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5th I-CReST 2025

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SYNERGY FOR FUTURE SUSTAINABILITY:
BRIDGING SCIENCE, TECHNOLOGY AND HUMANITIES

Abstract Book

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FOREWORD



Assalamu'alaikum warahmatullahi wabarakatuh and greetings.

On behalf of the Centre of Foundation Studies, Universiti Teknologi MARA (UiTM) Selangor Branch, Dengkil Campus, it is my great pleasure to welcome all esteemed participants from diverse institutions to the **5th International Conference on Research and Practices in Science, Technology and Social Sciences (I-CReST), 2025**. This year's theme, "Synergy for Future Sustainability: Bridging Science, Technology, and Humanity", brings together experts from multiple disciplines to share insights, engage in discourses, and cultivate collaborations that will shape a more synergistic and sustainable future.

This Book of Abstracts reflects the collective dedication and scholarly contributions of all parties involved in **I-CReST 2025**. In an era marked by ever-evolving technological advancements, our ways of teaching, learning, and conducting research are being profoundly reimagined. These breakthroughs, when coupled with multidisciplinary collaboration, can spark transformative solutions, nurture critical and creative thinking, and thereby address pressing global challenges that transcend geographical and disciplinary boundaries.

By amalgamating the strengths of science, technology, and the human spirit, we can drive sustainability in education and beyond, from an elusive aspiration into a tangible reality. I-CReST 2025 stands as a catalyst for this visionary progress, thus fostering an environment where knowledge, innovation, and shared purpose converge.

I extend my deepest appreciation to our dedicated reviewers for their meticulous work in upholding the quality of abstracts and manuscripts, many of which will also appear in reputable academic journals. I also extend my heartfelt appreciation to the conference organising committee, led by Dr. Fadiatul Hasinah Muhammad, for their unwavering dedication, tireless efforts, and steadfast commitment throughout every stage of this endeavour.

I trust that I-CReST 2025, and future editions in the years ahead, will carry forward their legacy as a meaningful platform for advancing personal, institutional, national, and global aspirations in education and research. Insya Allah, the impact we forge here will resonate far into the future.

Thank you.

Professor Dr. Zulkhairi Haji Amom
Director
Centre of Foundation Studies
Universiti Teknologi MARA (UiTM)
Cawangan Selangor
Kampus Dengkil

PREFACE



Assalamu'alaikum warahmatullahi wabarakatuh and warm greetings to all.

I am honoured to welcome academicians, researchers, industry professionals, graduate students, and all participants to **the 5th International Conference on Research and Practices in Science, Technology, and Social Sciences (I-CReST), 2025**. The theme, "**Synergy for Future Sustainability: Bridging Science, Technology, and Humanity**", embodies our aspirations and shared commitment to fostering collaborations between researchers from various fields. The conference provides an avenue for sharing insights and knowledge, exploring innovative solutions, and inspiring changes for a sustainable future. In essence, the theme signifies our dream to harness the power of various scientific, technological, and social sciences fields in addressing contemporary challenges.

The pursuit of sustainability in the era of rapid technological advancement and complex global challenges warrants concerted efforts that go beyond scientific and technological solutions. Attaining a total synergy for future sustainability also requires a profound understanding of human values, socio-cultural dynamics, and ethical considerations. Hence, bridging science, technology, and humanity can yield more impactful approaches and strategies to address these complexities. Similarly, tertiary education will thrive and become sustainable through innovations in science and technology that are balanced with ethical responsibility, humanistic principles, and cultural awareness. Scientific and technological advances provide various tools to enrich teaching and learning experiences, while the aspect of humanity aligns them with values that prioritise holistic growth. This is where I-CReST 2025 can serve as a conduit through which these efforts can be realised. With a total of 122 abstracts, this year's conference has garnered exceptional responses from local and international researchers, reaffirming its position as a platform of choice for a shared commitment to advancing knowledge, forging collaboration, and shaping a sustainable future.

I wish to express my sincere appreciation to the Director of the Centre of Foundation Studies, Professor Dr. Zulkhairi Haji Amom, for his unwavering support. My utmost gratitude to the I-CReST 2025 Organising Committee for their wholehearted support and commitment, as well as for being my pillars of strength in making this conference a success. On behalf of the I-CReST 2025 Organising Committee, I welcome all the participants to the conference.

Insha Allah, we will meet again in I-CReST 2027.

Dr. Fadiatul Hasinah Muhammad
Chairperson
I-CReST 2025



ABOUT THE CONFERENCE

The **International Conference on Research and Practices in Science, Technology and Social Sciences (I-CReST)** is an academic conference organised by the **Centre of Foundation Studies, Universiti Teknologi MARA (UiTM), Selangor Branch, Dengkil Campus, Malaysia**. Aligned with this year's theme, "***Synergy for Future Sustainability: Bridging Science, Technology, and Humanity***", the conference serves as a dynamic and pivotal virtual platform for researchers, scholars, and educational practitioners to engage in scholarly discourse, share the latest research findings, and foster collaborative networks. I-CReST strives to advance knowledge dissemination and facilitate intellectual discussions on diverse topics, with specific emphasis on transformative ideas that are aligned with science, technology, humanity, and their critical intersections in empowering and making education more sustainable. This conference has a typical format of 30-50 minutes of presentations by plenary and keynote speakers, as well as invited presenters, who are experts in their respective fields. Interactive Q&A sessions subsequently follow the slots. To reach a wider audience, enhance accessibility, and promote greater academic engagement, the conference participants' pre-recorded video presentations are streamed via Pusat Asasi UiTM's YouTube Channel. Since its inaugural event in 2020, I-CReST has received tremendous positive responses, attracting diverse perspectives from academia and industry. I-CReST 2025 garnered a total of 122 abstracts and presentations on cutting-edge studies within the scopes of science, technology, and social sciences, as well as those of a cross-disciplinary nature. The conference also provides opportunities for publication in proceedings with an e-ISBN. Selected papers will be recommended for publication in journals indexed by WOS/Scopus/MyCite/MyJournal, following a thorough peer-reviewed process.

THEME SYNOPSIS

I-CReST 2025's main theme addresses **FOUR** (4) tracks to encourage scientific writing/publication across multidisciplinary research in the broad fields of the following.

Physical Sciences:
Medical Physics; Nuclear Physics; Photonics; Optics; Spectroscopy; Device Physics; Material Science; Polymers; Nanotechnology; Solid State Ionics; Inorganic and Organic Chemistry; Natural Products Chemistry; Catalysis; Renewable and Sustainable Energy

Biological Sciences:
Botany; Forestry; Ecology; Zoology; Entomology; Microbiology; Biotechnology; Genetics; Bioinformatics; Nutraceutical; Cosmeceutical; Pharmaceutical; Pharmacology; Biomedicine; Health Sciences

Information Technology, Engineering and Mathematics
Human-Computer Interaction; Information Virtualization; Modelling and Simulation; Computer Security; Wireless and Mobile Communications; Software Engineering; Internet of Things; Data Analytics; Multimedia Computing; Information Retrieval; Electronic Learning; Artificial Intelligence and Machine Learning; Web Technology; Pure and Applied Mathematics; Mathematics Education; Mathematical Modelling; Mathematical Statistics; Fuzzy Mathematics and Applications; Operations Research

Social Sciences & Humanities
Education/Pedagogy; Communication Arts; Information Communication; Linguistics/Neurolinguistics/Sociolinguistics; Literature and Poetry; Educational Management and Leadership; Early Childhood Education; Panicgogy; Civil Law; Economics and Financial Law; Human Right Law; Public Law; Islamic Law; Contract Law; Consumer Law; Comparative Law; Commercial Law; Competition Law; Constitutional Law; Environmental Law; Family Law

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Synergistic Nanodelivery Platforms for Sustainable Biomedical and Agrichemical Innovations

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ABTRACT

The convergence of nanoscience, biotechnology, and sustainable material design is opening transformative pathways in healthcare and agriculture. This work highlights nanocolloidal systems and advanced nanostructures as versatile delivery platforms that unite scientific innovation with societal needs. In biomedicine, palm-based nanoemulsions show promise for targeted lung cancer therapy by overcoming challenges of solubility, stability, and toxicity. Their physicochemical and aerodynamic profiles demonstrate suitability for deep lung deposition and enhanced therapeutic outcomes. Complementary nanostructures including graphene derivatives, mesoporous silica, iron oxides, and reticular frameworks such as MOFs, ZIFs, and COFs offer high porosity, pH-responsive release, and functionalised precision for theranostic applications. In vitro and in vivo studies reveal controlled drug release, favourable cellular interactions, and optimised aerosolisation for inhalation therapies. Beyond medicine, nanotechnology also advances sustainable agriculture. Calcium-based MOFs encapsulating fungicides provide targeted protection against Ganoderma boninense, a devastating crop pathogen. Molecular simulations guide the rational design of nanocarriers, ensuring efficient delivery while minimising environmental burden. Integration of nanofibres, nanotubes, and nanoporous systems further extends potential in both biomedical and agrichemical fields, creating synergies that enhance performance and sustainability. Collectively, these findings underscore how nanodelivery systems can bridge science, technology, and humanity paving the way for sustainable theranostics, resilient food systems, and future-ready innovations that strengthen human and planetary well-being.

KEYNOTE SPEAKERS (SCIENCE & TECHNOLOGY)

The Distributed Energy Resources (DER): The Direction and The Challenges for Electrical Grid System

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ABSTRACT

The Distributed Energy Resources (DER) is a new energy generation model to supply electricity nowadays. The DER offers a flexible energy generation system in the electrical grid system and offers a more efficient supply system to electricity users. With more DER in the electrical grid system, the dependency to conventional bulky power generation could be reduced and ease the loading capacity of transmission lines. In line with that benefit, it is anticipated that the potential of major blackout in the electrical grid system would be reduced. Though DER offers a lot of advantages to the electrical grid system, these flexible resources produce some challenges to electrical communities. This keynote would address the current direction related to DER and its challenges to the electrical grid system. A number of literature and research studies will be discussed to provide insight remarks for this new electricity model. The future of pursuing the research activities related to the DER area would be shared as it could offer a major breakthrough in the engineering area.

Keywords: Distributed Energy Resources (DER); Electrical Grid System; Loading Capacity; Transmission Line

KEYNOTE SPEAKERS (SOCIAL SCIENCES)

Exposure, Immersion, Interactivity: Power-ups for Education 5.0

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ABSTRACT

The transition into the Education 5.0 era demands a rethinking of how formal education is designed, delivered, and experienced. At the heart of this transformation lie three pedagogical 'power-ups': exposure, immersion, and interactivity. These are not merely enhancements to traditional teaching, but essential components of a human-centred, values-driven educational paradigm that prioritises empathy, creativity, and ethical engagement as espoused by the Education 5.0 global movement. Exposure refers to the deliberate broadening of learners' intellectual and cultural horizons. It involves introducing students to diverse disciplines, perspectives, and global contexts, thereby cultivating openness, adaptability, and critical awareness. Immersion, by contrast, emphasises depth over breadth. It calls for learning experiences that are authentic, reflective, and sustained, where students are not merely passive recipients of information but active participants in meaning-making. Lastly, interactivity completes the triad by fostering dynamic, dialogic engagement. Through collaborative learning, digital platforms, and participatory pedagogies, interactivity transforms the classroom into a space of co-construction and shared inquiry. This keynote paper draws upon a body of work that integrates creative thinking, interdisciplinary approaches, and accessible academic communication. It highlights practical innovations such as gamified learning formats, immersive teaching practices, and interactive assessments that exemplify how these three dimensions can be embedded meaningfully into higher education. These strategies not only align with the aspirations of Education 5.0 but also respond to the complex demands of contemporary learners and societies. Exposure, immersion, and interactivity are not isolated techniques but interdependent forces that empower educators to cultivate learners who are intellectually agile, socially conscious, and future-ready. Ultimately, this keynote invites tertiary level educators to embrace these power-ups as tools for designing transformative educational environments in the years to come.

INVITED SPEAKERS (SCIENCE & TECHNOLOGY)

Generalised Additive Models in Demographic Event History Analysis: A Birth Event Case Study

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ABSTRACT

Discrete-time event history analysis is widely used in fertility research, especially when birth dates are imprecisely recorded. However, conventional specifications of continuous covariates using functions such as categories, polynomials, or piecewise functions can limit flexibility and precision. This study applies Generalised Additive Models (GAM) to discrete-time event history analysis of birth events, assessing their advantages over conventional methods. Using the Household Longitudinal Study consisting of 22,020 women, we model parity specific birth progressions with covariates including age, year, time since last birth, education, and country of birth. Logistic GAM with smooth terms and interactions are selected using the Bayesian Information Criterion. GAM markedly improve model fit and reveal nuanced fertility patterns such as bimodal age effects and education-related postponement that is not captured by traditional approaches. Their flexibility and interpretability make GAM a valuable tool for analysing complex fertility dynamics in longitudinal data.

Elucidation of Detailed Three-Dimensional Structures of Organic Molecules by Chiroptical Spectroscopy

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ABSTRACT

Structural elucidation of newly isolated and synthesized compounds is a fundamental but sometimes time-consuming step. Especially when their bioactivities are of interest, analysis of not only their stereochemistry but also their conformation is important, for example, for the development of more effective drug molecules. While stereochemical determination has become easier with the recent development of micro-ED and other methods, conformational analysis in the solution state remains difficult. Our group has been using chiroptical techniques (i.e., spectroscopic techniques using circularly polarized light) such as vibrational circular dichroism (VCD), electronic circular dichroism (ECD) and Raman optical activity (ROA) spectroscopies to elucidate the three-dimensional structures of various natural products, biomolecules, and their synthetic analogues in the solution state. This presentation discusses the stereochemical and conformational analysis of terpenes (1), marine natural products (2), sugars (3), lipids (4), and synthetic compounds (5) by a combined use of chiroptical spectroscopies and density functional theory (DFT) calculations.

Elucidating The Effects of Neodymium Nanoparticles on Judd-Ofelt and Optical Parameters of Zinctellurite Glass For Fiber Lasers

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ABSTRACT

The Judd-Ofelt analysis of neodymium nanoparticles doped zinctellurite glass were performed to determine their spectral parameters. A glass sample of neodymium nanoparticles doped zinc-tellurite with chemical composition of 0.47TeO2 + 0.2B2O3 + 0.29ZnO + 0.05Nd2O3 was synthesized by using conventional melt quenching method. We select 0.05 mol fraction of neodymium nanoparticles in tellurite glass as it gives the optimum results for glass stability and spectral intensities. The Judd-Ofelt parameters were determined by using least-square fitting method. It was found that the observed that neodymium nanoparticles doped zinctellurite glass exhibit judd-ofelt parameters as follows; Ω2 = 2.623, Ω4 = 0.174, Ω6 = 0.837 and found in the following Ω2 < Ω4 <Ω6 trend. The hypersensitive transition was highly related to the Ω2 parameter. Furthermore, the hypersensitive at 4I9/2 → 4G5/2 transition affect the value of Ω2 which satisfies the selection rule Δs=0, Δl⩽2 andΔJ⩽2. The Ω4 parameter was related mainly to the bulk properties of the host matrix meanwhile the Ω6 parameter was related to the rigidity of the glass matrix. The extinction coefficient and fermi energy of the glass system were determine using least-square fitting method. It was revealed that the studied glass system exhibit reduction in extinction coefficient due to the change of wavelength. It was found that the Fermi energy decreases along with neodymium nanoparticles concentration. The decreasing trend of Fermi energy, EF indicates the enhancement of semiconducting properties. Therefore, the studied glass system have an excellent potential to be utilized in semiconducting materials. Therefore, the investigated glass materials may provide a good material for fiber lasers.

Keywords: Tellurite oxide; Neodymium oxide; Glasses; Optical properties; Judd-ofelt analysis; Extinction coefficient

Beyond Data: Synergizing AI and Humanities for a Sustainable Future

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ABSTRACT

Data analytics has become the backbone of modern decision-making, yet sustainable progress demands more than quantitative insight. Advances in Artificial Intelligence (AI), particularly in Natural Language Processing (NLP) and Generative AI, enable us to extract meaning from vast, complex datasets which is vital for sustainable future. This session explores how the synergy between AI-powered analytics and the humanities can drive solutions that are not only data-informed but also ethically sound, culturally sensitive, and socially inclusive. We will showcase AI application such as machine translation for indigenous language and tourism sentiment analysis for community engagement, illustrating how integrating human values into data analytics transforms information into wisdom. The result is a pathway to a sustainable future where technology amplifies, rather than replaces, humanity's role in shaping our shared destiny.

INVITED SPEAKERS (SOCIAL SCIENCES)

Eco-STEM-Based Learning to Enhance Scientific Creativity

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ABSTRACT

Eco-STEM is an educational approach that integrates ecological principles into the fields of Science, Technology, Engineering, and Mathematics (STEM) with the goal of creating an inclusive and sustainable learning system. Scientific creativity is a style or trait of thinking that emphasizes scientific knowledge, scientific inquiry skills, and creative thinking. It describes an individual's thinking skills that can generate a multitude of original ideas from various fields to solve problems.

Synergy for Future Sustainability: Quran and Hadith-Based Communication as an Approach to Building a Prosperous Society in Malaysia

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ABSTRACT

This article discusses the role of communication based on the Quran and Hadith in shaping a prosperous society in Malaysia, in line with the theme *"Synergy for Future Sustainability: Bridging Science, Technology and Humanity."* As a pluralistic nation comprising diverse ethnicities, religions, and cultures, Malaysia requires a communication approach that fosters harmony and social sustainability. Communication grounded in Islamic principles such as *sidq* (truthfulness/honesty), *tabayyun* (verification of truth), *hikmah* (wisdom/appropriateness), and *ihsan* (goodness/compassion/courtesy) has the potential to serve as a vital foundation for managing differences, strengthening cross-cultural understanding, and integrating scientific and technological progress with human values. This conceptual study also examines contemporary challenges such as the spread of false information, hate speech, and political polarization, and proposes implementation strategies through education, training, and legal enforcement. The proposed Islamic communication model emphasizes synergy between religious principles, technological platforms, and active community participation. In conclusion, prosperous communication guided by divine revelation can serve as the foundation for unity and a pillar of sustainable development in Malaysia.

Keywords: Islamic communication; Prosperous communication; Quran; Hadith; Future sustainability; Plural society

Islamic Inheritance Law as a Framework for Intergenerational Justice and Sustainable Family Wealth Distribution

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ABSTRACT

Islamic inheritance law (*faraid*) represents a unique and comprehensive system for wealth distribution that combines legal, ethical, and spiritual dimensions. Designed to ensure fairness and justice among heirs, *faraid* is based on divine principles that allocate fixed shares to family members, including both men and women, thereby preventing wealth concentration and fostering social balance. In contemporary discourse, the concepts of sustainability and intergenerational justice have become central to addressing global economic and social challenges. The principles embedded in *faraid*—such as equitable distribution, protection of vulnerable heirs, and the circulation of wealth—align closely with these modern goals, making it a relevant framework for promoting sustainable family wealth management. This paper explores the intersection between Islamic inheritance law and the concept of sustainability, with a particular focus on its potential contribution to the Sustainable Development Goals (SDGs), especially SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities). By adopting a normative-juridical and socio-legal approach, this research examines the underlying principles of *faraid* and their implications for achieving long-term economic justice within families and communities. Comparative analysis is also undertaken to highlight the differences and synergies between *faraid* and contemporary secular inheritance systems, particularly in terms of fairness and wealth preservation. The findings indicate that Islamic inheritance law not only ensures legal clarity and minimizes disputes but also supports the creation of a more balanced and sustainable economic order. The paper argues that integrating *faraid* with modern legal technologies, such as digital wills and blockchain-based asset management, could further enhance its applicability in the contemporary era, ensuring that its timeless values continue to address evolving socio-economic realities.

Keywords: Faraid; Intergenerational Justice; Sustainability

Integrating Multimodality and Reception Studies for Research in the Humanities and Social Sciences

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ABSTRACT

Multimodal research has traditionally focussed on the analysis of texts and their production, resulting in a wealth of theoretical and analytical constructs as well as approaches. On the one hand, multimodal research on texts and their production has pushed the field forward; on the other hand, however, it has resulted in different, and at times contradictory, accounts of how different modes work individually and together in making meaning. One of the reasons for the divergent accounts is a relative lack of empirical evidence coming from the other end of the multimodal communication process, i.e. the reception of multimodal texts. It is crucial to note that 'reception' here is not intended as passive uptake of an encoded message in a unidirectional process, but as the purposeful, active interaction and engagement of participants with a text in what Barker calls a "*two-sided* affair" (2021: 194, *emphasis in original*). Over the last two decades, scholars from a variety of fields, including linguistics, communication science, media studies and critical discourse studies, have started to take on the challenge of investigating text reception. Reception studies come in different forms, with different focuses and methodological approaches, both qualitative and quantitative. However, the common denominator between them is the interest, as the name suggests, to explore how people interact and engage with multimodal texts. This keynote will provide a summary of key issues in the integration of multimodal research and reception studies as well as a summary of previous research and how this can be applied to research projects withing the humanities and social sciences.

Keywords: Multimodality; Reception studies; Empirical research; Humanities; Social sciences

PHYSICAL SCIENCES

I-CReST 2025:023-006 – Performance of Azulene and Azulene-PEG Saturable Absorber in Mode-Locked Thulium-Holmium Doped Fiber Lasers

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ABSTRACT

This study investigates the performance of azulene and azulene-PEG as saturable absorbers (SAs) to induce mode-locked pulses in thulium-holmium-doped fiber lasers (THDFLs). The incorporation of polyethylene glycol (PEG) with azulene significantly enhances stability and optical performance. Key findings include improved linear absorption by 256 %. The nonlinear optical properties such as modulation depth, and saturation intensity of azulene-PEG are higher compared to azulene. Stability tests showed that azulene-PEG maintained mode-locked operation for up to 2 days, compared to 5 hours for azulene. The laser efficiency of azulene-PEG was higher at 3.38% compared to 2.53% for azulene. These results indicate that azulene-PEG is a promising new class of saturable absorbers for ultrafast photonic applications, offering advantages in stability and performance over pristine azulene. This study contributes to the development of organic-based saturable absorbers for next-generation ultrafast laser systems.

Keywords: Azulene; azulene-PEG; saturable absorbers; polyethylene glycol; thulium-holmium doped fiber lasers

I-CReST 2025:033-013 – Unlocking the Hidden Power of Polyethylene Glycol Plasticizers in Enhancing Ionic Conductivity of Cellulose-Based Biopolymer Electrolytes

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ABSTRACT

Achieving safer and more sustainable energy storage requires innovative electrolyte design. Solid biopolymer electrolytes (SBEs) offer a promising pathway with natural polymers at its core. This in turn provided enhanced safety, compatibility and electrochemical stability. However, optimizing ionic conductivity remains a critical challenge. This work explores the transformative role of plasticizers in overcoming these limitations, focusing on polyethylene glycol (PEG) plasticizer in 2-hydroxyethyl cellulose (2HEC) system doped with ammonium thiocyanate (ATC). Strategic incorporation of PEG led to a significant enhancement in charge transport, with ionic conductivity increasing from 1.16×10^{-4} S/cm to 1.76×10^{-3} S/cm at 8 wt.% PEG. Fourier Transform Infrared (FTIR) spectroscopy confirmed intensified polymer salt interactions through the emergence of a distinctive C–O stretching peak (800 cm^{-1} – 1200 cm^{-1}), while X-ray diffraction (XRD) analysis revealed a broadened peak at $2\theta \approx 23°$, indicating increased amorphous content which is an essential factor in facilitating ion migration. By unlocking the hidden potential of plasticizers, this study redefines the structure–conductivity relationship in biopolymer electrolytes, paving the way for next-generation energy storage solutions. These insights offer a crucial step toward the development of high-performance, eco-friendly electrochemical systems that align with global sustainability goals.

Keywords: Solid Biopolymer Electrolyte (SBE); 2-Hydroxyethyl Cellulose (2HEC); Polyethylene Glycol (PEG); Ionic Conductivity; Structural Properties

I-CReST 2025: 047-023 – Optimization of Sodium Iodide Content in Cornstarch -Based Biopolymer Electrolytes for Enhanced Ionic Conductivity

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ABSTRACT

This study investigates the effect of sodium iodide (NaI) concentration on the ionic conductivity and structural properties of cornstarch-based solid polymer electrolytes (SPEs) synthesized via the solution casting method. A series of films containing 0–20 wt% NaI were prepared and characterized using electrochemical impedance spectroscopy (EIS) and Fourier transform infrared spectroscopy (FTIR). The results revealed that ionic conductivity increased with NaI content up to 15 wt%, reaching a maximum of 9.43×10^{-9} S/cm, due to enhanced ion dissociation and interactions between Na^+ ions and hydroxyl groups in the starch matrix. FTIR analysis confirmed the complexation through peak shifts and intensity changes in the O–H and C–O–C functional groups. However, further salt addition beyond 15 wt% resulted in conductivity decline, attributed to ion aggregation and reduced polymer chain mobility. This work demonstrates the importance of salt optimization to achieve a balance between ionic conductivity and structural stability in bio-based electrolytes, contributing to the development of sustainable materials for electrochemical energy storage applications.

Keywords: Cornstarch biopolymer; Sodium iodide (NaI); Solid polymer electrolyte; Ionic conductivity; FTIR analysis

I-CReST 2025:077-043 – Investigation of Iodine Stability and Uptake in Iodised Salt: Effects of Temperature, pH, and Radiation

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ABSTRACT

Iodine is a trace element needed in humans since it plays a vital role in metabolism. The thyroid gland will absorb iodine to secrete hormones for controlling metabolism. Iodine is volatile as it readily sublimes at high temperatures. Thus, it is essential to keep iodine at a suitable temperature, and it is also important for consumers to take a sufficient amount of iodine in their daily meals. Therefore, this research aims to verify the temperature and pH properties of iodine, investigate the effect of radiation on iodised salt and evaluate the suitability of iodine uptake by the human thyroid. This research involved the titration method. The amount of thiosulfate used in the titration is proportional to the amount of iodine in the salt. The absorption peak and functional group in the salt solution are analysed using UV-Visible and FTIR spectroscopy. The iodised salt is irradiated with Cs-137 to analyse its composition using FESEM-EDX. The concentration of iodine resulting from the titration is converted into parts per million (ppm to determine the iodisation level in the salt approved by the World Health Organisation (WHO and the suitable amount of iodine uptake for a healthy thyroid. This study shows that the iodine content is low at high temperatures and in acidic conditions. The UV and infrared absorption in the salt sample solution showed its peak value and the functional group present in the sample. The non-irradiated and irradiated iodised salts had shown their elemental composition using FESEM with EDX. Also, the iodine concentration in iodised salt and its suitability for iodine consumption in humans followed the iodisation level set by the WHO.

Keywords: Irradiated; detergent; BSA; emulsion; albumin

I-CReST 2025:075-045 – Highly Conductive Gel Biopolymer Electrolyte Based on Newly Synthesized Glutaryl Kappa-carrageenan for Energy Storage Application

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ABSTRACT

Abstract. A novel kappa-carrageenan derivative, glutaryl kappa-carrageenan (G-κCar) was successfully produced via nucleophilic substitution reaction. The introduction of glutaric anhydride (GA) into the kappa-carrageenan (κCar) matrix has markedly altered its chemical and electrochemical properties. Elemental analysis showed that the GA substitution led to an increased oxygen percentage in G-κCar compared to pure κCar. The highest degree of substitution obtained was 4.14 in 3gGA-κCar/48h synthesized sample. The successful substitution of GA molecule into κCar polymeric chain was confirmed by the FTIR analysis based on the formation of a new carbonyl (C=O) bond in the G-κCar spectra. The 1H NMR analysis further proved the GA substitution by the appearance of new multiple resonance peaks at δ = 1.70 ppm – 2.75 ppm, which belong to the characteristic signals of protons in the anhydride group. TGA thermograms showed lower degradation temperature in the synthesized G-κCar due to disruption of both inter and intramolecular hydrogen bonds in the G-κCar polymeric chains. The substitution of GA also improved the ionic conductivity of G-κCar up to 4.63 × 10-3 S cm-1 at ambient temperature. Cyclic voltammetry plots demonstrated that the 3gGA-κCar/48h sample had a larger background current than κCar that indicated that the synthesized 3gGA-κCar/48h biopolymer has an improved effective surface area. Linear sweep voltammetry (LSV) analysis revealed the increased electrochemical potential in G-κCar compared to the pristine κCar. The highest potential obtained was 1.95 V for 3gGA-κCar/48h sample. The transference number for 3gGA-κCar/48h is calculated to be 0.98 over five continuous hours. This implied that ionic conduction in the gel is predominantly driven by ions, with the contribution of electrons being minimal and therefore negligible. These results suggest that G-κCar exhibits excellent electrochemical properties, establishing it as a potential new biopolymer derivative for gel biopolymer electrolyte applications.

Keywords: kappa-carrageenan; biopolymer derivative; glutaric anhydride; gel electrolyte; conductivity

I-CReST 2025: 082-046 – Investigation of Nickel and Gold-based RF MEMS Creep Deformation: Simulation Approach Using NanoHub

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ABSTRACT

This study focuses on the investigation of the influence of beam dimensions and electrical parameters on creep deformation in radio frequency microelectromechanical systems (RF MEMS) fixed beam switches. For RF MEMS, creep is a time-dependent deformation that occurs under sustained stress on the structure and represents a significant issue in the long-term reliability of MEMS devices operating under continuous applied voltage. The RF MEMS simulation is performed using the nanoHUB to monitor the behaviour of the RF MEMS creep on a constant voltage of 20V with various structures where the beam thickness and initial air gap are varied. For the MEMS simulation, we focus on two materials, namely Nickel and Gold. The first investigation involved the variation of beam thickness from 1μm to 5.45μm, while keeping the initial gap constant. Whereas, in the second investigation, the beam thickness was kept constant, and the initial air gap was varied from 0.9μm to 5μm. The result from the first investigation shows that Nickel demonstrates the lowest deformation when the beam thickness was 2μm and the initial air gap was kept constant. The initial air gap is important as it determines the distance between the beam and the substrate, with shorter gaps leading to more deformation. In the second investigation, Nickel showed the lowest deformation when the beam thickness was constant, and the air gap was set to 2.5μm. This research indicates that beam dimensions play a larger role in the creep behaviour of one material. It can also be concluded from both results that the material selection affects RF MEMS creep, as both deformation shows Nickel creep much faster than Gold due to its highest RF creep. For future recommendations, it is recommended to include different types of materials in this study to enhance understanding of the materials in RF MEMS creep.

Keywords: RF MEMS; nanoHUB; Reep deformation; Beam dimensions; Applied volt

I-CReST 2025: 081-047 – Comparative Analysis of the Electrical Performance of $MoSe_2$ and MoS_2 as Channel Materials in 2D Field-Effect Transistors Using a Simulation Approach on nanoHUB

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ABSTRACT

The continuous demand for enhanced transistor performance in advanced integrated circuits presents major challenges particularly in achieving strong electrostatic control, high carrier mobility, and reduced leakage current. These challenges are critical in the design of field-effect transistors (FETs) where scaling effects can degrade device performance. Two-dimensional (2D) materials, especially transition metal dichalcogenides (TMDs), have emerged as promising channel materials due to their atomically thin structure and favorable electronic properties. This study investigates the suitability of molybdenum diselenide ($MoSe_2$) and molybdenum disulfide (MoS_2) as 2D channel materials for ultra-scaled FETs. Simulations were conducted using the 2D-FET tool on nanoHUB.org by varying key physical parameters including scattering mean free path (mfp), gate oxide thickness (tins), gate insulator dielectric constant (epsr), and gate length while keeping other factors such as the complementary metal-oxide semiconductor (CMOS) type, channel orientation, and temperature constant. Electrical performance was assessed through drain current–gate voltage (Id–Vg) characteristics. Results show that $MoSe_2$ exhibits higher carrier mobility making it suitable for high-speed applications such as processors whereas MoS_2 provides superior gate control and lower leakage, favoring low-power applications. These findings highlight the complementary advantages of both materials in addressing scaling challenges and support their potential for next-generation energy-efficient nanoelectronic devices.

Keywords: $MoSe_2$; MoS_2; mfp, tins; epsr

I-CReST 2025: 087-053 – Effect of Mechanical Processing on the Thermophysical Properties of MgO/Car Radiator Coolant-Based Nanofluid

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ABSTRACT

The continuous demand for enhanced transistor performance in advanced integrated circuits presents major challenges particularly in achieving strong electrostatic control, high carrier mobility, and reduced leakage current. These challenges are critical in the design of field-effect transistors (FETs) where scaling effects can degrade device performance. Two-dimensional (2D) materials, especially transition metal dichalcogenides (TMDs), have emerged as promising channel materials due to their atomically thin structure and favorable electronic properties. This study investigates the suitability of molybdenum diselenide ($MoSe_2$) and molybdenum disulfide (MoS_2) as 2D channel materials for ultra-scaled FETs. Simulations were conducted using the 2D-FET tool on nanoHUB.org by varying key physical parameters including scattering mean free path (mfp), gate oxide thickness (tins), gate insulator dielectric constant (epsr), and gate length while keeping other factors such as the complementary metal-oxide semiconductor (CMOS) type, channel orientation, and temperature constant. Electrical performance was assessed through drain current–gate voltage (Id–Vg) characteristics. Results show that $MoSe_2$ exhibits higher carrier mobility making it suitable for high-speed applications such as processors whereas MoS_2 provides superior gate control and lower leakage, favoring low-power applications. These findings highlight the complementary advantages of both materials in addressing scaling challenges and support their potential for next-generation energy-efficient nanoelectronic devices.

Keywords: Nanofluids; MgO nanoparticles; Car radiator coolant

I-CReST 2025:094-061 – Surface Modification of Silane-functionalized Cellulose Aerogel Microbeads for Cooking Oil-Water Separation

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ABSTRACT

Contamination of water has intrigued exceptionally deliberation has threatened towards global society and increasing concern to the discharge of industrial wastewater and oil leakage. This may lead to various catastrophic consequences on ecosystem and climate change. Meanwhile, renewable, economically viable, and abundantly accessible biomass presents an attractive feedstock option for various industrial applications. The biopolymer category, predominantly comprised of polysaccharides, offers nearly boundless polymeric raw materials characterized by exceptional structure and properties. In this study, biodegradable three-dimensional porous structure cellulose aerogel microbeads (CAM) was successfully fabricated, enhancing their properties through a facile dropping technique. The microbeads underwent surface modification through a silanation process utilizing trimethoxymethylsilane (TMMS) as the silane agent. Subsequently, the surface-modified microbeads were subjected to an oil-water separation process using waste cooking and an adsorption study was carried out. The chemical properties of the CAM and silanated CAM (sCAM) revealed from FTIR spectrum analysis confirmed the presence of silane in the cellulose matrix and its composites, along with evidence of silanation using TMMS. The oil/water separation study presented a direct correlation between higher oil concentrations and increased adsorption capacity of silane-functionalized microbeads. Meanwhile, leaching studies unveiled the microbeads' successful manifestation of superoleophilic properties, as revealed by wettability and contact angle analyses. The facile methodology employed for fabricating cellulose-microbeads, functionalized with silane for oil and water separation, showed promising and effective applications in water treatment. Moreover, this approach aligns with sustainability goals by effectively utilizing biomass resources. Therefore, this study is expected to expand the chain of high value-added products and green growth for sustainability, which is in line with key principles of National Biomass Strategy 2020 and Sustainable Development Goals 2030 by United Nations.

Keywords: Freeze-dried cellulose aerogel; oil-water separation; porous structure; silanation; waste cooking coil

I-CReST 2025: 101-067– Effect of High-Energy Ball Milling on the Phase, Morphology and Crystallite Size of Cr-Doped Al_2O_3 Materials

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ABSTRACT

Al_2O_3 compounds are known for their large crystal size and high stability, making it difficult to reduce their crystallite size. Doping with Cr further increases the hardness and stability, which makes the synthesis of Cr-doped Al_2O_3 nanomaterials even more challenging. One way of reducing the crystallite size of the materials is by using the high-energy ball milling method. The ball-milling method is carefully controlled to avoid unwanted chemical reactions that may change the phase and stoichiometry of the materials. In this work, pure and single-phase micron-sized $Al_{2-x}Cr_xO_3$ (x=0.1, 0.2, 0.3) materials were successfully obtained via the self-propagating combustion (SPC) method. These materials were then subjected to a simple milling process to reduce the crystallite size. This milling process was used to produce $Al_{2-x}Cr_xO_3$ nanomaterials from its microcrystalline powder. The comparisons between the micron-sized and milled samples in terms of their phase, morphology and crystallite size were discussed. The XRD results reveal that all the milled samples were pure with no impurity or other phases present. SEM results show a gradual decrease in crystallite size with increased milling time to 72 hours from around 1500 nm to ~40 nm. The milled samples consist of mainly well-formed spherically shaped crystals without any planar blocks like in the micron state. It was found that the ball-milling method has been successfully done to reduce crystallite size without the change of phase of the materials. Thus, the materials' stoichiometries are maintained.

Keywords: Al_2O_3; $Al_{2-x}Cr_xO_3$; Doped; Combustion; Ball-milling

I-CReST 2025: 108-071– Acetate-Based Ionic Liquids as Solvents for Pretreatment of Lignocellulosic Biomass from Oil Palm Empty Fruit Bunch

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ABSTRACT

This study investigates the role of ionic liquids (ILs) in the pretreatment of lignocellulosic biomass, focusing on oil palm empty fruit bunches (OPEFB), a promising feedstock for industrial and bioenergy applications due to its high lignin, cellulose, and hemicellulose content. Ionic liquids such as triethylammonium acetate (TEAA) and diethylammonium acetate (DEAA) were selected for their unique properties, including low volatility, wide liquid range, and strong solvation ability, making them effective solvents for biomass decomposition. The synthesis and characterization of TEAA and DEAA were confirmed using thermogravimetric analysis (TGA), nuclear magnetic resonance (NMR), and fourier-transform infrared spectroscopy (FTIR). Pretreatment experiments conducted at 30°C, 80°C, and 130°C revealed significant changes in the composition, crystallinity, and morphology of OPEFB. The highest percentage of breakdown for TEAA and DEAA were recorded over five hours at 130°C, which may indicate the most effective method of lignin removal. When all of these factors are considered, it is clear that higher temperature and greater duration lead to more successful breakdown of the lignocellulose from OPEFB. FTIR and X-ray diffraction (XRD) analyses demonstrated alterations in chemical structure and reduced crystallinity, while field emission scanning electron microscopy (FESEM) showed increased porosity and surface roughness in the treated samples. The FTIR spectra shows transmittance between treated and raw oil palm empty fruit bunch (OPEFB) samples. These findings highlight the potential of TEAA and DEAA as effective pretreatment solvents to enhance the structural accessibility of OPEFB for downstream bioenergy conversion processes.

Keywords: Ionic Liquids (ILs); Pretreatment; Oil Palm Empty Fruit Bunch (OPEFB); Triethylammonium Acetate (TEAA); Diethylammonium Acetate (DEAA)

I-CReST 2025:115-078 – A Synthesis and Characterisation of Doped Dysprosium in $LiMnTiO_4$ Cathode Materials for Lithium-Ion Batteries

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ABSTRACT

The demand for enhanced performance in Li-ion batteries necessitates the development of advanced cathode materials. This study investigates the synthesis and characterisation of dysprosium-doped $LiMn_{1.9}Ti_{0.1-x}Dy_xO_4$ (x = 0.00, 0.01, 0.05) cathode materials, focusing on their structural, compositional, and morphological properties. The primary objective is to understand how dysprosium substitution at the titanium site influences these properties and the overall electrochemical performance of the material. Using the self-propagation combustion synthesis method, we achieved high purity and single-phase formation with reduced particle sizes. The thermal properties were studied by Simultaneous Thermal Analysis (STA). Structural analysis through X-ray diffraction (XRD) revealed significant changes in the crystal lattice parameters, confirming successful doping. Field emission scanning electron microscopy (FESEM) provided detailed insights into the morphology of the material. These results suggest that dysprosium-doped $LiMnTiO_4$ is a promising candidate for next-generation Li-ion battery cathodes. In conclusion, this research demonstrates the potential of dysprosium doping in enhancing the properties of LiMnTiO4 cathode materials, offering valuable insights for the development of high-performance and sustainable energy storage solutions.

Keywords: Cathode; Lithium-ion; LiMnTiO4; Dysprosium

I-CReST 2025:079-083 – High-Energy Ball Milling of Pineapple Pomace: The Finer, the Better?

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ABSTRACT

The agro-industrial processing of pineapple generates substantial amounts of pomace waste, which remains largely underutilized despite its rich fibrous and bioactive compounds. This study explores the conversion of pineapple pomace into functional powder via high-energy ball milling, aligning with circular economy principles and waste valorization strategies. The milled powders were characterized for morphological changes using scanning electron microscopy (SEM), while colour attributes were evaluated using a colorimeter. Hydration properties were also assessed to determine the suitability for food and material applications. Results revealed that prolonged milling significantly reduced particle size, improved surface homogeneity, and modified colour characteristics. While finer particles influenced hydration behaviour due to structural alterations, optimizing milling duration was found to be essential for achieving a functional balance tailored to specific applications. This work demonstrates the potential of ball-milled pineapple pomace as a sustainable, value-added biomaterial for food or material applications.

Keywords: Pineapple pomace; Waste; Milling; Powder

I-CReST 2025:099-088 – Influence of Erbium Nanoparticles Concentration on The Optical Properties of (70-x) TeO_2-20ZnO-10Na_2O-(x)Er Glass System

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ABSTRACT

The remarkable physical features of tellurite glass make it a suitable alternative to silicate glass, which is currently employed as the main core for optical applications. Research continuously makes developments to improve the optical performance and stability of tellurite glass. A series of tellurite glasses incorporating varying concentrations of metallic erbium nanoparticles, was synthesised using the composition of (70-x)TeO_2-20ZnO-10Na_2O-(x)Er, where x=0.00, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, and 0.35 mol%, by melt-quenching technique. The incorporation of erbium nanoparticles changed the physical appearance of the glass from light yellow to light pink. The influence of metallic erbium nanoparticles on the absorption edge of the glass was assessed by UV-Vis absorption spectroscopy. The absorption spectra exhibited seven significant bands of Er3+ ions transitioning from the ground state ($^4I_{15/2}$) to various excited states of 4f shell, within the wavelength range from 380 nm to 975 nm. The absorption edge shifts to longer wavelengths with an increase in erbium nanoparticles concentration. The direct band gap value, E_{dirr} of the glass ranges from 3.101 eV to 3.127 eV, whereas the indirect band gap, E_{indir}, lies between 3.117 eV and 3.315 eV. The Urbach energy, EU of the glass exhibits a non-monotonic trend with varying concentrations of erbium nanoparticles, ranging from 0.149 eV to 0.169 eV. The absorption edge information of tellurite glass doped with erbium nanoparticles is crucial in considering this material for photonic applications.

Keywords: Tellurite glass; Erbium nanoparticles; Absorption edge; Band gap; Urbach energy

I-CReST 2025:128-092 – Ionic Conductivity and Temperature Dependence Studies of PVC Complexes Modified with Doping Salt and Additives

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ABSTRACT

The ionic conductivity of PVC-$NH_4CF_3SO_3$ system, PVC-$NH_4CF_3SO_3$-EC system and PVC-$NH_4CF_3SO_3$-Bu_3MeNTf_2N system has been presented. The highest conductivity for the salted system at room temperature is found to be 2.50×10^{-7} S cm^{-1} at 30 wt.% $NH_4CF_3SO_3$ (A4) concentration. Addition of EC increased the ionic conductivity value of the highest-conducting sample in the salted system. The plasticized sample at room temperature with 5 wt.% EC (B1) concentration is found to have a maximum value of 3.06 × 10-5 S cm^{-1}, whereas 15 wt.% Bu_3MeNTf_2N (C3) gave ionic conductivity value of 1.56 × 10-4 S cm^{-1} at room temperature, which is the highest among the samples studied in this work. In temperature dependence-ionic conductivity study, all systems exhibited Arrhenius type of behaviour within the temperature regime studied and favored the ion hopping mechanism at elevated temperatures. The dielectric constant, ε_r studies were observed to follow the trend of the conductivity studies for all systems. The sample with the highest conductivity value possessed the highest value of dielectric constant. Analysis of the experimental conductivity data showed that the correlated barrier hopping (CBH) model is the most applicable conduction mechanism for PVC-$NH_4CF_3SO_3$ and PVC-$NH_4CF_3SO_3$-EC system, whereas the conduction mechanism in PVC-$NH_4CF_3SO_3$-Bu_3MeNTf_2N system can be best represented by the overlapping large polaron tunneling (OLPT) model.

Keywords: Conductivity; Dielectric; Arrhenius; CBH Model; OLPT Model

I-CReST 2025: 144-107– Raman and CHNS-Based Elucidation of Carbon Development in Banana Peel Biomass for Sustainable Carbon Materials

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ABSTRACT

The growing demand for sustainable materials in environmental and energy applications has led to increased interest in agricultural waste, particularly for producing activated carbon (AC). While conventional AC is derived from non-renewable sources like coal and petroleum coke, agricultural biomass such as banana peels offers a green and sustainable alternative due to its rich lignocellulosic content. This study investigates the carbon development characteristics of banana peel biomass through Raman Spectroscopy and CHNS elemental analysis. Banana peels, an abundant agriculture waste, were thermochemically treated and analyzed to evaluate their potential as a carbon rich material for energy and material applications. Raman Spectroscopy was used to assess the structural evolution of carbon, particularly focusing on the D and G bands, which reflect disorder and graphitic characteristics, respectively. The intensity ratio (I_D/I_G) revealed a progressive transformation of amorphous carbon to more ordered structures with increasing carbonization temperature. Complementarily, CHNS analysis quantified the elemental composition of carbon (C), hydrogen (H), nitrogen (N), and sulfur (S). The correlation between structural by Raman Spectroscopy and compositional analysis by CHNS data underscores the potential of banana peel biomass as a sustainable precursor activated carbon, or carbon-based nanomaterials. This integrative research provides a better knowledge of biomass carbonisation routes and promotes the value-added use of agricultural waste.

Keywords: Agriculture waste; Banana peels; Activated carbon; Sustainable

I-CReST 2025:163-119 – Analysis of Soliton Microcomb Dynamics for Energy-Efficient WDM Data Centre Interconnects

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ABSTRACT

Conventional wavelength-division multiplexing (WDM) links in data centres rely on multiple discrete lasers, which are power-hungry and scale poorly in energy efficiency. Optical frequency combs produced in integrated microresonators, known as soliton microcombs offer a compelling alternative by providing many wavelength channels from a single laser pump, drastically reducing the energy per bit for WDM transmission. In this work, we present an analysis of soliton microcomb dynamics tailored for energy-efficient WDM data centre interconnects. We model the generation of dissipative Kerr solitons under realistic low-power conditions and evaluate key metrics such as pump power, conversion efficiency and per-line power. Our results show that a microcomb source can produce a broad set of WDM carriers with high spectral purity while operating at a fraction of the power consumption of multi-laser arrays. With pump powers on the order of tens of milliwatts, conversion efficiencies of about 50% to 70% can be achieved, yielding per-channel optical power on the order of 1 mW. This is significantly lower than per-channel outputs of individual distributed feedback (DFB) lasers. We further demonstrate that the microcomb-based WDM transmitter can improve the energy-per-bit by an order of magnitude compared to legacy architectures. This analysis underscores that soliton microcombs enable energy-efficient scaling of data centre interconnect bandwidth. By consolidating multiple channels into one miniature comb source, overall transmitter power is minimised, paving the way for high-capacity and low-energy optical links in future green data centres.

Keywords: Soliton microcomb; Lugiato-Lefever equation; Wavelength-division multiplexing; Data center interconnects; Kerr frequency comb

I-CReST 2025:143-120 – Green Synthesis of ZnO-NPs and Ag/ZnO-NPs using *Mariposa Christia vespertilionis* leaves extract and its Photodegradation against Pesticides: Endosulfan and Aldrin

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ABSTRACT

Green synthesis of zinc oxide nanoparticles (ZnO-NPs) has gained interest and its application as a photocatalyst for the degradation of various organic pollutants. In this study, ZnO-NPs and silver doped Ag/ZnO-NPs with various ratios (3%,5%,7%) were synthesized using *Mariposa christia vespertilionis* (MCV) leaves extract by a simple and economical green synthesis approach. Ultraviolet-visible spectroscopy (UV-Vis) was used to confirm the nanoparticle synthesis by observing the SPR around 277 nm wavelength. The Fourier Transform-Infrared Spectroscopy (FT-IR) also confirmed the formation of ZnO-NPs by observing the metal-oxygen absorption peak at a wavenumber of 601.81 cm-1, referred to as the Zn-O bond. The sharp peaks of the X-ray diffractogram (XRD) indicated the hexagonal wurtzite structure of the samples. Scanning electron microscope (SEM) declared that the synthesized nanoparticle samples were spherical shaped with a size range of 270–530 nm while transmission electron microscopy (TEM) reveal spherical and polyhedral crystallites with highly agglomerated structures with interplanar distances of 0.2497 nm, 0.2005 nm, 0.2194 nm, and 0.2625 nm. The Thermogravimetric analysis (TGA) was employed to study the thermal properties. The fully characterized samples were used as a photocatalyst against the degradation of model pesticides of endosulfan and aldrin. ZnO-NPs showed high degradation compared to previous studies of 94.79% and 96.07%, which is greater than Ag/ZnO-NPs that indicated 94.51% and 90.70% when tested against endosulfan and aldrin, correspondingly at optimum conditions under direct sunlight at pH7 for 180 min. Comparative studies on different kinetic models like zero-order, first-order, and second-order reaction kinetics were carried out which revealed First-order reaction as the best fit kinetic model for the photocatalytic degradation of both Endosulfan and Adrin. This finding also shows the potential of ZnO-NPs and Ag/ZnO-NPs synthesized by green, economical and sustainable route with various potential applications that can be further explored.

Keywords: Green synthesis; ZnO-NPs, Pesticides; Photodegradation; *Mariposa Christia Vespertilionis*

I-CReST 2025:161-121 – Thermal and Structural Properties of Polyethylene Oxide/Poly(n-butyl methacrylate) Blends Incorporated with TiO_2 Nanoparticles

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ABSTRACT

Low-density polyethylene (LDPE) is the first thermoplastic polyolefin utilized in commercial Polymer nanocomposites with inorganic fillers are widely explored to improve thermal and structural properties of polymer systems. This study aims to investigate whether the addition of titanium dioxide (TiO_2) nanoparticles influences the thermal and morphological behavior of an immiscible polymer blend consisting of polyethylene oxide (PEO) and poly(n-butyl methacrylate) (PnBMA). Blend films were prepared via solution casting, with TiO_2 incorporated up to 5 *wt*%. Characterization was performed using differential scanning calorimetry (DSC), X-ray diffraction (XRD), and polarized optical microscopy (POM). DSC analysis showed that the glass transition temperature (*Tg*), melting temperature (*Tm*), and heat capacity change (ΔCp) of PEO remained largely unchanged across all compositions, suggesting that PEO and PnBMA are immiscible. The presence of PnBMA, even at increasing amounts, did not significantly disrupt the thermal transitions of PEO when PEO was the major component. XRD analysis confirmed that the crystalline structure of PEO was maintained, as no peak shifting occurred with the addition of PnBMA or TiO_2. POM micrographs revealed that PnBMA was randomly dispersed within the PEO matrix, and the characteristic spherulitic morphology of PEO remained intact in PEO-rich blends. Importantly, the incorporation of TiO_2 nanoparticles up to 5 *wt*% into the blend systems did not significantly affect the thermal, structural, or morphological properties of the PEO/PnBMA blends. These results indicate that the system remains thermally and structurally stable despite the addition of nanofillers, and TiO_2 does not interact strongly with either polymer under the conditions tested.

Keywords: Polyethylene oxide; Poly(n-butyl methacrylate); Titanium dioxide; Thermal properties, Structural properties

I-CReST 2025:164-122 – Polychaete-Mediated Synthesis and Characterization of Gold Nanoparticles (AuNPs) Using *Marphysa moribidii* Extract from Different Age Classes

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ABSTRACT

The utilization of *Marphysa moribidii,* a local marine baitworm (Polychaeta), as a possible biogenic reducing agent in the synthesis of AuNPs was successfully performed. In this particular study, different age classes of *M. moribidii* based on their body widths that classified as Class I (3 – 5 mm), Class II (6 – 8 mm), and Class III (9 – 11 mm) were employed in the biosynthesis of AuNPs. The use of different age classes of *M. moribidii* for the biosynthesis of AuNPs is a fascinating approach that takes advantage of the varying metabolic activities of the different age groups. The colour change of the solution from yellow to red ruby is the initial observation for the successful biosynthesis of AuNPs where AuNPs_II shows the fastest changes of colour after 2 h incubation and maintains stability for over 1 month of storage. Further confirmation was depicted from the existence of surface Plasmon resonance (SPR) absorption peaks in a range of 545 – 552 nm from UV-Vis spectroscopy. TEM analysis shows the formation of spherical-like shapes of biosynthesis AuNPs with average particle size around 42 – 57 nm where AuNPs_II had the smaller particle size. Lastly, the antibacterial assessment of biosynthesized produced from different age classes of *M. moribidii* had good antibacterial activity against Gram-negative bacteria, but poor activity against Gram-positive bacteria. AuNPs produced from Class II *M. moribidii* (AuNPs_II) provide the highest ZOI value of 13 mm. The utilization of different age classes of *M. moribidii* for the biosynthesis of metal nanoparticles is an interesting pathway for designing a novel method that can be considered nature-friendly, safe, and hopeful for the future.

Keywords: Gold nanoparticles; *Marphysa moribidii*; Polychaetes; Antimicrobial activity

I-CReST 2025:168-127 – Development of an Integrated Sensor System for Monitoring the Effectiveness and Safety of Ozonated Water in Odor Removal at Selected Fish Markets in Kota Kinabalu, Sabah

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ABSTRACT

This research is to develop and deploy an integrated sensor system which aims at monitoring the effectiveness and safety of ozonated water in mitigating foul odors at selected fish markets in Kota Kinabalu. Ozonated water was applied and monitored using a real-time sensor system. The system effectively captured key parameters including Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), ammonia levels (NH_3), and airborne particulate matter (PM). Results demonstrated a significant reduction in odor intensity during ozonation, COD, BOD, and NH_3 levels dropped notably during treatment phases, and the air quality remained within safe exposure limits throughout, confirming the treatment's safety.

Keywords: Sabah fish markets; Ozonated water treatment; Fish market sanitation; Odor control; Integrated sensor system; Air quality monitoring

I-CReST 2025:147-128 – Swelling Study of Sugarcane Bagasse Extracted Cellulose Modified with Synthetic Polymers as Bio-based Hydrogels

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ABSTRACT

Solubility of cellulose in common solvents has been a challenge in generating cellulose-based hydrogels. In the present work, sugarcane bagasse extracted cellulose grafted with synthetic polymer and cross-linked using glutaraldehyde (GA) was synthesized and studied to form hydrogels. Cellulose was isolated from sugarcane bagasse via pre-treatment with 4 vol% sulphuric acid (H2SO4) and 10 wt% sodium hydroxide (NaOH) solution. The cellulose extracted was dissolved in ZnCl2/CaCl2 solution at 65 ℃ to fabricate self-standing cellulose hydrogel without cross-linker. Another cellulose hydrogel was generated and immersed into 5 wt% GA solution to cross-link the cellulose chains. To improve the stability and swelling properties of cellulose, poly(vinyl alcohol) (PVA) was introduced into the cellulose by using GA to cross-link cellulose chains with PVA chains. The resulting hydrogels were characterized with Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy and solid state 13C Nuclear Magnetic Resonance (NMR) spectroscopy for structural determination. Three self-standing cellulose-based hydrogels, including regenerated cellulose (RC), GA cross-linked cellulose (C-GA), followed by PVA and GA cross-linked cellulose (C-GA-PVA) were successfully generated from ZnCl2/CaCl2 dissolution system and each hydrogel possessed different physical aspects. The synthesis of the chemical cross-linking reaction between cellulose, GA and PVA was further confirmed from ATR-FTIR and NMR spectra. The swelling degree of hydrogels generally increases after the addition of PVA and GA into cellulose suspension, showing 52 % (RC), 80 % (C-GA) and 135 % (C-GA-PVA). C-GA-PVA possessed the best swelling capability and potential for possible application of hydrogel.

Keywords: Sugarcane bagasse; Cellulose; Poly (vinyl alcohol); Hydrogel

BIOLOGICAL SCIENCES

I-CReST 2025: 037-014 – Effect of Oil Concentration and Dripping Distance on the Flaxseed-Ginger Oil Alginate Beads' Properties

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ABSTRACT

This study focuses on the development and characterization of alginate beads for encapsulating flaxseed oil (FO) and ginger oil (GO), with the aim of enhancing their appearance to potentially improve consumer palatability. FO, rich in omega-3 fatty acids, was combined with GO, known for its antioxidant and digestive properties. The oils were encapsulated using the extrusion dripping method with a 2.5% (w/v) sodium alginate solution. The effects of oil concentration and the nozzle-to-gelation bath distance on bead properties specifically size and sphericity were evaluated. Emulsions were prepared with different oil concentrations [FOGO 10%, FOGO 5%, FO 5%, and GO 5% (w/v)] using 1% Tween 80, followed by sonication. Beads were extruded at four distances (10 cm, 15 cm, 20 cm, and 25 cm) into a 2% calcium chloride solution. Rheological parameters, including viscosity and shear rate, were measured using a rheometer. Bead size and sphericity were analyzed using ImageJ software and a sphericity factor formula, respectively. Results showed that a 5% (w/v) FOGO emulsion and a 25 cm dropping distance yielded the most uniformly spherical beads, with an average diameter of 2.04±0.15 mm and a sphericity factor of 0.01±0.022. The findings demonstrate that both oil concentration and extrusion distance significantly influence the physical characteristics of the alginate beads. These findings support the use of optimized alginate bead formulation to improve the appearance and potential palatability of functional oils, paving the way for more consumer-friendly delivery systems in nutraceutical and food applications.

Keywords: Alginate; Encapsulation; Flaxseed oil; Ginger oil

I-CReST 2025: 038-015 – Wide-spectrum Antibacterial Endophytes Associated with Malaysian Medicinal Plant

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ABSTRACT

The rising prevalence of multidrug-resistant (MDR) bacterial infections has ignited a worldwide health crisis, rendering massive synthetic antibiotics ineffective and resulting in notable morbidity and mortality. As the antibiotic pipeline grows depleted, there is a greater need for novel antibiotic discovery, particularly from natural resources. Medicinal plants, which have long been utilized in conventional medicine, serve as a potential repertoire for endophytes, an untapped source of bioactive metabolites with antibacterial potential. Thus, the current study aimed to isolate potential antibacterial endophytes from various Malaysian medicinal plants and screen their antibacterial potential against a wide spectrum of MDR bacteria. A total of nine Malaysian medicinal plants and sixteen test bacteria were used in this study. Surface sterilization method was employed to isolate endophytic fungi from selected medicinal plants. The agar plugs diffusion assay was employed to screen the antibacterial potential of endophytic fungal isolates. The results revealed that 345 endophytic fungal isolates were successfully obtained in this study, with 62.6% demonstrating antibacterial potential against at least one test bacterium. The highest percentage of endophytic fungal isolates with antibacterial potential was recovered from *Terminalia catappa* (90.4%). *Staphylococcus aureus* was the most susceptible to endophytic fungal isolates, with 21.3% of inhibitory activity. The findings highlight Malaysian medicinal plants as a potential source of endophytic fungi capable of combating MDR bacteria, paving the path for the next generation of effective antibiotics.

Keywords: Mmultidrug-resistant bacteria; Medicinal plant; Endophytes; Antibacterial potential

I-CReST 2025: 045-021 – Coral Bleaching Experiment System

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ABSTRACT

The declining of coral reef ecosystem has been observed over the last 30 years and projected to continue declining in the future because corals are really sensitive animals towards any changes in their surrounding; temperature, nutrient and water clarity. Coral bleaching is one of disaster affected by natural or human impact towards coral reefs. Mass coral bleaching events has been going on since 1998 and getting worse in 2010 and 2016 throughout the whole world, including in Malaysia. Increase of slightly higher temperature can interrupt the coral-zooxanthellae relationship, and leading to coral whitening, aka coral bleaching. Coral bleaching experiments has been done through the years from various countries to aid in coral conservation and restoration to identify the degree of bleaching towards stressors. In this study, coral triangle in South-east Asia region is the focused area because of the high diversity of coral species growth. The main species in Pulau Bidong, Terengganu, Malaysia, Acropora digitifera was chosen for this study, studied its bleaching criteria by examined the coral polyps and colour changes after synergistic effect of temperature and nitrates, the stressors. The coral nubbins were experimented in three sets of optimum, high and higher of temperature and nitrate levels in laboratory for 3 days. Its physiological changes were recorded every 12 hours. Differentiate this study with other coral bleaching experiment systems; their highest temperature been applied to the corals, the duration of the elevated temperature that corals can withstand, and the species that have been used in the coral bleaching experiment. Thus, this study can contribute knowledge to identifying Acropora digitifera as super coral for its resilience and resistance in husbandry. However, more studies need to be done on identify the genes that make them more tolerant and can be used in enhanced coral breeding.

Keywords: Coral bleaching; Coral polyps; *Acropora digitifera*

I-CReST 2025: 001-041 – Differentiating infected from vaccinated animals (DIVA) strategy for Lumpy Skin Disease (LSD) cases in Pahang via real-time PCR assay

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ABSTRACT

Lumpy skin disease (LSD) is an emerging transboundary viral disease listed by World Organisation for Animal Health (WOAH) as notifiable disease due to its significant economic losses and the potential of rapid spread. The etiological agent called lumpy skin disease virus (LSDV); could infect cattle and water buffalo by causing high fever, swollen lymph nodes, cutaneous nodules of 2 to 5 cm in diameter on the head, neck, limbs, udder, genitalia and perineum; lachrymation, reduction in milk production, and sometimes death. In response to a widespread LSD outbreak in Malaysia in 2021 which caused substantial economic losses, the authority has intensified control measures including vaccination program. Since 2022, LSD has become endemic in several states, including Pahang. As a result, distinguishing between naturally infected and vaccinated animals; an approach known as DIVA (Differentiating Infected from Vaccinated Animals) is essential for effective disease management and eradication. Thus, this study aims to evaluate LSD-positive cases in Pahang using a molecular DIVA strategy based on a real-time polymerase chain reaction (qPCR) assay. Following this, clinical samples collected from suspected LSD cases were processed and tested for the presence of LSDV. The confirmed positive samples were then subjected to DIVA qPCR testing to identify the viral strain. Our findings revealed that all positive cases were due to wild-type LSDV, indicating ongoing circulation of the virus in Pahang. We have successfully established a molecular-based method for DIVA LSD via qPCR assay which enables accurate identification of infection sources and supports targeted control interventions. Hence, it is an urge for continuous efforts of LSD awareness, strict regulation on animal movement and import protocol, as well as proper vaccination programs to curb the spread of LSD in Pahang.

Keywords: Lumpy skin disease (LSD); Lumpy skin disease virus (LSDV); Differentiating Infected from Vaccinated Animals (DIVA); Real-time polymerase chain reaction (qPCR)

I-CReST 2025: 078-059 – Bridging Biodiversity and Community Engagement Through iNaturalist: Campus-Based Citizen Science Projects

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ABSTRACT

This study explores the outcomes of two campus-based citizen science initiatives, Khazanah Alam Campus Challenge (2023) and Biodiversity Conservation & Climate Change Project (2024), organised by Al-Bukhari Library, Universiti Teknologi MARA (UiTM) Jengka Campus, Pahang. Designed to promote biodiversity awareness and civic engagement, these initiatives utilised iNaturalist, a mobile-based citizen science platform, to involve students, faculty, and local communities in real-world biodiversity monitoring. The programs were conducted in collaboration with non-governmental organisations (NGOs) and partner universities, with significant participation from ORBID (Organisation Biodiversity Club), whose members contributed as active citizen scientists. Participants engaged in observing and recording flora and fauna around the campus environment, fostering experiential learning and strengthening environmental stewardship. Drawing solely from iNaturalist data, the two initiatives recorded a total of 1,299 observations, identifying 638 unique species, contributed by 68 observers and verified by 268 global identifiers. The findings reveal high species richness, especially among plants and insects and underscore the effectiveness of digital citizen science platforms for localised ecological engagement. This paper highlights the evolving role of academic libraries in bridging science, technology, and community participation. By integrating open science tools with place-based learning, the initiatives demonstrate meaningful alignment with the Sustainable Development Goals (SDG 13: Climate Action, SDG 15: Life on Land, and SDG 17: Partnerships for the Goals). The experience affirms the potential of collaborative, tech-enabled approaches to cultivate biodiversity literacy and participatory conservation in higher education settings.

Keywords: Citizen Science; iNaturalist; Biodiversity; Academic Libraries; SDG

I-CReST 2025: 012-074 – Harnessing Endophytic Fungi for Antifungal Potential in Sustainable Rubber Cultivation in Malaysia

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ABSTRACT

Rubber tree disease poses a major threat to Malaysia's rubber industry, causing significant reductions in latex yield and quality. If left uncontrolled, these diseases can severely impact farmer income and industry sustainability. In response to increasing concern among local rubber farmers, this study was conducted to identify endophytic fungal pathogens from infected rubber trees and evaluate the antifungal potential of selected plant extracts. Leaf samples were collected from diseased rubber trees in Lakota, Jeli, Kelantan. Endophytic fungi were isolated using the tissue transplantation method. A total of 40 fungal isolates were obtained and characterized based on morphological features such as colony shape, margin, color, and pigmentation. From these, 25 distinct isolates were selected for antifungal screening using the well diffusion method against five plant extracts: mulberry root, mulberry fruit, mulberry stem, garlic, and senna leaves. Among them, two plant extracts showed notable antifungal activity. Mulberry root extract inhibited the growth of 10 isolates (L1S4, L1S6, L2S5, L3S2, L3S5, L3S8, L4S1, L4S2, L4S4), while garlic extract was effective against isolate L1S9. The antifungal activity is likely due to bioactive secondary metabolites present in the extracts, which may suppress or eliminate fungal pathogens. These findings highlight the potential of plant-derived compounds as sustainable alternatives for managing fungal diseases in rubber trees. Further investigation is needed to isolate and characterize the active compounds and assess their efficacy for practical application in rubber plantations.

Keywords: Endophytic fungi; Rubber tree disease; Antifungal activity; Plant extracts; Sustainable agriculture

I-CReST 2025: 117-079 – Zinc Oxide Nanoparticles for Antibacterial Applications: A Systematic Review

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ABSTRACT

Zinc oxide (ZnO) nanoparticles (NP) have become promising photocatalytic antibacterial agents due to their ability to generate reactive oxygen species (ROS) when exposed to light irradiation, which effectively inhibiting bacterial growth. This systematic review covered on the recent research (2020–2025) of ZnO-based photocatalysts, focusing on 2 themes which are involving synthesis methods of ZnO NP, and the efficient of ZnO NP against pathogenic bacteria. Key findings reveal that sol-gel, hydrothermal, and green synthesis methods produce ZnO nanoparticles with desired properties and application, meanwhile doping with others metal (e.g., Ag, Cadmium) enhances visible-light activity. ZnO nanoparticles exhibit higher efficacy against Gram-positive bacteria (e.g., Staphylococcus aureus) compared to Gram-negative strains (e.g., Escherichia coli) because of differences in cell wall structure between these bacterial strains. Applications of ZnO NP extent to medical coatings, water disinfection, and wound dressings. However, challenges such as cytotoxicity, stability, and scalability remained. For more clinical and environmentally friendly applications, future studies should also focus on cytotoxicity and biocompatibility. This review highlights ZnO's potential as a sustainable antibacterial agent while emphasizing current limitations and future potentials.

Keywords: Zinc oxide nanoparticles; ZnO synthesis; photocatalysts; bacterial; antibacterial activity

I-CReST 2025: 129-094 – Enzymatic Synthesis and Antimicrobial Studies of Ethyl Butyrate: A Short Chain Ester for Fragrance Industry

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ABSTRACT

Ethyl butyrate was successfully synthesized via enzymatic esterification of butyric acid and ethanol using immobilized lipase (Novozym 435) as a catalyst. The product was characterized using multiple analytical techniques to confirm its identity and purity. Fourier Transform Infrared (FTIR) spectroscopy revealed a strong absorption band at 1734 cm^{-1}, confirming the presence of the ester carbonyl group (C=O). In the ^{13}C Nuclear Magnetic Resonance (NMR) spectrum, distinct peaks at 174.74, 62.63, 35.89, 18.41, and 13.39 ppm indicated the presence of different carbon environments corresponding to the ethyl butyrate structure. Gas Chromatography-Mass Spectrometry (GC-MS) further confirmed the compound's identity with a molecular ion peak at m/z 116, matching its theoretical molecular mass.The antimicrobial activity of the synthesized ethyl butyrate was evaluated against both Gram-positive and Gramnegative bacteria using the agar diffusion method. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) values were determined, revealing strong antimicrobial activity particularly against Staphylococcus aureus, Salmonella typhimurium, Escherichia coli, and Bacillus subtilis. MBC/MIC ratios were below 4, suggesting effective bactericidal properties. Additionally, the physicochemical properties of ethyl butyrate were assessed. It showed a Sun Protection Factor (SPF) value of 28, a saponification value of 228, and both iodine and peroxide values of 0. These results comply with industrial safety standards, indicating that the compound is stable and safe for consumer use. Overall, the synthesized ethyl butyrate demonstrated desirable chemical characteristics, notable antimicrobial activity, and physicochemical properties suitable for use in cosmetic or fragrance formulations.

Keywords: Enzymatic synthesis; Ethyl butyrate; Antimicrobial; Short chain ester; Fragrance

I-CReST 2025:129-095 – Antimicrobial Study of Synthesized Cetyl Palmitate for Application in the Cosmetic Industry

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ABSTRACT

Cetyl palmitate is a waxy ester commonly derived from palm or coconut oil and widely used in personal care products for its conditioning and smoothing properties. In this study, cetyl palmitate was synthesized via an enzymatic esterification reaction between cetyl alcohol and palmitic acid using Lipozyme as a biocatalyst in hexane. The reaction was conducted at 50°C with agitation at 150 rpm for 5 hours. The synthesized product was characterized using Fourier Transform Infrared (FTIR) spectroscopy and Gas Chromatography-Mass Spectrometry (GC-MS). FTIR analysis revealed a prominent ester carbonyl absorption peak at 1732.67 cm^{-1}, confirming ester bond formation. GC-MS analysis showed a retention time of 30.029 minutes, corresponding to the molecular weight of cetyl palmitate (480.3 g/mol), further validating the synthesis. The antimicrobial activity of the synthesized ester was evaluated against both Gram-positive and Gram-negative bacteria using the agar diffusion method. The Minimum Inhibitory Concentration (MIC) was determined via the microdilution method, while the Minimum Bactericidal Concentration (MBC) was used to distinguish between bacteriostatic and bactericidal effects. The results indicated a bacteriostatic effect against Gram-positive bacteria (Bacillus subtilis and Staphylococcus aureus) at a concentration of 1:60 v/v, and a bactericidal effect at 1:40 v/v. Furthermore, the physicochemical properties of the wax ester were analyzed. The synthesized cetyl palmitate exhibited an SPF value of 7.13, a peroxide value of 6.00, a saponification value of 106.59, and an iodine value of 0.00. These values are within acceptable ranges for cosmetic formulations. In conclusion, the synthesized cetyl palmitate shows promising antimicrobial activity and favorable physicochemical properties, supporting its potential as a functional ingredient in cosmetic and personal care products.

Keywords: Enzymatic synthesis; Cetyl palmitate; Antimicrobial; Long chain ester; Cosmetic

I-CReST 2025:130-096 – Biodiversity of Apocrita (Hymenoptera) in Banting Oil Palm Plantations: A Study of Species Richness and Abundance

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ABSTRACT

Hymenoptera is a diverse and large group of insects that is divided into suborder Symphyta and Apocrita, including bees, wasps, ants and sawflies. To date, there has been no study on Apocrita insects inhabiting the oil palm plantations in Banting. The establishment of oil palm plantations can lead to the destruction of natural habitats, potentially affecting both plant and animal biodiversity. Consequently, there are concerns that oil palm cultivation may have negative ecological impacts. The objectives of this study were to determine the diversity and abundance of suborder Apocrita at Oil Palm Plantation, Banting and to compare its diversity and abundance at three different areas, inner (Trap 1), middle (Trap 2) and outer (Trap 3). A Malaise trap was installed at each sampling site, and insects were collected and identified after one month. Biostatistical parameters such as Shannon-Wiener diversity index (H'), evenness index (E'), and Margalef richness index (R') were used to identify abundance, evenness and richness of the family Apocrita. From the results obtained, the most abundant Apocrita found was from Trap 1, with 1767 individuals collected, followed by Trap 2 and Trap 3, with 183 and 2 individuals, respectively. Trap 3 exhibited the highest evenness index, with E' = 1.000, signifying a perfectly even distribution where all species were equally abundant in the outer area compared to Trap 1 and Trap 2 with E'=0.231 and E'= 0.312. The Margalef richness index (R'), showed the highest value of R' = 2.006 in Trap 1, suggesting that the greatest species richness was observed there with 105 morphospecies while for Trap 2 and Trap 3, there were only 16 and 2 morphospecies found. This study suggests that Apocrita abundance is higher in the inner areas of the oil palm plantation compared to the middle and outer areas. This study is important as it provides insights into the potential ecological impacts of oil palm plantations and contributes to the improvement of sustainable agricultural practices. Moreover, certain Apocrita species may benefit agriculture by serving as pollinators and natural enemies of crop pests.

Keywords: Hymenoptera; SApocrita; Oil palm; Diversity; Abundance

I-CReST 2025:158-125 – Time-dependent Polyethylene Terephthalate (PET) Biodegradation by *Aspergillus niger* and *Aspergillus oryzae* under Solid State Fermentation

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ABSTRACT

Polyethylene terephthalate (PET) is a major plastic pollutant, contributing significantly to global environmental issues such as landfilling and microplastic due to its non-biodegradable nature. This study investigates the potential of fungal-mediated PET bottles biodegradation under solid-state fermentation (SSF) as a sustainable and eco-friendly waste management approach. This study evaluates the effects of fermentation time on the weight loss of PET after treatment with *Aspergillus niger* and *Aspergillus oryzae* separately. In this study, xylanase activity was measured over a 10-week treatment period to assess the enzyme's role in the hydrolysis and subsequent weight reduction of PET. The alterations in chemical structures and surface structure of the PET caused by the xylanase-mediated degradation were also analysed. The procedures begin with solid state fermentation using PET samples derived from mineral water bottle wastes as substrates. The fermentation was carried out separately by utilizing *Aspergillus niger* and *Aspergillus oryzae* as inoculum for 10 weeks. Sucrose and yeast extract were added as carbon and nitrogen sources to enhance the microbial activity. The procedures were continued with analysing xylanase activity throughout the fermentation period. The results showed that *Aspergillus oryzae* exhibited both highest xylanase activity of 467.8 U/ml and maximum PET weight loss of 1.91% at week 4. Meanwhile, *Aspergillus niger* showed peak xylanase activity at week 2 with 641.9 U/ml of xylanase activity, with its maximum weight loss 0.76% was observed at week 6. These results demonstrates that *Aspergillus oryzae* are more efficient for short term PET biodegradation compared to *Aspergillus niger*. This research suggests SSF as a convenient low-cost substrates, energy-efficient and low operational requirement plastic degradation method and contributing to advancements in microbial biotechnology and environmental sustainability.

Keywords: Polyethylene terephthalate; Solid state fermentation; Aspergillus niger; Aspergillus oryzae; Xylanase

I-CReST 2025:155-131 – Biological Activity of *Averrhoa bilimbi* and *Solanum melongena* Ethanolic Extracts: A Comparative Study

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ABSTRACT

Plants are enriched with essential phytochemicals that are responsible for biological activities. This study was conducted to compare phytochemical constituents, anti-diabetic and anti-obesity properties of *Averrhoa bilimbi* and *Solanum melongena* ethanolic extracts. Phytochemical constituents were screened by qualitative standard protocols. Anti-diabetic was determined by α-glucosidase inhibition assay and anti-obesity was evaluated by pancreatic lipase inhibition assay. Phytochemical screening showed the presence of phenol, flavonoids, tannins, alkaloids, saponins and coumarins in both extracts. *In-vitro* inhibition assay demonstrated that *A. bilimbi* ethanolic extract (100 µg/ml) possessing moderate anti-diabetic (71.34±1.8%) and moderate anti-obesity (68.93±2.7%) properties. Meanwhile, *S. melongena* ethanolic extract (100 µg/ml) possessing moderate anti-diabetic (57.87±2.4%) and low anti-obesity (43.78±1.5%) properties. In conclusion, *A. bilimbi* and *S. melongena* ethanolic extracts showed the presence of important phytochemicals that may contribute to anti-diabetic and anti-obesity activities at different levels.

Keywords: Pytochemicals; Anti-diabetic; Anti-obesity

I-CReST 2025:187-137 – Content Validation of Behavioral Treatment Framework

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ABSTRACT

Dental occupational hazards pose a significant risk to dental practitioners, with insufficient guidelines to mitigate prevalent issues such as back, shoulder and neck pain as well as eye strain. Ergonomic recommendations for minimizing the risks of back injuries and eye fatigue focus on improving working posture are important to prevent musculoskeletal disorder. Therefore, this study aimed to validate the items of Behavioral Treatment Framework (BTF) on dental practitioners' occupational health. Materials and methods: This is a qualitative study and convenience sampling was applied. The content validation of BTF was conducted by interviewing orthopaedic specialists, optometrists and dental practitioners and their feedback was recorded and analysed using content validity index (CVI) in terms of its relevancy, clarity, simplicity and ambiguity. The revision of the BTM items (I-CVI score <1) was guided by expert feedback, leading to the finalisation of items for the newly developed BTF. Result: Twelve (12) out of 21 items were refined based on index values and expert feedback. Item 3c (pre-operative), initially comprising two components, was split into two separate items (3c and 3d). The newly developed BTF now comprises 22 items. Conclusion: BTF demonstrated strong evidence of content validity across all four dimensions: relevancy, clarity, simplicity, and ambiguity. Most of the items achieved acceptable to excellent Item-Level Content Validity Index (I-CVI) scores, with Scale-Level Content Validity Index (S-CVI) values meeting recommended thresholds. It indicates that the framework components are conceptually sound, contextually appropriate, and clearly presented.

Keywords: Validation; Behavioural treatment framework; Occupational hazards; Back pain; Eye strain

I-CReST 2025:187-147 – Evaluation of Quality of Life Impact of Refractive Correction among Myopes in Kelantan

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ABSTRACT

Uncorrected refractive errors, particularly myopia, can significantly affect an individual's vision-related quality of life (VRQoL). While refractive correction with spectacles or contact lenses is common, its actual impact on patients' functional and emotional well-being remains underexplored. This study aimed to evaluate the VRQoL of myopic individuals using their current refractive correction. A cross-sectional study was conducted at six private optometry premises in urban and suburban areas of Kelantan, Malaysia. A total of 54 myopic participants aged 18 to 39 years were recruited through convenience sampling. Participants completed the validated Malay version of the Quality of Life Impact of Refractive Correction (QIRC) questionnaire. Functional and emotional VRQoL scores were derived and analyzed using descriptive statistics and independent *t*-tests via SPSS Version 20. Results showed that the magnitude of myopia significantly influenced functional VRQoL, with participants having moderate-to-high myopia (SER ≥ 3.00 D) reporting higher scores than those with low myopia ($p < .01$). Emotional VRQoL was significantly influenced by age and gender, where younger participants and females reported better emotional well-being ($p < .05$). No significant differences were found for residential location, employment status, or correction type. In conclusion, both functional and emotional aspects of VRQoL are impacted by specific demographic and clinical variables. These findings underscore the need for personalized optometric care and support systems that address not only visual correction but also psychological well-being in myopic patients.

Keywords: Myopia; Quality of life; Refractive correction; Spectacles; Vision-related quality of life

INFORMATION TECHNOLOGY, ENGINEERING & MATHEMATICS

I-CReST 2025:036-012 – A Systematic Review of Virtual Desktop Infrastructure (VDI) Implementation for Smart Campus in Higher Education Institutions

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ABSTRACT

The use of digital technologies has led to the advancement of higher education institutions to establish smart campuses in a bid to improve on the efficiency of the institutions and the quality of education. VDI has become a popular choice as it provides central processing, flexibility, and enhanced access. However, the implementation of VDI in higher education has several challenges that need to be understood with the help of enablers, barriers, and impacts. This paper will give a comprehensive understanding of VDI as a solution for smart campuses in higher education with the focus on the factors that affect success, the problems encountered and the consequences on teaching and learning. The study has the following objectives: The first is to determine the major factors that enhance the chances of successful adoption of VDI in smart campuses. The second objective is to explore the problems that institutions go through during its implementation. The third objective is to assess the effect of VDI on the quality of teaching and learning experiences in higher education. The research design that is used in this paper is a systematic review and the articles used in this study are peer-reviewed articles, conference and papers, reports published from 2020 to 2024. The criteria for inclusion of the studies were based on the requirement that the studies must have described the application of VDI in the higher education system and how it integrates with the smart campus. The results show that successful VDI adoption is dependent on solid infrastructure, organizational infrastructure, and user preparedness, whereas major challenges include high costs of implementation, security risks, and user's reluctance to change. The review also emphasized the resources, positive effectiveness impacts in of supporting VDI the which hybrid include learning easy model, access and to reduction digital in the need for physical infrastructure and equipment. These findings support the notion that VDI is an essential tool in the realization of smart campus strategies and enhancement of sustainable learning practices. The study concludes that although VDI has a great potential to transform higher education and improve the quality of learning and teaching, the implementation of VDI poses several challenges that must be addressed including the need for proper planning, engagement of all the stakeholders and investment in the infrastructure and cybersecurity. Based on the findings of this study, it is recommended that higher education institutions should adopt a staged approach in the implementation of VDI and this should be done in conjunction with other smart campus

solutions. Future research should emphasis on providing guidelines and best practices for VDI adoption and evaluating the effects of VDI on organizational performance and student achievement in the long run. This review provides unique insights into overcoming barriers and offers strategic recommendations for its sustainability. Hence, this paper offers a valuable addition to the existing literature on digital transformation in higher education and valuable recommendations for academic leaders, IT managers and policy makers.

Keywords: Education digitalization; Digital transformation in education; Higher education; Smart campus; Virtual desktop infrastructure (VDI)

I-CReST 2025:061-032 – Factors affecting User's Quality of Experience (QoE) Towards Graphical-based Authentication – A Systematic Literature Review

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ABSTRACT

Graphical-based authentication systems have emerged as promising alternatives to traditional text-based passwords since they enhance memorability and provide better protection against common cyber threats. Comprehensive research examining user perceptions when interacting with graphical-based authentication systems is limited. This paper conducts a systematic literature review (SLR) aimed at identifying the key factors influencing users' Quality of Experience (QoE) with GBA. Following PRISMA guidelines, we analyzed 48 relevant studies published between 2010 and 2024 from reputable digital libraries. Our results indicate five key factors impacting QoE: usability, accessibility, memorability, visual design, and legibility impact factor. Furthermore, the review highlights an increasing need for authentication design focused on QoE, which integrates subjective user preferences with objective usability metrics. The study concludes by offering insights for developing GBA systems that adhere to user-centered principles, ultimately enhancing both security and user satisfaction.

Keywords: Graphical-based authentication; Quality of experience (QoE); Usability; Shoulder surfing; Systematic literature review

I-CReST 2025:062-033 – User Engagement Factors for iStaff@UMT Mobile Application

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ABSTRACT

The growing popularity of mobile applications and technologies, lead many companies and institutions to develop modules or system through mobile application. User engagement is widely recognized as a critical factor in determining the success of mobile applications. Without a clear understanding of user engagement and empirical evidence linking it to key performance indicators, Digital Ecosystem Centre (DEC), Universiti Malaysia Terengganu (UMT) may struggle to effectively optimize their offerings to meet user needs for iStaff@UMT Mobile Application (iStaff@UMT). Since iStaff@UMT was launched, it has been found that the number of active users is relatively low when compared to the total number of UMT staff. Additionally, less research has been conducted on the factors of user engagement with the mobile application. This research aims to study the factors of user engagement on iStaff@UMT, which is to identify the factors that contribute to user engagement for mobile application, to examine the factors that influence user engagement for iStaff@UMT and to propose the factors for improving user engagement towards iStaff@UMT. The data was collected using a survey approach. UMT's staff that has been used iStaff@UMT were selected as respondents. A total of 95 respondents responded to the questionnaire. IBM SPSS 29 software was used to analyse the data. The research findings showed that user engagement on iStaff@UMT is influenced by design, information quality and usability factors. Meanwhile, functional and interaction factors have been found not significantly influence user engagement of iStaff@UMT. Theoretically, this study contributes to the understanding of the key factors that influence user engagement on iStaff@UMT, valuable input for new mobile applications development and paves the way for further research into other potential influences on mobile application user engagement.

Keywords: Experience; User engagement factors; Mobile application

I-CReST 2025: 066-036– Foundations for the Programming Conceptual Understanding Test (PCUT): A Literature Review of Pedagogical Innovations

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ABSTRACT

As programming education evolves, enhancing conceptual understanding among novice learners remains a critical challenge. This literature review synthesizes key pedagogical innovations from 2015 to 2025 that inform the development of a validated assessment instrument for programming conceptual understanding. Five major approaches are explored: conceptual metaphors, robotics and interactive tools, prototype theory, physical programming tools, and ontology-based frameworks. These strategies collectively aim to scaffold abstract reasoning, reduce cognitive load, and foster deeper learner engagement. Conceptual metaphors provide intuitive cognitive bridges between everyday experiences and abstract programming constructs. Robotics and physical tools offer tangible, multimodal learning environments that enhance motivation and comprehension. Prototype theory emphasizes relatable exemplars to support categorization and knowledge transfer, while ontology-based learning structures promote metacognitive reflection and conceptual integration. The review highlights a growing consensus that multimodal, metaphorical, and structured pedagogies significantly improve computational thinking and problem-solving skills. This synthesis supports the design of the Programming Conceptual Understanding Test (PCUT), a novel assessment tool grounded in cognitive science and validated through mixed-methods research. The review concludes by identifying future research directions, including cultural adaptability, scalability, and integration with adaptive technologies to personalize learning. These insights offer a foundation for a more inclusive, effective, and engaging programming education.

Keywords: Programming basics; Learning tools; Student assessment; Teaching methods; Problem solving

I-CReST 2025:076-042 – Sailing into Cyber Awareness: Determinants of Security Behaviour Among Seafarers

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ABSTRACT

The maritime industry is increasingly vulnerable to cyber threats, as demonstrated by the 2017 Maersk cyberattack, which exposed the fragility of global shipping operations. With the growing integration of digital technologies into shipboard systems, ensuring robust cybersecurity awareness among maritime personnel is more crucial than ever. However, empirical research on the human and behavioural factors influencing cybersecurity awareness in maritime contexts remains limited. This study investigates the influence of self-efficacy, perceived benefits, cues to action, and perceived susceptibility on the cybersecurity awareness of seafarers. Grounded in the Health Belief Model—a well-established framework from preventive healthcare adapted in this study to understand users' computer security behaviour. This study employs a quantitative approach to examine hypothesised relationships among these variables. Data were collected through structured questionnaires administered to seafarers who regularly operate computer systems, and statistical analysis was conducted to evaluate the strength and significance of the relationships. Findings reveal that perceived benefits and cues to action significantly contribute to improving cybersecurity awareness. In contrast, perceived susceptibility emerged as a weaker predictor. This is likely due to seafarers' limited experience with actual cyber incidents and the common belief that such threats mainly affect shore-based systems. Incident-based training and realistic simulations are recommended to clearly demonstrate the operational impact of cyberattacks on shipboard environments. This study contributes to the growing body of literature on maritime cybersecurity by addressing a gap concerning human factors in information security behaviour. It offers practical implications for maritime organisations, shipping companies, and policymakers seeking to strengthen cyber resilience. Promoting continuous training and awareness initiatives can help foster a proactive cybersecurity culture among seafarers and mitigate risks associated with human error in digital maritime operations.

Keywords: Maritime Cybersecurity; Cybersecurity Awareness; Health Belief Model; Seafarers and Maritime Digitalization

I-CReST 2025:085-050 – Enhancing SME Brand Visibility through Digital Multimedia Production

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ABSTRACT

This paper presents a case study on the production of a corporate promotional video for OTC Training Centre Sdn Bhd, showcasing a practical approach to digital branding through cost-effective multimedia tools and agile development methods. Designed to strengthen brand identity and public engagement, the video highlights OTC's mission, services, and training excellence. The production process followed three phases—pre-production, production, and post-production—utilising accessible resources such as an iPhone for filming and software tools including CapCut, Canva, and Freepik. The Agile methodology facilitated iterative development based on real-time feedback from stakeholders. Published on OTC's YouTube channel, the video achieved over 130 views and 1,800 impressions within three weeks, alongside favourable feedback. This project illustrates how small and medium enterprises (SMEs) can leverage simple digital technologies and adaptive workflows to enhance communication and outreach sustainably. By integrating technology, creative media, and organisational goals, the study contributes to ongoing discussions on bridging science, technology, and the humanities for future-ready, resource-efficient solutions.

Keywords: Digital communication; Corporate branding; Agile methodology; Multimedia production; Sustainable outreach; Interdisciplinary synergy

I-CReST 2025:088-055 – Forecasting the Unemployment Rate in Malaysia Using the ARIMA Model

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ABSTRACT

Considerable fluctuations in Malaysia's labour market have been driven by both global economic uncertainties and domestic transformations. Events such as the COVID-19 pandemic exposed the labour markets to certain vulnerabilities. Gaps remain in the literature regarding the continuous validation of forecasting models of the unemployment trend in the presence of extreme events such as COVID-19, particularly over extended and post-pandemic periods. It is essential to develop an accurate forecast for unemployment trends to inform effective labour market policies and economic planning. This study analyses the monthly unemployment rate in Malaysia from January 2016 to March 2025 with the aim of modeling and forecasting Malaysia's monthly unemployment rate using a time series approach. A structural break analysis, assuming one break, identified a significant change in trend occurring in February 2020, which aligns with the onset of the COVID-19 pandemic. This suggests that the pandemic had a notable impact on the labour market. The identified break point is then used as a basis for modeling the data using ARIMA, considering the change in trend to improve forecasting accuracy. Two distinct forecasting models are developed: one assumes no pandemic, using data before February 2020, and the other reflects the post-pandemic period. Forecasts for both scenarios highlight how the pandemic altered the unemployment trend and model structures. Findings underscore the importance of accounting for structural breaks to improve forecasting accuracy and provide critical evidence for labour market policy and planning.

Keywords: Unemployment rate; ARIMA; Time Series Analysis; Structural breaks

I-CReST 2025:090-056 – Integrating User-Centered Design and Persuasive Technology: A Case Study on The Raw's Skincare E-Commerce Digital Transformation

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ABSTRACT

The skincare e-commerce industry is growing quickly, but many websites still face problems with being easy to use and keeping users engaged. This study focuses on how two design approaches, User-Centered Design (UCD) and Persuasive Technology (PT), can work together to improve the digital experience of skincare websites. The research uses *The Raw*, a skincare brand, as a case study. To carry out this research, the study used both quantitative and qualitative methods. A survey was conducted to collect user feedback, and interviews were held with experts in website design and user experience. These methods helped gather insights about how users interact with the website, what keeps them engaged, and which features help influence their decisions. The findings demonstrate that UCD enhances the user-friendliness and accessibility of websites. It improves how easy it is for users to find what they need and interact with the site. On the other hand, PT uses techniques like customer reviews, limited-time offers, and personalized recommendations to build trust and guide users toward taking action, such as making a purchase. By combining both approaches, the website became more engaging, easier to use, and more effective in meeting users' needs. This research provides clear design suggestions that can help other skincare brands improve their online platforms. The study also adds to the current knowledge about how to use UCD and PT together in e-commerce, offering useful ideas for businesses that want to improve their digital presence and build stronger relationships with customers.

Keywords: User-Centered Design; Persuasive Technology; Skincare E-Commerce; Digital Transformation; User Engagement

I-CReST 2025:093-060 – Integrating the Formative and Summative Evaluation in the Development of Face Recognition Attendance System

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ABSTRACT

The advancement of computer vision technologies has facilitated the development of numerous applications across various sectors, including education. Among these innovations, facial recognition stands out as a prominent application, particularly when integrated with business processes such as attendance management systems. Traditional attendance systems often suffer from inefficiencies such as being time-consuming, susceptible to manipulation, and lacking in security and data integrity. In response, automated attendance systems leveraging facial recognition aim to overcome these limitations by offering a more efficient, accurate, and secure method of attendance tracking. This paper presents our experience in the development and evaluation of a facial recognition-based attendance system, with a particular focus on the critical role of both formative and summative evaluations. Formative evaluation, conducted during the development phase through expert reviews, was instrumental in identifying design flaws and ensuring that all essential user requirements were captured. In contrast, summative evaluation, carried out via user acceptance testing after system completion, provided valuable insights into user satisfaction and system effectiveness, guiding further refinements. The integration of both formative and summative evaluations not only addresses different aspects of system quality but also ensures a more robust and user-centred system design. Employing this dual-evaluation approach enhances the reliability and practicality of face recognition-based attendance systems, aligning them with the evolving needs of modern organizations.

Keywords: Computer vision; Attendance system; Formative evaluation; Summative evaluation; System development

I-CReST 2025:104-069 – Advancement in *Halalan Toyyiban* Laboratory Instrumentations for Sustainable Food Product Analysis

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ABSTRACT

The *halalan toyyiban* (HT) concept is crucial in ensuring food products adhere to both *halal* (permissible) and *toyyiban* (wholesome) Islamic dietary principal, addressing ethical, safety, and quality considerations in the global food industry. However, challenges such as complex food matrices and the presence of forbidden adulterants necessitate advanced analytical techniques for robust detection. This comprehensive review explores the advanced laboratory instrumentation for HT assurance, focusing on spectroscopic techniques such as Fourier Transform Infrared Spectroscopy (FTIR) for rapid, non-destructive analysis, chromatographic methods such as High-Performance Liquid Chromatography (HPLC) and Gas Chromatography (GC) for precise quantification, and molecular approaches including Polymerase Chain Reaction (PCR) for high-sensitivity contaminant detection. Additionally, the microbiological assessments aspects ensure food safety and hygiene compliance. Beyond the analytical advancements, sustainability is increasingly integral for HT compliance, necessitating environmentally friendly detection methods, efficient resource utilization and reduced chemical waste in food product testing laboratories. Furthermore, this review also highlights the role of Multivariate Data Analysis (MVDA) in managing complex datasets, enhancing pattern recognition, and improving predictive modeling for more accurate decision-making for the HT aspects based on aforementioned laboratory instrumentations. While these methodologies offer significant advancements, challenges such as high costs, lack of standardization, and technical expertise remain key limitations. This study emphasizes the need for cost-effective, automated and standardized detection laboratory system that allign with sustainability goals, ensuring more efficient, accessible and environmentally responsible HT compliance framework for a reliable and ethical food product laboratroy results

Keywords: *Halalan toyyiban* authentication; Food safety and quality; Laboratory instrumentation; Analytical detection; Multivariate data analysis

I-CReST 2025:105-076 – Evaluating the Impact of Autonomous Mobile Robots on Warehouse Efficiency in a Malaysian Retail Pharmacy Chain

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ABSTRACT

This study investigates the operational impact of Autonomous Mobile Robots (AMRs) in the warehouse of a Malaysian retail pharmacy chain navigating the complexity of omni-channel fulfilment. The research addresses a key problem: how mid-sized warehouses can scale efficiency without major infrastructure overhaul in the face of high SKU variability and fluctuating order volumes. A mixed-methods design was used, combining survey data (n=30) based on the Unified Theory of Acceptance and Use of Technology (UTAUT) and interview insights (n=7) aligned with the Supply Chain Agility and Resilience (SCAR) framework. Quantitative findings revealed a significant increase in picking accuracy from 94% to 99.95%, with a 50% reduction in peak manpower requirements. Regression analysis confirmed performance expectancy ($\beta = 0.383$, $p = .044$) and facilitating conditions ($\beta = 0.406$, $p = .032$) as strong predictors of employee intention to use AMRs. Qualitative insights supported these findings and highlighted the AMRs' ability to reduce physical strain and structure workflow, while also exposing critical dependencies on backend systems. Fulfilment continuity was vulnerable to Wi-Fi signal drops below -50 dBm and inaccurate SKU metadata, which caused system interruptions and rack failures. Nevertheless, AMR integration enabled a 30.7% increase in inventory value stored within the same footprint and improved throughput during campaigns, reaching up to 22,000 order lines daily. These results suggest that AMRs can act as scalable, labour-efficient solutions when paired with reliable digital infrastructure and well-planned operational redesign. The study concludes that while AMRs alone do not solve all fulfilment challenges, they significantly enhance agility and productivity in resource-constrained retail environments, offering a replicable model for automation in Southeast Asia's emerging logistics sector.

Keywords: Autonomous Mobile Robots; Warehouse Automation; Supply Chain Agility; Technology Adoption; Omni-channel Logistics

I-CReST 2025:120-082 – Scan, Pay, and Go? Unpacking the Barriers to Cross-Border QR Payments Through the Lens of VAM

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ABSTRACT

The Value-Based Adoption Model (VAM) theory provides an important framework for understanding the use of QR mobile payments across borders, especially in terms of international transactions. Meanwhile, the adoption of mobile payment systems is growing in the domestic context. However, the adoption of mobile payments across borders still remains inconsistent, mainly among outbound Malaysian tourists. There are several factors that lead to this inconsistency. Firstly, the mobile QR payment operation mechanism used in other countries is unfamiliar to many Malaysian travellers, leading to uncertainty and doubt. Secondly, high exchange rates and additional service fees will discourage users from using mobile payments in the international context. Thirdly, concerns over data security, fraud, and differing regulatory protections across borders increase the perceived risk of using such systems. Furthermore, the lack of trust in foreign FinTech providers and the limited visibility of internationally recognized support contribute to this inconsistency. This paper investigates the origins, strengths, and limitations of VAM and its application in cross-border QR mobile payments. By integrating constructs such as perceived value, benefit, cost, and risk, this study provides a theoretical lens to analyse digital consumer behaviour and can contribute to the existing body of knowledge by offering theoretical extensions to VAM. Besides that, it can provide actionable insights for FinTech developers, policymakers, and tourism industry stakeholders aiming to improve QR mobile payment adoption among international travellers.

Keywords: Value-Based Adoption Model; QR Mobile Payments; Cross-Border Transactions; International travellers

I-CReST 2025:123-087 – Vortex Formation and Heat Transfer Coefficient Relationship Through Synthetic Jet Cooling Application on Electronic Devices

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ABSTRACT

With the decreasing size and the increasing complexity of modern electronic gadgets, heat dissipation problems on these gadgets have become increasingly challenging to resolve thus causing inefficient in thermal management. Compact electronic gadgets with high power requirements and miniature electronic components are usually more susceptible to overheating due to their size which hinders efficient heat transfer. This paper discusses the application of synthetic jet cooling on these devices through the relationship between vortex formation and heat transfer coefficients. Synthetic jet is a device capable of discharging fluid to dissipate heat on given devices. It consists of a periodically moving diaphragm and cavity with a nozzle. Vortices were formed when fluid is being discharged through the synthetic jet. Through ANSYS FLUENT, fluid characteristics of these vortices were simulated, and the air flow is approximated to be of three-dimensional, unsteady, turbulent, and incompressible. Experimental data are also being discussed in this paper to validate the simulated data. Taguchi method was chosen as the method for optimizing the data hence generated an equation to predict the temperature response to the synthetic jet application. It was observed that nozzle diameter became the prominent parameter that contributed to the temperature response. Nozzle to heated surface distance and cavity depth came in second and third respectively as contributors. Based on these contributing factors, heat transfer process can be most effective when the vortex formed through synthetic jet is as close as possible to the heater surface. The generated equation was able to predict the temperature response as accurately as possible.

Keywords: Synthetic jet; Thermal management; Vortices; Optimization

I-CReST 2025:145-105 – Classifying Emotional Responses of Children with Autism Towards Robot Movement: A Proposed Framework Based on a Preliminary Case Study

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ABSTRACT

Children with Autism Spectrum Disorder (ASD) face unique challenges in recognizing, processing, and expressing emotions. Recent technological interventions using robots provide promising avenues to support these individuals. By integrating the Kansei Engineering approach and the KJ Method, this study proposes a refined framework for classifying emotional responses elicited by various robot movement patterns such as circular, forward, forward left, forward right, reverse left and reverse right based on previous preliminary case study. These theoretical underpinnings, describe methodological approaches, and discuss the implications for designing adaptive robot systems that enhance social communication and educational outcomes for children with ASD. While based on preliminary case study, the proposed framework provides valuable insights into interpreting emotional responses in children with ASD and can act as useful reference for incorporating robots into their daily routines

Keywords: Autism; robot movement; KJ Method; Emotion classification

I-CReST 2025:150-111 – Singly Diagonally Implicit Block BDF of Order 3 for Stiff Ordinary Differential Equations

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ABSTRACT

This paper presents the development of a Singly Diagonally Implicit Block Backward Differentiation Formula (SDIBBDF) of order 3 for solving stiff Ordinary Differential Equations (ODEs). The general formula is derived using Taylor series expansion, yielding two approximate solutions that are computed simultaneously in a block. The proposed method is shown to be zero-stable, consistent, convergent, and A-stable. Numerical results, based on maximum error and execution time, indicate that the proposed method outperforms the existing method in solving stiff ODEs.

Keywords: Block backward differentiation formula; Singly diagonally implicit; Stiff ODEs

I-CReST 2025: 199-149 – GIS Open Sources for Mapping the Customer Lifetime Value of KR1M in Malaysia: Criteria, Tools and Platform

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ABSTRACT

Traditionally, the lifetime value of business including *Kedai Rakyat 1Malaysia* (KR1M) was measured by financial-based model (called as non-spatial model) since the first model was introduced in early 1930s. The roots of establishment of customer lifetime value (CLV) model is to determine how long the business can be survived that is depend on the financial success of the business. Based on current literature review, the model of CLV is dominating by non-spatial variables, as representing by the most well known model of recency, frequency and monetory model (RFM model). The main objective of the study is to compare the GIS open source for mapping the CLV of KR1M in order to understanding the sustainability of KR1M. The comparisons are based on criteria, tools and platform with regard to suitability for mapping the CLV of KR1M. The method used in this study was exploration study by testing and evaluating the performance of the five (5) GIS open sources such as Quantum GIS, PostGIS, GeoServer and MapServer, OpenLayers and Leaflet, and Cloud-Native GIS Tools. The major finding is Cloud-Native GIS is the most preferred choices for mapping the CLV of KR1M based on some reasons. In addition, this study will help the government, policy makers and researcher in understanding the sustainability of KR1M in current marketplace, accordingly to spatial based point of view.

Keywords: GIS open source; Customer Lifetime Value; Kedai Rakyat 1Malaysia

I-CReST 2025: 207-156 – Real-time Measurement of EMG Signal and Joint Angles for Biomechanical Evaluation of Arm Movements

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ABSTRACT

Electromyography (EMG) signal is a critical biosignal that capture neuromuscular activity and offer significant utility in biomedical signal processing applications, including diagnostics, rehabilitation monitoring, and human-machine interfacing. This study presents the development of a cost-efficient, real-time signal acquisition and signal processing system designed to measure EMG signals and corresponding upper limb movements during elbow flexion. Surface EMG electrodes were located on the biceps brachii following SENIAM guidelines, while an electronic goniometer captured joint angles during biceps curl tasks for load of 0 kg, 2 kg, 4 kg and 6 kg. Signal acquisition and processing were executed via a custom interface system, with outputs visualized in real time. The results showed a direct relationship between EMG signal amplitude, elbow angle and external load, confirming the system's capability to characterize muscle activation dynamics. The proposed system demonstrates potential as a portable, cost efficient and scalable platform for real-time biomedical signal monitoring and biomechanical analysis.

Keywords: Electromyography (EMG); Elbow flexion; Time domain; Upper limb motion

SOCIAL SCIENCES

I-CReST 2025:020-008 – A systematic review of Alternative Dispute Resolution Mechanisms: The Tribunal for Consumer Claims Malaysia

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ABSTRACT

ADR is central to consumer protection. A body of literature on ADRs has emerged since. In Malaysia the Tribunal for Consumer Claims of Malaysia (TCCM) was established to provide a mechanism for dispute resolution. Thus, the purpose of this paper is to conduct a systematic review of studies related to the Tribunal for Consumer Claims Malaysia (TCCM) focusing on its effectiveness as the dispute resolution mechanism. The review results showed that the number of research papers on consumer redress appears to be limited and published sporadically at distant yearly intervals. Moreover, the few journals on TCCM seem to show that TCCM appears not to be very popular with the consumers and it is proposed that TCCM should keep abreast with rapid changes brought about by globalization and liberalization to attract more adversely affected consumers to register their grievances.

Keywords: Consumer protection; Consumer Redress; Disputes; Tribunal

I-CReST 2025:029-009 – Assessing Visitor Satisfaction with CPTED Infrastructure

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ABSTRACT

Every public park needs to be functional to increase the biodiversity of the urban ecosystem and safe to satisfy the social and psychological needs of the community. This is an important concern of the local authorities. Globally, crime prevention through environmental design (CPTED) is a widely adopted strategy by municipalities for parks. The research questions of this study are "How satisfied are park visitors regarding the provision of *CPTED infrastructure?*" and "*What strategies can be implemented to improve the safety aspects of the case study area*? The aim of this study is to evaluate visitors' level of satisfaction with CPTED infrastructure and propose relevant improvements in the case study area, i.e., Taman Merdeka Johor Bahru Public Park. The method of sampling implemented was convenience sampling involving 152 visitors to the park. The researchers conduct surveys during weekdays and weekends within 3 months. The data collection instrument was a questionnaire containing Likert-like scale queries. Descriptive statistics of frequencies, means, cross-tabulation and correlation function to present data in a meaningful way and reveal patterns or relationships within the data. The findings indicate the majority of respondents (89.5%) do feel fear when they are in Taman Merdeka. However, on average, the visitors are quite satisfied with the provision of infrastructure. Factors that influence the fear of respondents are poor lighting, poor access control, and lack of park maintenance. A test of association using chi-square verifies that there is a significant association ($p<0.05$) between the variables *worried about being a victim of crime, provision of lighting infrastructure and maintenance of landscaping elements*. In this case study, respondents have feelings of fear for safety from crime and view the implementation of more efficient CPTED safety infrastructure as required. The findings and proposed recommendations could assist local authorities in improving the formulation and implementation of CPTED.

Keywords: CPTED; Public parks; Park planning

I-CReST 2025: 030-010 – The Impact of Self-Awareness on Positive Thinking, Communication, and Achievement in University Students: The Mediating Role of Social Networking Sites

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ABSTRACT

This study examines the influence of self-awareness on positive thinking, communication skills, and academic achievement, with social networking sites (SNS) as a potential mediator. Given the growing role of digital platforms in education and socialization, understanding how self-awareness interacts with SNS usage is crucial. A quantitative cross-sectional survey was conducted among Malaysian university students, utilizing validated self-report questionnaires. Data were analyzed using Structural Equation Modeling (SEM) to test direct and mediating effects. The findings indicate that self-awareness significantly enhances positive thinking, communication, and academic performance, while SNS has a dual role positively reinforcing optimism but negatively mediating academic success. The study highlights the importance of digital self- regulation strategies and suggests educational interventions to enhance self-awareness for better academic and social outcomes.

Keywords: Self-awareness; Social networking sites; Positive thinking; Communication; Academic achievement; Digital behavior

I-CReST 2025:042-019 – The Influence of Technology on L2 Learners' Writing Skills in the Era of AI

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ABSTRACT

Artificial Intelligence (AI) writing tools such as ChatGPT and QuillBot transformed the landscape of writing assistance through their capabilities in grammar enhancement, idea organization, and content refinement. These innovative tools delivered instantaneous feedback, creative input, and improvement suggestions, enabling users to create refined and coherent content with increased efficiency. Their significance grew substantially in both educational and professional environments, particularly benefiting individuals who struggled with common writing challenges including grammatical accuracy, vocabulary limitations, and organizational difficulties. This quantitative study investigated the impact and utilization patterns of AI writing tools among Second Language (L2) students, employing a questionnaire-based methodology. The research examined the tools' effectiveness in enhancing writing competencies, error identification, and overall quality of written work, with specific attention to vocabulary expansion, sentence construction, idea organization, and stylistic elements. Through analysis of L2 student experiences, the study explored how AI tools enhanced creative expression, writing style development, and student engagement in the writing process. The research objectives included evaluating the extent of AI tools' influence on L2 students' writing capabilities, identifying specific advantages these tools offered, and understanding their role in addressing the challenges faced by L2 students in traditional writing tasks. The investigation was particularly relevant given the increasing adoption of AI tools in academic settings, where writing proficiency remained crucial across various disciplines. Findings indicated widespread adoption and positive impacts of AI writing tools, particularly in areas of skill development, quality enhancement, and writing efficiency. The personalized feedback and targeted support provided by these tools contributed significantly to building L2 students' confidence and competence in writing. This research underscored the transformative role of AI tools in contemporary writing instruction, highlighting their contribution to skill development and their potential to prepare L2 students for academic and professional success.

Keywords: AI writing tools; Writing skills development; L2 students; Educational technology

I-CReST 2025:028-020 – Harnessing Extrinsic Motivation for Sustainable Education: Pathways to Empowerment in Education for Sustainable Development among Pre-University Students in Kuantan, Pahang

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ABSTRACT

Education for Sustainable Development (ESD) plays a critical role in equipping students with the knowledge and motivation needed to address global sustainability challenges. This study explores the relationship between extrinsic motivation on fostering sustainable education among pre-university students in Kuantan, Pahang. Using a quantitative research approach, data were collected through a close-ended questionnaire from a sample of 127 students. The responses were analyzed using SPSS to identify key factors influencing students' engagement with ESD. The findings highlight the significant role of extrinsic motivation such as rewards, recognition, and external encouragement in enhancing students' commitment to sustainable education. This study contributes valuable insights for educators, policymakers, and curriculum developers by emphasizing the need for strategically designed motivational frameworks to promote ESD. The results provide a foundation for further research and practical applications in shaping effective sustainability education strategies.

Keywords: Education for sustainable development; Extrinsic motivation

I-CReST 2025: 048-024 – Burnout Associated with Psychological Distress Before Reading Law in Degree: A Case Study

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ABSTRACT

Burnout associated with psychological distress is an issue hindering law students' maximum achievement globally. With good mental health students will be able to live their lives to the fullest, hence have better academic performance. This research is meant to look at reasons why law students burnt out during their study. This is quantitative research. There are 10 sections in the instrument. It has 3 sections. Section A has items on demographic profile; section B has 24 items on learners' drive while Section C has 26 items on burnout. There are 113 respondents from the Centre of Foundation Studies at UiTM Selangor, Dengkil Campus, Malaysia. General findings concluded that burnout amongst law students is prevalent. This research is important to ascertain and thus be able to strategize methods or steps to counter this issue

Keywords: Burnout; Foundation studies; Law students; Quantitative research; Learners' drive

I-CReST 2025:052-027 – Making Sense of Calculus: Unpacking the Conceptual Knowledge of Instantaneous Rate of Change Among Malaysian Pre-Service Mathematics Teachers

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ABSTRACT

While derivatives are often introduced through symbolic manipulation and graphical interpretations, their function as tools for modeling real-world change is rarely emphasized in secondary mathematics. This study investigates how Malaysian pre-service mathematics teachers conceptualize the derivative beyond its procedural definition, focusing specifically on how they interpret the concept of instantaneous rate of change across different forms: equations, tables, graphs, and symbols. Using a qualitative case study approach, three mathematics majors underwent task-based interviews that included interpretive questions. Data from interviews and written responses were analyzed through directed content analysis. Findings reveal that although participants could define derivatives as a "rate of change" or "slope," none could explain the underlying principles such as the relationship between dy/dx and δy/δx or interpret how derivatives describe change in various representations. Their limited knowledge was closely tied to static procedures, lacking the flexibility needed for pedagogical application. This highlights an urgent need to shift teacher education from symbolic fluency towards conceptual adaptability, enabling future educators to teach derivatives as powerful tools for reasoning about change in diverse real-world settings.

Keywords: Calculus; Derivatives; Pre-service mathematics teachers; Instantaneous rate of change; Conceptual knowledge

I-CReST 2025:058-030 – Regulating Artificial Intelligence: Legal, Technical, and Ethical Dimensions

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ABSTRACT

This study explores how legal frameworks, technical standards, and ethical guidelines collectively shape the governance of emerging technologies, with a focus on consumer protection in the context of artificial intelligence (AI). Adopting a qualitative doctrinal methodology and supported by in-depth expert interviews, the research identifies legal frameworks, technical standards, and ethical guidelines as the three foundational pillars of effective AI governance. Interview data reveal that public perceptions of AI regulation vary significantly across age and gender. Older participants express greater support for regulation, mainly due to privacy concerns, while women tend to show lower levels of trust in industry self-regulation. The findings also indicate a general lack of public understanding of AI risks and operations, limiting individuals' ability to make informed decisions. Respondents emphasize the need for greater transparency in AI systems and improved public education to enhance regulatory trust. Furthermore, participants highlight the challenges of regulating fast-changing AI technologies and call for flexible, collaborative governance involving governments, industry, and consumers. Overall, the study illustrates the complex interdependence of legal, technical, and ethical measures in building public trust and protecting consumer rights in the AI era.

Keywords: AI regulation; Consumer protection; Legal framework; Technical standards; Ethical guidelines

I-CReST 2025:060-031 – Mindful Machines, Mindful Teachers: The roles of Reflective Learning in AI-Driven Higher Education

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ABSTRACT

The rapid integration of generative artificial intelligence (GAI) tools such as ChatGPT into higher education brought significant shifts in teaching and learning practices. While these tools enhanced efficiency, personalization, and instructional innovation, they also presented pedagogical and ethical concerns related to academic integrity, cognitive overreliance, and digital equity. Building on the foundational work from the comparative analysis of Scopus, Academia, ResearchGate, Google Scholar and WOS (2021 to 2025), which highlighted educators' ambivalence toward AI adoption, this study expanded the discourse by embedding structured reflective learning as a pedagogical strategy in response to GAI use. Grounded in Reflective Practice Theory, Connectivism, and Transformative Learning Theory, the study employed a sequential mixed-methods design. Quantitative data were collected through surveys from 152 faculty members and 318 undergraduate students across three universities, capturing patterns of AI usage, self-efficacy, ethical perceptions, and reflective dispositions. Qualitative data were obtained from semi-structured interviews and reflective journals involving 30 purposively selected participants. A four-week structured intervention was implemented with experimental groups, incorporating reflective prompts, guided annotation of AI-generated outputs, and peer feedback sessions. Quantitative analysis revealed statistically significant improvements in participants' reflective thinking scores ($p < 0.01$), ethical awareness ($p < 0.05$), and confidence in pedagogical decision-making involving AI. Thematic analysis of qualitative data identified three core shifts: heightened critical awareness of AI's role, improved capacity to balance AI use with academic integrity, and increased collaboration around ethical teaching strategies. The study concluded that structured reflective learning provided a viable, scalable approach to cultivating responsible and pedagogically sound use of GAI tools in higher education. Findings offer practical recommendations for curriculum redesign, faculty development, and institutional policies. This research contributed meaningful insights to the ongoing efforts to integrate AI ethically and effectively in postsecondary education.

Keywords: Reflective learning; Generative AI; ChatGPT; Higher education; Teaching and learning

I-CReST 2025:063-034 – Do ChatGPT Helpful in Preparing Assignment? A Qualitative Study Based on The Instructor Perspective

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ABSTRACT

ChatGPT has been deemed an influential tool and is widely used in various fields including education. With vast promising potential, ChatGPT has risen as a central focus of researchers nowadays. This study aims to explore the effectiveness of ChatGPT usage in preparing the students' assignment. This study mainly focusses on the educators' perspective. A qualitative research design was employed with a total of 66 students participating in this study. A total of eight meaningful themes emerged from the thematic analysis. In summary, findings show that ChatGPT has a strong association with improving students' assignment quality before and after. Nevertheless, there are two main issues on the use of ChatGPT for the assignment preparation that need to be further addressed. This study provides insights on the impact betterment of students' writing assignments with the optimization of ChatGPT usage. Thus, further study and evaluation of its impact are necessary to ensure the optimal incorporation of AI-based learning tools like ChatGPT continuously used in the learning process.

Keywords: ChatGPT; Artificial Intelligence; Qualitative; Educator perspective

I-CReST 2025:064-035 – From School to Campus: Mapping the Stress Landscape of First-Year University Students in Malaysia

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ABSTRACT

The transition from secondary school to university is a critical developmental stage that often exposes students to various forms of stress. This study aims to examine the levels of stress experienced by first-year university students, focusing on four domains: 1) Physical Stress, 2) Interpersonal Relationship Stress, 3) Academic Stress, and 4) Environmental Stress, as measured by the Student Stress Inventory (SSI). A total of 412 first-year students from three public universities in Malaysia (UUM, UMS and UPSI) participated in the study. The respondents came from diverse educational backgrounds and were selected using stratified sampling techniques. Data were analyzed to determine which stress domain posed the greatest challenge during the initial year of university life. Findings reveal that environmental stress (mean=19.89) was the most significant source of pressure among students, followed by academic stress (mean=19.24), physical stress (mean=16.65), and interpersonal relationship stress (mean=15.00). The high level of environmental stress suggests challenges related to living conditions, campus facilities, and general adaptation to a new environment. The results highlight the need for higher education institutions to provide structured support systems and orientation programs that address environmental and academic concerns, especially during the critical adjustment period in the first year. This study contributes to a better understanding of the stress profile of new university students and provides practical implications for student affairs and mental health services.

Keywords: Student stress; First-year university students; Student Stress Inventory; Higher education

I-CReST 2025:069-037 – Strengthening Professional Learning Communities through Middle Leadership in Malaysian Secondary Schools

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ABSTRACT

Professional learning communities are essential for fostering school-wide improvement and instructional effectiveness. Nevertheless, many schools struggle to implement them effectively due to heavy teacher workload, poor understanding, and inconsistent practices. Middle leaders have the potential to support and sustain professional learning communities by encouraging collaboration and guiding teaching practices, but their role is often overlooked. There is still little research on how middle leaders influence the success of professional learning communities, especially in Malaysian schools. Thus, the current research investigates the effect of middle leadership on the professional learning communities. A quantitative, cross-sectional survey was conducted among 284 secondary school teachers in Penang. The data were analysed through partial least squares structural equation modelling (PLS-SEM). The findings indicated a significant direct effect of middle leadership on professional learning communities. This study highlights the strategic role of middle leaders in cultivating effective professional learning communities. The study provides valuable insights for educational leaders and policymakers seeking to enhance the implementation and impact of professional learning communities. Strengthening middle leadership can contribute to more enduring and effective professional learning environments, advancing teaching quality and student outcomes. Middle leadership is especially crucial in addressing challenges such as inconsistent professional learning communities practices and low teacher engagement.

Keywords: Middle leadership; Partial least squares structural equation modelling (PLS-SEM); Professional learning communities

I-CReST 2025:070-038 – A Sustainable Framework for Music Learning: Fusing Multiple Intelligences with Constructivist Pedagogy

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ABSTRACT

In the evolving landscape of education, fostering sustainable learning practices that address diverse learner needs is essential for nurturing future generations. This paper proposes a sustainable framework for music learning that synergizes Howard Gardner's Multiple Intelligences (MI) theory with constructivist pedagogy to create an inclusive, adaptable, and human-centered music education model. By bridging cognitive diversity with active, experiential learning, this framework aims to enhance the holistic development of young learners while promoting long-term engagement and sustainability in music education. The problem addressed is the limited personalization in traditional music instruction, which often overlooks learners varied intellectual strengths beyond linguistic and logical abilities. Integrating MI with constructivist principles where learners actively construct knowledge through interaction and reflection provides a strong foundation for differentiated music teaching. This fusion allows educators to design activities that engage multiple intelligences, including musical, kinesthetic, interpersonal, and intrapersonal domains, facilitating deeper understanding and creative expression. Additionally, the framework emphasizes the role of educational technology as a key enabler in fostering dynamic, learner-centered environments. Technology-mediated resources can offer individualized feedback, support collaboration, and provide access to diverse musical cultures, bridging science and technology with the humanistic core of music education. This conceptual framework outlines practical strategies for curriculum design and teacher training that promote lifelong musical engagement, cultural continuity, and respect for learner diversity. By aligning scientific theories with pedagogical innovation and humanistic values, the framework exemplifies the synergy needed to develop equitable, adaptive, and impactful music education for future sustainability

Keywords: Cust Constructivist pedagogy; Human-centered education; Multiple intelligences; Music education; Sustainable learning

I-CReST 2025:073-040 – Evaluating the Impact of a Resilience Training Program on First-Year Students in Basic Organic Chemistry

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ABSTRACT

Teaching resilience to students is crucial for helping them overcome challenges and become skilled problem solvers. In this study, we created a resilience intervention program delivered through a blog platform and assessed its impact on first-year university students taking a basic organic chemistry course. Using the Resilience Scale-10 questionnaire before and after the program, students in the experimental group reported greater self-determination and better adjustment to university life after transitioning from high school. Additionally, paired t-test results revealed a statistically significant improvement in resilience levels following participation in the program ($p < .001$). Finally, reflections submitted by participants showed increased motivation and enthusiasm toward learning organic chemistry moving forward.

Keywords: Resilience; Organic chemistry; Blog; Padlet; Reflective essay

I-CReST 2025:065-044 – Interactive Learning for Young Minds: "What a Day!" Card Game as a Tool for English Language Acquisition in Secondary School Learners

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ABSTRACT

In the pursuit of effective language pedagogy, the use of educational games has gained attention for their potential to foster comprehensive learning outcomes. This study evaluates the effectiveness of card game What A Day, an educational tool, in enhancing English language acquisition among Malaysian secondary students through cognitive, affective, and psychomotor outcomes. Using a quasi-experimental one-group pre-test–post-test design, significant improvements were observed across all domains. Cognitive gains, supported by Mayer's multimedia learning theory, reflected enhanced understanding, recall, and application. Affective outcomes revealed increased motivation and positive attitudes, aligning with Self-Determination and control-value theories. Psychomotor improvements included better pronunciation, fluency, and expressive delivery, consistent with embodied learning and Total Physical Response principles. Correlational analyses confirmed strong intra-domain coherence. The findings validate the pedagogical value of integrating narrative, interactivity, and multimodal elements in digital tools to promote holistic, learner-centered language development offering practical implications for educators and curriculum designers

Keywords: Card game; Language acquisition; Interactive learning; ESL learners; Communication

I-CReST 2025:084-048 – Enhancement of Teaching and Learning, and Assessment (TnL-A) Methods for BQS406 Course: Students' Reflection

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ABSTRACT

In recent years, higher education institutions have increasingly adopted blended and student-centered pedagogies to enhance engagement and learning outcomes. This shift is particularly relevant in disciplines such as the built environment, where applied knowledge, soft skills, and interdisciplinary understanding are crucial. The changes were also supported by Universiti Teknologi MARA through their establishment of Education 5.0 UiTM. Therefore, this study explores the perceptions of Quantity Surveying students who undertook the Principles of Economics course (BQS406) at the Faculty of Built Environment, Universiti Teknologi MARA (UiTM). Two objectives were outlined (i) to identify students' reflection towards the changes of teaching and learning, and assessment (TnL-A) methods and (ii) to examine the recommendations in enhancing the TnL-A for BQS406 course. A total of 39 undergraduate students participated in a survey evaluating online assessments, game-based learning, forum discussions, group activities, final presentations, and peer assessments. Based on quantitative analysis findings revealed a consistently positive responses, with mean scores exceeding 4.0 on a 5-point Likert scale across all components. Outcome shows that game-based learning and individual assessments were rated highest for their effectiveness in enhancing subject knowledge, critical thinking, and independent learning. Furthermore, feedback underscored the need to contextualise content with real-world applications, incorporate interactive and visually enriched instruction, and improve clarity in assessment guidelines. Students also recommended more flexible and frequent assessments, greater scheduling consideration, and cost-effective alternatives for project work. These findings support the integration of active, reflective, and context-driven pedagogies to improve educational delivery and student development in built environment programs

Keywords: Blended learning; Student reflection; Teaching and learning; Assessment

I-CReST 2025: 080-052 – From Screen to Classroom : Student Perceptions of Asynchronous Teaching and Learning Physics at Foundation Level

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ABSTRACT

This study investigates the effectiveness of a blended learning approach combining asynchronous video-based instruction with remedial face-to-face (F2F) sessions in improving conceptual understanding among foundation-level physics students. Over a two-weeks of period, students engaged in self-paced asynchronous learning using YouTube pre-recorded lecture videos and accompanying exercises, which also served as attendance markers. Students took a test after the online learning to check their progress, then attended face-to-face remedial classes and took another test to see if they improved more. Results showed that notable increasement in student performance after the face-to-face remedial classes. In addition to quantitative data, qualitative feedback was collected to explore student perceptions of both learning modes. Students enjoyed the flexibility and the chance to replay the videos, especially because the explanations were clear and helped them understand difficult topics. However, challenges included difficulty maintaining motivation learning alone, lack of real-time feedback, and surrounding distractions. In contrast, they found that face-to-face classes are more helpful because they could interact with lecturer and colleagues, ask questions directly, and stay focused. The findings suggest that while asynchronous learning can effectively introduce physics concepts, more than 80% student agree that their understanding is significantly enhanced when complemented by interactive, in-person support. This study shows that while online learning is helpful, students improve more when it is followed by well-planned face-to-face remedial sessions.

Keywords: Blended learning; Asynchronous Teaching and Learning; Remedial face-to-face classes; YouTube pre-recorded lecture videos

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I-CReST 2025:049-054 – Pembinaan Model Penjara Mesra-Keluarga Untuk Meningkatkan Hubungan Sosial Prospek

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ABSTRACT

Hubungan sosial yang kukuh antara banduan dan ahli keluarga merupakan faktor pelindung penting dalam proses pemulihan dan pengurangan residivisme. Namun, sistem penjara konvensional sering kali gagal menyediakan ruang dan pendekatan yang menyokong interaksi keluarga secara berkesan. Kajian ini membincangkan pembinaan model penjara mesra-keluarga sebagai pendekatan alternatif yang berpotensi meningkatkan hubungan sosial prospek dan mengurangkan kadar residivisme. Melalui kajian literatur sistematik terhadap jurnal berimpak tinggi dan buku akademik terkini, artikel ini menganalisis komponen-komponen utama model penjara mesra-keluarga, cabaran dalam pelaksanaannya, dan kesannya terhadap hubungan sosial banduan. Hasil kajian menunjukkan bahawa model penjara mesra-keluarga yang merangkumi ruang lawatan mesra kanak-kanak, program keibubapaan dan kebapaan, protokol lawatan yang peka terhadap keperluan kanak-kanak, dan komunikasi yang berkesan antara banduan dan keluarga dapat mengurangkan tekanan keibubapaan, meningkatkan kesejahteraan banduan dan anak-anak mereka, serta memperkukuh hubungan keluarga. Kajian ini juga mendapati bahawa penglibatan anak-anak dalam proses membuat keputusan dan penyelidikan yang berkaitan dengan mereka bukan sahaja meningkatkan kualiti perkhidmatan tetapi juga menjadi proses pemerkasaan. Implikasi daripada kajian ini mencadangkan bahawa institusi pembetulan perlu mengintegrasikan pendekatan berasaskan keluarga dalam dasar dan amalan mereka untuk memaksimumkan hasil pemulihan dan reintegrasi banduan.

Keywords: Penjara mesra-keluarga; Hubungan sosial; Pemulihan banduan; Reintegrasi

I-CReST 2025:083-057 – How Support and Coach-Athlete Intimacy in Closeness Aspect Influence Athletes' Performance

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ABSTRACT

The concept of closeness within the coach and athlete relationship represents a pivotal aspect of interpersonal dynamics in sport psychology and athletic development. Closeness is defined by the presence of emotional warmth, mutual trust, and a strong sense of support, all of which contribute to a meaningful and impactful relational bond. This emotional connection does not arise spontaneously; rather, it is cultivated through consistent interaction, open communication, and reciprocal understanding over time. Coaches demonstrate respect for their athletes by acknowledging their efforts, valuing their growth, and believing in their potential to succeed. Shared experiences, such as the challenges of training, the highs and lows of competition, and moments of personal and professional growth, further reinforce this relational depth. These joint experiences allow both parties to form a deeper understanding of each other's motivations, values, and emotional states. As this bond strengthens, it fosters a relational environment where both the coach and the athlete feel psychologically safe, respected, and empowered to perform at their best. Specifically, athletes performance closely related towards self-definition and motivation and how closeness aspect would affect the specific athletes. Therefore, interpersonal closeness between coach athletes or among athletes should catch the eye of attention for improving performances. The dimension of impact of closeness in team and emotional influence were investigated during execution of performances. The present study employed a mixed-methods approach, incorporating both psychometric assessment and physical performance testing to examine the influence of coach–athlete relational closeness on maximal power output. A total of approximately 60 competitive athletes participated in the research. Participants were first administered a standardized questionnaire designed to evaluate their perceived level of interpersonal closeness with their coaches, based on established constructs within the coach–athlete relationship literature. Following the completion of the questionnaire, athletes performed a maximal power test using the standing broad jump, a validated field measure for lower-body explosive strength. Each athlete completed the test under two distinct conditions: one reflecting a perceived presence of relational closeness and the other in the absence of such influence. This dual-condition approach allowed for a comparative analysis of how the emotional aspect of closeness might influence physical performance outcomes. In this study, two key statistical analyses were employed to support the research objectives. A paired sample t-test was used to compare athletes' standing broad jump performance under two conditions: with and without the influence of perceived coach–athlete closeness. This test was appropriate for identifying significant differences in performance within the same group of athletes. Additionally, Cronbach's alpha was applied to assess the internal consistency of the questionnaire measuring relational closeness. This reliability test ensured that the items used in the scale consistently reflected the intended psychological construct, providing confidence in the validity of the responses. This research provides

valuable insights into the critical role of relational closeness between coaches and athletes in enhancing athletic performance. By demonstrating the measurable impact of emotional connection on maximal power output, the study underscores the importance of fostering trust, respect, and support within the coach–athlete dynamic. Consequently, athletes can achieve performance gains more efficiently within a shorter time frame, facilitating a smoother transition to higher levels of professionalism and readiness.

Keywords: Athlete; Coaching; Motivation; Maximal power; Athlete response

I-CReST 2025:094-062 – Enhancing Anatomical Understanding in Biology Education Through Integrated 3D Printing Technology Modules

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ABSTRACT

In the world of IR 4.0, 3D printing and 3D scanning stand as significant instruments. 3D printing, or additive manufacturing, is a process of creating 3D objects using layering method by referring 3D digital model. On the other hand, the 3D scanner is a device that captures real-life objects to convert them into a 3D digital model. Medical students without access to anatomy models often struggle with visualizing complex body structures. Sole reliance on 2D illustrations, textbooks, or digital resources leaves gaps in practical understanding, which tactile and visual teaching aids can effectively bridge. This project introduces an innovative approach to biology and medical education by using 3D scanning and printing technologies to create detailed organ models. Real organ structures are scanned to produce accurate, high-resolution 3D prints, which are then developed into interactive teaching modules. Through the development of high-resolution 3D-printed anatomical models derived from real organ scans, an interactive and tactile learning module was introduced into secondary school biology classrooms. Classroom implementation incorporated a game-based approach through activities such as the Organ Matching Game and the Build-a-Human-Body Puzzle. Students learning about human organ systems showed marked improvement when the module was used in class. Preliminary results indicate improved student engagement, enhanced spatial understanding of organ structure and function, and increased retention of anatomical knowledge. Students reported greater interest and confidence in biology, and teachers observed a measurable improvement in learning outcomes compared to conventional methods. This approach provides an ethical, scalable, and cost-effective alternative to traditional teaching aids, aligning with modern pedagogical practices and the demands of 21st-century education

Keywords: 3D scanning; Human organs; Medical education; Real to replica; Teaching teaching

I-CReST 2025:096-063 – Exploring Pre-University Learners' Needs in Attaining Grammatical Competence Using a Web-Based Module: ESL Instructors' Insights

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ABSTRACT

This qualitative study examined English as a Second Language (ESL) instructors' viewpoints of the grammatical competence learning needs of pre-university ESL learners who used a web-based learning module. Five ESL instructors attended semi-structured interviews and presented in-depth insights regarding their beliefs and experiences with effective grammar teaching in a digital learning environment. The learners' perceived lacks, wants, necessities, and learning needs were examined using the needs analysis model from the instructors' perspectives. There were four recurring themes and thirteen sub-themes identified using a thematic analysis procedure. The results extensively presented the importance of and the challenges in grammar teaching and learning, the students' learning needs from the instructors' viewpoints, as well as their preferred grammar topics, types of exercises, and types of media, which contributed to a more in-depth understanding of ESL learners' grammar needs in web-based modules. The recommendations will enhance pre-university digital grammar teaching

Keywords: English as a second language; ESL instructors; Grammar; Pre-university level; Web-based learning

I-CReST 2025:098-066 – Entrepreneurial Alertness, Innovative Behaviour and Entrepreneurship Education: A Framework on Social Entrepreneurship Intention Among Students

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ABSTRACT

Recently, there is a growing concern over the increase in social problems particularly in developing countries. One way to solve these social problems is by stimulating the growth of social entrepreneurship through social entrepreneurs. Social entrepreneurship plays an important role in fixing social problems such as environmental concerns, poverty and unemployment. Several scholars proved that entrepreneurship intention is the most important antecedent of entrepreneurial behaviour that could influence the development of social entrepreneurship. Nonetheless, there are still limited studies on the factors responsible in predicting the intention to become a social entrepreneur, which may hamper the growth of social entrepreneurship. This study aimed to highlight the impact of entrepreneurial alertness and innovative behaviour on social entrepreneurship intention, by stressing the role of entrepreneurship education as a moderating force to these relationships. The study implies how policymakers, educational institutions and students could shape the development of social entrepreneurship through entrepreneurship education, entrepreneurial alertness and innovative behaviour in developing countries

Keywords: Entrepreneurship alertness; Innovative behaviour; Entrepreneurship education; Social entrepreneurship intention

I-CReST 2025:102-068 – Mapping the Landscape of Whistleblowing and Culture: A Bibliometric Analysis

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ABSTRACT

This research aims to shed light on both existing and emerging trends in whistleblowing behaviour and culture by providing a comprehensive bibliometric mapping through descriptive and network analyses. Previous studies have employed diverse methodologies from various disciplines to examine how culture influences whistleblowing behaviour, ethical decision-making processes, organizational responses, and the efficacy of protection measures across different contexts. In this study, a total of 296 publications published between 1996 and 2023 related to whistleblowing behaviour and culture were identified in Scopus. These 296 publications cover 560 authors, 219 source documents, 46 countries, and 277 institutions. The analysis was conducted using Biblioshiny, a Bibliometrix R software. Before the analysis, the selected articles were preprocesses, which included scanning, cleaning, and harmonizing the data. Overall, the findings from this bibliometric study provide important insights, including information on highly cited documents, the most productive contributors, the most frequently used keywords, the most productive countries and sources, network analysis data on co-occurrence networks, and themes mapping information on whistleblowing and culture studies. The findings of the study may be helpful to scholars, as they show both the current performance of authors, documents, and journals, as well as the progression of themes over time

Keywords: Scopus; Bibliometric analysis; Whistleblowing; Culture

I-CReST 2025:106-070 – Engaging the Next Generation: Gamified Approaches to Citizen Participation in Urban Public Space Design in Japan

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ABSTRACT

In Japan, local governments have increasingly emphasized citizen participation in urban planning and public space design. Yet, such efforts often remain limited to formal hearings or passive information sessions, leading to low engagement—particularly among youth and underrepresented groups. While the integration of information and communication technologies (ICT) has expanded opportunities for electronic participation (e-participation), these approaches frequently fail to foster sustained or inclusive civic involvement. This study investigates the potential of gamification—the use of game-like elements in non-game contexts—as means to enhance motivation, inclusiveness, and interactivity in citizen engagement. Focusing on recent Japanese initiatives, including Minecraft-based urban design workshops and 3D simulation platforms employed by local governments, the paper examines how gamification influences participation design, demographic outreach, and institutional linkage. The International Association for Public Participation (IAP2)'s Public Participation Spectrum is used as a theoretical framework to assess the depth and quality of engagement achieved through these methods. The findings suggest that while gamification can attract new participants and promote creative forms of engagement, its application in Japan is still largely experimental, short-term, and loosely connected to policymaking processes. Key challenges include the lack of institutional receptivity, insufficient mechanisms for policy integration, and the need for more inclusive and sustainable design frameworks. This paper argues that for gamification to contribute meaningfully to participatory governance in Japan, it must be embedded within broader administrative and cultural structures. The study offers insights into how playful engagement can coexist with serious democratic practices in local governance contexts.

Keywords: Citizen participation; Gamification; Youth engagement; Inclusiveness

I-CReST 2025:109-073 – Function of The Use of Dializer in Dialysis Treatment According to The View of Islamic Law

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ABSTRACT

Dializer is an important equipment that should be provided in every dialysis center as a kidney replacement to undergo dialysis treatment to affected patients. The development of the use of dializer along with technological advances that are able to stabilize the patient's condition after undergoing treatment procedures is set with discipline. Although there have been various public reactions to the ability of the dializer to replace the patient's kidney function, he has proven that the patient's health performance has improved and is comfortable when using it. Therefore, this study explores the function of the use of dialyzer when undergoing dialysis treatment from the perspective of Islamic law in ensuring a better level of patient health. The study focused on the use of dialysers from 2015 to 2025 in Malaysia. Qualitative methodology is applied in the study through the results of interviews and surveys on the studies of scholars in related fields. The results of the study found that the use of dializer is a problem in the interests of preserving life as long as it does not contain elements of harm and is doubtful according to the view of Islamic law. Thus, this study suggests that studies on the use of dializer be expanded at various levels of disciplines so that its function is believed in treating patients.

Keywords: Dializer; Dialysis treatment; Maslahah islamic law

I-CReST 2025:110-075 – Instructors' Perceptions and Readiness Towards Open Book Examination

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ABSTRACT

Malaysian's higher education institution has integrated open book examinations in ensuring the effectiveness of the educational assessment system. In conjunction to that, higher order thinking skill (HOTS) has been one of the prominent elements as it is aligned with the Malaysian Education Blueprint's policy in creating holistic students. However, there are several misconceptions concerning open book examinations as well as the teaching strategies used to integrated HOTS as it is claimed to be ineffective. Furthermore, creating questions for open book examinations is challenging due to the needs to cater to students' levels, hence this questions the educators' readiness and training in regard to the creating process. Thus, in this paper, it is aimed to discover instructors' perception towards the implementation of HOTS as well as their views and practices towards open book examination. We further extended the study by investigating their readiness in setting high quality exam question. With a total of 8 university's instructors and the employment of qualitative approach through semi-structured interview, the findings revealed that the instructors have various insights and are optimistic towards the implementations of higher-level thinking order in the examination. It is also found that they prefer the open book examination despite of having different ease of the administration. Lastly, most of them are experienced in conducting the examination despite facing several issues.

Keywords: Open book examinations; Higher-order thinking skills; Assessments; Instructors' readiness; Higher education

I-CReST 2025: 044-077 – Teaching as Activism in Higher Education: Fostering Climate Crisis Awareness through Literary Engagement

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ABSTRACT

This paper explores the transformative potential of teaching literature as a form of activism to cultivate awareness and critical engagement with the climate crisis, aligning with the aims of the United Nations' SDG 4 (Quality Education) and SDG 13 (Climate Action). As global environmental concerns increases, the need for educational initiatives that promote ecological literacy and enable students to become environmentally conscious citizens has been more pressing. A descriptive quantitative design was employed in a university-level poetry course, where selected works by Muhammad Haji Salleh and E-Wen Chong were integrated into the syllabus to examine students' perspectives on the use of ecocritical poetry to raise awareness of the climate crisis and to explore pedagogical approaches that effectively foster awareness of climate change and SDG goals. Data were collected using a questionnaire adapted from established instruments and validated by two subject-matter experts to ensure reliability and contextual relevance. Findings reveal that literature, when taught through an activist lens, enhances students' emotional and intellectual engagement with environmental issues, challenges anthropocentric worldviews, and encourages sustainable thinking aligned with SDG 12 (Responsible Consumption and Production). The study also underscores the critical role of educators as agents of change who can disrupt dominant narratives and foster ecological empathy through literary engagement. By framing the literature classroom as a space of resistance and awareness-building, the paper argues that climate-themed texts can function as powerful tools of pedagogical activism, bridging personal insight with collective responsibility. This research contributes to the expanding field of environmental humanities and offers practical insights for climate pedagogy in higher education.

Keywords: Ecocriticism pedagogy; Climate crisis awareness; Literature and activism; Sustainable developmental goals

I-CReST 2025: 118-080 – What Drives Young Adults' Intention to Adopt Buy Now, Pay Later (BNPL) Services?

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ABSTRACT

The extensive adoption of digital financial technologies, particularly those offering innovative credit solutions, has significantly transformed the way young adults manage their financial affairs. Among these, Buy Now, Pay Later (BNPL) emerges as a short-term financing mechanism that enables consumers to break down payments into interest-free installments. This approach is particularly appealing to younger consumers who place a high value on flexibility and convenience. Although BNPL services are experiencing rapid growth, a noticeable gap persists in academic research concerning the primary factors influencing young adults' decisions to utilize these platforms. This study aims to address that gap by investigating the motivations underlying young individuals' engagement with BNPL. Employing a quantitative methodology, data from 395 survey participants were analyzed. The results indicate that perceived ease of use, perceived usefulness, and flexible payment options significantly enhance the likelihood of BNPL adoption among young adults. These findings deepen our understanding of the drivers motivating young consumers to adopt digital financial tools. The implications of these results are particularly relevant for financial institutions, policymakers, and educational entities seeking to better align fintech offerings with the evolving expectations of younger populations. Furthermore, this research provides policymakers with valuable insights to inform future financial technology initiatives.

Keywords: Buy Now, Pay Later (BNPL); Digital financial technologies; Young adults; Intention to adopt

I-CReST 2025: 119-081– An Inferential Study on the Effectiveness of the Ibadah Camp in Enhancing Islamic Learning Outcomes

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ABSTRACT

This study explores the effectiveness of the Ibadah Camp in supporting the learning outcomes of CCUB1061 Usrah 1 at CFS IIUM. The course aims to instil fundamental Islamic values including Islam, Iman, Ihsan, Adab, and the development of a balanced personality. The Ibadah Camp, a compulsory experiential component of the course, consists of three modules: TRUST (Amanah and Iqra'), LEADERS (Khalifah and Rahmatan lil Alamin), and KhAIR in Action (a scenario-based group task). A quantitative methods approach was used, with data collected through a structured questionnaire distributed to students who had completed both the course and the camp. The analysis measured student perceptions of knowledge acquisition, real-life application, personality development, and overall satisfaction. Results indicated that the majority of students agreed the camp significantly enhanced their understanding and practice of Islamic values. The correlation analysis revealed a moderate, statistically significant positive correlation between students' satisfaction with the Ibadah Camp and their perceived achievement of the Usrah 1 learning outcomes. Specifically, the TRUST and LEADERS modules were seen as instrumental in reinforcing key Islamic concepts, while KhAIR in Action effectively facilitated real-life application and problem-solving. More than 80% of students reported growth in spiritual, social, and personal dimensions, indicating the camp's role in shaping a balanced personality. In conclusion, the Ibadah Camp contributes meaningfully to the objectives of Usrah 1 and should be retained and further enhanced as a key element of Islamic value-based education at the foundation level.

Keywords: Experiential Learning; Islamic Values; Learning Outcomes

I-CReST 2025: 121-084 – Exploring the Adoption of Digital Health Applications: A Conceptual Model Based on the Unified Theory of Acceptance and Use of Technology (UTAUT)

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ABSTRACT

The advancement of digital technologies in healthcare has led to the spread of digital health applications to improve patient well-being, monitor health, and improve healthcare services. Despite the benefits of such applications, the adoption of digital health applications remains conflicting among users. This article proposes a conceptual framework for understanding user acceptance of digital health applications based on the Unified Theory of Acceptance and Use of Technology (UTAUT). Through the integration of the key constructs from UTAUT—performance expectancy, effort expectancy, social influence, and facilitating conditions, along with variables specifically related to the healthcare context such as health literacy and perceived health risk, this work aims to provide a comprehensive conceptual understanding of the factors influencing behavioural intention to use digital health applications. This insight can enlighten the development of targeted interventions to encourage acceptance of such applications. The model is projected to offer policymakers, industry players, and scholars strategies to foster the acceptance of digital health applications, improving the uptake of digital health innovations.

Keywords: Digital health application; User acceptance; UTAUT; Health literacy; Behavioural intention

I-CReST 2025: 121-085 – Exploring the Factors Influencing University Students' Adoption of Online Learning Platforms: A Conceptual Study Based on The Value Adoption Model (VAM)

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ABSTRACT

In the fast-changing technological environment, users worldwide are transitioning from traditional methods to digital solutions. This phenomenon has forced higher learning institutions to heavily rely on online learning platforms to complement or substitute traditional classroom teaching methods. However, students' willingness to adopt digital or online learning platforms varies significantly. This conceptual study utilised the Value Adoption Model (VAM) as a base model to investigate the key determinants that influence students' adoption of online learning platforms in higher education. Drawing from VAM's key constructs—perceived benefits (enjoyment and usefulness) and perceived sacrifices (technical complexity and cost concerns)—this paper proposes a conceptual framework to examine how these factors contribute to perceived value, which ultimately shapes the intention to adopt online learning platforms. The proposed study contributes to the existing literature by offering a comprehensive conceptual insight into the factors influencing online learning platforms adoption for universities, policymakers, and ed-tech developers to enhance online learning adoption by focusing on maximising benefits and minimising sacrifices.

Keywords: Online learning; Perceived value; Perceived benefits; Perceived sacrifices; Value Adoption Model

I-CReST 2025: 122-086 – Exploring Malaysian Medical Doctors' Knowledge of AYUSH and TCM in Menopausal Symptoms Management

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ABSTRACT

Menopause is a natural stage in woman's life but it often with symptoms such as hot flashes, mood changes, sleep disturbances, and vaginal dryness, that significantly affect quality of life. Although Hormone Replacement Therapy (HRT) is common treatment, women worried about its potential side effects such as breast cancer, and stroke. Hence, women are looking for alternative options like AYUSH (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) and Traditional Chinese Medicine (TCM) which offer natural and holistic approaches to manage menopause. These systems are well-integrated in countries like China and India; however, their adoption in Malaysia's mainstream medical practice remains limited, mainly due to the low engagement and recommendations among medical doctors. Hence, this study aimed to explore Malaysian medical doctors' knowledge of AYUSH and TCM in managing menopausal symptoms. A qualitative phenomenological design was used, 25 medical doctors specializing in internal medicine, family medicine, and obstetrics and gynaecology were purposively selected and interviewed through one-on-one online sessions. Key themes were identified focused on doctors' awareness and knowledge of AYUSH and TCM, familiarity with applications, and perceived recommendations in clinical practice. Findings revealed that while most participants were aware of the existence and increasing use of T&CM among Malaysians often through media, family or peer conversations. They reported having limited knowledge of the principles, mechanisms, role and clinical evidence supporting these systems. This knowledge gap was primarily due to the lack of formal education and clinical exposure contributed to hesitancy in recommending such therapies. In conclusion, this study highlighted general awareness but limited knowledge among Malaysian medical doctors regarding the use of AYUSH and TCM for managing menopausal symptoms. This gap showed the need for more structured education, interprofessional collaboration, and evidence-based integration into Malaysia's healthcare system in order to support for more holistic, patient-centred care for menopausal women

Keywords: Menopausal symptoms; Knowledge; TCM; AYUSH; Medical doctors

I-CReST 2025: 125-089 – i-Sirah Board Game: Stories from the Quran as a Pathway to Islamic Civilisation

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ABSTRACT

i-Sirah Board Game is an educational innovation designed to promote students' understanding of Islamic civilisation through Quranic narratives and reflective learning. It is developed for pre-university students at the Centre for Foundation Studies, International Islamic University Malaysia (CFS IIUM). This digital board game integrates elements of i-Sirah Interactive and Qur'anic tadabbur. The game board is divided into four sections, each representing different juzuk of the Quran. As students move their pieces by rolling the dice, they land on destinations linked to specific Quranic verses. At each point, they watch a short video about Prophet's Sirah story and then answer related questions. This process helps students connect Quranic guidance with historical lessons and moral values. The originality of the innovation lies in its combination of storytelling, gamification, and Quran-based learning, making Sirah both engaging and interactive. It fosters active learning, critical thinking, and collaboration among students, while deepening their appreciation for Islamic history and civilisation. Initial trials indicate strong positive responses, including increased motivation to learn Sirah, better retention of historical lessons, and improved moral reasoning. The game is adaptable for different age levels and learning outcomes, making it applicable in schools, madrasahs, and learning centres. The digital format ensures broad accessibility, and with further development, the game holds strong potential for educational commercialisation in both local and international Islamic education settings.

Keywords: i-Sirah; Digital Board Game; Islamic history and civilisation

I-CReST 2025: 127-091 – Academic Word List (AWL) Knowledge of Malaysian Pre-University Undergraduates

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ABSTRACT

The Malaysian Programme for International Student Assessment (PISA) shows a persistent decline in Malaysian students' reading performance. This raises concerns about the students' readiness for tertiary education. The concerning trend suggests that Malaysian students may face substantial challenges in higher education, particularly in understanding academic texts. Research indicates that effective comprehension requires knowledge of at least 98% of the words in a text. This includes academic vocabulary that is often underrepresented in secondary education materials. Despite the exposure of English vocabulary in school, Malaysian undergraduates have consistently demonstrated limited academic vocabulary proficiency, with few mastering essential academic word lists. Therefore, this study aims to explore the academic vocabulary knowledge of Malaysian pre-university students using Coxhead's Academic Word List (AWL). A quantitative approach is employed to investigate the academic vocabulary knowledge of pre-university students who are at a crucial transitional stage between school and university. The vocabulary test is adapted from Flavell and Nation's word recognition format and based on Coxhead's Academic Word List (AWL). A purposive sample of 400 Semester 1 public university students in Malaysia responded to the test via Google Form. The findings revealed that Malaysian pre-university students generally possess a moderate level of academic vocabulary knowledge. Moreover, statistical analysis indicates a significant difference in vocabulary profiles between students from the Social Science group and those from the Science and Technology group, indicating varying levels of academic readiness across disciplines. Conclusively, exploring Academic Word List (AWL) Knowledge of Malaysian Pre-University Undergraduates has prominent implications for academic institutions to review and improve the current curriculum to ensure there is an equitable tertiary education readiness among students from different academic streams.

Keywords: Academic Word List; Academic vocabulary; Vocabulary assessment; Academic text; Tertiary education readiness

I-CReST 2025: 094-093 – Bridging the Gap in STEM Education by Visualizing Physics Concepts with 3D Printing

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ABSTRACT

In today's world, STEM (science, technology, engineering, and mathematics) is often seen as challenging by many students, leading to various potential drawbacks. In a technology-driven era, students who do not engage with STEM may struggle to address major global challenges due to a lack of essential knowledge and problem-solving skills. Physics, a branch of science that explores matter, energy, and fundamental forces, is particularly difficult for students, as many find it hard to visualize its concepts and theories. This struggle often diminishes thieir interest in learning science. To enhance comprehension and engagement, 3D printing technology is utilized to provide clearer visual representations, making science more accessible and stimulating for students. This module is designed to create an interactive and engaging learning experience, fostering a deeper understanding of physics concepts. By incorporating real-life applications, it helps maintain students' focus and interest while improving thier ability to visualize physics principles. The module includes a 3D galaxy study kit, specifically focusing on the topic of gravitation. These resources aim to enhance conceptual visualization and assess students' understanding of the subject. The 3-D printed study kits are designed using computer software and produced with a 3D printer, ensuring accessibility and ease of use kinaesthetically. This approach enhances students' enthusiasm for learning, making physics more engaging and comprehensible.

Keywords: 3D printing technology; Kinesthetics; Physics; School students; Visualization

I-CReST 2025: 133-099 – Contrastive Analysis between English and Arabic Grammar: Predicting Learning Challenges among Malaysian Students

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ABSTRACT

The present study aims to compare and contrast the grammatical structures of English and Arabic, with a specific focus on predicting areas of difficulty for Malaysian students when transferring grammatical knowledge from Arabic to English. The analysis is grounded in Lado's Contrastive Analysis Hypothesis and guided by Prator's five categories of difficulty, which together provide a systematic framework for identifying and evaluating potential learning challenges. The primary objectives of this study are to identify which aspects of English grammar may pose difficulties for learners with prior exposure to Arabic and to determine transferable grammatical features that can be incorporated into the development of an English learning module. Through a detailed comparison, the study identifies four key grammatical elements, which are nouns, pronouns, adjectives, and tenses that show notable similarities in form or function across both languages. These elements are predicted to be the least challenging in terms of linguistic transfer and, therefore, represent potential starting points for instructional scaffolding. The findings suggest that incorporating these aspects into tailored teaching materials may enhance learners' understanding of English grammar by building on their existing knowledge of Arabic. Hence, this study offers insights for language educators and curriculum developers in designing more effective bilingual language learning strategies.

Keyword: Arabic grammar; English grammar; Contrastive analysis hypothesis; Linguistic transfer, English learning module

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I-CReST 2025:116-100 – Reading Meaning Through Semiotics: Visual Discourse Analysis of *Mag* Magazine in Pakistan

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ABSTRACT

The importance of images as a semiotic resource in communication has long been overlooked by discourse analysis. This study will make an argument that like language, images/visuals are full of meaning and are controlled by visual grammar that can be used to interpret the visuals. Therefore, Kress and Van leeuwen (2006) multimodal discourse analysis social semiotic approach is applied to four selected editions of *Mag* magazine. The main purpose is the present change from the customary analysis of visual in line with the semantic indicator to examination of visual images in isolation. The findings from the study indicate that the framework recognized the participant-viewer interaction, narrative and conceptual processes, and the symbolic aspects of the images, all of which support sociological interpretation of images particularly lifestyle magazines that need to grab the attention of the public.

Keywords: Magazine; Media; Multimodal; Images and context; Visual grammar

I-CReST 2025:146-106 – Gamifying Mathematics: Investigating the Relationship Between Self-Efficacy and Affective Engagement via Minecraft Education Edition

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ABSTRACT

This study explored the relationship between secondary student's self-efficacy and affective engagement in mathematics with the use of Minecraft Education Edition as a tool for gamification. Under the theoretical framework of Bandura's Social Cognitive Theory, the study was conducted to measure the self-efficacy and affective engagement along with the relationship between the two. A mixed-methods approach with 94 Form Four students was conducted which included interviews and a survey with seven items on self-efficacy and six items on affective engagement (high reliability, 4-point Likert scale). The findings indicated that both affective involvement (Mean=3.25, Standard Deviation=0.43) and self-efficacy (Mean=3.19, Standard Deviation=0.40) were at relatively high levels. However, there was no statistically significant relationship reported between these two variables (r=0.160, p=0.124). This implies that although, self-confidence and engagement may be positively related through Minecraft Education Edition at the individual level, the linear relationship between them in this case needs to be examined. The study highlights gamification's potential in mathematics education.

Keywords: Minecraft Education Edition; Gamification tool; Bandura's Social Cognitive Theory

I-CReST 2025:139-109 – Traditional Timber Joinery and Local Materials in the Mak Ani Heritage House: Sustainable Construction in Negeri Sembilan Vernacular Architecture

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ABSTRACT

The traditional Malay houses of Negeri Sembilan reflect a unique socio-cultural system rooted in Adat Perpatih, inherited from the Minangkabau community. The Mak Ani Heritage House, located in Kampung Parit Istana, Kuala Pilah, stands as a rare example of vernacular architecture that has remained structurally intact for over a century. Remarkably, it was constructed entirely without the use of nails. This study focuses on documenting traditional timber joinery techniques and the application of locally sourced materials that have contributed to the house's longevity and environmental sustainability. A critical issue addressed in this research is the growing risk of losing traditional carpentry knowledge due to insufficient technical documentation and the influence of modernization. Using a qualitative approach, including site observation, measured drawings, semi-structured interviews, and literature review, this study identifies various joinery systems such as mortise and tenon (tanggam lubang & puting),through beam joint (tanggam penyalur), notched joint (tanggam takuk), half lap joint (tanggam lekap), tongue and groove (tanggam lurah dan lidah), wooden pegs (pasak), and wedges (baji), all of which are applied in a modular and flexible construction method. The findings reveal that these traditional techniques are not only sustainable but also share fundamental principles with modern prefabricated building systems, being demountable, reassemble, and relocatable. The use of naturally treated hardwoods such as merbau and meranti further enhances the house's structural resilience. As a whole, the Mak Ani Heritage House represents a model of vernacular construction that embodies both functional structural integrity and a deep cultural understanding of the tropical environment. This study aspires to serve as a technical and cultural reference for future conservation and innovation in traditional Malaysian architecture.

Keywords: Heritage house; Traditional timber joinery; Sustainable architecture; Local materials; Prefabricated system

I-CReST 2025:148-110 – Spatial Interpretations of a Matrilineal Heritage House in Negeri Sembilan: A Case Study of Rumah Warisan Mak Ani

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ABSTRACT

This study explores the spatial philosophy embedded in Rumah Warisan Mak Ani, located in Parit Istana, Kuala Pilah, Negeri Sembilan. The house was selected as a case study due to its well-preserved architectural characteristics that represent the traditional Malay house of Negeri Sembilan, shaped by the matrilineal system of Adat Perpatih. Using a qualitative research approach, including site observation, spatial documentation, and literature review, this research investigates how space is organized not only for practical purposes but also to reflect cultural values and the adat-based social structure. The findings highlight that the arrangement of key spaces of serambi (veranda), rumah ibu (main house), and kitchen demonstrates more than functional zoning; it symbolizes core societal roles and traditional wisdom. The serambi is used for communal gatherings, customary ceremonies, and decision-making through consensus, primarily involving male elders. The rumah ibu represents the honor and central role of women as the holders of inheritance and culture, while the kitchen facilitates the transmission of values and domestic knowledge across generations. The study identifies five key principles of spatial philosophy within the context of Adat Perpatih: generational continuity, openness and consensus, symbolic boundaries, spatial hierarchy, and environmental harmony. These principles show how space helps to guide behavior, protect cultural identity, and preserve traditional knowledge and values. Ultimately, Rumah Warisan Mak Ani is not merely a physical structure but a living social institution that educates and sustains the values of the Adat Perpatih community. Its preservation offers valuable insights for heritage conservation and vernacular architectural studies.

Keywords: Adat Perpatih; Traditional Malay house; Spatial philosophy; Cultural heritage; Matrilineal society

I-CReST 2025: 151-112 – Empowering Indigenous Learners in Sarawak: A Systematic Literature Review Linking 21st-Century Learning Skills to English Language Performance

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ABSTRACT

English language learning must be aligned with the Sustainable Development Goals (SDGs) of Quality Education (SDG 4.0) and the 21st century skills in ensuring the continuous empowerment of diversity and inclusion in lessons. This systematic literature review investigates how 21st-century learning skills; critical thinking, communication, collaboration, and creativity contribute to the English language performance of indigenous learners in Sarawak, Malaysia. Drawing on 38 empirical studies published between 2019 and 2025, the review integrates regional perspectives and contributions from Universiti Kebangsaan Malaysia (UKM) scholars. Five emergent themes—cognitive engagement, social-affective strategies, digital literacy, cultural responsiveness, and teacher preparedness—are examined through the lens of Vygotsky's socio-cultural theory and Bronfenbrenner's ecological model. Findings indicate that effective pedagogical interventions must be culturally grounded, digitally enabled, and aligned with learners' linguistic realities. Mobile-assisted tools, strategic reading, and community-driven curriculum adaptations were identified as critical enablers of academic success. The review concludes by recommending policy shifts toward curriculum reform, professional development, and indigenous empowerment in East Malaysian education.

Keywords: English Language Proficiency; English as Second Language Teaching and Learning; Indigenous Learners; Indigenous Learners' Empowerment; 21st-Century Learning Skills

I-CReST 2025:152-113 – Resilience in Crisis: The Influence of Leadership Style, Climate, and Motivation on Employee Job Performance in Kuala Lumpur Financial Industry

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ABSTRACT

Numerous academics have undertaken research in the field of job performance, but financial industries, notably in Kuala Lumpur, Malaysia, have received less attention and little investigation. This study's primary objective is to determine whether job performance is influenced by leadership style, organizational climate, and motivation under abrupt situations in Kuala Lumpur, Malaysia's financial industries. Consequently, this study has three objectives which is to examine the effect of leadership style on job performance in financial industries. Next, examine the effect of organizational climate on job performance in financial industries and examine the effect of motivation on job performance in financial industries. In order to investigate the association between the variables, 377 questionnaires will be given, and all questions will be analyse using descriptive, Pearson correlation, and multiple regression methods. The pilot study's findings indicate that leadership style, organizational climate, and motivation have substantial effects on job performance. The study also covers recommendations and implications for future study and practice.

Keywords: Leadership style; Organizational climate; Motivation; Job performance; Malaysia

I-CReST 2025:157-116 – Flora of the Nanoscale: Artistic Nanoflowers

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ABSTRACT

Nanoflowers are an essential component of nanoart due to their unique and versatile features. They can be synthesized to have a variety of morphologies, compositions, and sizes, which can be utilized to generate a vast array of creative expressions. These unique properties can also be utilized in functional applications in fields such as catalysis, drug delivery, and biosensors. Nanoflowers can be utilized in numerous ways to produce beautiful patterns and designs in nanoart. For instance, they can be combined into nanocomposites, nanostructures, and other nanoscale structures to produce new and inventive artworks. In addition, their optical, electrical, and mechanical capabilities can be used to create interactive and responsive nanoart. Nanoflowers can be used to investigate the convergence of art, science, and technology because they are aesthetically pleasing and have practical applications. The growth of nanotechnology has created new opportunities for artistic expression, and nanoflowers have become a prominent topic of study and artistic expression in the realm of nanoart.

Keywords: Nanoflower; Nanoart; Nanotechnology; Nanoscale

I-CReST 2025: 162-118 – Speaking Out in Southeast Asia: An Overview of Free Speech in Malaysia and Indonesia

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ABSTRACT

Freedom of speech is a core pillar of democracy, universally acknowledged and enshrined in the constitutions of many countries. This article provides a comparative legal analysis of how this right is articulated and regulated in Malaysia and Indonesia, with particular reference to Article 10(1) of the Malaysian Federal Constitution and Article 28E of Indonesia's Constitution 1945. The study first traces the constitutional contexts that shaped both countries' contemporary understandings of free speech. This study employs a doctrinal methodology to analyse these countries' legal frameworks governing free speech. It examines Malaysia's Federal Constitution and key statutes that limit this right through the Communications and Multimedia Act 1998. In parallel, it reviews Indonesia's Constitution and Law No. 39 of 1999 on Human Rights, which collectively establish the legal foundation for freedom of speech in the Indonesian context. Although the law generally grants individuals the right to express themselves freely, Article 28J (2) of the 1945 Constitution and Article 70 of Law No. 39 of 1999 impose certain limitations, requiring that such freedom be exercised with respect for the rights of others, morality, public safety and public order. The article concludes that adequate protection of free speech in both jurisdictions hinges on harmonising statutory limits with constitutional intent, strengthening independent oversight and fostering a regional discourse that balances democratic participation with legitimate state interests, which is essential for maintaining the country's functioning, stability and security.

Keywords: Free speech; Malaysian Federal Constitution; Indonesian Constitution; Limitations

I-CReST 2025:149-126 – Understanding the Non-Participation in the Boycott of Israel-Based Products Among Universiti Utara Malaysia (UUM) Community

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ABSTRACT

This study investigates the reasons behind the reluctance or refusal of the Universiti Utara Malaysia (UUM) community to engage in boycotts of Israel-based products. While public discourse often emphasizes pro-Palestinian sentiment and collective solidarity, actual consumer behavior reflects a complex array of influences. Using the Theory of Planned Behaviour (TPB), this research explores how attitudes, subjective norms, and perceived behavioural control can also explain non-participation in boycotts. A total of 380 responses were collected via online surveys from UUM community. The findings reveal that although there is general awareness and moral support for Palestine amongst the university community, practical constraints, social ambiguity, and lack of perceived efficacy significantly hinder boycott participation. Attitude showed a negative correlation with boycott behaviour, while subjective norms and perceived behavioural control had significant but nuanced effects.

Keywords: Boycott; Attitude; Subjective norms; Perceived behavioural control; Israel-based products

I-CReST 2025:169-129 – Perception and Acceptance on New Paddy Seed Variety Among Farmers in Bau, Sarawak

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ABSTRACT

Rice security has been consistently in Malaysia's self-sufficiency program as it is a staple food for vast majority of the population. This paper employed survey data to identify farmers' perception and acceptance on new paddy seed variety in Bau area in Sarawak. 113 of respondents among paddy farmers in five area (Singai, Jagoi, Bratak, Krokong, and Tringgus) were involved in this survey. The objectives of the study were to obtain farmers' perception and acceptance on new paddy seed variety. However, a clear perception and acceptance about this new variety among paddy farmers is still vague. Therefore, Power analysis and descriptive analysis using SPSS are then performed to identify the perception and acceptance of new paddy seed varieties among farmers. The results showed that the perception level on new paddy seed variety is yield performance which has the highest mean score and standard deviation (M=2.24, SD=1.543) among the other, and the lowest mean score and standard deviation (M=1.89, SD=1.249) for new paddy seed variety is the aroma of rice. While as, the acceptance level on new paddy seed variety is yield performance which has the highest mean score and standard deviation (M=2.22, SD=1.808) among the other, and the lowest mean score and standard deviation (M=1.98, SD=1.389) for new paddy seed variety is the pest resistance.

Keywords: Farmers' perceptions; Acceptance; New paddy seed variety; Bau, Sarawak

I-CReST 2025:178-133 – Non-Wood Timber Products as Sustainable Materials for Circular Industrial Design in Southest Asia

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ABSTRACT

This paper explores the potential of non-wood products (NWTPs) to promote circular design in industrial applications in Malaysia and Indonesia. As global attention shifts toward sustainable and renewable materials, NWTPs such as bamboo, rattan, and coconut waste present promising alternatives to traditional wood resources. This study uses a qualitative approach, including literature reviews, case studies, and expert insights, to examine the material properties, lifecycle potential, and integration of NWTPs in product and industrial design. Key findings indicate that NWTPs are renewable, biodegradable, and locally abundant, aligning with circular economy principles such as reuse, repair, remanufacturing, and recycling. However, challenges to adopting NWTPs include limited processing technologies, inconsistent supply chains, and a lack of design-driven innovation in both countries. By mapping existing ecosystems and identifying sustainable design strategies, this paper highlights opportunities to improve material efficiency and reduce environmental impacts. The findings aim to guide designers, industry, and policymakers in fostering a more resilient, bio-based circular economy across Southeast Asia.

Keywords: Non-Wood Timber Products (NWTPs); Circular Design; Sustainable Industrial Applications

I-CReST 2025: 184-139 – Muslimah Fashion : Theory and Concept

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ABSTRACT

This study explores the theoretical frameworks and cultural concepts underpinning Muslimah fashion. The objective of this study is to identify elements influencing Muslimah fashion trends according to the theory and concept of Muslimah Fashion. This study also considers the influence of social media and fashion influencers on the evolution of Muslimah attire in Malaysia. This study used a qualitative approach through systematic literature review on journals, books, and reports that were analyzed. There are two key theories, including Social Identity Theory and Theory of Planned Behavior. These frameworks provide insights into how fashion choices are shaped by identity, personal motivation, social influence, and cultural context. The findings reveal that Muslimah Fashion is not static but evolves with time, integrating faith-based values with modern fashion trends. This study contributes to a deeper understanding of the intersection between faith, fashion, and youth identity, emphasizing the importance of Muslimah fashion as both a personal and societal phenomenon.

Keywords: Muslimah fashion; Theory; Concept; Trends

I-CReST 2025:142-140 – Constructing Interpretive References in Literary Prose Translation: The Role of Metadiscourse

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ABSTRACT

Successful literary reading involves generating inferences to construct a coherent understanding of a text's world, with interpretive inferences being central to literary comprehension and appreciation. These interpretive inferences emerge from affordances and constraints offered by text, context, and reader. This study investigates the role of metadiscourse—language that organizes text and signals the author's stance—in constructing interpretive references in literary prose translation. Applying Hyland's (2005) interpersonal model of metadiscourse, we discuss the comprehension of the first two paragraphs of Aldo Leopold's "Great Possessions" and its three different Chinese translations from the perspective of metadiscourse. Our findings reveal that metadiscourse facilitates the generation of appropriate interpretive references, thereby enhancing the literary reading experience. Conversely, failures in establishing metadiscourse coherence are shown to cause significant misunderstandings, leading to mistranslations that impede the target reader's access to the rich literariness of the source text. This research, highlighting the value of metadiscourse analysis for literary reading, has implications for literary prose translation.

Keywords: Metadiscourse; Interpretive inferences; Literary reading; Translation

I-CReST 2025:192-141 – Artificial Intelligence and Critical Thinking in English Language Teaching (ELT): A Systematic Review of Trends and Gaps (2020–2025)

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ABSTRACT

Artificial Intelligence (AI) has emerged as a trend in education, specifically in English Language Teaching (ELT), offering potential to enhance language skills. However, while AI is widely explored in general education and higher education, its application in ELT for pre-university learners remains underexplored, especially in terms of critical thinking development, indicating a gap in the literature. Therefore, this study aims to systematically review how AI is integrated into ELT for pre-university learners and how such integration supports the development of critical thinking. Adopting a Systematic Literature Review (SLR) approach guided by PRISMA 2020, this study analysed articles retrieved from Scopus and Web of Science published between 2020 and 2025. A total of 8 out of 1726 studies were included based on the inclusion and exclusion criteria, showing that there are indeed limited studies. The SAMR model was employed to categorise levels of AI integration, while Bloom's Taxonomy and the 21st Century Skills Framework guided the critical thinking analysis. Thematic analysis was conducted to identify patterns across studies. Findings indicated that AI integration in ELT is largely focused on writing and speaking skills, with practices ranging from substitution tools, such as automated grammar checks, to redefinition approaches, like AI chatbots and personalised feedback systems. There is a limited number of studies assessing critical and higher-order thinking skills, which indicates that there is a need to fill this gap. These findings implied a need to design AI-enhanced ELT tasks that could foster critical thinking, underpinned by clear pedagogical frameworks. This review offers valuable insights for educators, curriculum developers, and researchers in leveraging AI to enhance critical thinking among pre-university students in ELT.

Keywords: Artificial intelligence (AI); Critical thinking; English Language Teaching (ELT); Pre-University education

I-CReST 2025: 193-142– TikTok as a Teaching Platform: Measuring Its Effectiveness in Teaching Mathematics Concepts to Secondary Scholl Students

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ABSTRACT

Many students face persistent challenges in understanding fundamental mathematical concepts, often due to the limitations of traditional teaching methods that do not fully engage learners or make abstract ideas relatable. This study aims to evaluate the effectiveness of TikTok as a supplementary learning tool in enhancing student motivation and academic performance and identify barriers to its use in mathematics education. Employing a quantitative research design, the study involved 89 Form Two students from two classes at a secondary school in Selangor. Data were collected through motivation and barriers questionnaires and pre- and post-tests designed to measure academic performance. Descriptive and inferential statistical analyses were used to analyse the data, including paired samples t-tests and Pearson correlation. The findings revealed a significant improvement in students' academic performance following the TikTok-based intervention, indicating the platform's potential to facilitate understanding of mathematical concepts. However, motivation remained at a moderate level, suggesting that while TikTok can engage students visually and interactively, it does not automatically foster deeper interest in mathematics. Students also reported barriers such as exposure to inappropriate content and concerns about data privacy. These results highlight that with careful supervision and content moderation, TikTok holds promise as an interactive and engaging teaching aid in mathematics education, contributing to the development of 21st-century teaching practices that resonate with digitally native students.

Keywords: TikTok; Mathematics Education; Motivation; Academic Performance; ECM

I-CReST 2025: 195-143 – Strategic Violations of Grice's Maxims in *The Devil Wears Prada*

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ABSTRACT

This study investigated pragmatic violations of Grice's (1975) conversational maxims in a selected film entitled, *The Devil Wears Prada* (2006), with the focus on elucidating how its characters' deliberate flouting of the Cooperative Principle shapes interpersonal dynamics and narrative depth. While violations of Grice's maxims in communication frequently cause misunderstandings, these are often intentionally done in films to show different motives and reveal social dynamics to the extent that they may negatively influence viewers' interpretation and comprehension. A qualitative discourse analysis was utilised to identify patterns of violation in the film's dialogues based on Grice's framework – the maxims of Quality, Quantity, Relation, and Manner. A total of 27 instances of maxim violations were revealed, with the maxim of Quality being the most significantly breached (8) as in giving false statements and hyperbole. This was followed by 7 violation instances of the maxim of Quantity (excessive or insufficient information) and 7 violation instances of the maxim of Relation (irrelevant responses). The maxim of Manner was the least with 5 violation instances as in obscurity and ambiguity. These violation instances indicate clear communicative functions which include face-saving, evasion, persuasion, and deception that portray different social maneuvering and power asymmetries within professional and personal interactions. These strategic violations enhance character portrayal and underscore the interplay between implicit meaning and social pragmatic in cinematic discourse. These findings enrich pragmatics and media linguistics by showcasing how scripted dialogues manipulate conversational norms to fulfil certain narrative and relational purposes. Implications are practically relevant to language education through pedagogical insights into implicit communication and pragmatic competence. Future work should focus on comparing variations in cross-cultural and cross-genre violations.

Keywords: Strategic violations; Grice's maxims; Dialogues; Communicative functions

I-CReST 2025: 197-145 – Ensuring Robustness in PLS-SEM and Regression: Evaluating Multivariate Assumptions in the Study of Innovative Work Behaviour Among Malaysian Academics

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ABSTRACT

This study offers a methodological examination of multivariate assumptions, including normality, linearity, homoscedasticity, multicollinearity, and residual independence, within a behavioral research model focused on innovative work behavior (IWB) among academics in Malaysian higher education institutions (HEIs). Employing multiple regression and partial least squares structural equation modeling (PLS-SEM), the study utilizes data gathered from 389 permanent academic staff at Malaysian universities listed in the QS World University Rankings 2023. The predictions were evaluated using SPSS Version 29, while SmartPLS 4.0 was employed for model estimation. The results confirm that the dataset adequately meets all key assumptions, except for multivariate normality, thereby strengthening the validity of the subsequent inferential analysis. This paper contributes methodologically by offering a structured, contextual approach to assumption testing in higher education research, serving as a reference for similar studies in the behavioral and social sciences. The study enhances the methodology by presenting a contextual approach to assumption testing within higher education research and provides practical suggestions for researchers in similar fields. Therefore, it is suggested for research in behavioral, social sciences, management, and other pertinent fields to adopt and adhere to this process to fulfill the requirements for multivariate data analysis.

Keywords: Multivariate Assumptions; PLS-SEM; Regression Analysis; Innovative Work Behavior; Higher Education

I-CReST 2025: 194-148 – "*We're just being the real parents*": Discursive Constructions of Career-Oriented 'Good' Mother Identities among Malaysian Mothers on Social Media

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ABSTRACT

This study examines how new Malaysian mothers discursively construct and negotiate their often-conflicting identities on social media in relation to their career roles. Grounded in Baxter's (2007) Feminist Poststructuralist Discourse Analysis and Bucholtz and Hall's (2005) sociocultural linguistic theory of identity, the research unpacks evolving discourses of motherhood within the shifting and intersecting landscapes of caregiving, career, and digital self-presentation. The study draws on a comparative dataset comprising: (1) six months' worth of private Facebook and Instagram posts from 2016, and (2) public motherhood-related postings on Instagram Stories, TikTok, and Threads from January to June 2025. The 2016 data were sourced from six Malaysian mothers: two working mothers (WM), two work-at-home mothers (WAHM), and two stay-at-home mothers (SAHM), selected from diverse demographic backgrounds. Findings reveal that participants construct ambivalent identities as they negotiate multiple, interrelated discourses frequently tied to ideals of the 'good' mother. The women's multifarious accounts of 'good' mothering thus disclose identity struggles in which they orient to the sometimes opposing temporal and sociocultural aspects associated with being a 'good' mother in Malaysia, especially those related to career decisions. The 2025 data reflect greater visibility of alternative narratives, marked by more nuanced self-disclosures amplified by contemporary social media platforms' relatively newer, multimodal features. This study contributes to a deeper theoretical understanding of discursive identity construction in mediated contexts. Tracing discursive shifts over nearly a decade unveils how sociocultural and digital developments both reinforce and challenge dominant discourses surrounding motherhood and career decisions in Malaysia. The findings offer timely insights into the complexities of identity construction through how mothers discursively negotiate 'good' mother identities by navigating competing social demands and expectations within a multicultural society.

Keywords: Discursive identity construction; Motherhood discourses; Social media discourses; Career discourses

I-CReST 2025: 204-152– Exploring the Challenges of Battery Energy Storage System Integration in Solar-Powered Manufacturing: A Case Study

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ABSTRACT

The integration of Battery Energy Storage Systems (BESS) in solar-powered manufacturing is gaining attention as a means to enhance energy reliability and sustainability. However, BESS adoption remains limited despite its potential, particularly in industrial settings. This study explores the key barriers hindering BESS integration in solar manufacturing companies in Malaysia. Employing a qualitative case study approach, semi-structured interviews were conducted with six managerial-level informants with experience in solar-powered manufacturing and energy storage initiatives. Thematic analysis revealed five main challenges, namely Theme 1: Financial Barriers (high initial costs, long payback periods, and maintenance expenses), Theme 2: Technical Difficulties (battery lifespan, limited surplus energy, storage capacity, integration compatibility, and safety risks), Theme 3: Regulatory and Policy Limitations (ambiguity in government policies and lack of incentives), Theme 4: Operational Issues (lack of awareness, lack of technical expertise, internal resistance, and limited access to benchmarking data), and Theme 5: Environmental and Sustainability Concerns (battery recycling, battery disposal, and resource extraction). These findings underscore the need for clearer regulatory frameworks, financial incentives, capacity-building, and sustainable lifecycle management of battery systems. This study offers theoretical and practical insights to support policymakers, energy stakeholders, and manufacturers in facilitating the successful integration of BESS to achieve a resilient, cost-effective, and sustainable energy future.

Keywords: Battery Energy Storage; Solar System; BESS; Manufacturing; Thematic Analysis

I-CReST 2025: 203-154 – Forecasting Equity Crowdfunding Performance in Relation to Macroeconomic Indicators in Malaysia: A Comparative Analysis of Holt-Winters and ARIMA Models

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ABSTRACT

The concept of equity crowdfunding (ECF) has been seen as a potential funding platform in Malaysia especially among SMEs and startups. This alternative financing mechanism is one of the funding initiatives implemented by the government to facilitate access to capital for growing businesses. Despite its increasing significance, its future performance remains uncertain due to the dynamic nature of financial market and the changing regulatory environment. Broader macroeconomic variables such as gross domestic product (GDP), inflation rate, unemployment rate and interest rate may play an essential role in shaping the performance of the ECF. Such external factors add further uncertainty and instability within the market. Therefore, the capacity to create accurate forecasting of ECF performance is vital to predict trends in the market, risks, and assist strategic decision making for the policymakers, investors, and platform operators. In line with this need, the study aims to forecast the performance of ECF based on statistical time-series models which can be beneficial to the stakeholders. The monthly data from 2017 to 2022 were collected from the Department of Statistics Malaysia (DOSM) and Securities Commission Malaysia (SC), analysed using Holt-Winters Exponential Smoothing model and the Box-Jenkins Autoregressive Integrated Moving Average (ARIMA) method. The measure of model performance was based on Root Mean Square Error (RMSE), Mean Absolute Error (MAE), and Mean Absolute Percentage Error (MAPE). The results indicated that although Holt-Winters fit the short-term changes, ARIMA was better suited to overview changes in the systems and long-run trends, illustrating the dynamics of the crowdfunding ecosystem. These finding demonstrate the evolving role of ECF as both a financing channel and an indicator of economy changes. Therefore, this research can contribute to the theoretical knowledge while leading to a valuable application of the current findings by practitioners in policymaking, investors, and the operation of ECF platforms.

Keywords: Equity Crowdfunding (ECF); Autoregressive Integrated Moving Average (ARIMA); Holt-Winters Additive Model; Exponential Smoothing



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