recovery performance.

This case demonstrates that successful WAG implementation requires detailed reservoir characterization, careful injectant ratio optimization, and continuous performance monitoring. Despite operational challenges such as corrosion risk and injection logistics, WAG remains a technically robust and economically viable EOR strategy in offshore and onshore mature fields.

Keywords: *Water Alternating Gas (WAG), Enhanced Oil Recovery (EOR), miscible injection, mobility ratio control, sweep efficiency, gas breakthrough, incremental oil recovery.*

Advantages, Disadvantages, and Challenges of Applying Information and Communication Technologies and Artificial Intelligence in The Education System

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Abstract

The application of information and communication technologies and artificial intelligence in the education system presents various advantages, disadvantages, and challenges. The current reality is unfolding against the backdrop of new scenarios and perspectives. In this regard, in this article, the authors explore and develop this crucial and far-reaching topic, concluding that: i) The application of new technologies and artificial intelligence represents a significant opportunity to strengthen the education system. It is important to recognize that we are facing a new reality; ii) The demonization and rejection of the application of new technologies and artificial intelligence are not wise approache, iii) Education is being transformed by the advent of new technologies and artificial intelligence. Specifically, with regard to digital immigrants and digital natives, iv) the fundamental rights of digital natives cannot be ignored or postponed. And thus, they conclude by proposing: i) The adoption of public policies to raise awareness of the importance of applying new technologies and artificial intelligence to the education system, ii) It is essential to implement public policies for training teachers and students on the nature and scope of new technologies and artificial intelligence within the education system, iii) Properly adapt the application of new technologies and artificial intelligence within the education system in accordance with the nature and requirements of digital natives; iv) Establish legal limits to safeguard and ensure the effective recognition of the fundamental rights of digital natives.

Keywords: *Application of information and communication technologies in the education system. Application of artificial intelligence in the education system. Advantages, disadvantages, and challenges.*

Flow Efficiency Based Candidate Selection and Evaluation Workflow for Matrix Acidizing in a Mature Offshore Field

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Abstract

Matrix acidizing is widely applied to improve productivity by removing near-wellbore damage and enhancing formation permeability. This paper presents a practical, data-driven methodology for candidate selection and post-treatment evaluation, implemented in a mature offshore field in the Caspian Sea.

A population of active production wells was screened using a flow efficiency-based approach. Flow efficiency was calculated as the ratio of actual productivity index (PI) to ideal PI. The ideal PI was estimated using theoretical inflow performance relationships assuming undamaged reservoir conditions, while the actual PI was derived from measured well production rates and corresponding drawdown pressures. This comparison enabled quantification of near-wellbore impairment and identification of underperforming wells with significant stimulation potential.

Wells exhibiting low flow efficiency were shortlisted as candidates for acid stimulation. Hydrochloric acid (HCl) was injected into the near-wellbore region to dissolve damage and improve flow capacity. Post-job analysis demonstrated a positive response in several treated wells, with noticeable increases in oil production rates. However, treatment effectiveness varied across the candidate pool, reflecting differences in reservoir quality, degree of depletion, and damage mechanisms.

The results highlight the importance of robust candidate selection and demonstrate that flow efficiency provides a simple yet effective screening metric. The proposed workflow offers a practical tool for optimizing acidizing interventions in brownfield developments and can be readily applied to similar assets.

Keywords: *Matrix Acidizing; Flow Efficiency; Productivity Index; Candidate Selection; Well Stimulation; Caspian Sea; Brownfield Optimization; Near-Wellbore Damage*

Modeling of the Properties of Expanding Cementing Slurries Based on the Reaction of Calcium Carbonate with Organic and Mineral Acids for Terrigenous Reservoir Conditions

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Abstract

This paper presents a semi-empirical model of expanding cementing systems based on the reaction of calcium carbonate with organic and inorganic acids accompanied by carbon dioxide generation. The study focuses on pore structure evolution in cement stone under conditions of terrigenous reservoirs typical of oil and gas fields in the Caspian region. The proposed model describes the relationships between gas generation kinetics, acid concentration, porosity, compressive strength, and permeability of the cementitious material. It is shown that increasing acid concentration leads to higher CO_2 production, greater expansion, and increased permeability, while simultaneously reducing mechanical strength. Hydrochloric acid demonstrates the most intensive reaction and strongest structural degradation, whereas organic acids (formic, acetic, citric) provide more controlled gas evolution and a more uniform pore structure. An integrated optimization criterion is proposed to evaluate the balance between expansion, strength, and permeability. The results obtained can be applied to the design of adaptive cementing formulations for strengthening the near-wellbore zone in weakly consolidated terrigenous reservoirs.

Keywords: *cementing systems, calcium carbonate, carbon dioxide, gas generation, porosity, permeability, compressive strength, terrigenous reservoirs, organic acid, modeling, near-wellbore zone.*

Antecedents of Intention to Use Digital-Only Banks: The Moderating Role of Perceived Risk

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Abstract

This study covers the investigation of consumer behaviour towards the adoption of digital-only banking services in Malaysia. The study covers the role of digital literacy and informational literacy in determining perceived ease of use (PSEOU)and perceived usability (PU). In addition, the effect of PSEOU and PU is examined in influencing the behavioral intention of digital-only banking services. The present study also investigates the moderating role of perceived risk between PSEOU and PU towards intention to adopt digital-only banking services. The research framework and hypotheses for the current research study are grounded in the Technology Acceptance Model and informed by past literature and theories. This study used a quantitative approach to data collection, employing a structured questionnaire. Based on the convenience sampling method, a total of 145 usable responses were analysed using SPSS and SmartPLS. The findings showed that digital literacy had a positive and significant effect on perceived ease of use and perceived usefulness. Information literacy does not affect perceived usefulness but does impact perceived ease of use positively. Another important finding is the significant impact of perceived usefulness on behavioral intention, while there is no impact of perceived ease of use. The study also found that perceived risk is not significant in moderating the relationships. This research fills an important gap in the theory of TAM because it introduces digital and information literacy and perceived risk in the analysis of digital-only banking adoption. The findings offer practical insights for banks and policymakers to enhance consumer acceptance through digital literacy.

Keywords: *Digital literacy, information literacy, Ease if Use, Perceived Usefulness, Intention to adopt*

Integrated Optimization of Hydraulic Fracture Length and Width for Improved Unconventional Reservoir Performance

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Abstract

Background: Hydraulic fracturing design optimization remains a critical challenge in unconventional reservoirs due to the complex relationship between fracture geometry, conductivity, and reservoir productivity. Although increasing fracture dimensions is commonly considered beneficial, excessive fracture extension or width may not translate into proportional production gains due to reservoir limitations, pressure depletion effects, and conductivity constraints. This study investigates the influence of hydraulic fracturing length and width on well performance and identifies an optimized fracture configuration for enhanced hydrocarbon recovery.

Methodology: A reservoir simulation study was performed for an unconventional reservoir with permeability ranging from 5 to 13 mD. A sensitivity analysis was conducted by varying hydraulic fracture length and width parameters while evaluating production response. Multiple fracture length scenarios were simulated for horizontal well sections of 150 m and 200 m to determine the optimum fracture extension. Subsequently, fracture width sensitivity cases were evaluated using the selected fracture length while monitoring cumulative gas production over the production period.

Results: The simulation results demonstrated that fracture length has a significant impact on production; however, the longest fracture did not provide the highest production performance. The optimum fracture length for the investigated reservoir was identified as 125 m, providing the best balance between stimulated reservoir volume and fracture conductivity. Further extension beyond this value resulted in limited production improvement. Additional analysis of fracture width showed that increasing fracture width improved production by enhancing conductive flow paths. The maximum production response was achieved at an optimum fracture width of 0.045 m. Increasing fracture width beyond this value did not improve productivity and caused a decline in production efficiency.

Conclusions: The study confirms that hydraulic fracturing optimization requires simultaneous consideration of fracture length and width rather than maximizing individual fracture parameters. The proposed workflow provides a practical approach for designing cost-effective stimulation treatments and improving unconventional reservoir development performance.

Keywords: *Hydraulic fracturing; unconventional reservoirs; fracture optimization; fracture conductivity; fracture width; fracture length; reservoir simulation*

Banking Sector Leadership and National Economic Performance: A Panel Regression Analysis of Selected ASEAN Countries

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Abstract

This study examined the influence of banking sector development on national economic performance among selected ASEAN countries, namely Brunei, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam, using panel regression analysis. Specifically, the study investigated the effects of Domestic Credit to Private Sector, Bank Capital to Assets Ratio, Non-Performing Loans, Broad Money Growth, and Commercial Bank Branches on Real GDP growth rate. Secondary panel data were obtained from international financial databases, particularly the Asian Development Bank and the World Bank, and analyzed using Fixed Effects and Random Effects estimators. Diagnostic tests for stationarity, multicollinearity, heteroscedasticity, autocorrelation, and cross-sectional dependence were conducted to ensure model validity. Findings revealed that Broad Money (BM), Non-Performing Loans (NPL), Domestic Credit to the Private Sector (DCPS), and Commercial Bank Branches (CBB) as Banking Sector Development indicators significantly influence national economic performance, as proxied by Real GDP Growth Rate. The overall R^2 of the final model is .378, implying that approximately 37.8% of the variation in real GDP growth within countries over time is explained by the Banking Sector Development indicators included in the model. These findings provide important policy implications for governments and financial institutions, emphasizing the need to strengthen financial regulations, improve credit risk management, and promote productive credit allocation to support sustainable economic growth.

Keywords: *Banking Sector Development, Real GDP Growth Rate, Panel Regression, Fixed Effect, ASEAN Countries*

Deep Learning for Crop Disease Detection: A Systematic Survey on Reliability Calibration and Multimodal Fusion

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Abstract

Crop disease pathogens cause annual global agricultural damages exceeding USD 220 billion, accounting for 20-40% of global crop yield losses. While deep learning architectures demonstrate impressive performance on controlled benchmark datasets, models achieving above 99% classification accuracy on benchmarks such as PlantVillage frequently exhibit severe generalization failures when deployed on field-captured imagery affected by ambient shadows, variable illumination, and complex canopy backgrounds. This systematic survey directly addresses the persistent gap between controlled laboratory benchmark performance and real-world field deployment reliability. Following a PRISMA-guided selection protocol, we systematically analyze 82 peer-reviewed studies published between 2018 and 2026, structuring them under a novel six-category taxonomy: single-image CNNs, transfer learning and domain adaptation, graph neural network (GNN) spatial models, recurrent temporal architectures, multimodal ensemble systems, and reliability-aware inference pipelines. Comparative synthesis indicates that multimodal fusion architectures reduce severity estimation mean absolute error (MAE) by up to 50% relative to single-modality baselines, while post-hoc isotonic calibration reports Expected Calibration Error (ECE) values as low as 0.02% in representative calibrated studies. Furthermore, our evaluation reveals key deployment barriers including the scarcity of field-validated multi-disease benchmarks, the widespread absence of probability calibration reporting, limited adoption of spatial graph neural reasoning, and the lack of lightweight edge-deployable ensemble architectures. Finally, we formulate a nine-direction strategic research roadmap---spanning federated benchmarking, INT8 edge quantization, foundation model fine-tuning, satellite remote sensing integration, and continual active learning---to systematically guide the engineering of field-robust, reliable, and trustworthy precision agriculture AI systems.

Keywords: *Crop disease detection, deep learning, multimodal fusion, reliability calibration, precision agriculture.*

The Influence of Hydraulic Fracture Geometry (Length and Width) on Well Production in Unconventional Reservoirs: An Integrated Review and Simulation-Based Analysis

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Abstract

Hydraulic fracturing is among the most widely applied well-stimulation technologies for enhancing well productivity in low-permeability, unconventional reservoirs such as tight gas sands, shale gas, and coalbed methane formations. While the qualitative benefit of hydraulic fracturing on well deliverability is well established, the quantitative relationship between fracture geometry, fracture half-length and width, and cumulative gas production remains an active research area, since excessively long or wide fractures do not necessarily translate into proportionally higher recovery and may instead raise cost without a matching production benefit. This paper synthesizes three related reservoir-simulation studies conducted on an unconventional gas reservoir with matrix permeability of 5-13 millidarcy (mD), in which sensitivity analyses were performed on hydraulic fracture length (50-200 m) and fracture width (0.010-0.050 m) for horizontal wells with 150 m and 200 m lateral sections. The underlying theory of fracture propagation, conductivity, and formation damage is reviewed, and the simulation methodology, production-forecast data, and resulting trends are re-examined within an integrated framework. The analysis confirms that total gas production increases with fracture length up to approximately 125 m, beyond which additional length yields negligible incremental recovery irrespective of horizontal-section length. Holding fracture length at 125 m, production increases with fracture width up to approximately 0.045 m, after which further widening yields no additional benefit and can marginally reduce oil production. These findings show that hydraulic-fracturing design should be optimized jointly for length and width rather than maximized for either parameter individually, providing a practical benchmark for fracture-design decisions in reservoirs of comparable permeability.

Keywords: *hydraulic fracturing, fracture length, fracture width, fracture conductivity, proppant, well stimulation, reservoir simulation.*

Bibliometric Mapping of Philippine Mathematics and Science Artificial Intelligence in Education Research (2018–2025): Technology Trends, Gaps, and Future Directions

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Abstract

Artificial Intelligence has become an emerging concern in Mathematics and Science Education as schools and higher education institutions explore its use for instruction, learning support, assessment, and academic decision-making. This bibliometric study examined Artificial Intelligence-related research in Philippine Mathematics and Science Education from 2015 to 2025. It aimed to identify publication trends, dominant themes, collaboration networks, research gaps, and future directions. Data were collected from Scopus, ScienceDirect, and Philippine E-Journals using search terms related to artificial intelligence, machine learning, generative AI, mathematics education, science education, STEM education, and the Philippines. Following PRISMA-based screening, 15 studies were included from 168 initially identified records. Descriptive bibliometric indicators, VOSviewer keyword co-occurrence mapping, and qualitative content analysis were used to analyze publication patterns, technology themes, authorship, institutional links, and gaps. Results showed that publications were concentrated in 2025, with Philippine E-Journals contributing the largest share of included studies. Most outputs were journal or research articles, and the studies focused mainly on higher education and secondary education. The keyword network showed central themes such as artificial intelligence, STEM education, science education, mathematics education, AI literacy, AI integration, AI-supported learning, digital access, and mathematics achievement. Collaboration patterns showed that most studies were multi-authored, but partnerships remained mostly within the same institution. No international co-authorship was found in the dataset. The findings indicate that AI-related Mathematics and Science Education research in the Philippines is emerging but still limited in volume, institutional reach, international linkage, and coverage of elementary and multi-level contexts. Future research can expand through cross-level studies, learning analytics, AI ethics, classroom-based trials, and stronger inter-institutional and international collaboration.

Keywords: *artificial intelligence, bibliometric analysis, mathematics education, Philippines, science education*

Reconstructing Professional Identity through Digital Pedagogy in ELT: A Narrative Inquiry of Government School English Teachers in Nepal

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Abstract

In the modern era of AI, technology or CALL, MALL is the major source of knowledge. The swift digital transformation of education has profoundly altered pedagogical practices, teacher roles and professional identities across global English Language Teaching (ELT) contexts. The expansion of digital education and post-pandemic technology-mediated instruction has led to unprecedented sociocultural, technological and pedagogical transitions for English teachers in Nepal, particularly in government schools. This study investigates the reconstruction of professional identity of English teachers at government schools in Nepal through engagement with digital pedagogy. Using a qualitative narrative inquiry design guided by Sociocultural Theory, Communities of Practice, and the Technological Pedagogical Content Knowledge (TPACK) framework, the study investigates teachers' lived experiences, identity negotiations, and pedagogical transformations.

Data were generated from ten English teachers in government schools in rural and urban educational contexts, through in-depth semi-structured interviews, reflective narratives, classroom observations and digital teaching artefacts. The results show how the teachers negotiated and reconstructed their professional identity in a constant movement from traditional knowledge transmitters to digitally mediated facilitators of learning. The study also shows that the digital pedagogy transformed the teachers' classroom authority, professional agency, pedagogical beliefs, emotional experiences, and self-perception as English language educators.

The findings further reveal that there are substantial structural and sociocultural challenges to these teachers such as poor technological infrastructure, lack of institutional support, digital inequality, lack of ICT training, unstable internet access and emotional stress associated with online teaching. Yet, many participants perceived digital pedagogy as a revolutionary pathway for professional growth, reflective practice, collaborative learning and identity expansion.

In this study, we argue that the reconstruction of teacher identity in the digital era is not simply a matter of technological adjustment, but a complex sociocultural process under the influence of institutional conditions, professional agency, emotional labor, and changing pedagogical expectations. This research adds to the ongoing discourses on teacher identity, digital pedagogy and ELT in a developing educational context, and provides practical implications for teacher education, digital professional development, and educational policy reform in Nepal.

Keywords: *government schools, Nepal, narrative inquiry, reconstruction of professional identity, teacher agency, digital pedagogy, English language teaching*

Natural Blueprint for a More Environmentally Sustainable and Disaster-Resilient Ateneo de Manila Senior High School Campus

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Abstract

Rising temperatures and intensified monsoons present drastic environmental threats to many urbanized educational institutions in the Philippines. This study addresses the current risks of urban heat island effects and localized flooding within the Ateneo de Manila Senior High School campus through the development of a "natural blueprint", a scalable green infrastructure model employing specialized local flora. To validate the framework, a 1:193 scaled physical diorama of the campus was constructed, using modified materials to accurately simulate the biomechanical and hydrological capabilities of the selected flora. The diorama was used to execute and simulate four empirical tests evaluating hydrological infiltration, passive shading, active transpiration, and geotechnical stability against a bare substrate control. Quantitative analysis was performed through independent t-tests stating that the selected flora achieved a 49.93% increase in mean water infiltration ($p < .001$) and a significant surface temperature reduction of 1.10°C ($p = 0.002$). The designed material-root system quantitatively optimized geotechnical stability, achieving a 50.64% improvement in geomechanical resistance to erosion. A digital version of the proposed blueprint was constructed by the researchers, in the case for any potential further studies. The research's findings provided empirical evidence that nature-based solutions can mitigate microclimate and hydrological stressors. Altogether, integrating biological defense systems into institutional architecture offers a sustainable, cost-friendly, and disaster-resilient blueprint to safeguard educational continuity and serves as a framework for urban disaster risk reduction across the Philippines.

Keywords: *Nature-based solutions, green infrastructure, urban heat island, campus sustainability, disaster risk reduction, diorama simulation*

Multimodal Cross-Attention Development with open SMILE, YOLOv26, and AraBERT for Tajweed Law Classification

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Abstract

This study develops a multimodal deep learning model for the multi-label classification of *Tajweed* rules in Quranic recitation. Most previous studies have relied on unimodal, audio-based approaches that are sensitive to variations in reciter styles, resulting in limited generalization capabilities when encountering reciters not included in the training set. The proposed multimodal model integrates three modalities in parallel, as each provides complementary information that a single modality cannot capture: audio represents the acoustic characteristics of pronunciation; visual spectrograms capture temporal-frequency patterns distinctive to specific Tajweed rules; and Arabic text provides the linguistic and semantic context that underpins the Tajweed rules themselves. Features from these three modalities are extracted separately: 88-dimensional eGeMAPSv02 acoustic features via openSMILE; Mel-spectrogram visual representations extracted using a YOLOv26 backbone; and semantic representations of vowelless Arabic text encoded using AraBERT. A cross-attention mechanism is employed to enable the model to adaptively extract Tajweed rule information across modalities. The dataset, sourced from Hugging Face, covers Juz 1 of the Quran recited by 30 reciters—comprising 4,440 samples—and focuses on four Tajweed rule classes: Ikhfa Haqiqi, Nun Ghunnah, Mim Ghunnah, and Mad Jaiz Munfashil. The model is evaluated using a reciter-independent split to assess its ability to generalize to reciters not encountered during training. Since identical Qur'anic verses may occur across different reciters, potential textual-content overlap is explicitly considered when interpreting the contribution of the textual modality. Performance is assessed using Macro F1-score and Micro F1-score for the four target Tajweed classes.

Keywords: *Cross-Attention, multimodal, Qori-Independent Split, Tajweed*

Analytical Formulation of Entropy Generation in Fractal Microchannel Networks with the Mathematical Induction Framework

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Abstract

The design of microchannel heat sinks traditionally relies on resource-intensive numerical simulations to resolve internal flow dynamics and thermal gradients. This reliance on iterative spatial solvers creates a computational bottleneck during rapid topology optimization for high-flux thermal management systems. This manuscript introduces a fully analytical framework to evaluate the thermodynamic performance of fractal branching microchannels, bypassing grid-based computational fluid dynamics. While developed for high-performance computing, this mesh-free mathematical method also provides an accessible design utility for decentralized rural energy infrastructure. We extract and formulate exact governing equations for both frictional and thermal entropy generation across an arbitrary number of branching levels. Applying the Principle of Mathematical Induction, a generalized closed-form solution is established, proving that total entropy generation converges toward predictable theoretical limits. These specific bounds are governed entirely by geometric bifurcation ratios and the fundamental thermophysical properties of the working fluid. The analytical derivations confirm that a diameter scaling ratio of 0.793 minimizes frictional irreversibility across infinite tiers, aligning with Murray's Law. Conversely, minimizing thermal entropy requires a diameter ratio strictly bounded between 0.707 and 0.840, depending on localized heat flux density. To reconcile these conflicting physical requirements, a dimensionless Bejan number analysis maps the exact transition boundary where thermal irreversibility overtakes hydrodynamic friction. This established framework equips thermal engineers with a rigorous mathematical tool to optimize complex flow architectures independent of expensive computing hardware, reducing standard computational assessment times to milliseconds while maintaining first-principles accuracy.

Keywords: *Fractal Microchannels, Entropy Generation Minimization, Mathematical Induction, Thermal Hydraulics, Constructal Theory, Rural Technology Development.*

Psychometric Calibration of a Mathematics Assessment for Criminology Students: A Rasch Measurement Approach

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Abstract

Mathematical proficiency is becoming more important in criminology research with regard to the need for forensic computation, statistics, and crime mapping. However, classical test scores generally confuse individual ability with item difficulty, thereby obscuring true learning gaps in knowledge. In this study, the Rasch model of measurement (one-parameter logistic Item Response Theory approach) was used to assess the mathematical abilities of Bachelor of Science in Criminology students and analyze the psychometric properties of a 50-item departmentalized examination. Using the quantitative cross-sectional approach, empirical data were collected from 300 criminology students of a state university in the Northern Philippines. The results showed wide distribution from –5.41 to +5.36 logits (M = 0, SD = 0.68) of person ability (θ), where the most students have the average level of quantitative knowledge. Diagnostics of scale quality have shown high item calibration reliability (Item Reliability = 0.9694; Separation = 5.62) and moderate person measurement reliability (Person Reliability = 0.7799; Separation = 1.88; Strata = 2.84). This test scale was characterized by well-developed difficulty structure (B_{par} from < –0.50 to > 1.50). The fit analysis has found 18 misfitting items according to $S\text{-}X^2$ criteria ($p < .05$) and 7 items above the Mean Square thresholds (*WMS/UMS* > 1.10, | *ZSTD* > 2.0), indicating the specific items which were affected by guessing or inappropriate wording. Principal Component Analysis of standardized residuals has indicated the unidimensionality of scale (first contrast eigenvalue = 3.19; mean U2 = 0.79) and local independence. The Wright Item-Person Map confirms the proper targeting between item difficulties and person abilities. In summary, this exam is a psychometrically valid tool for testing the quantitative skills of students, which allows making useful diagnostic recommendations for improving instruction, curricula and item bank in criminal justice.

Keywords: *Rasch model, mathematics assessment, criminology education, item response theory, psychometrics*

Rasch Model, Mathematics Assessment, Criminology Education, Item Response Theory, Psychometrics

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Abstract

The rapid evolution of Artificial Intelligence (AI) is fundamentally reshaping educational systems worldwide, creating unprecedented opportunities for personalized learning while simultaneously raising concerns regarding equity, ethics, and responsible implementation. This study investigated the global research landscape on inclusive and ethical AI integration in education through a comprehensive bibliometric analysis of scholarly publications indexed in Scopus and Web of Science from 2015 to 2025. Using VOSviewer and Biblioshiny, the study employed citation analysis, co-authorship mapping, keyword co-occurrence analysis, and thematic evolution techniques to identify emerging trends, influential contributors, collaborative networks, and research gaps within the field.

Findings revealed a dramatic surge in AI-in-education scholarship beginning in 2020, largely driven by advances in generative AI technologies and digital learning innovations. Major research themes centered on personalized learning, adaptive educational systems, AI literacy, academic integrity, data privacy, algorithmic fairness, ethical governance, and equitable access to educational technologies. The United States, China, and the United Kingdom emerged as the most influential contributors, reflecting strong interdisciplinary collaboration among education, computer science, and policy researchers. Despite the growing body of literature, inclusivity-related concerns, particularly digital inequality, accessibility, and representation of learners from developing countries, remain insufficiently explored.

The findings underscore the urgent need for policy-driven, ethically grounded, and socially inclusive frameworks that ensure AI technologies promote educational equity, transparency, accountability, and sustainable innovation. By synthesizing a decade of global scholarship, this study provides valuable evidence for researchers, educators, policymakers, and technology developers seeking to advance responsible AI integration in education and foster more inclusive learning environments worldwide.

Keywords: *Artificial Intelligence in Education, Bibliometric Analysis, Inclusive Education, Ethical AI Integration, Educational Technology*

Digitalizing Government-To-Business (G2b) Transactions: Adoption and Challenges in Rural Areas of Palawan

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Abstract

The study, entitled "Measuring the Adoption of Government-to-Business (G2B) e-Governance Services and the Difficulties Encountered by Business Owners in Palawan," evaluated the extent of G2B e-governance service adoption and the challenges experienced by business owners in Palawan. This was conducted in 3 barangays in Aborlan, Palawan, namely: Isaub, Jose Rizan, and Aborlan. Convenience sampling was used to reach 180 business owners in the area. This study will address to business owners and the Local Government Units. A descriptive quantitative research design was used, with data analyzed using frequencies, percentages, weighted means, and rankings. Most respondents were female and middle-aged. Small enterprises represented the largest business category, with micro and small businesses comprising nearly all participants. The retail sector was the most prevalent, and most businesses had been established recently. Findings showed a low adoption rate of G2B e-governance services. Online business permit applications were the most often accessed service, but overall usage remained limited. Electronic submission of business documents was the least utilized service. Key barriers to adoption included technical issues, insufficient support from Local Government Unit (LGU) staff, inadequate internet connectivity, limited digital competencies, and a preference for in-person transactions. No significant differences in the adoption of G2B e-governance services or in the problems encountered were observed when respondents were grouped by age or sex. The study finds that G2B e-governance services are still significantly underutilized. It is recommended that the Local Government Unit (LGU) enhance platform reliability, establish digital help desks and assisted kiosks, expand internet access, offer digital skills and cybersecurity training, and simplify online procedures, particularly for small, retail, and newly established businesses. Additionally, the LGU should develop policies to promote the digitalization of small businesses in rural areas.

Keywords: *Government-to-Business (G2B), e-governance, digital government services, technology adoption.*

God's Plan in The Midst of Uncertainty: The Story of Jeremiah

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Abstract

Human beings continually face uncertainty arising from spiritual, moral, political, social, economic, technological, and existential crises. Such circumstances often raise fundamental theological questions concerning God's sovereignty, suffering, divine purpose, and the future. The Book of Jeremiah provides a significant biblical framework for addressing these questions because Jeremiah ministered within a period of profound national and spiritual crisis while continuing to proclaim God's Word. The theological message of Jeremiah demonstrates that human uncertainty does not imply divine uncertainty and that God remains sovereign over history even when His purposes are not fully understood by human beings.

This study aims to examine the theology of God's plan in the midst of uncertainty through the story and prophetic ministry of Jeremiah, particularly in relation to divine sovereignty, human responsibility, disobedience, judgment, suffering, repentance, hope, and restoration. It also seeks to develop an apologetic framework that connects Jeremiah's theological message with contemporary challenges involving doubt, competing worldviews, secularism, relativism, technological development, and the crisis of meaning.

The study employs a biblical-theological and theological-apologetic approach. The analysis is developed through thematic coding and triangulation involving biblical, rational, historical, and contextual dimensions. Fifteen analytical categories (A1–A15) are employed to examine theological foundations, revelation, sovereignty, epistemology, worldview, anthropology, sin, morality, Christology, the cross and resurrection, doubt, hope, the Church, contextualization, and transformation. The study also employs the concepts of "worldview turbulence" and "analogical entropy" as heuristic metaphors for understanding the interaction between facts, presuppositions, emotions, experiences, culture, technology, morality, doubt, and faith. These scientific concepts are used analogically and are not presented as scientific proofs of theological claims.

Discussion and Analysis: The analysis demonstrates that Jeremiah's ministry cannot be separated from the historical crisis of Judah, including distorted worship, moral decline, political instability, national threat, and persistent disobedience. Jeremiah 1:5 establishes that divine calling precedes human awareness, while Jeremiah 7:23 emphasizes obedience as the proper response to God. Jeremiah 29:11 is interpreted within the historical context of exile, demonstrating that God's plan does not eliminate

suffering but establishes hope and future purpose within suffering. The theological movement identified in the study may be summarized as **human uncertainty → God's sovereignty → God's Word → repentance → judgment and refinement → hope → Christ → salvation and restoration**. From an apologetic perspective, this trajectory is extended into the contemporary context through **proof, defense, and offense**, followed by biblical-rational-contextual triangulation and a Christ-centered conclusion.

Conclusion: The study concludes that God's sovereignty remains operative even when human beings experience uncertainty, suffering, doubt, and apparent historical chaos. Jeremiah does not teach that believers can fully comprehend every detail of God's plan; rather, he calls God's people to trust the God who governs history according to His sovereign purpose. Christian faith therefore rests not on complete human knowledge but on God's revealed truth and faithfulness. Within contemporary apologetics, this theological conviction provides a foundation for engaging competing worldviews through biblical truth, rational analysis, historical awareness, and contextual relevance. The ultimate direction of this framework is Christ, the fulfillment of hope, leading toward the glory of God and the transformation of life.

Keywords: *God's Plan; Jeremiah; Divine Sovereignty; Human Uncertainty; Suffering; Hope; Christian Apologetics; Worldview; Christ; Transformation.*

Island School Leaders' Experiences of Resilience in Disaster Proned Areas: A Development of Disaster Risk Reduction Management Program Model

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Abstract

This study explored the experiences of school leaders in an island schools in Burdeos, Polillo, Panukulan, Patnanungan and Jomalig in managing disasters and sustaining school operations. Using a qualitative approach, data were gathered through in-depth interviews with selected school heads and analyzed through thematic analysis. The findings revealed that disaster risk reduction in these schools follows a pattern captured in the I-HEART Resilience Model, which reflects how school leaders Identify hazards and risks, practice Human-centered leadership, Educate and empower their school community, Act and prepare through planning and early warning systems, respond with care during emergencies, and Transform and thrive during recovery. The results show that typhoons are the most common hazard, causing class suspension, disrupted instruction, and limited access to learning. School leaders rely on preparedness plans, communication systems, and coordination with local stakeholders to guide decision-making. They also demonstrate empathy, shared responsibility, and strong support for teachers and learners during difficult situations. Learning continuity is maintained through modular and flexible strategies, while recovery focuses on restoring operations and improving school facilities. The findings further highlight the importance of community partnership, inclusive practices, and resource availability in strengthening resilience. Based on these results, the study proposes the I-HEART Resilience Model as a practical framework for disaster risk reduction in island schools. The model provides a structured approach that reflects real experiences and can guide school leaders in managing disasters effectively while ensuring the continuity of education in hazard-prone communities.

Keywords: *disaster risk reduction, school leadership, resilience, island schools, I-HEART model*

E-Commerce Chatbots and Their Impact on Customer Satisfaction, Loyalty, and Continuous Usage: A Moderation Analysis of Generations Y and Z

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Abstract

This study investigated how e-commerce chatbots impact customer satisfaction, loyalty, and continuous usage, and tested generational cohort (Gen Y vs. Gen Z) as a moderating factor. Using a quantitative, causal-predictive PLS-SEM design, data were gathered from 400 Filipino chatbot users equally split between both generations. Results show that information quality, system quality, and chatbot experience significantly affected perceived privacy risk, which subsequently influenced customer satisfaction directly and via the need for human interaction. Furthermore, satisfaction and loyalty strongly predicted continuous usage, validating all direct and mediated hypotheses. However, multigroup analysis revealed no significant generational moderation, indicating that Generations Y and Z behave equivalently in post-adoption usage. The study recommends a unified, generation-agnostic chatbot strategy prioritizing data privacy and seamless human-escalation pathways to drive long-term customer retention.

Keywords: *Chatbots, E-commerce, Moderation Analysis, PLS-SEM, WarpPLS*

Frontline Academic Leaders' Approaches in Mitigating Faculty Workplace Dynamics Toward a Generational Leadership Model for a Private University in Cavite

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Abstract

This study explored the lived experiences of frontline academic leaders and faculty members in managing workplace dynamics within a multigenerational academic environment at Lyceum of the Philippines University Cavite. Specifically, the study sought to understand how frontline academic leaders interpret and enact leadership approaches in addressing workplace dynamics arising from generational diversity, how faculty members experience and interpret these leadership practices, and how these experiences contribute to the development of a contextualized leadership model.

The study employed a qualitative research design utilizing Dyadic Interpretative Phenomenological Analysis (IPA). Participants consisted of nine frontline academic leaders, including coordinators, program chairs, and college secretaries, and nine faculty members representing different generational cohorts, namely Baby Boomers, Generation X, Millennials, and Generation Z. Data were gathered through semi-structured interviews and analyzed through iterative coding, thematic analysis, and dyadic interpretation to examine both individual and shared meaning-making processes.

The findings revealed that leadership within a multigenerational academic environment is fundamentally a relational and co-constructed experience between frontline academic leaders and faculty members. The overarching phenomenon that emerged from the study was the continuous negotiation of leadership relationships within a multigenerational academic environment. Five interrelated themes emerged from the analysis: (1) Adaptive Leadership Across Generations, (2) Leadership Through Relationship Building and Communication, (3) Managing Conflict Through Understanding and Dialogue, (4) Balancing Structure and Flexibility, and (5) Continuous Leadership Learning and Institutional Support. The findings indicated that leadership effectiveness emerges through continuous adaptation, communication, dialogue, balanced authority, and shared learning, enabling leaders and faculty members to navigate generational differences while maintaining workplace harmony, collaboration, trust, and engagement.

Based on the findings, the study developed the Adaptive Relational Generational Leadership (ARGL) Model. The model conceptualizes leadership as a dynamic and relational process in which leadership effectiveness emerges through the continuous negotiation of leadership relationships, adaptation to generational diversity, and collaborative meaning-making between frontline academic leaders and faculty

members.

The model provides a contextualized framework that may guide frontline academic leaders in responding effectively to multigenerational workplace realities within higher education institutions.

Keywords: *Adaptive Relational Generational Leadership (ARGL), frontline academic leaders, multigenerational workforce, Dyadic Interpretative Phenomenological Analysis, higher education leadership, workplace dynamics, generational diversity*

Establishment of A Calibration Facility in Philippine State College of Aeronautics

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Abstract

The study aimed to evaluate the feasibility of establishing a Calibration Facility at the Philippine State College of Aeronautics, focusing on the Technical Faculty and College officials from PhilSCA as the participants of this study. To gather data, the researcher used a locally structured, close-ended questionnaire, the Frequency & Percentage distribution, Mean and Kruskal Wallis H-Test . The questionnaire was validated to ensure that it contained all the information required to assess the establishment of a calibration facility. The study concluded that setting up a calibration facility is essential, and the participants agreed.

Doing so will preserve the equipment's and tools' safety. By creating a metrology culture, the facility will manage the institution's measuring tools and equipment and train staff members like avionics instructors. The study also revealed the demographic profile of the participants include technical faculty members and college administrators and officials from the campus, many of whom possess the advanced academic credentials such as graduate of Master in Aeronautical management and other participants has the units in their Doctorate and extensive years of service in aviation education. Most of the participants are male and aged between 26-30 and 51-60 years old, with most of them in permanent status.

Calibration is essential in every industry, and the study's objective is to build a calibration facility that will provide the required standard calibration services for specific laboratory tools and equipment used in the Powerplant and Avionics laboratory. The facility of the calibration is for the quality assurance of an Aviation Training Organizations that do conform to the approved benchmark practices of Civil Aviation Authority of the Philippines in conformity with the International Civil Aviation Organization. To ensure aviation safety that requires the Philippine Civil Aviation Authority that enforces rigorous regulations and maintain ongoing oversight aligned with ICAO standards. Precision measurements are essential in aerospace that a reliable calibration services are indispensable to this safety mission.

Keywords*: Calibration, Calibration discipline ,Feasibility, Electrical discipline About four key words or phrases in alphabetical order, separated by commas.*

Cultivating Environmental Stewardship: Designing Learning Materials in Science and Technology Education for Enhanced Biodiversity Assessment and Conservation

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Abstract

Environmental education is essential in shaping students' understanding of biodiversity conservation. However, many aspects of the current science curriculum, particularly local biodiversity conservation, remain challenging for students to fully comprehend. This gap limits their ability to connect with real-world ecological issues vital for a sustainable future. The study assessed curriculum competencies and existing learning materials on biodiversity and conservation, focusing on cognitive contextualization and affective learning domains. Through interviews, field observations, and biodiversity assessments, several environmental threats in Lake Buluan were identified. The biodiversity assessment, conservation challenges, and sustainable solutions were incorporated into the development of enhanced localized learning materials in science and technology education. These materials were compared with conventional learner's manuals to assess their effectiveness in improving students' knowledge, awareness, perception, and sense of responsibility toward biodiversity conservation. Results showed that students who utilized the enhanced localized materials demonstrated significant improvement in knowledge, awareness, and environmental stewardship. The study underscores the importance of integrating localized learning materials into the curriculum to foster long-term environmental awareness and stewardship, contributing to the broader goal of education for sustainable futures.

***Keywords**: Localized Learning Materials, Curriculum Contextualization, Environmental Education, Cognitive and Affective Domains, Biodiversity Conservation*

Mapping Artificial Intelligence Applications in the Halal Ecosystem: Software Engineering Benefits and Research Challenges

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Abstract

Artificial intelligence (AI) is increasingly being investigated as an enabling technology for halal assurance, authentication, traceability, certification, tourism, and decision support. However, existing evidence is dispersed across food science, information systems, supply-chain management, tourism, and computing literature, making it difficult to identify the software-engineering patterns that characterize the emerging halal technology landscape. This study presents a software-engineering-oriented systematic mapping of AI applications within the halal ecosystem. The research was guided by four questions concerning (1) AI technologies used, (2) software-engineering applications, (3) reported benefits, and (4) challenges and research gaps. The analysis used a populated evidence-extraction workbook derived from the study concept. Nineteen records were available for screening; fourteen records were retained for the mapping because they were marked for inclusion, while five records marked "Maybe" were excluded from quantitative synthesis pending verification. The included corpus comprised seven primary studies and seven review/framework studies published between 2017 and 2026. Machine-learning methods were the most recurrent technology family, appearing explicitly in nine included records, while natural language processing, computer vision, blockchain, and other intelligent techniques appeared as complementary technologies. At the software level, authentication, classification, certification/compliance, traceability, forecasting, recommendation, and decision support were the dominant application patterns. Across the evidence, reported benefits included automation, accuracy, efficiency, faster or data-driven decision-making, improved traceability, and stronger consumer-facing trust or accessibility. The most persistent challenges were data limitations, weak or limited validation, model transparency, interoperability and adoption barriers, governance, and domain-specific deployment. The findings support a software taxonomy for intelligent halal systems and suggest that future work should prioritize auditable, interoperable, explainable, and real-world validated AI solutions aligned with halal requirements.

Keywords: *artificial intelligence; halal ecosystem; systematic mapping; software engineering; halal authentication; machine learning; traceability; intelligent systems*

Sensory Evaluation of A Tilapia-Oat-Turmeric Seasoning Blend for Consumer Acceptability in Soup Matrices

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Abstract

Seasoning blends incorporating fish by-products and functional plant ingredients have emerged as innovative solutions for enhancing the nutritional profile and sensory appeal of soup-based food products. The objective of the study was to formulate and assess the sensory acceptability of soups containing different levels of tilapia-oat-turmeric seasoning for their potential use in food innovation and food security in the Philippines. Fifty untrained panelists enrolled in the Food Service Management and Culinary Technology programs of the Sultan Kudarat State University were involved in sensory evaluation of the soups with 100 g, 200 g and 300 g tilapia powder, respectively, and rated for texture, aroma, taste, color and overall acceptability using a 9-point hedonic scale. The soups were made by adding standard seasoning mixtures to vegetable broth, and the sensory testing was performed under predetermined conditions with random presentation of samples. Statistical analysis using one-way ANOVA results showed that texture, aroma, taste and color did not differ between treatments; however, overall acceptability showed significant differences among treatments, with the highest preference being obtained with the 300 g treatment. All the mixed soups had significantly higher sensory attributes than the control (plain vegetable broth), indicating that the blend effectively increased the palatability of the products. The present findings provided evidence that fish by-products and functional plant ingredients can be effectively utilized for the development of value-added food products as a prospective way for sustainable nutrition and consumer acceptance. The study provides insight into the need to optimize ingredient concentration for overall acceptance with the possibility of the tilapia-oat-turmeric blend as a new and balanced resolution to challenges to food insecurity.

Keywords*: Tilapia powder; oat; turmeric; seasoning blend; soup; sensory evaluation; consumer acceptability; food innovation*

Influences of Virtual Influencers on Vietnam's Fashion Industry Development

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Abstract

The aim of this study is to maximize using virtual influencers (hereafter VIs) for Vietnam's fashion industry development. Employing a qualitative, multi-method research design, including 21 semi-structured interviews and 8 focus groups with Vietnamese Gen Z consumers, the project presents main drivers for following VIs. Findings show the ways VIs can boost sustainable development of Vietnam's fashion industry through educational content, aspirational styling, partnerships with eco-conscious brands, and interactive storytelling. Notably, VIs contribute to expansion into international markets, heightened environmental awareness, cost saving and influence sustainable product consideration. On the contrary, loss of work, change in the company's human resource structure, tensions around authenticity and greenwashing, the paradox of promoting consumption for sustainability, data privacy and violation of copyright laws persist. This research gives some recommendations on the employment of VIs to develop Vietnam's fashion industry: Build up stories surrounding fashion VIs narratives, enrich the virtual influencer content, integrate fashion VIs into live events, be aware of ethical implications of virtual influencer advertising.

Keywords: *qualitative research, fashion industry development, sustainable development, virtual influencers.*

Misconceptions in Ecology of the Junior High School Grade Levels

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Abstract

This study developed, validated, and determined the misconceptions in ecology across the junior high school level. The study also developed and validated the effectiveness of the proposed program to minimize misconceptions among the students. This study employed a quantitative method supported by qualitative data gathering through the conduct of performance tasks, an interview guide, and determined the effectiveness of the strategy through pre-test and post-test. The results of the study showed the following: photosynthesis and respiration are the topics with the highest misconceptions occurred; most of the students from junior high school were evaluated Level 3 in their drawing and verified in the interview. This means in this level, students showed misconceptions in the ecology topics given by the researcher; based on the interview given to the students, most students have prior knowledge from their past lessons based on the teachings of their teachers. Some students would browse online and some of the students read it from their books. The results of the drawing and interview showed that misconceptions about selected ecology concepts persist across the grade level. META DAT-CROSS Strategy (Metacognitive Developing Assessment and Tools to Support the teaching and learning of Science Cross Cutting Concepts) was the intervention developed by the researcher was effective in minimizing and correcting misconceptions about students in ecology across the junior high school as shown in the pre-test and post-test scores of the students. Thus, the utilization and enhancement of the content of the META DAT-CROSS strategy is recommended to further improve concepts in ecology topics.

Keywords*: Misconceptions. Ecology. META DAT – CROSS. NDDU. SKSU. Philippines*

Misconceptions. Ecology. META DAT – CROSS. NDDU. SKSU. Philippines

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Abstract

Generative artificial intelligence (GenAI) offers opportunities to improve the efficiency, accuracy and quality of financial reporting. However, its professional adoption remains constrained by concerns regarding data security, technical competence and output reliability. This study examined accounting professionals' intention to use GenAI in financial reporting in Tacurong City, Philippines, using an extended Unified Theory of Acceptance and Use of Technology framework. Specifically, it assessed adoption-related perceptions in terms of performance expectancy, effort expectancy, social influence, facilitating conditions, privacy and security concerns, training and development and perceived risk. A cross-sectional quantitative descriptive-comparative design was employed. Data were collected from 65 accounting professionals through an adapted survey questionnaire using quota sampling. Frequency, percentage, mean, standard deviation and one-way analysis of variance were used to analyse the responses. The findings revealed a high overall intention to use GenAI in financial reporting (M = 3.51, SD = 0.27). Effort expectancy received the highest rating (M = 4.14, SD = 0.61), followed by performance expectancy (M = 3.85, SD = 0.53), facilitating conditions (M = 3.55, SD = 0.43) and social influence (M = 3.42, SD = 0.43). Training and development, privacy and security concerns and perceived risk received moderate ratings. No statistically significant differences were found according to current position or title (p = .441), employment sector (p = .360) or years of professional experience (p = .454). These results demonstrate broadly consistent openness to GenAI across professional groups. However, responsible adoption requires targeted competency development, organisational support, data-protection protocols, ethical guidelines and human oversight. The study contributes context-specific evidence concerning GenAI adoption among accounting professionals in a developing regional economy.

Keywords: *accounting professionals, financial reporting, generative artificial intelligence, technology adoption, UTAUT*

From Beans to Breakthroughs: Exploring the Innovation Adoption of Smallholder Cacao Growers

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Abstract

In rural farming communities, smallholder cacao growers continuously face financial limitations, environmental risks, and production uncertainties while striving to improve their livelihoods through agricultural innovations. This embedded single-case study aimed to explore the innovation adoption, challenges, and adaptive integration practices of smallholder cacao growers who are members of the Senator Ninoy Aquino Cacao Growers Association in Senator Ninoy Aquino, Sultan Kudarat, Philippines. The study utilized a qualitative research design using an embedded single-case study approach, with ten (10) smallholder cacao growers chosen through purposive sampling. Reflexive thematic analysis was used as the data analysis tool. Results revealed that agricultural innovations positively transformed farming practices, productivity, and economic viability among growers. The participants perceived trainings, institutional interventions, and technical assistance from agencies such as the Department of Trade and Industry (DTI), Department of Agriculture (DA), and Department of Science and Technology (DOST) as major catalysts for innovation adoption. However, growers experienced financial constraints, labor and time demands, environmental vulnerabilities, limited postharvest infrastructure, and gaps in technical knowledge. To cope with these challenges, growers integrated traditional and modern farming practices, applied adaptive and experiential strategies, selectively implemented innovations, and utilized financial support mechanisms. Nonetheless, innovation adoption among cacao growers is shaped by institutional support, economic aspirations, social learning, and adaptive decision-making.

Keywords: *agricultural economics, smallholder cacao growers; innovation adoption, embedded single-case study; Philippines*

Faith, Inclusion, and Change: Muslim Women's Aspirations for the Future of Dance and Sport in Physical Education at Sultan Kudarat, Philippines

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Abstract

This phenomenological study explored the aspirations of Muslim women for the future of dance and sport within Physical Education (PE) at Sultan Kudarat, Philippines, situating their voices within the broader discourse on faith, inclusion, and educational change. While prior research in the local context has documented the lived experiences and coping strategies of Muslim women navigating PE (Espartero & Edaño, 2025), comparatively little is known about how these women envision the future of the field itself, and what role they see themselves playing in shaping it. Using purposive sampling, ten Muslim women finished all basic PE subjects and students majoring PE were interviewed in depth; data collection concluded at the tenth interview upon reaching data saturation, consistent with methodological evidence that in-depth interview studies with relatively homogeneous samples commonly reach saturation between five and twenty-four interviews, often by around the ninth (Hennink et al., 2017; Hennink & Kaiser, 2022). Data were analyzed using Colaizzi's (1978) descriptive phenomenological method. Five themes emerged: Commitment to Faith and Inclusion, Culture and Education Inclusivity, Confidence-Building Engagement, Commitment to Modesty and Inclusivity, and Openness to Change. Findings reveal that participants did not experience faith and institutional participation as inherently opposed; rather, they actively negotiated, and in several cases transformed, restrictive practices into openings for reform, while envisioning themselves as future educators and advocates who could institutionalize the accommodations they once had to fight for individually. The study contributes an aspiration-oriented, forward-looking account to a literature that has largely emphasized

***Keywords**: Muslim women, physical education, inclusion, phenomenology, dance and sport*

Bamboo Promising Technologies: Unveiling The Local Knowledge in The Bamboo Industry from Cane Selection to Market Display

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Abstract

This study explored the integration of local knowledge and emerging technologies in the bamboo industry it focused on the entire production process from cane selection to market display. It was centered in Sultan Kudarat and South Cotabato where bamboo craftsmanship is deeply rooted in tradition, The research highlighted how indigenous techniques contribute to sustainable practices and economic development. It utilized mixed methods research surveys, interviews, and observations the study identified key stages such as cane selection, raw material preparation, treatment, construction, and product display.

Findings revealed that local artisans prioritize traditional methods, emphasizing the quality and sustainability of their craft despite limited access to modern machinery and packaging strategies.

The research also identified challenges such as high transportation costs and competition with synthetic materials, while underscoring strong market potential and profitability, especially for large bamboo products like kubos and furniture.

The study concluded that blending traditional craftsmanship with modern tools and market strategies can significantly enhance the viability, scalability, and cultural preservation of the bamboo industry.

Keywords: *bamboo industry, local knowledge, traditional craftsmanship, emerging technologies, sustainable practices, bamboo products, market display, indigenous knowledge, economic development*

Rethinking the Role of Philosophy in Global Challenges: Toward a Normative Foundation for Peace and Sustainable Development

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Abstract

Global challenges of the twenty-first century — armed conflict, inequality, climate change, technological disruption, forced displacement, political polarization, and environmental degradation — are typically approached through scientific, technological, economic, and political interventions. While indispensable, these approaches do not by themselves resolve the normative questions that underlie global problems: What constitutes a just society? What kind of development is worth pursuing? Whose interests should guide technological progress? What does it mean to live peacefully? And what do present generations owe to those not yet born? This paper argues that philosophy supplies a critical, ethical, and normative foundation for multidisciplinary problem-solving, one that technical disciplines cannot supply on their own. Drawing on Johan Galtung's distinction between negative and positive peace, Amartya Sen's and Martha Nussbaum's capability approach, Jürgen Habermas's theory of communicative action, Emmanuel Levinas's ethics of the Other, and Hans Jonas's ethics of responsibility, the paper contends that global challenges cannot be resolved through technical means alone because they involve competing values, contested conceptions of justice, and unresolved questions about the purpose of development. Philosophy is theorized here as a normative compass that evaluates the assumptions, purposes, and ethical legitimacy of multidisciplinary interventions rather than competing with them. The paper further develops a Philosophical-Normative Model in which critical reflection generates ethical principles that, in turn, orient multidisciplinary action toward sustainable peace and human flourishing. Philosophy, on this account, is not an isolated academic discipline but a dialogical and ethical practice that connects knowledge with wisdom, capability with responsibility, and development with justice.

***Keywords**: philosophy, global challenges, peace, sustainable development, ethics, justice, human dignity, multidisciplinary approaches, human flourishing*

Manisan Ka Palimbang: A Historical Case Study of Resilience, Peacebuilding, and Inclusive Local Development in a Former Conflict-Affected Municipality in Southern Philippines

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Abstract

This study examines the transformation of Palimbang, Sultan Kudarat, a former conflict-affected municipality, into a locality associated with resilience, peacebuilding, and inclusive local development. Grounded in Mindanao, it offers insights for communities worldwide where local governments rebuild trust, restore security, reintegrate former conflict actors, and pursue development after instability. Using a qualitative historical case study design, data came from interviews, group narratives, life history testimony, and documentary sources involving department heads, a business-sector representative, the Philippine Army, the Philippine National Police, a former rebel and public servant, and the accomplishment narrative of the local chief executive. Data were analyzed using reflexive thematic analysis and historical narrative analysis. Findings generated six themes: remembered violence and institutional fragility; security stabilization as the foundation of development; visible and responsive governance; reconciliation and reintegration of former conflict actors; inclusive service delivery and economic recovery; and Manisan Ka Palimbang as reclaimed identity. The Malisbong Massacre surfaced as a wound shaping memory, identity, and resilience. Across sources, peace and order enabled transformation, while development appeared through infrastructure, business, tourism, financial institutions, health services, education, and formalized enterprise. The study concludes that Manisan Ka Palimbang offers a post-conflict transformation model where peace is built through trust, inclusive governance, reintegration, culturally grounded mechanisms, and reclaimed identity.

Keywords*: Palimbang, Peacebuilding, Resilience, Post-conflict Recovery, Inclusive Governance*

Culinary and Technology Fusion: Transforming Apple-Amplaya Ice Cream Making into an Educational Video

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Abstract

Ice cream is widely consumed as a dessert, yet the development of innovative formulations using fruits and vegetables remains an opportunity for combining food innovation with technology-based learning. The study aimed to determine the most preferred formulation, assess its sensory acceptability, determine its packaging, labeling, and return of investment, and evaluate the quality of the developed educational video in terms of content, interface, organization, and overall package. An experimental product-development approach was employed using four formulations. Preference ranking, blind and non-blind tests, and a 9-point hedonic scale were utilized, while Friedman's test and mean were used for data analysis. faculty members, students, and community youth participated in the product evaluation, while BTTE/BTVTE alumni and social media users evaluated the educational video. Findings revealed that Formulation 2, containing 250 g of ampalaya puree and 250 g of apple powder, was the most preferred formulation. The sensory qualities obtained an overall mean of 8, interpreted as "Like Very Much." The product could produce 60 packs of 100 g each at an estimated selling price of ₱16.88 per pack. Laboratory analysis showed 65.90% moisture, 2.31% protein, 3.41% fat, 0.94% ash, and 96 mg/100 g sodium. Computed nutrition information showed that a 50-g serving provides 70 calories, 1.5 g total fat, 50 mg sodium, 14 g carbohydrates, and 1 g protein. Microbiological analysis reported a coliform count of 330,000 CFU/g and an Escherichia coli count of <10 CFU/g in the submitted sample. The educational video obtained a very high extent of quality in content, interface, and organization, meeting 91–100% of the quality expectations, while the overall package was rated at a high extent. The study concludes that apple and ampalaya can be successfully developed into an acceptable and potentially marketable ice cream product while its production process can also serve as a quality instructional resource in Technology Education. It is recommended to improve production hygiene, handling, storage, and preservation, conduct shelf-life testing, and further future studies may also assess the product's commercial viability and consumer acceptance in broader markets.

Keywords: *apple–ampalaya ice cream, culinary innovation, educational video, sensory acceptability, food product development, Technology Education*

The Dual-Burden Framework: Time Poverty, Unpaid Care Work, and Enterprise Sustainability Among Rural Female Entrepreneurs

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Abstract

Rural women entrepreneurs are vital contributors to grassroots economic resilience, yet their participation in local markets remains constrained by gendered expectations surrounding unpaid domestic and caregiving labor. This study re-analyzes enterprise outcomes through a gendered lens using a quantitative descriptive-comparative dataset of 313 multi-role women microentrepreneurs in Boac, Marinduque. The analysis is anchored in Alice Eagly's Social Role Theory and Naila Kabeer's Resources-Agency-Achievements Empowerment Framework.

Findings indicate that most respondents demonstrate strong socioeconomic contributions, particularly in meeting daily household expenses and supporting children's education. However, a closer examination of operational challenges reveals substantial role overload and physical and mental exhaustion, reflecting the persistent tension between entrepreneurial responsibilities and domestic obligations. Kruskal–Wallis test results further demonstrate that age significantly influences socioeconomic contribution levels, suggesting that generational life stages shape women's time availability, household responsibilities, and capacity to negotiate domestic roles. Married women, who comprise 62.94% of the respondents, experience particularly pronounced tensions between reproductive and caregiving responsibilities and their capacity to sustain and expand their enterprises.

The findings suggest that conventional microenterprise interventions are insufficient when women are treated primarily as economic actors while the unpaid care economy remains unaddressed. Women's enterprise performance is shaped not only by access to financial and productive resources but also by their agency over time, household responsibilities, and decision-making. Accordingly, this study proposes a gender-responsive policy framework centered on accessible institutional care infrastructure, equitable redistribution of unpaid care work, flexible enterprise support, and digital literacy initiatives tailored to multi-role women entrepreneurs. Addressing these structural constraints can strengthen women's entrepreneurial agency, improve enterprise sustainability, and enhance their broader socioeconomic contributions to rural communities.

***Keywords**: Time Poverty; Unpaid Care Work; Rural Women Entrepreneurs; Enterprise Sustainability; Gender Empowerment*

From Experiential Learning to Workplace Performance: OJT Experiences of Business and Hospitality Graduates

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Abstract

On-the-Job Training (OJT) provides an essential bridge between academic preparation and workplace demands by allowing students to apply theoretical knowledge in actual professional settings. This study assessed the OJT experiences, workplace performance, and challenges of graduates from the business, accounting, hospitality, and tourism programs of Sultan Kudarat State University. A convergent mixed-methods research design was employed, integrating quantitative assessments of graduates' OJT experiences and employer-assessed performance with qualitative accounts of challenges encountered during training. Quantitative data were analyzed using descriptive and inferential statistics, while qualitative responses were examined through thematic analysis. Results revealed that the graduates' overall OJT experience was Very Satisfactory, with work environment and training and support from host agencies receiving the highest ratings. Employer assessments likewise indicated that graduates demonstrated very high workplace performance, particularly in technical knowledge, work habits, and personal attributes. OJT experiences did not significantly differ according to age, gender, or year graduated; however, a significant difference was observed across academic programs. Furthermore, OJT experience had a strong positive and significant relationship with workplace performance, indicating that favorable training experiences were associated with better workplace performance. Qualitative findings identified challenges involving adjustment to unfamiliar work environments, communication and language barriers, workload and time management, workplace relationships, financial constraints, and other personal difficulties. The findings highlight the importance of strengthening program-specific OJT frameworks, pre-deployment preparation, institutional monitoring, industry mentorship, and post-deployment evaluation to enhance experiential learning, professional competence, and graduate career readiness.

Keywords: *experiential learning, on-the-job training, workplace performance, career readiness, SDG1 Quality Education*

Working Capital Management Practices and Sustainability Outcomes of Barangay Micro Business Enterprises in Norala, South Cotabato: An Explanatory Sequential Mixed-Method Study

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Abstract

This study examined the relationship between working capital management practices and sustainability outcomes of Barangay Micro Business Enterprises (BMBEs) in Norala, South Cotabato, where many microbusinesses face challenges in maintaining long-term viability. An Explanatory Sequential Mixed-Method design was implemented, using total enumeration sampling of 85 respondents for the quantitative phase. In this phase, statistical tools used were mean, standard deviation, Spearman Rank Order correlation analysis, and multiple regression analysis. This was followed by a qualitative phase utilizing a phenomenological research design where seven (7) participants were interviewed using semi-structured questions to deepen the understanding and validate the significant findings from the quantitative phase. The findings reveal that working capital management was very highly practiced while sustainability outcomes was high. Furthermore, working capital management has a moderate positive relationship with sustainability outcomes. It was also found that two of the domains of working capital management significantly influence sustainability outcomes. Of the two domains cash management practices resulted as the best predictor of sustainability outcomes. The results further conclude that proper management of cash and is crucial to the sustainability and resilience of BMBEs, suggesting that practical, direct involvement of the owner in terms of financial management practices should be strengthened to support sustainable microenterprise development. Moreover, the regression analysis showed that 28.5% of the variance in sustainability outcomes was explained by working capital management, while the remaining 71.5% was attributed to other external factors of sustainability.

Keywords: *Barangay Micro Business Enterprises (BMBEs), working capital management, sustainability outcomes, explanatory-sequential mixed method*

Transforming Struggling Readers Through ARAL-BASA: Reading Gains and Mentoring Experiences in a School–University Literacy Partnership

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Abstract

Persistent foundational literacy difficulties remain a concern in Philippine elementary education, highlighting the need for interventions that support struggling readers while strengthening the preparation of future teachers. This study examined changes in learners' reading performance and explored the mentoring experiences of Bachelor of Elementary Education (BEEd) pre-service teachers participating in ARAL-BASA (Adopt-a-Reader for Literacy Advancement–Building Avid Successful Achievers), a school–university literacy partnership implemented during teaching internship. An explanatory sequential mixed-methods design was employed. The quantitative phase analyzed existing school-based reading assessment data from Grades 1–6 learners with comparable pre- and post-intervention results following one semester of literacy mentoring. The qualitative phase analyzed written responses to open-ended questions from 20 pre-service teacher-mentors concerning mentoring practices, perceived learner progress, challenges, professional learning, and program sustainability. Quantitative data were analyzed using descriptive and inferential procedures, while qualitative data underwent thematic analysis. Five themes emerged: (1) Meeting Readers Where They Are: Individualized and Responsive Literacy Mentoring; (2) Progress Through Practice, Encouragement, and Trust; (3) Small Steps, Meaningful Gains: Growing Skills, Confidence, and Independence; (4) From Teaching Reading to Learning to Teach: The Formation of Responsive Educators; and (5) It Takes More Than a Mentor: Sustaining a Literacy Support Ecology. Participants perceived learner progress in reading skills, confidence, motivation, participation, and independence, while mentoring fostered patience, empathy, adaptability, reflective practice, and learner-responsive professional judgment. Integrated findings position ARAL-BASA as a reciprocal learning partnership in which literacy support and teacher formation occur simultaneously, highlighting the potential of sustained mentoring and school–university collaboration to support struggling readers while providing authentic professional learning for future teachers.

Keywords*: ARAL-BASA, literacy mentoring, struggling readers, pre-service teachers, reading intervention, school–university partnership, mixed methods*

Cooperative Learning and Writing Motivation among College Students: The Mediating Role of Writing Strategy

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Abstract

The purpose of this study was to determine the mediating effect of writing strategy on the relationship between cooperative learning and writing motivation among college students. Explanatory sequential mixed methods was employed to obtain data from 300 college students across six state universities and colleges in Region XII. A medgraph was used in determining the mediating effect of writing strategy on the relationship between cooperative learning and writing motivation which was found to be significant partial mediation in this study. Moreover, through in-depth interview and focus group discussion with 17 participants taken from the quantitative respondents, data were integrated with the findings in the quantitative aspect of the study. Furthermore, the participants confirmed the relationships and the functions of the variables in the mediation model. With the confirmation, it can be stated therefore that there is a considerable evidence that writing strategy is one of the reasons why cooperative learning could influence writing motivation of college students in Region XII as presented in the partial mediation model. Additionally, thematic analysis of the qualitative data unveiled the essential themes generally confirming the mediation model and its particulars.

Keywords: *OSINT, Digital Forensics, Cybercrime Investigation, Open-Source Intelligence Tools, Cybersecurity, Artificial Intelligence, Data Privacy, Counterterrorism, Cyber Threat Analysis.*

Durability of Asphalt Concrete with The Utilization of Glass Waste

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Abstract

Asphalt Concrete Wearing Course (ACWC) is increasingly being used on road pavements as part of continuous road infrastructure development. However, road flaws can occur because of faulty material mixing and construction techniques. This study aimed to evaluate the performance of asphalt concrete mixtures modified using glass waste (GW) as a fine aggregate, comparing the durability of asphaltic concrete with and without GW, as well as the durability of porous asphalt. A review of existing literature was conducted to analyse the study's components, which included glass trash, aggregates, and bitumen. Previous study on the use of glass waste in concrete mixtures was also examined to support the usage of waste materials in the road construction industry. Asphalt mixtures containing 0%, 10%, 15%, and 20% GW were created using the Marshall Mix Design technique and assessed for Marshall characteristics. The results showed that the 10% GW mixture outperformed the control mixture in terms of Marshall performance, while the 15% GW mixture had the highest Marshall stability. The Cantabro Loss test was used to measure the durability of asphalt mixtures. The 0% GW control combination had the highest average Cantabro Loss of 6.0315%, whereas the 10% GW mixture had the lowest average value of 3.3749%, showing greater resistance to abrasion. The 15% and 20% GW combinations had average Cantabro Losses of 3.7076% and 4.0768%, respectively. Overall, the 10% GW mixture had the best durability performance and was deemed the most appropriate proportion for the asphalt mixtures studied. The findings show that the addition of GW can improve the durability of asphalt mixtures while also providing an alternative application for waste glass in road building.

***Keywords**: Asphalt Concrete, Glass Waste, Marshall Mix Design, Cantabro Loss, Durability.*

Evaluating the Impact of Building Information Modelling (BIM) on Sustainable Construction Practices

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Abstract

Building Information Modelling (BIM) has evolved as an important digital technology for improving project coordination, efficiency, and sustainability in the construction industry. This study investigates the impact of Building Information Modelling (BIM) on increasing environmental and economic sustainability in building projects, as well as the factors that influence BIM adoption in the construction sector. A structured questionnaire survey was conducted among construction professionals, including engineers, architects, project managers, quantity surveyors, and BIM coordinators, as part of a quantitative research technique. A total of 94 valid replies were gathered and evaluated with Microsoft Excel. Descriptive statistics, mean score ranking, percentage analysis, and Cronbach's Alpha reliability testing were used to assess BIM awareness and adoption, environmental sustainability, economic efficiency, collaboration and project performance, barriers and challenges, and BIM implementation strategies. The reliability analysis found strong internal consistency, with Cronbach's Alpha values ranging from 0.788 to 0.833.

The study found that BIM significantly improves project efficiency, stakeholder coordination, transparency, resource optimisation, and environmental performance. High implementation costs, a lack of government assistance, inadequate BIM knowledge, and aversion to change are all significant impediments to BIM adoption. The report also highlights the importance of training programs, defined BIM guidelines, and organisational readiness in guaranteeing successful BIM adoption. The study reveals that BIM is an effective tool for improving the construction industry's sustainability and project performance while also contributing to the Sustainable Development Goals (SDGs), notably SDG 9, SDG 11, SDG 12, and SDG 13.

Keywords*: Building Information Modelling (BIM), Sustainable Construction, Construction Industry, Environmental Performance, BIM Adoption.*

Mathematical Theory of Configuration, Protein Folding and Vibrational Dynamics

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Abstract

This paper develops a mathematical framework for describing protein dynamics in three- dimensional space, with particular emphasis on the coupled relationships among protein configuration, mechanical energy, folding dynamics, and vibrational modes. The proposed coarse-grained theory represents a protein configuration as a point on a configuration manifold equipped with a Riemannian metric. A configuration-dependent energy functional is introduced, from which a generalized gradient-flow equation governing the evolution of the protein configuration is derived. The vibrational behavior associated with each configuration is then formulated as a generalized spectral problem involving a configuration-dependent differential operator and a mass operator. Through this formulation, the framework provides a mathematical pathway linking protein configuration and folding dynamics to configuration-dependent eigenvalues, eigenmodes, and vibrational frequencies.

The theory is systematically developed through a sequence of definitions, a mathematical pipeline, a master equation, and supporting theorems with proofs that establish key mathematical properties of the proposed framework. Particular attention is given to the consistency of the variational formulation, the existence of the Riemannian gradient, energy dissipation under generalized gradient flow, characterization of equilibrium configurations, spectral properties of the linearized operator, modal representation, and the coupling between configurational evolution and vibrational dynamics.

The resulting formulation is intended to be computationally implementable through numerical and programming-based methods, allowing the proposed framework to be evaluated against established approaches for describing protein dynamics, including Normal Mode Analysis (NMA), Elastic Network Models (ENMs), Molecular Dynamics (MD), and related methods.

Keywords*: configuration manifold, protein folding, vibrational dynamics, Riemannian metric*

Speaking Needs and Anxiety Among Pre-Service Teachers: Basis for Developing An Intensive Speaking Enhancement Training Program (ISETP)

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Abstract

Speaking is a critical communicative skill that pre-service teachers must develop to deliver effective classroom instruction. However, many face challenges in speaking English, often compounded by anxiety. This study aimed to determine the speaking needs and anxiety levels of pre-service teachers at Central Philippines State University and to develop an Intensive Speaking Enhancement Training Program (ISETP) tailored to these needs.

A quantitative research design was utilized involving 145 pre-service teachers and 20 cooperating teachers selected through purposive complete sampling. Data were collected using a validated, researcher-developed questionnaire on speaking needs and a modified version of Aydin and Ustuk's (2020) speaking anxiety scale. Interviews were also conducted to triangulate and support the findings.

The results highlighted a difference in perceptions: pre-service teachers primarily identified oral fluency as their most crucial skill to develop, whereas cooperating teachers emphasized the need for improvement in both fluency and vocabulary. Additionally, pre-service teachers reported low levels of speaking anxiety, while cooperating teachers perceived their anxiety as high. A statistically significant negative correlation was observed between speaking needs and anxiety, suggesting that as speaking competence improves, anxiety tends to decrease.

These findings informed the development of the ISETP, a five-day, needs-based training program designed to enhance the speaking skills of pre-service teachers while reducing their anxiety. The program was created using the ADDIE model (Analyze, Design, Develop), with recommendations for future implementation and evaluation phases. This study contributes to teacher education by emphasizing the importance of addressing both linguistic and emotional barriers in delivering effective lessons in the classroom.

Keywords: *Speaking Needs, Speaking Anxiety, Pre-service Teachers, Cooperating Teachers, ISETP, ADDIE model*

Factors Influencing the Adoption of Workplace Acoustic Solutions in Saudi Arabia

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Abstract

In Saudi Arabia, rapid commercial construction under the country's national diversification programmes has driven demand for modern workplaces, yet acoustic performance remains an under-studied facet of office design. This research investigates the drivers behind and barriers to the specification of acoustic solutions in the Saudi commercial office sector, exploring two research questions: which factors decision-makers prioritise when specifying acoustic solutions, and which barriers hinder adoption. A qualitative, interpretivist design was used. A purposive sampling technique selected eight participants (P1–P8) from across the specification chain in the Saudi market. Seven participated in semi-structured interviews and one responded in writing. Braun and Clarke's (2006) six-phase thematic analysis was used to analyse the data, which were then interpreted in light of Innovation Diffusion Theory (Rogers, 2003) and Institutional Theory (DiMaggio and Powell, 1983; Meyer et al., 2009). Eight themes were identified across the two research questions. Cost ranked as the leading factor for every participant, and consistently prevailed where trade-offs were required. The intangibility of acoustic performance — the challenge of proving a benefit that clients cannot hear before installation — served as a core barrier compounding the other issues, including limited client awareness and the absence of mandatory regulations. Adoption was therefore driven less by the characteristics of the products themselves than by the institutional context in which specification decisions are taken, where weak coercive pressure leaves cost as the default criterion. The study offers a qualitative contribution to an under-researched market, extends diffusion and institutional perspectives to a construction-sector product category, and provides guidance for manufacturers and specifiers operating where cost sensitivity is high and regulatory pressure is weak.

Keywords*: workplace acoustics; adoption barriers; Saudi Arabia; Innovation Diffusion Theory; Institutional Theory*

Effectiveness of Culturally Adapted Leadership Training to Improve Leadership Support and Work Engagement Among Nurses in Makkah Primary Health Care in Saudi Arabia

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Abstract

Background: The nursing workforce in Makkah Primary Health Care centers is highly multicultural (more than 65% expatriates), creating unique leadership challenges. Limited culturally competent leadership support has been associated with lower work engagement, higher emotional exhaustion, and increased turnover intention among nurses, particularly during high-pressure periods such as Hajj and Umrah seasons.

Objective: This study aimed to evaluate the effectiveness of a culturally adapted leadership training program in improving perceived leadership support and work engagement among nurses working in Makkah Primary Health Care centers, Saudi Arabia.

Methods: A cluster-randomized quasi-experimental pre-test/post-test design with a non-equivalent control group wasutilized. Twenty Primary Health Care centerswas randomly assigned to either the intervention group (n = 10 centers) or the control group (n = 10 centers). Nurse leaders in the intervention centers received an 8-session (4-week) culturally adapted leadership training program grounded in Leader–Member Exchange (LMX) principles and tailored to the Saudi multicultural context. Nurses in the control centers continued with usual practice. A total of 250 registered nurses (125 per group) completed the questionnaires one week before and one week after the intervention. Data was collected using the Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2019) and the Supportive Leadership Scale (SLS; 15 items; McGilton, 2010). Both instruments were administered in Arabic and English.

Results:the current study demonstrated that mean score of (Work Engagement) increased from 3.70 ± 1.08 before the intervention to 4.16 ± 1.03after the intervention indicating a significant improvement following the intervention. Similarly, the mean score of (Leadership Support) increased from 4.76 ± 1.40 to 5.38 ± 1.12. These findings indicate that the culturally tailored leadership training program was associated with significant improvements in both work engagement and perceived leadership support among nurses.

Conclusion: The present study concluded that perceived leadership support and work engagement were significantly enhanced after the intervention, suggesting that culturally adapted leadership development may improve nurses' workplace experience

Keywords: *Culturally adapted leadership training, work engagement, perceived leadership support, Leader–Member Exchange (LMX), nursing, quasi-experimental study, Makkah, Saudi Arabia*

The Role of Digital Business Platforms in Enhancing SME Performance in Malaysia

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Abstract

The rise of digital technologies has revolutionised the way small and medium-sized businesses (SMEs) work, engage with their customers, and strive for business development. The present study focuses on the effect of Digital Platform Usage, Digital Marketing Adoption, and E-Commerce Integration on the growth of SMEs in the Klang Valley, Malaysia.

The researcher used a cross-sectional survey design with a quantitative data collection approach, obtaining data from 88 valid respondents consisting of SMEs in various industries in the form of a structured questionnaire. Reliability analysis, descriptive analysis, normality test, Pearson correlation analysis, and multiple regression analysis were used to analyse the collected data in IBM SPSS Statistics.
The results showed that all three independent variables positively and significantly affected SME Growth. Digital Marketing Adoption emerged as the strongest predictor ($\beta = 0.390$, $p = 0.001$), followed by E-Commerce Integration ($\beta = 0.234$, $p = 0.016$) and Digital Platform Usage ($\beta = 0.231$, $p = 0.027$).

The three variables together accounted for 56.0% of the variance ($R^2 = 0.560$) in SME Growth, indicating the significant impact of digital business practices on the development of SMEs. The results indicate the need to improve the potential of digital marketing, but also to really leverage digital platforms and include e-commerce activities in the business processes. The study helps to develop the understanding of the study of digitalisation and SME Growth in the Malaysian context and offers practical implications for SME owners, managers, policymakers, and relevant support agencies in enhancing the digital competitiveness of SMEs and their sustainable growth.

Keywords: SME Growth, Digital Platform Usage, Digital Marketing Adoption, E-Commerce Integration, Digitalisation, Malaysia

Speak, Write, and Think (SWAT) Reading Strategy to Improve Reading Comprehension Skills of Grade 8 Frustration Learners

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Abstract

Reading at a frustration level severely limits an adolescent learner's academic progress and self-efficacy. This study investigated the effectiveness of the Speak, Write, and Think **(SWAT**) reading strategy in improving the comprehension skills of Grade 8 learners classified under the frustration reading level. This study employed a quantitative pre-test and post-test research approach. A purposive sample of 13 Grade 8 frustration-level readers underwent an intensive intervention utilizing the SWAT framework. The strategy systematically blended verbal processing (**Speak**), graphic organizing and note-taking (**Write**), and guided metacognition (**Think**) during reading sessions. Standardized reading assessments (**PHIL-IRI**) measuring literal, interpretative, and evaluative comprehension levels were administered before and after the intervention to track progress. The results demonstrate that the **SWAT reading strategy** is highly effective in moving Grade 8 learners out of the Frustration Level. Data analysis revealed a rapid and statistically significant improvement in the learners' literal and interpretive comprehension scores. However, the data also revealed that evaluative comprehension, specifically critical thinking, judging text quality, and analyzing author intent, remained a challenge and did not progress at the same velocity, indicating that higher-order skills require more structured, long-term scaffolding. Nonetheless, the **SWAT** strategy serves as an excellent immediate intervention to rescue struggling readers from the frustration threshold by mastering basic textual meaning. To bridge the gap in higher-order thinking, educators must extend the "**Think**" phase of the strategy with prolonged, explicit cognitive modeling.

Keywords*: Reading Comprehension, SWAT Strategy, Metacognition, Adolescent Literacy, Action Research, Grade 8 Learners.*

Pathways Towards Innovative Governance Among Exemplary Local Government Units in Iloilo Province

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Abstract

The local governments are pushed to embrace digital transformation or strengthen their existing capabilities if they have already embarked on it. This study examines the innovation practices of exemplary local government units (LGUs) in Iloilo Province, Philippines, that excelled in the Innovation Pillar of the 2023 Cities and Municipalities Competitiveness Index (CMCI). Employing a qualitative case study design and purposive sampling, key informants from the participating exemplary LGUs took part in in-depth interviews. Thematic analysis using NVivo software identified five thematic lenses: digital transformation, administrative innovation, entrepreneurship and economic development, stakeholder engagement and feedback mechanisms, and institutionalization and sustainability. While centered on Iloilo, the findings reflect broader regional and global public-administration trends by revealing how local leaders manage digitalization pressures despite resource constraints. The study demonstrates how digital tools, combined with human and organizational factors, advance socioeconomic development and responsive governance. It documents best practices from exemplary LGUs and identifies the challenges and strategies that inform innovative-governance frameworks, enriching scholarly discussion on the interaction of technology, leadership, and community dynamics in local governance.

Keywords: *Cities and Municipalities Competitive Index, Digital Transformation, Innovation Pillar, Innovative Governance, Local Government Innovation*

The Impact of Islamic Banking Social Welfare Initiatives on Customer Loyalty in Islamabad, Pakistan

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Abstract

This paper investigates the influence of Islamic banking social welfare programs on customer satisfaction and loyalty of Islamic banks customers in Islamabad, Pakistan. It aims to explore three welfare initiatives namely, Zakat and Charity Programs, Qard Hasan (interest-free lending) and Community Development Programs with moderating variable being Customer Trust. This study is designed to find out whether these welfare programs increase customer loyalty and whether the impact on customers' loyalty varies from one welfare program to another, and if this varies depending on the customer's trust of the Islamic bank.

A cross sectional research design and quantitative approach is used. Structured questionnaire will be used for data collection among the customers of Islamic banks in Islamabad such as Meezan Bank, Bank Islami, Dubai Islamic Bank, and Al Baraka. The respondents are sampled through non-probability purposive and convenience sampling methods, and potential respondents are those who have a relationship with their bank. The required number of respondents based on G*Power analysis is 158. Data screening, coding, descriptive statistics and preliminary analysis will be conducted using IBM SPSS Statistics and the measurement and the structural model will be tested using PLS-SEM and bootstrapping by using SmartPLS 4.

The study is ongoing at the pre-results stage and the empirical results have yet to be finalized. Based on the proposed hypotheses and literature reviewed, it was expected that the implementation of Zakat and Charity Programs, Qard Hasan and Community Development Programs will have a positive effect on customer loyalty, and Customer Trust will have a positive impact on the relationships. The study holds importance in that it can provide insights for Islamic banks to determine if their Shariah compliance activities related to welfare can lead to improved customer relationships, trust, and long-term loyalty. The results can also be useful to bank managers, CSR departments, regulators and researchers for creating better welfare and customer retention policies for Islamic banking sector in Pakistan.

***Keywords**: Islamic Banking; Social Welfare Initiatives; Customer Loyalty; Customer Trust; Islamabad*

Educational Differences and Cultural Adaptation as Predictors of Employability Skills and Signalling Challenges Among Bangladeshi Graduates in Malaysia

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Abstract

The growing mobility of international students has revealed the challenges they face in adapting to different educational environments and in preparing for employment in host countries. This paper explores the impact of education and cultural adaptation on the development and signaling of employability skills among Bangladeshi students in Malaysian higher educational intuitions.

The method used was quantitative and date were collected through an online questionnaire from 152 Bangladeshi students studding in Malaysian universities. Descriptive statistics, Pearson correlation and multiple regression analysis were used to analyze the data with IBM SPSS Statistics.

The findings suggest that both educational inequality and cultural adjustment positively affect the development of employability skills. The strongest factor was cultural adaptation which means that students who can adapt well to multicultural learning environments have better communication, teamwork and problem-solving skills. The results also point to the fact that educational differences imply higher signaling problems when students attempt to signal their competencies to potential employers. Interestingly, stronger employability skills and higher cultural adaptation did not reduce signaling challenges as expected. Alternatively, students with higher levels of adaptation and skills development reported greater awareness of barriers in the labor market such as issues related to credential recognition and employer preferences.

The study finds that employability skills acquisition may not be sufficient for international graduates to fill the labor market information gaps. The findings provide practical insights for universities, employers and policy makers interested in ways to improve supports mechanisms for international students and improve graduate employability outcomes.

Keywords*: Employability Skills, Signalling Challenge, Cultural Adaptation, Educational Difference, Critical Awareness Effect.*

Consumer Cultural Intelligence, AI Chatbot Communication, and Customer Satisfaction: Evidence from Shopee, Malaysia

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Abstract

This study explores the relationship between consumer cultural intelligence (CQ) and Customer Satisfaction towards AI Chatbots and how this relationship is moderated by communication Quality on Shopee Malaysia. The study consisted of two objectives: (1) to study the direct link between the four components of CQ (metacognitive, cognitive, motivational, and behavioural) and customer satisfaction; and (2) to study the mediation of communication quality in this relationship. The research was based on Cultural Intelligence Theory, the SERVQUAL model, and the Stimulus-Organism-Response framework. Cross-sectional, quantitative, and explanatory methods were used in the research. The data were collected through a structured online questionnaire that was sent to respondents of Malaysia with the age of 18 years and have used the Shopee chatbot within the past six months. The sampling technique used was purposive sampling and snowball sampling, which was purposive sampling of n=200-250, and the n obtained was 220. The data were analysed using SPSS software that helped to carry out reliability analysis, correlation analysis, multiple regression analysis, and mediation analysis using the Sobel test. Customer satisfaction was shown to be favourably and significantly influenced by all four CQ characteristics (H1-H4 were supported), and communication quality was found to be a significant mediator between them (H5-H8 were supported). Additionally, despite the respondents' high CQ ratings (M=4.22), customer satisfaction received the lowest score (M=2.96), and communication quality was only rated as moderate (M=3.20), making it possible to identify the CQ satisfaction gap. The results indicate that perception of communication quality is what enables CQ to function in AI-mediated service encounters, and that cultural competency alone is insufficient to guarantee a high degree of satisfaction. The study provides key insights into the creation of culturally competent AI systems, which are sensitive to cultural differences and bring cultural intelligence to the realm of AI-mediated services.

Keywords*: Consumer Cultural Intelligence; AI Chatbots; Customer Satisfaction; Communication Quality; Shopee*

Patterns and Functions of Code-Switching in the Oral Language of English as A Second Language (Esl) Students

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Abstract

In English as a Second Language (ESL) education, oral participation plays an important role in building students' confidence in communication. However, many students still experience challenges in speaking such as anxiety and fear of making mistakes during spoken tasks. Linguistic strategies became important tools that allow students to express their ideas and facilitate meaning-making during classroom interaction, namely code-switching. Despite its common usage, research focusing specifically on the oral language patterns and functions of college-level ESL learners still remains limited. The researchers of this study aimed to identify the specific patterns and functions of code-switching among first-year English majors. The study also examined how code-switching practices influenced their oral performance. By employing a descriptive qualitative approach, the researchers conducted discourse analysis on five weeks' worth of pre-recorded classroom observations and performed thematic analysis on semi-structured interviews, with ten (10) purposively selected respondents. The results showed that tag-switching was the most frequently used pattern which mainly functions for politeness and comfortability that helped them in maintaining the flow of their thoughts during recitation. The findings also suggested that the use of code-switching contributes to enhanced learners' participation, heightened speaking confidence, and reduced anxiety associated with monolingual constraints. It showed that the practices of code-switching are not indicators of linguistic deficiency, but rather strategic and effective communicative strategies. Based on the findings of the study, the researchers proposed structured guidelines to help ESL teachers integrate these approaches into classroom activities and instruction to foster a more inclusive and supportive learning environment.

Keywords: *Code-switching, English as Second Language, Oral Participation, Discourse Analysis*

TRASE: A Blockchain-Anchored Mobile Application for Cosmetic Product Verification

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Abstract

Counterfeit cosmetics threaten consumer safety, reduce trust, and damage the reputation of legitimate brands because conventional supply-chain records are often centralized and difficult for consumers to verify. This paper presents TRASE, a consumer-facing mobile application that uses blockchain anchoring to support cosmetic product authenticity and traceability verification without requiring blockchain expertise. TRASE was developed using the Rapid Application Development model and implemented as a three-tier system comprising a Flutter mobile frontend, a Python FastAPI backend with SQLAlchemy, and a Solidity smart contract deployed on the Ethereum Sepolia testnet. Product records are stored off-chain in a PostgreSQL database, while their cryptographic hashes are anchored on-chain. During verification, the application compares the database hash with the corresponding blockchain record and reports whether the product information remains consistent or has been tampered with. The system was evaluated through functional testing, load testing with Locust, a security audit of environment variables and credential handling, independent verification using Sepolia Etherscan, and a System Usability Scale study involving 20 participants. All five functional test cases passed, and the backend recorded a 0% error rate under tests involving up to 100 concurrent virtual users. Anchored records were independently traceable on the public blockchain, while the application achieved a mean SUS score of 84.13, exceeding the commonly cited benchmark of 68. These results indicate that a hybrid off-chain/on-chain architecture can provide transparent, consumer-accessible product verification and offer small and medium-sized cosmetic brands a practical approach to demonstrating product authenticity.

Keywords: *Blockchain traceability; cosmetic supply chain; product authenticity; mobile application; consumer trust*

From Screening to System: A Closed-Loop AI Preventive Health Ecosystem for Workforce Non-Communicable Disease Management in Malaysia

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Abstract

Background: Non-communicable diseases (NCDs) are Malaysia's leading cause of death. The 2023 National Health and Morbidity Survey found that 15.6% of adults have diabetes, 29.2% have hypertension and 33.3% have hypercholesterolaemia, with a large share undiagnosed. Workplace screening programmes typically end at detection, producing data without sustained intervention or organisational change.

Objective: This paper describes the design and early deployment of Sihat AI, an artificial intelligence (AI) preventive health ecosystem, and proposes a framework for moving workforce health from episodic screening to institutionalised prevention.

Methods: We present a design-science description of the platform and a descriptive analysis of aggregated, de-identified data from our institutional workforce deployment. The platform integrates smart health kiosks, smartphone-based remote photoplethysmography (rPPG), laboratory report analytics and a conversational AI health assistant into a unified user profile. Care follows a five-stage closed loop (Detect, Triage, Intervene, Monitor, Measure) supported by six structured clinical protocols.

Results: Across the deployment, 893 employees were screened and 4,492 vital-sign records were captured, an average of five records per person. A total of 172 employees (19.3%) were flagged as critical-risk, indicating substantial unrecognised risk in an active working population.

Conclusion: The decisive innovation is not the screening technology but its institutionalisation. Embedding health data into organisational policy, through a health passport and human-resource integration, turns prevention into a permanent operating system rather than a discretionary wellness programme. We outline implications for national workforce wellness indices and scalable preventive health infrastructure in emerging economies.

Keywords: *artificial intelligence; preventive health; non-communicable diseases; workforce wellness; remote photoplethysmography; closed-loop care; digital health infrastructure; Malaysia*

Virtual Influencers Promoting Disinformation: Effects on Followers' Well-Being

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Abstract

This paper aims to examine how virtual influencers promote disinformation and what the effects of this process are on their followers' well-being. This study used a multi-method qualitative design, including semi-structured interviews and focus groups with Gen Z consumers. 18 people participated in the semi-structured interviews and 32 people attended the focus group discussions. Data was analyzed by thematic analysis using Braun and Clarke (2006). The results highlight the significance of understanding the effects of virtual influencers promoting disinformation in different contexts. We also figure out how to improve followers' well-being via virtual influencer content. Further research should use a quantitative approach to test the hypotheses emerging from our conceptual framework. In addition, to enhance the generalizability of our findings, future studies could analyze consumer perceptions of virtual influencers across multiple countries. Another suggestion for further research is to compare consumer perceptions across different social media platforms besides Instagram. This study shows the diverse effects of virtual influencers' disinformation promotion, offering significant insights for marketing managers and encouraging policymakers to protect consumer well-being, specifically among younger audiences, in virtual influencer marketing. A recent systematic literature review on virtual influencers indicates that there is a lack of research regarding how virtual influencers impact their followers' well-being (Las Zkiewicz and Kalinska-Kula, 2023). Our research is the first study which looks at the effects of virtual influencers promoting disinformation on their followers' well-being. It makes a clear theoretical contribution to address the research gap in current literature as regards to the impact of virtual influencer marketing on consumer well-being.

Keywords: *influencer marketing, social media influencers, virtual influencers, well-being.*

English as A Language of Instruction Among Culturally Diverse Students in A State University in The Philippines

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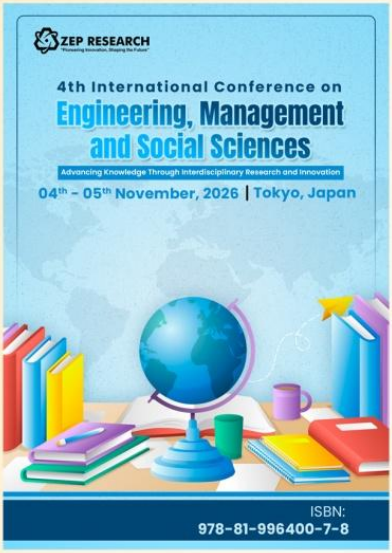
Abstract

The complex, inseparable relationship between language and education has greatly influenced teachers' meaningful experiences and students' academic success, since education is delivered through language. Deciding the right language in education

contributes to nation building; but its designation as the language of instruction (LoI) may pose challenges, particularly in helping culturally diverse students to learn. The study examined the status of English as a language of instruction based on teachers' and culturally diverse students' experiences in higher education. This aimed to address issues such as the neglected use of English, low licensure passing rates, students' low English proficiency, and challenges in teaching and learning. Fully Mixed Sequential Equal Status Research was employed. The QUAN aspect used a survey instrument, while the QUAL aspect employed semi-structured interviews triangulated through FGD. The study included 357 respondents in two groups: 65 college teachers and 292 culturally diverse students, identified through purposive sampling. The QUAN data were obtained using descriptive statistics, while QUAL data were obtained through Thematic Analysis. Hence, data comparison and consolidation involved QUAN data transformation. Through data integration, the study revealed nine integrated themes. They are the undeniable relevance and importance of English, profound usefulness of English, recognizable teachers' pedagogical practices, extensive preference and acknowledgment of differentiated language of instruction, inevitable problems in English, selective institutional practices, preference for Content and Language Integrated Learning, inspiring students' learning practices, and long-term communicative competence. Further, the results revealed a lack of teacher training. Hence, an English language training program for non-language teachers was recommended and hoped to be institutionalized to improve instructional quality without sacrificing students' culture and diversity.

Keywords: instruction, culturally, Analysis, institutional

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978-81-996400-6-1