Sus-LaB 5th

Sus-LaB5 2025: Driving Research & Innovation Towards Sustainable Life

March 25-27, 2025
Taichung, Taiwan

https://suslab5.hust.edu.tw/index.php

SUS-LAB 5th

PROCEEDING OF 2025 SUS-LAB5 INTERNATIONAL CONFERENCE

HOSTED BY

HSIUPING UNIVERSITY OF SCIENCE & TECHNOLOGY (HUST), TAIWAN

AND

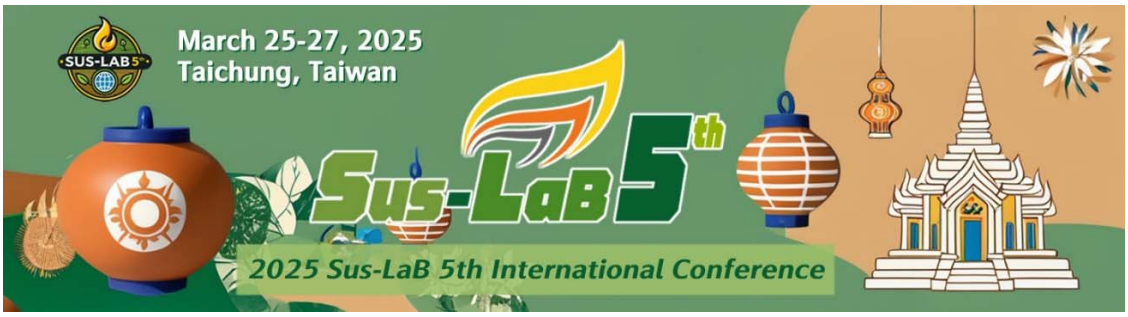
RAJAMANGALA UNIVERSITY OF TECHNOLOGY RATTANAKOSIN (RMUTR), THAILAND

CONFERENCE DATES

MARCH 25-27, 2025

Sus-LaB5 2025 International Conference Agenda

March 25, 2025 (Tuesday)			
09:00-17:00	**Abroad Guests Registration** Location: Central Plaza of Building A 1st F, HUST or Lobby of Hotel National		
March 26, 2025 (Wednesday)			
09:00-10:00	Check in, Registration and On-Site Payment Location: Central Plaza of Building A 1st F		
10:00-10:05	Opening Ceremony and Introduction of HUST (short film) Location: Building A 6th F, A0607		
10:05-10:20	HUST President's and RMUTR President's Remarks		
10:20-10:25	Gift Exchange		
10:25-10:30	Group Photo		
10:30-11:15	Keynote 1	Host: Dr. Shwn-Meei Lee Speaker: Dr. Chin-Fa Lee Location: Building A 6th F, A0607	
11:15-12:00	Keynote 2	Host: Dr. Shwn-Meei Lee Speaker: Dr. Paiboolya Gavinlertvatana Location: Building A 6th F, A0607	
12:00-13:30	Lunch Time (Building A 4th F, A0408)		
13:30-15:00	Session A Host: Dr. Neng-Fu Shih (Building A 2nd F, A0206)	Session B Host: Dr. Jia-Lin Lu (Building A 5th F, A0509)	Session C Host: Dr. Wen-Hui Yang (Building A 2nd F, A0204)
15:00-15:30	Coffee Break (Building A 4th F, A0408)		
15:30-17:00	Session D Host: Dr. Neng-Fu Shih (Building A 2nd F, A0206)	Session E Host: Dr. Jia-Lin Lu (Building A 5th F, A0509)	Session F Poster Papers (Building A 4th F, A0408)
18:00-20:00	Banquet (Yamatoya Banquet Center)		
March 27, 2025 (Thursday)			
9:30-10:30	HUST Campus Touring (Free Activity) Host: Dr. Su-Ming Huang		
10:30-11:00	Coffee Break Location: Building A0206, 2nd F		
11:00-12:00	Closing Ceremony		



Section Presentation Agenda

***Please kindly note: For each speech, the time limitation is 15 minutes.**

1. **Section A: March 26 (13:30-15:00)**
   Host: Dr. Neng-Fu Shih
   Location: Building A 2nd F, A0206
2. **Section B: March 26 (13:30-15:00)**
   Host: Dr. Jia-Lin Lu
   Location: Building A 5th F, A0509
3. **Section C: March 26 (13:30-15:00)**
   Host: Dr. Host: Dr. Wen-Hui Yang
   Location: Building A 2nd F, A0204
4. **Section D: March 26 (15:30-17:00)**
   Host: Dr. Neng-Fu Shih
   Location: Building A 2nd F, A0206
5. **Section E: March 26 (15:30-17:00)**
   Host: Dr. Jia-Lin Lu
   Location: Building A 5th F, A0509
6. **Section F: March 26 (15:30-17:00)**
   Poster Papers
   Location: Building A 4th F, A0408

Section A: March 26 (13:30-15:00)

Host: Dr. Neng-Fu Shih Location: Building A 2nd F, A0206

***Please kindly note: For each speech, the time limitation is 15 minutes.**

Time	Paper ID.	Author's Name	Paper Title
13:30 | 15:00	1-1	Shu-Jen Chen	A Longitudinal Study on the Impact of Gender and Education Level on Knowledge, Attitudes, and Behaviors in Food and Agriculture Education: A Case Study of the Implementation of the USR Project
	1-2	Palis Anambutr Rion Anjelo Vizconde Cabigting Wesley Wei-Wen Hsiao Po-Ting Lin Iman Adipurnama I-Ju Teng Taweechai Amornsakchai Duc-Thang Vo	An Efficiency Improvement Technique for High Frequency Passive Devices Based on the Superconducting Materials
	1-4	Shih-Chan Chien, Tung-Yuan Ni Erich Kai-Fan Chang Geeng-Jen Sheu	Sustainable Development and Potential Applications of Fluid Ionization Technology
	2-1	Ekasit Nugoolcharoenlap	An Efficiency Improvement Technique for High Frequency Passive Devices Based on the Superconducting Materials

Section D: March 26 (13:30-15:00)

Host: Dr. Neng-Fu Shih Location: Building A 2nd F, A0206

Time	Paper ID.	Author's Name	Paper Title
15:30 | 17:00	2-3	Ming-Te Cheng	A Preliminary Study of the Taiwan's National Science Council's "Draft Basic Law on Artificial Intelligence"
	2-4	Jiun-Chuan Chao	Methods for Setting Topics at National Science and Technology Conference: Taking Net-Zero Emissions and Sustainability as an Example
	2-6	Yau-Ren Shiau Shuien Lin Chiou	Preventive Maintenance Planning for Carbon Emission Anomaly Warning
	2-11	Jiangyun Chen Songyu Jiang, Nutteera Phakdeephirot	Willingness of Chinese Students to Participate in Thai Festival Base on Technology Acceptance Model
	7-1	Neng-Fu Shih Chia-Yen Wei	Implement of Drone flight teaching by using Digital Materials and teaching aids through action research

Section B: March 26 (13:30-15:00)

Host: Dr. Jia-Lin Lu Location: Building A 5th F, A0509

***Please kindly note: For each speech, the time limitation is 15 minutes.**

Time	Paper ID.	Author's Name	Paper Title
13:30 | 15:00	6-1	Nathee Monthonwit	The relationship between gamers' motivation to engage with particular video game genres and their sexual orientation and gender identity
	6-2	Shiu-Hua Wu Kuo-Shan Yao	Potential of Artificial Intelligence Generated Content Technology in Character Design for Picture Books
	6-4	Kek-Hong Lim Uei-Ren Chen	Exploring Wartime Art and Overseas Chinese Patriotism from the Nanyang Perspective
	6-7	Nai-Ying Chang Hao-Yuan Cheng	Enhancing Lifelong Learning: A Case Study on English Reading and Vocabulary Instruction in Continuing Education
	6-8	Vince Jia-Lin Lu Cindy Hsing-Yu Wang	Avant Garde of SDGs Practitioner in Sarah Orne Jewett's *A White Heron*

Section E: March 26 (13:30-15:00)

Host: Dr. Jia-Lin Lu Location: Building A 5th F, A0509

Time	Paper ID.	Author's Name	Paper Title
15:30 | 17:00	6-9	Yona Yena Shwu-Ting Lee Steven Hsiao	Taking Taiwan as an example to see the impact of UN (United Nation) input the "Decontextualized modern urban planning worldwide construction and the suggestion of sustainable"
	6-10	Fan Kong Prapatpong Senarith	The Strategic Management of University Students Volunteer Service Practices under the Perspective of Three-Complete Education in Luoyang Normal University, Henan Province
	5-1	Atcharawan Phenwansuk	The study of the Toddy Palm Learning Center for the development and promotion of creative tourism of Tham-Rong community in Ban Lat District, Phetchaburi Province
	5-4	Yi Ouyang Songyu Jiang	Exploring Development Trends of Yunnan Coffee Shops: A Latent Dirichlet Allocation (LDA) Approach to Consumer Reviews

Section C: March 26 (13:30-15:00)

Host: Dr. Wen-Hui Yang Location: Building A 2nd F, A0204

Time	Paper ID.	Author's Name	Paper Title
13:30 | 15:00	3-4	Chaojie Hu	Purchase Intent of Fenjiu Among Elderly Consumers in Shanxi Province
	4-1	Bo Zhang Nutteera Phakdeephirot	Analysis Servant Leadership Influences Employee Turnover Intention: Based on the Psychological Contract, Organizational Commitment and Employee Satisfaction
	4-3	Yu-Ching Huang Yu-Hwa Lin	A Study on Female Leadership Styles, Job Burnout, and Turnover Intention
	2-9	Yau-Ren Shiau Shih-Ru Yu	Construction of Remaining Useful Life Prediction Models

Section F: March 26 (13:30-15:00)

Poster Papers Location: Building A 4th F, A0408

Time	Paper ID.	Author's Name	Paper Title
15:30 | 17:00	2-5	Mao-Lin Ciou Shang-Lin Yang	High performance infrared high-pass optical filter designed by multilayer thin-film stack
	2-7	Cong Xu	Nonlinear Dynamics and Regime-Switching in Land-Economy Systems: A Structural Approach to Sustainable Development Under Environmental Uncertainty
	2-8	Chien-Chien Tseng Shang-Lin Yang	Realization of near-infrared low-pass optical filter based on thin-film multilayer structure
	2-10	Akera Ratchavieng Weerawat Phengchuy Somjai Srinate	The Development of Platform for Facilitating Knowledge Management Lesson on the Topic of the School Botanical Gardens in Prachuapkhirikhan Province
	4-2	Shwn-Meei Lee Yen-Ting Lin Chen-Wei Lin Gui Ren Hiroshi Honda	Sustainability of Factors for Purchase Intention in Business Environment
	6-5	Pornsawan Amornsakchai Nattapakal Kittisunthonphisarn Nattaphorn Jandee	Development and Production of Interactive Videos for Laboratory Safety Education in Chemistry
	7-2	Shwn-Meei Lee Chen-Wei Lin Yen-Ting Lin Jorge Padmore Hiroshi Honda	Impact of Sustainability in the Quality Improvement of Medical Device

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History of Sus-Lab

Sus-LaB1 2016

Sustainable L&B International Conference was started in 2016. Sus-LaB1 was hosted by Rajamangala University of Technology Rattanakosin (RMUTR), Thailand and University of Gävle (HIG), Sweden. It was held on 29th November–2nd December 2016 at Rajamangala University of Technology Rattanakosin (Salaya and Wang Klai Kangwon Campus) under the main topic of "A Multidisciplinary View on Sustainable Life and Business: Sus-LaB".

7 keynote speakers: Professor Dr.Arne Fagerström, University of Gävle Sweden; Associate Professor Dr.Kitikorn Charmondusit, Vice President for Environment and Sustainable Development, Mahidol University Thailand; Assistant Professor Dr.Agneta Sundström, University of Gävle Sweden; Professor Dr.Aihie Osarenkhoe, University of Gävle Sweden; Professor Emeritus Dr.Gary Cunningham, University of Gävle Sweden; Professor Dr.Lars Hassel, Gävle and Umeå University Sweden; and Professor Dr.Wanlop Surakampontorn, Rajamangala University of Technology Rattanakosin Thailand. 27 manuscript submissions from 4 counties.

Sus-LaB2 2018

Sus-LaB2 is held again with the cooperation between the Rajamangala University of Technology Rattanakosin (RMUTR), Thailand and Hsiuping University of Science & Technology (HUST), Taiwan under the topic of "2nd Multidisciplinary Views on Sustainable Living & Built Environment: Sus-LaB 2" on 11th – 14th January 2018 at The Royal City Hotel, Bangkok and Rajamangala University of Technology Rattanakosin, Salaya and Wang Klai Kangwon Campus, Thailand.

7 keynote speakers: Professor Dr. Somchai Wongwises (RMUTR Thailand), Professor Dr. Wanlop Surakampontorn (RMUTR Thailand), Professor Dr. Lin Hsun-Chen (HUST Taiwan), Professor Dr. San-Lin Yang (HUST Taiwan), Professor Dr. Chung-Jen Ou (HUST Taiwan), Dr. Pi-Fuang Chen (Zolargus USA) and Professor Dr. Joseph J. Jacobsen (U. Concordia USA). 35 manuscript submissions from 6 counties.

Sus-LaB3 2019

Sus-LaB 3 is held again with the cooperation between the Sus-LaB 3 is held again with the cooperation between the Hsiuping University of Science & Technology (HUST), Taiwan and the Rajamangala University of Technology Rattanakosin (RMUTR), Thailand, under the topic of "3rd Multidisciplinary Views on Sustainable Living & Business: Sus-LaB 3" on 19th – 21th March 2019 at HUST Campus, Taichung City, Taiwan.

4 keynote speakers: Prof. Krichkanok Sudasna (RMUTR, Thailand), Prof. Joseph J. Jacobsen (U. Concordia USA), Dr. Ho-Pen Chang (National Space Program Organization, Taiwan) and Deputy Director Chen Yung-Hsin (New Construction Office/Taichung City Government, Taiwan). 90 accepted abstracts (114 submissions from 11 countries with 22 facilities). 51 full papers for Hsiuping Journal Special Issue.

Photos, Video & Documents (Opening Ceremony, MOTIF of Sus-LaB 3, Closing Ceremony, POSTLUDE of SusLaB3, Proceedings, Letters ect.)

Sus-LaB 4 2023

Sus-LaB 4 (The 4th RMUTR & 3rd RICE/ Sus-LaB 4 International Conference) is held again with the cooperation between the Rajamangala University of Technology Rattanakosin (RMUTR) , Thailand and Hsiuping University of Science & Technology (HUST), with the theme of "Moving towards Sustainable Development Goals" from 16th -18th August 2023 at Sammanakhan Chalerm Phrakiat King Rama IX Building, the Rajamangala University of Technology Rattanakosin, Wang Klai Kangwon Campus, Hua-Hin District, Prachuap Khiri Khan Province, Thailand.

3 keynote speakers: Mr. Teerakiat Jareonsettasin (M.D.) Chairman, Council of the President of the University Council and the President of Rajamangala University of Technology, Former Minister of Education, Ministry of Education (Thailand) Associate Professor Dr. Peeradej Thongampai Director, Knowledge Network Institute of Thailand Dr.Illias Animon Forestry Officer, Food and Agriculture Organization of the United Nations: FAO. 75 manuscript submissions from 6 countries.

Message from the President Mei-Ching Chen of Hsiuping University of Science and Technology

On behalf of Hsiuping University of Science and Technology, I would like to express my sincere gratitude and hearty thanks to work with Rajamangala University of Technology Rattanakosin, Thailand together for this International Conference. Hsiuping University of Science and Technology and Rajamangala University of Technology Rattanakosin this time cooperate with each other again and plan to organize an International Conference on "Sus-LaB5th International Conference：Driving Research & Innovation Towards Sustainable Life." We are pleased to welcome participants to this meeting held at Hsiuping University of Science and Technology, Taichung, Taiwan on March 25-27, 2025.

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. Nowadays we can see the excessive and negative exploitation of the planet. Human beings impose exploitative uses of the natural world for various expedient purposes. With regard to these deteriorating problems, how to protect and restore the land ecosystem becomes an important issue and motif. To achieve the Sustainable Development Goals of Driving Towards Sustainable Life, the conference provides a venue where academic officers, general officers, researchers, experts worldwide, and graduated students can share more knowledge, ideas and experiences in sustainable living and built environment from the experts on sustainable life and business. We believe it is of tremendous significance to have an opportunity to share the knowledge from all participants.

With the keynote speakers' valuable speeches and the authors' papers submitted which provide so many unique insights including applications of sustainable life, business and built environment, we would like to express our gratitude to all of them. We also look forward to your participation again in our next event.

Meiching Chen

Dr. Mei-Ching Chen

President of Hsiuping University of Science and Technology

Message from the President Udomvit Chaisakulkiet of Rajamangala University of Technology Rattanakosin

Rajamangala University of Technology Rattanakosin, Thailand in cooperation with Hsiuping University of Science together with Technology, Republic of China (Taiwan) host "Sus-LaB 5th International Conference: Driving Research & Innovation Towards Sustainable Life on 25th-27th March 2025 to be held at Hsiuping University of Science and Technology, Taichung, (Taiwan). Its purpose is to enable experts, academics, practitioners, and related stakeholders to share their knowledge and experience in a diverse fields related to sustainable development while lending opportunities for participants to network for greater collaboration within and across their respective fields of expertise that relate to sustainable development as well as to deepen the bodies of knowledge through of research and review in the context of sustainable development so that it can be useful tools for academia and communities of practice to work towards the sustainability development goals.

Consequently, Rajamangala University of Technology Rattanakosin commits to drive itself toward the United Nations' Sustainable Development Goals (SDGs) because higher education institutions must be key driving forces towards SDGs through the development of future manpower and the hubs of knowledge and research. RMUTR has continuously carried out its mission to develop education, society, community, and care for the environment. SDGs have been a core of the university's operations reflected in our missions and all aspects of our operation including teaching and constructions, research, education management, internal university management, collaboration with external agencies, etc.

On this particular occasion, I hope that this conference will be an ideal opportunity to share experiences and exchange ideas with colleagues regarding many aspects of multidisciplinary perspectives pacing themselves towards a sustainable living and built environment. Finally, I wholeheartedly wish the participants be a success at this conference.

d. udomvit

(Assoc. Prof. Dr. Udomvit Chaisakulkiet)

President of Rajamangala University of Technology Rattanakosin

Abstract List

Keynote Speakers

Contribution Abstracts

1. Sustainable Life

2. Engineering and Applications

3. Economy and Business

4. Management

5. Tourism Industry

6. Humanities and Arts

7. Other Related Topics

Keynote Speakers

國立中興大學 National Chung Hsing University

Topic: Crafting Bio-active Sulfur-Containing Molecules: A Sustainable Approach

Dr. Chin-Fa Lee (pdf)

Director of Instrument Center

Department of Chemistry

National Chung Hsing University, Taiwan

RATTANAKOSIN RMUTR

Topic: Adaptation and Mitigation: A Complementary Process to Respond and Reduce the Negative Impact of Climate Crisis

Expert committee of Academic council, Rajamangala University of Technology Rattanakosin

Advisor to the Minister of Natural Resources and Environment

Advisory Committees; Plant Genetic Conservation Project Under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn (RSPG)

Expert committee; Coordination center, Plant Genetic Conservation Project under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn, Rajamangala University of Technology Rattanakosin

Chairman of the advisory committees; Agriculture and Forestry Climate Change Research Center, Agriculture Faculty, Chiangmai University, Chiangmai, Thailand

President; Thai Orchids Lab Company Limited

§ Keynote 1 §
Crafting Bio-active Sulfur-Containing Molecules: A Sustainable Approach

Chin-Fa Lee[a*]

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Abstract

Sulfur-containing molecules are important skeletons in organic synthesis and pharmacetical industry. Phosphate esters are crucial in organic synthesis as they are present in biologically active moieties and serve as versatile intermediates in amide synthesis. Phosphorodithioates are well-known as antiviral agents, plant growth regulators, enzyme inhibitors, and lubricants. However, the known procedures for preparing phosphorodithioates suffer from several drawbacks, such as the use of toxic reagents, harsh reaction conditions, limited substrate scope, and the involvement of air-sensitive reagents. Therefore, the synthesis of phosphorothioates under milder and more environmentally friendly conditions is highly desirable. Cross-dehydrative coupling (CDC) reactions have attracted significant attention for their ability to enhance reaction efficiency and improve atom economy. However, the oxidative CDC of thiols and phosphonates to form P-S bonds remains challenging because the P-H and S-H bonds are readily oxidized by stoichiometric oxidants. Molecular oxygen (O_2), an environmentally friendly and ideal oxidant, is widely used in organic synthesis. Here, we present a simple Cs_2CO_3-catalyzed aerobic oxidative cross-dehydrative coupling of thiols and phosphonates for the synthesis of dithiophosphates. This method, characterized by mild reaction conditions, excellent functional group tolerance, and broad S-H and P(S)-H substrate scope, offers a valuable protocol for organic synthesis.

§ Keynote 2 §
Adaptation and Mitigation: A Complementary Process to Respond and Reduce the Negative Impact of Climate Crisis

Paiboolya Gavinlertvatana[a,*] and Kamlai Laohaphatanalert[b]
[a]Expert committee of academic council, Rajamangala University of Technology Rattanakosin, Thailand
[b]Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology, Thailand
[*]Correspondence: thaiorchidslab@gmail.com

Abstract

Climate change is having a significant impact on all sectors due to shifting climatic conditions. People also affected by this changing in numerous ways i.e. health difficulties caused by poor air quality, effects on local and global food security and accessibility and immigration. Industries are forced to alter their traditional operations and individuals must change their way of life to accommodate current and future concerns. To handle these challenges, adaptation and mitigation have been considered as complementary approaches. While mitigation refers to reducing or preventing the emission of greenhouse gases (GHG) into the atmosphere, adaptation refers to how to deal with the current and future repercussions of climate change. Thus, combining adaptation and mitigation will assist to reduce GHG emissions and prepare for the more severe negative effects of the climate crisis in a sustainable way. Climate science and policy have recently focused on the potential for synergy between adaptation and mitigation of climate change. Hence, there is an increasing demand for studies to find the appropriate combination of adaptation and mitigation recently. Where adaptation is largely determined by the availability of climate change-related information, voluntary mitigation is generally motivated by perceived vulnerability to risks and the severity of climate change or climatic variability impacts. As a result, in order to inspire behavior change, the climate change issue could be approached from a health perspective.

Keywords: Climate crisis, Adaptation, Mitigation, GHG emission.

Section One

Sustainable Life

1-1

A Longitudinal Study on the Impact of Gender and Education Level on Knowledge, Attitudes, and Behaviors in Food and Agriculture Education: A Case Study of the Implementation of the USR Project

Shu-Jen Chen[a*]
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[*]Correspondence: jen@hust.edu.tw

Abstract

This study examines the longitudinal impact of Food and Agriculture Education (FAE) on consumer knowledge, attitudes, and behaviors (KAB), focusing on the moderating effects of gender and education level. Utilizing the University Social Responsibility (USR) project as a case study, this research assesses how experiential learning initiatives influence sustainable consumption, food safety awareness, and environmentally responsible behavior. A two-phase data collection process was employed. Initially, 300 valid survey responses were gathered, revealing limited gender-based differences and no significant impact on education level. Recognizing the need for a broader assessment, the study expanded through USR program activities, incorporating interactive farm visits, educational workshops, and community lectures. By December 2024, an expanded sample of 1,280 participants was analyzed using T-tests, ANOVA, and Scheffé post hoc tests to assess evolving FAE outcomes.

The results demonstrated statistically significant differences in knowledge, attitudes, and behaviors based on gender and education level. Female participants exhibited stronger inclinations toward sustainable food choices, prioritizing food safety and environmentally friendly practices. Meanwhile, higher-educated participants displayed greater understanding and support for local agriculture, highlighting the role of education in shaping sustainable consumer behaviors. These findings underscore the need for demographic-tailored FAE programs, emphasizing gender-sensitive approaches and education-driven interventions to maximize engagement. Integrating theory with experiential learning proved effective in fostering long-term behavioral change, reinforcing the importance of incorporating FAE into educational frameworks to promote sustainable development.

Keywords: Food and Agriculture Education (FAE), University Social Responsibility (USR), Knowledge-Attitudes-Behaviors (KAB), sustainable consumption, gender differences

1-2
Carboxymethyl Chitosan-Coated Pineapple Leaf Fibers *via* Autoxidized Tannic Acid for Anionic Dye Removal

Palis Anambutr[a,#], Rion Anjelo Vizconde Cabigting[a,#], Wesley Wei-Wen Hsiao[b], Po-Ting Lin[a,c,d], Iman Adipurnama[a], I-Ju Teng[a], Taweechai Amornsakchai[e,f,*], Duc-Thang Vo[a,*]

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[b]Department of Chemical Engineering, College of Engineering, National Taiwan University of Science and Technology, Taipei, Taiwan

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[#] These authors contributed equally to this work.

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Abstract

Industrial processes often contaminate wastewater by releasing harmful dyes. Polymer-based adsorbents are commonly used for their removal, but these typically use artificial crosslinkers that pose health and environmental risks. In this work, an alternative adsorbent was developed by coating pineapple leaf fibers (PALF) with carboxymethyl chitosan (CMCS), which was crosslinked using autoxidized tannic acid (OTA) as a natural crosslinker. The synthesized material (PALF@OTA-CMCS) was characterized using FTIR and SEM. In batch adsorption experiments, PALF@OTA-CMCS achieved a fourfold increase in adsorption capacity (93.2 mg g-1) compared to pristine PALF towards methyl orange (MO). The equilibrium adsorption of MO by PALF@OTA-CMCS follows the Langmuir isotherm model, and the adsorption kinetics can be described by a pseudo-second-order kinetic model. These findings highlight the potential of the prepared PALF@OTA-CMCS as a green and sustainable alternative for the adsorption of anionic dyes from wastewater.

Keywords: Agro-waste valorization, carboxymethyl chitosan, pineapple leaf fiber, tannic acid, wastewater treatment

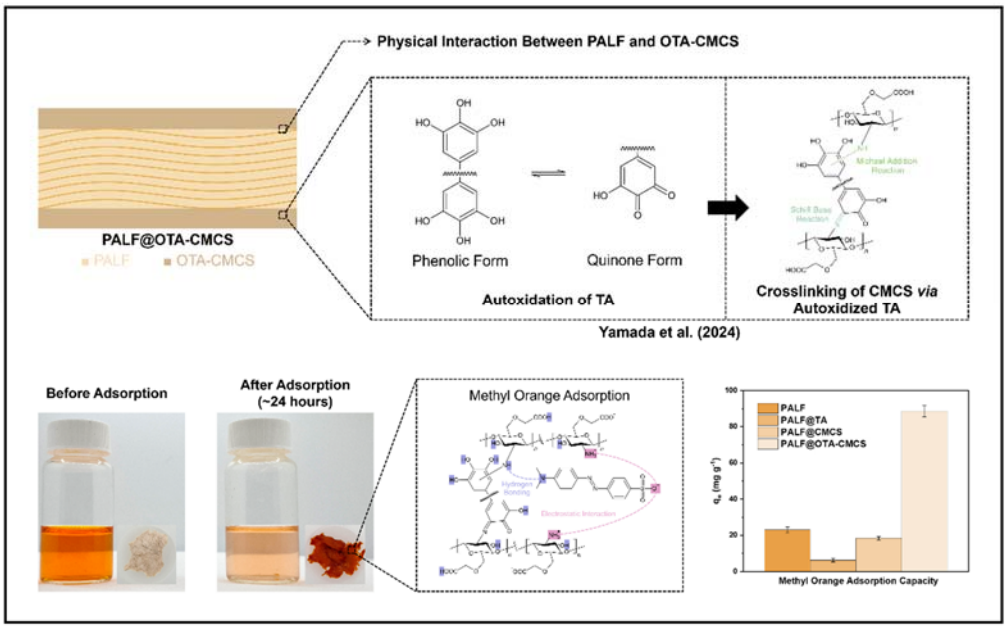

Fig. Abstract

1-3

Is It Easy to Be Green? The Servant Leaders' Influencing Process of Community Perceptions on Pro-environmental Behavior

Hui-Ling Tung[a,*], Arslan Ahmed[b]

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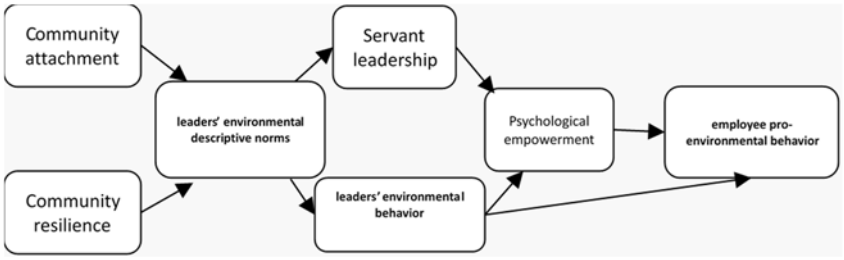
Abstract

Climate change is a critical global challenge that threatens both environmental and human systems. Human activities and organizational practices are primary drivers of climate change. To effectively address climate change in Pakistan, it is essential to understand the social factors that influence pro-environmentally behaviors. It is crucial for gaining a better understanding of this collective effort and how pro-environmental behaviors can be promoted within workplaces. In this study, we will utilize theories from organizational psychology to explore the relationship between individuals' attachment to their community and their perceptions of its resilience, and how these factors influence their perceptions of norms regarding pro-environmental behavior. Moreover, we also create and evaluate a model that connects servant leadership and leaders' pro-environmental behaviors in the workplace to employees' engagement in pro-environmental behavior. Data will be collected from middle-line managers and their subordinates in subordinate-leader dyads to test the hypothesis. Mediation analyses are expected to demonstrate that leaders' environmental descriptive norms will initially influence their servant leadership style and their own pro-environmental behaviors in the workplace. In turn, employees' own psychological empowerment and their leaders' workplace pro-environmental behaviors will be expected to predict their workplace pro-environmental behaviors. Additionally, employees' perceptions psychological empowerment are expected to serially mediate the association between community attachment and resilience and their pro-environmental behaviors. The expected results will suggest that leaders' environmental descriptive norms and the leadership and pro-environmental behaviors they enact play an important role in the greening of organizations. Conceptual and practical implications of these expected findings are discussed.

Keywords: pro-environmental behavior, servant leadership, environmental sustainability, community attachment, community resilience.



1-4

Sustainable Development and Potential Applications of Fluid Ionization Technology

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Abstract

Fluid ionization technology, an innovative physical descaling method, has gained increasing attention for its potential to enhance energy efficiency, reduce carbon emissions, and minimize energy consumption. By altering the ionic structure of fluid molecules through electromagnetic fields, it effectively prevents scale formation and dissolves existing deposits. The paper demonstrates that it can significantly improve heat exchange efficiency, reducing energy consumption by approximately 26% for every 0.6 mm decrease in scale thickness. Compared with traditional chemical treatments, it exhibits superior environmental performance by minimizing wastewater pollution and supporting sustainable development goals and carbon neutrality initiatives. These characteristics highlight the potential applications of fluid ionization technology in achieving energy efficiency and environmental sustainability.

Keywords: fluid ionization technology, physical descaling, sustainable development, heat exchange efficiency,

Section Two

Engineering and Applications

2-1

An Efficiency Improvement Technique for High Frequency Passive Devices Based on the Superconducting Materials

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Abstract

This paper presents a technique of the superconducting materials applying to passive high-frequency devices. The technique is based on a principal theory of high-temperature superconducting devices or named HTS devices. This can be applicable with the passive devices of the front-end of wireless systems operating at 2.6 GHz. In this research, microstrip filters and antennas are designed and fabricated as the prototype devices that are employed for making as the high-performance devices based on the HTS technology. For the filter, a 2.6 GHz sixth-order open square ring resonator bandpass filter is employed in the design with bandwidth of 80 MHz to show the filtering response surrounding at the passband response as high sharpness shape. The measured results show that the transmission coefficient (S_{21}) in the passband is lower than the simulated results as about 5.15 dB due to the dimension errors from the use of Ferric chloride (FeCI3) in the fabrication process. For the antenna, two square patch microstrip antennas designed for 1 element and 2 elements with arraying are employed. The measured results show that the reflection coefficients (S_{11}) in the passband and the antenna gain are in good agreement with the simulated results. In the testing process of all devices to operate as HTS devices, we will use a cooling machine to make the lowest temperature as -28 ºC. This technique can be used to increase the transmission coefficient (S_{21}) in the passband as 3.8 dB for the filter. Also, both square patch antenna 1 and 2 elements that can increase the antenna efficiency as the maximum values of 215 % and 131 %, and the antenna gain as the maximum values of 2.51 dBi and 4.51 dBi, respectively. The HTS technique can be applying to improve the better efficiency for the wireless system based on both devices, but the wested liquid nitrogen still continuously used in the operation that will be considered in the future work.

Keywords: HTS devices, Microstrip filters, Microstrip antennas, transmission coefficient, reflection coefficients, antenna efficiency, antenna gain.

2-2

Integrating FMCW Radar for Safe Speed Monitoring in Collaborative Robots

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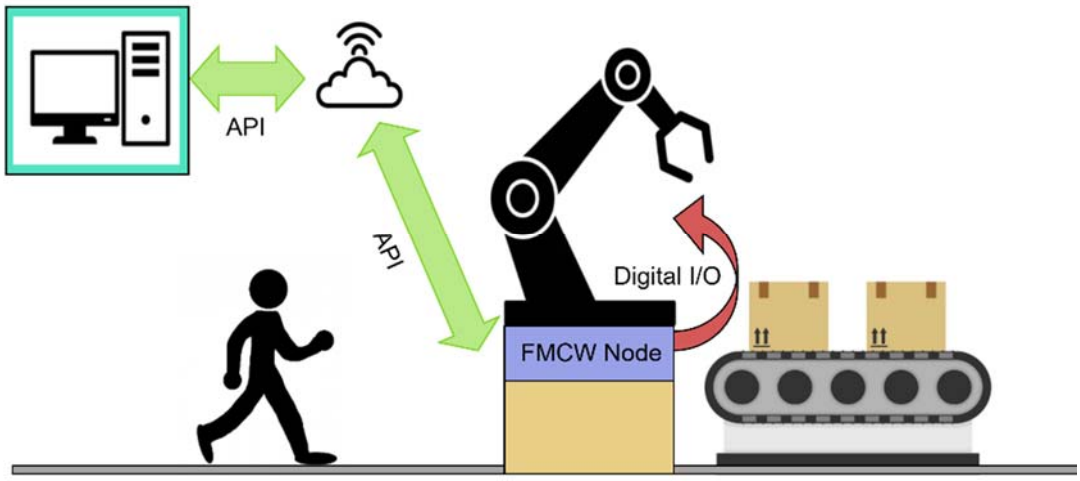
Abstract

The manufacturing sector is increasingly incorporating collaborative robots (cobots) due to their cost-effectiveness, safety, compact size, and intuitive interfaces. As the industry progresses, cobots must become more autonomous and intelligent to execute complex tasks alongside human workers. This necessitates the use of various internal and external sensing modalities to effectively detect humans and obstacles. This paper examines the feasibility and implications of integrating Frequency-Modulated Continuous Wave (FMCW) radar node into a cobot through an edge device for Safe Speed Monitoring (SSM). SSM ensures that the robot adjusts its speed based on the proximity of a human operator, maintaining a safe distance to enhance safety in human-robot collaboration. The edge device fulfills two essential functions: (1) sending a signal to the robot's I/O system to regulate speed in real-time, and (2) transmitting data to the cloud through Application Programming Interface (API) for remote monitoring motion and human presence on the operating floor. This approach, which can be integrated with other sensor technologies, offers a solution for both immediate operational safety and long-term process improvement, allowing the safety and efficiency of cobots.

Keywords: Human Machine Collaboration, Frequency-Modulated Continuous Wave, Safe Speed Monitoring, Cloud Monitoring.



2-3

A Preliminary Study of the Taiwan's National Science Council's "Draft Basic Law on Artificial Intelligence"

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Abstract

This article preliminarily explores the Taiwan's National Science Council's draft Basic Law on Artificial Intelligence and conducts a pre-legislative assessment of its legal priorities, with an emphasis on basic principles, government promotion, and governance principles. This article first reviews the history of artificial intelligence legal system design in our country and focuses on the proposals of several legislators and party groups. It is found that the draft proposed by legislator Lin Yi-jin and others is highly similar to the draft of the National Science Council. Whether the development of artificial intelligence technology and industry can be properly regulated remains to be seen. At present, the draft of the National Science Council has not yet been sent to the Legislative Yuan for review, and it may be revised before it is formally proposed.

Keywords: Artificial Intelligence, Legislation, Draft.

2-4

Methods for Setting Topics at National Science and Technology Conference: Taking Net-Zero Emissions and Sustainability as an Example

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Abstract

According to the *Fundamental Science and Technology Act*, the Executive Yuan has to host a National Science and Technology Conference every four years, and its conclusions are compiled into a National Science and Technology Development Plan. The Executive Yuan's 12th National Science and Technology Conference was hosted in December 2024. At this conference, topics related to net-zero emissions and sustainability played an important role. This study explores the methods and development stages of the topics covered in the National Science and Technology Conference. This article explores how to set the topic for this conference. The research results of this article can create a method for setting topics and help the government formulate science and technology policy. The research method of this paper was participant observation, which can help us collect various academic or policy materials on setting the net-zero emissions and sustainability topic by participating in the preliminary research process and reviewing the internal meeting documents. This study found that there were four stages to set the topic. The first stage was to set the topic. By using a literature survey method to analyze the *White Paper on Science and Technology (2023-2026)*, the previous *National Science and Technology Development Plan*, the Presidential Inaugural Address, and conclusions from the Executive Yuan's 2023 Technology Advisory Board Meeting, we can set topic preliminarily. The second stage was to adjust the topic framework by using in-depth interviews to consult experts from universities and research institutions individually. The third stage was to build consensus by using the focus group discussion (FGD) to host topic group meetings. The fourth stage was to complete the net-zero emissions and sustainability topic and strategies to submit to the 12th National Science and Technology Conference and drop the National Science and Technology Development Plan for 2025 to 2028.

Keywords: Net-zero Emissions and Sustainability; National Science and Technology Conference; Participant Observation; Fundamental Science and Technology Act; Focus Group Discussion

2-5
High performance infrared high-pass optical filter designed by multilayer thin-film stack

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Abstract

This paper describes the design and manufacture of a high performance infrared high-pass optical filter. We discuss the thin-film structure with SiH/SiON/…/SiON/SiH multilayer for the choice of suitable thickness and materials which multilayer is designed to coat on the silica glass substrate. The result in the figure shows a high performance resultof the designed infrared high-pass optical filter as the practical sample.

Keywords: Infrared, high-pass optical filter, thin-film.

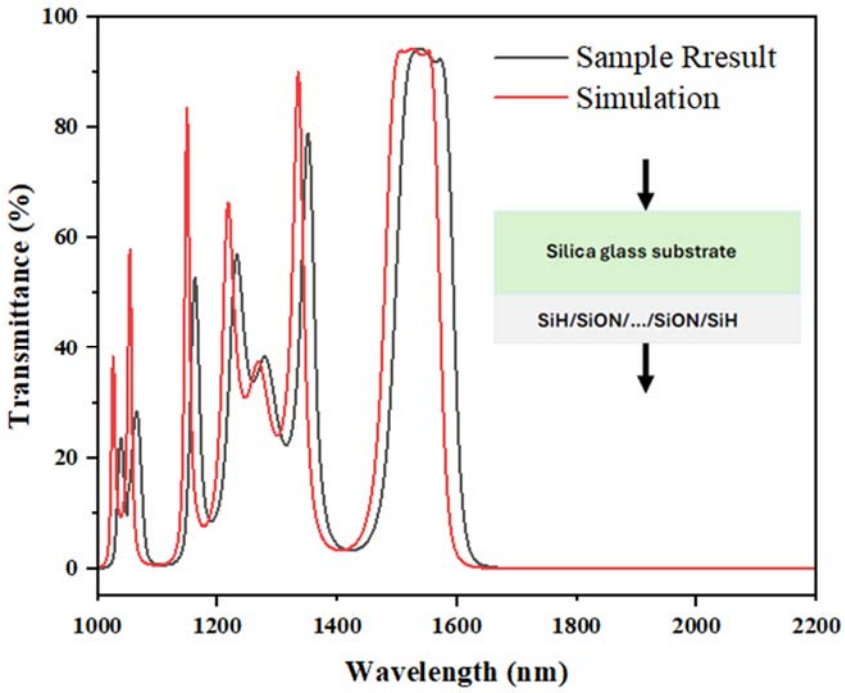

Fig. 1 The near-infrared high-pass transmittance ratio spectrum of simulation and sample measurement of the designed multilayer structure. The inset shows the structure of the designed sample.

2-6

Preventive Maintenance Planning for Carbon Emission Anomaly Warning

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Abstract

In modern production models, flow production systems are a common type of manufacturing system. Production scheduling is a crucial topic in such systems, as well-planned scheduling can maximize the overall efficiency of the manufacturing system. However, to ensure that production schedules are not disrupted by equipment failures, preventive maintenance planning becomes essential. Additionally, with global warming garnering increasing attention from major corporations, strict regulations have been imposed on carbon emissions in manufacturing systems. Equipment failure can not only be assessed through material quality but also by monitoring the carbon emissions generated by the equipment. Establishing a carbon emission warning mechanism allows for real-time monitoring of whether the manufacturing system's carbon emissions exceed regulations and whether equipment is malfunctioning. In practice, production scheduling and preventive maintenance often conflict with each other. Overemphasizing production capacity may lead to increased equipment failure rates and indirectly generate more carbon emissions. Conversely, focusing solely on equipment reliability and product quality may impact production capacity. Therefore, the establishment of a carbon emission warning mechanism becomes particularly important. This study uses FlEXSIM software to model and simulate a manufacturing system. When exploring production scheduling, it integrates management activities such as work-in-process inventory, product inspection, and preventive maintenance, while incorporating a carbon emission anomaly warning mechanism. A bi-objective mathematical model is developed, and the production scheduling decisions are optimized using the simulated annealing algorithm. Finally, an analysis of the carbon emission anomaly warning mechanism is conducted to enable adjustments to preventive maintenance planning.

Keywords: Carbon Emissions, Preventive Maintenance, Simulated Annealing Algorithm

2-7

Nonlinear Dynamics and Regime-Switching in Land-Economy Systems: A Structural Approach to Sustainable Development Under Environmental Uncertainty

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Abstract

This study addresses the pressing challenge of sustainable land management by introducing an innovative structural economic framework that bridges environmental dynamics with economic decision-making processes. We develop a multi-regime dynamic stochastic general equilibrium (DSGE) model, which incorporates land quality as a dynamic state variable and accounts for nonlinear interactions and regime-switching phenomena. The model is particularly relevant for understanding abrupt changes in ecosystem services under climate change.

Our framework makes several theoretical advancements. First, it captures the thresholds and discontinuities in land regeneration processes, which reflect irreversible environmental tipping points. This approach enables us to examine sudden shifts in ecosystem services as critical thresholds are breached, providing a nuanced understanding of regime transitions. Second, the model incorporates heterogeneous agents who face varying levels of access to land resources, constrained by financial limitations. This heterogeneity introduces complex distributional outcomes and highlights trade-offs between efficiency and equity in implementing sustainable land-use policies. Third, by employing global solution methods, including advanced approximation techniques and state estimation algorithms, we are able to explore multiple equilibria and dynamic transitions far from steady states. This approach is essential for designing robust policies in the face of potential critical environmental transitions.

Key findings reveal that traditional linear policy rules are inadequate as systems approach environmental thresholds. The interplay between financial constraints and environmental risks creates feedback loops that amplify vulnerabilities, particularly in resource-limited scenarios. Optimal policy interventions must be state-dependent, considering both the proximity to tipping points and the distributional impacts on heterogeneous agents. Our results emphasize the importance of adaptive, context-sensitive policies that balance environmental and socioeconomic objectives while leveraging technological advancements for monitoring and decision-making.

This research contributes to the ongoing discourse on sustainable development by advancing the theoretical understanding of nonlinear dynamics in coupled human-environmental systems. It also provides actionable insights for policymakers, particularly

in designing interventions that mitigate environmental risks while addressing equity considerations. The integration of smart technologies into monitoring frameworks underscores the relevance of this study to contemporary challenges in environmental governance and urban sustainability.

Keywords: Nonlinear Dynamics, Environmental Tipping Points, Sustainable Development, Land Resource Allocation

2-8
Realization of near-infrared low-pass optical filter based on thin-film multilayer structure

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Abstract

Thin-film multilayer optical filters play an important role in many optical sensing applications. The filtering function of a specific wavelength signal is very important for optical communication, image recording and control application. In some image sensing requires optical filters to reject background radiation which the wavelength is higher than the specific wavelength. The performance of optical filters is affected by the parameters of reflective index and thickness of the films. In this study, a practical study is done to show the effect of high performance low-pass optical filter.

Keywords: Near-infrared, optical filter, thin-film.

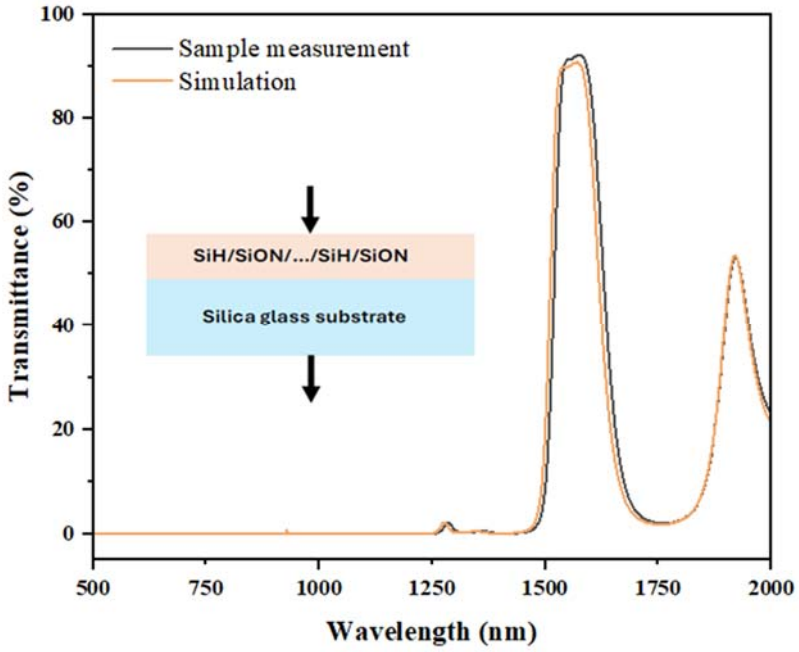

Fig. 1 The near-infrared low-pass transmittance ratio spectrum of simulation and sample measurement of the designed multilayer structure. The inset shows the structure of the designed sample.

2-9
Construction of Remaining Useful Life Prediction Models

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Abstract

Equipment aging or failure can lead to high maintenance costs, production interruptions, and operational losses, making preventive and predictive maintenance increasingly important. Predictive maintenance analyzes historical data and health indicators to estimate the Remaining Useful Life (RUL) of equipment, enabling proactive maintenance scheduling to avoid unexpected breakdowns. This study aims to maximize equipment lifespan, reduce failure rates and downtime losses through predictive maintenance, assess equipment health, diagnose failures using simulation data, and develop a RUL prediction model to optimize maintenance planning. The research is divided into two phases: developing the RUL prediction model and constructing an early warning mechanism. By simulating the operation of parallel machine systems and modeling machine vibration frequencies, the study builds and evaluates the RUL prediction model for accuracy. Techniques such as data normalization, standardization, and feature extraction are applied, with ANOVA used for feature selection. Logistic Regression (LR) and Support Vector Machine (SVM) are employed for training prediction models, and model accuracy is evaluated using a confusion matrix. Based on the prediction results, predictive maintenance analyses are conducted, and all data is integrated into a visualization interface to assist in quickly assessing equipment conditions and failure timings. Simulation data enables real-time monitoring of equipment health, predicting the timing of potential equipment failures or malfunctions based on historical data, and estimating RUL. ANOVA effectively identifies key features, and the machine learning models trained and validated with LR and SVM demonstrate high accuracy. This approach effectively predicts the timing of potential future equipment failures. Integrating this method with scheduling management could further stabilize equipment operation, significantly reducing downtime and failure risks, and greatly avoiding delays in order fulfillment caused by equipment shutdowns.

Keywords: Remaining Useful Life (RUL), Predictive Maintenance, Machine Learning, Visualized **Interface** System.

2-10
The Development of Platform for Facilitating Knowledge Management Lesson on the Topic of School Botanical Gardens in Prachuab Khirikhan Province

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Abstract

The objectives of this research project were: 1) to build, test and used a prototype of a platform for facilitating knowledge management lesson on the topic of school botanical gardens in Prachuapkhirikhan province; 2) to evaluate a prototype of a platform for facilitating knowledge management lesson on the topic of school botanical gardens in Prachuapkhirikhan province; and 3) to present a platform for facilitating knowledge management lesson on the topic of school botanical gardens in Prachuapkhirikhan province.This research is research and development. The sample group consisted of 35 administrators, teachers, students and those involved in the School Botanical Garden Project, Academic Year 2024, selected by a specific method, 30 experts. The research methodology was as follow: 1) design and development; 2) system quality assessment and evaluated by five experts; 3) tested by students over a three month period and research about satisfaction; and 4) efficiency improved by graduate students using interviewed techniques. Research instruments are questionnaires and interview guide.

The research results were as follows:1) the subjects were satisfying the prototype of a platform for facilitating knowledge management lesson on the topic of school botanical gardens in Prachuapkhirikhan province cause it was practical and not complicated and 2) the structure of this education platform consisted of a content web site, lecturer and students database, knowledge evaluation model, knowledge memorandum, web board, knowledge asset, document download and gallery. The process of platform based on dividing of process of knowledge management comprise: (1) Knowledge Identification;(2) Knowledge Acquisition; (3) Knowledge Creation and Exchange; (4) Knowledge Storage and Retrieval; and (5) Knowledge Transfer and Utilization. Moreover, the prototype can support the basic students and improves their skill performances.

Keywords: Knowledge Management, Platform for Facilitating, School Botanical Gardens

2-11

Willingness of Chinese Students to Participate in Thai Festival Base on Technology Acceptance Model

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Abstracts

This study explores the international students' cultural adaptation based on the technology acceptance model. And to explore the influencing factors of Chinese international students' willingness to participate in Thai traditional festivals. We recovered 498 questionnaires for the study of Chinese international students currently studying in Thailand, using convenience sampling method and distributing the questionnaires through the online platform Question star. The data analyses included descriptive statistical analyses, correlation analyses, and regression analysis. The results show that cultural adaptation and social needs are the main poppies for Chinese international students to participate in Thai traditional festivals, and perceived ease of use and perceived usefulness are not significantly affected. We provide lessons for cultural event planners and study abroad administrations in countries such as Thailand and suggests enhancing international students' sense of cultural adaptability and social interaction by optimizing the design of the events to facilitate their cultural adaptation process.

Keywords: Chinese students, Technology acceptance model, Cultural adaptation, Thai traditional festivals, willingness to participate

Section Three

Economy and Business

3-1

Supply Chain and Demand for Online Food Product Business After the COVID-19 Pandemic: A Study for the Creative Economy in Prachuap Khiri Khan Province

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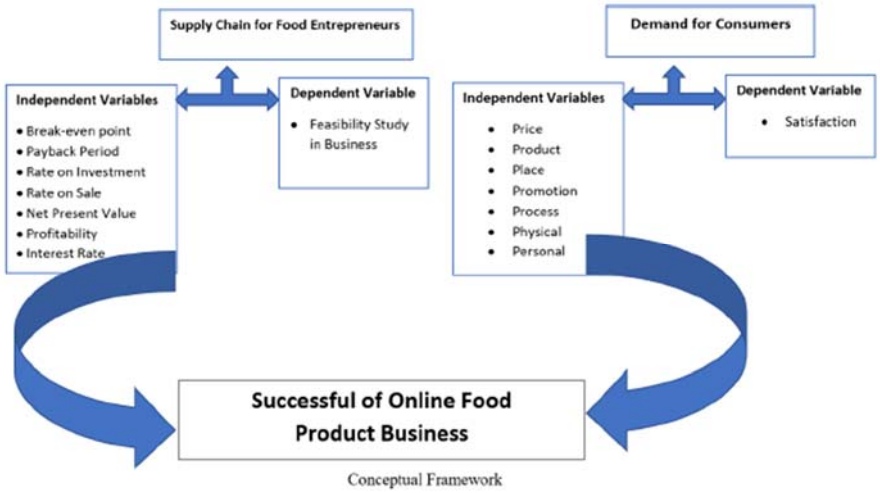
Abstract

This study explored the supply chain and demand dynamics of food product businesses in the post-COVID-19 era, focusing on feasibility and customer opinions in the urban creative economy of Thailand. The research involved 10 food entrepreneurs and 100 customers, utilizing questionnaires and interviews through a mixed-method approach. Key findings include: 1) Supply Side: A break-even point of 20,851 USD, a payback period of 1 year, a return on investment of 66.42%, a sales rate of 38.90%, and a net present value of 530 USD. 2) Profitability: A mean profitability score of 1.04 and an interest rate of 23.50%. 3) Demand Side: High overall opinion (mean score of 4.05 or 81%), with notable factors including effective use of online marketing (4.13 or 82.6%), the role of brand image in sales improvement (4.08 or 80%), employee and entrepreneurial characteristics for innovative marketing (4.06 or 81.2%), and the influence of location, promotion, pricing, and service processes on business success (4.00-4.03 or 80-80.6%). These findings underscore online marketing's potential as a transformative tool for urban food businesses in Thailand.

Keywords: Supply Chain, demand for online food product business, COVID-19, creative economy, Prachuap Khiri Khan province.



Conceptual Framework

3-2
Application of Virtual Reality Technology in Content Creation to Enhance Online Marketing Competitiveness of Community Products

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Abstract

Virtual reality (VR) technology is a crucial tool that can enhance online marketing for community enterprise products by effectively creating virtual shopping experiences. This research aims to develop VR content and evaluate user satisfaction using a 5-point scale assessment and open-ended questions. Data was collected from a sample of 400 internet users with online shopping experience. The research developed content on the Spatial.io platform by creating virtual space showcasing community enterprise products in an interactive 3D format. The environment simulates a game-like product exhibition booth where users can explore, present information through interactive infographics, and connect with e-commerce websites and social media platforms. The satisfaction assessment covered five aspects: information quality, perceived trust, perceived enjoyment, seamlessness, and purchase intention. All aspects were rated highly, with Perceived Enjoyment receiving the highest average score. Users suggested adding more video content and clearer product details. They also recommended implementing a tutorial system in the virtual space to accommodate users without gaming experience. This research lays the foundation for future development of VR e-commerce platforms for community products.

Keywords: Virtual Reality Technology, Community Products, Online Marketing

Figure 1: Virtual Reality Interface for Community Products Online Marketing

3-3
The Purchase Intention of Fenjiu Among College Students in Shanxi Province

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Abstract

This study employs the perceived value theory as its central framework to investigate the factors and mechanisms influencing college students' purchase intentions for Fenjiu in Shanxi Province. Data was collected from college students in Shanxi Province using a questionnaire survey, yielding 400 valid responses. A theoretical model encompassing five dimensions—functional, social, emotional, cognitive, and conditional values—was developed. Structural equation modeling (SEM) was utilized to examine the pathways through which perceived value affects purchase intention.

The results reveal that various dimensions of perceived value significantly impact college students' intentions to purchase Fenjiu. Emotional, social, and conditional values are direct drivers of purchase intention, whereas functional and cognitive values exert an indirect influence mediated by consumer satisfaction.

This study offers theoretical insights and practical strategies for Fenjiu to expand its presence among young consumers, emphasizing the significance of emotional value and cultural communication in brand promotion. The study recommends that Fenjiu focuses on fostering emotional connections with young consumers in its marketing strategies. By integrating cultural heritage with innovative communication strategies, the brand can establish cultural symbols and address the functional, social, and emotional needs of college student consumers. Through integrated value delivery and targeted marketing, Fenjiu can enhance young consumers' brand identity and purchase intentions while fostering the preservation and modernization of traditional Chinese liquor culture.

Keywords: Perceived Value, Purchase Intention, Shanxi Fenjiu, College Students, Structural Equation Modeling

3-4
Purchase intention of Fenjiu among elderly consumers in Shanxi Province

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Abstract

This study uses the perceived value theory as the core framework to deeply explore the factors and mechanisms that influence the purchase intention of elderly consumers in Shanxi Province. The research subjects are elderly consumers in Shanxi Province. The questionnaire survey method collects data, and 400 valid samples are finally obtained. Combining the unique needs and behavior patterns of the elderly consumer group, this study constructs a theoretical model of five **dimensions**: functional Value, Social Value, Emotional Value, cognitive Value, and conditional Value, and combines the structural equation model (SEM) to analyze the impact path of perceived value on purchase intention and purchase behavior.

The results show that different perceived value dimensions significantly impact the purchase intention and purchase behavior of elderly consumers of Fenjiu. Among them, emotional Value, Social Value, and conditional Value play a direct and key role in promoting purchase intention, while functional Value and cognitive Value indirectly affect purchase intention through the mediating variable of consumer satisfaction.

This study provides a theoretical basis and practical guidance for the Fenjiu brand to explore the elderly consumer market, highlighting the importance of emotional value and cultural communication in brand promotion. It is suggested that the Fenjiu brand should pay attention to the emotional connection with elderly consumers, emphasize health and wellness elements, inherit and innovate liquor culture, and meet the needs of elderly consumers in terms of functional, social, emotional, and other multi-dimensional values in the marketing process. Through multi-level value integration and precision marketing, the Fenjiu brand can not only enhance the brand recognition and purchase intention of elderly consumers but also further promote the inheritance and modernization of traditional liquor culture.

Keywords: perceived value, purchase **intention**, Shanxi Fenjiu, elderly consumers, structural equation model

Section Four

Management

4-1

Analysis Servant Leadership Influences Employee Turnover Intention: Based on the Psychological Contract, Organizational Commitment and Employee Satisfaction

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Abstract

The purpose of this study is to examine how Servant Leadership (SL) influences employees' turnover intention (TI) through Psychological Contract（PC）, Organizational Commitment (OC and Employee Satisfaction (ES). Turnover Intention. Servant leadership, as a leadership style centered on serving others and focusing on employee growth and well-being, has received increasing attention in organizational management. However, its specific mechanism of action on employee psychology and behavior still needs to be further clarified.

Using an empirical analysis method, the study constructed an influence path model based on questionnaire data from 400 employees of the Industrial and Commercial Bank of China (ICBC) to examine the association between servant leadership behaviors on perceived psychological contract fulfillment, organizational commitment, employee satisfaction, and turnover intention.

This study provides important insights into corporate management practices. Leaders should adopt a servant leadership style to effectively reduce employee turnover by strengthening the trust relationship with employees, honoring the psychological contract, and focusing on employee satisfaction. Future research can further examine the influence of the mechanisms in different cultural contexts to enhance the generalizability and practical value of the theory.

Keywords: Servant Leadership, Psychological Contract, Organizational Commitment, Employee Satisfaction, Turnover Intention.

4-2
Sustainability of Factors for Purchase Intention in Business Environment

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ABSTRACT

The objective of this study was to investigate what factors of innovativeness, management strategies, novelty in products, novel business model, reference value will contribute to purchase intention. Path analyses were conducted to show the impact of different factors.

Although the technology-acceptance model has been widely accepted in research of e-commerce topics, the present study went beyond technology and targeted other factors that might have dramatic influence on online shoppers purchasing intention as well. Based on an extensive literature review, data mining analysis, a set of quantitative surveys and in-depth interviews with the senior managers working with e-commerce companies, a conceptual model and a number of hypotheses were proposed. Both were instrumental to a comparative analysis among e-business companies. The SEM (structural equation modeling) and factor analyses were adopted for empirical and statistical analyses. The results showed positive correlations among factors indicated a great influence of innovative performance in different areas of management strategies on purchase intention; also demonstrated the great impact from the awareness of sustainability development in e-commerce companies. This report was intended to determine what factors affect online shoppers intentions in the e-business environment and to verify how organizations internal and external dynamics may underlie the success of e-commerce companies. These results provide insight on how e-business companies can improve their performance and win in fierce competition.

Keywords: Sustainability, e-commerce, innovativeness, management strategies, data mining, purchase intention, e-business, SEM.

4-3

A Study on Female Leadership Styles, Job Burnout, and Turnover Intention

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Abstract

This study examined the leadership styles of female leaders across various industries. While previous studies have highlighted a significant relationship between subordinates' perceptions of their supervisors' leadership styles and their own experiences of job burnout, limited research has investigated the impact of supervisors' leadership styles on their own emotional labor and job burnout. This study hypothesized a significant association between leadership style, job burnout, and emotional exhaustion.

The findings showed that factors such as income, marital status, and industry type significantly affect family pressure, job burnout, and emotional exhaustion. Transformational leadership traits, including intellectual stimulation and inspirational motivation, were strong predictors of turnover intention. Additionally, job burnout and family pressure were shown to have substantial impacts. In contrast, transactional leadership styles, such as contingent rewards and management by exception, demonstrated no significant correlation with turnover intention.

Keywords: female, leadership styles, job burnout, turnover intention

Section Five

Economy and Business

5-1
The study of the Toddy Palm Learning Center for the development and promotion of creative tourism of Tham-Rong community in Ban Lat District, Phetchaburi Province

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Abstract

This research was conducted to 1) investigate the local wisdom and creative tourism. 2) develop added value for Toddy palm learning center with tourism route. and 3) test and evaluate the tourist activities, and routes for promoting the creative tourism of Tham-Rong community. For the qualitative data, the target group purposively selected consisted of entrepreneurs, leaders, folk philosophers for 25 persons. The research instruments were in- depth interviewing and after that data was analyzed with the technique of content analysis. For the quantitative data, the participants were Thai tourists. The instruments were evaluated with the questionnaire of the tourist satisfaction. The analyzed data was presented into percentage, mean, standard deviation. The results were found that: 1) The local wisdom of toddy palm learning center and the creative tourism were accepted by the participants. The target group demanded the toddy palm learning center be created to suite the properties of tourist activities and tourism route to present and honor the wisdom of ancestors through activities that reflect the way of life of the toddy palm farmers in Tham-Rong community. 2) The development and added value of toddy palm learning center consisted of Attractions, which are related to local wisdom, traditional lifestyles, and occupations. Accessibility is accessible through convenient and safe to access private vehicles. Amenities, there are complete and sufficient standards. Activities can accommodate tourists for one day trips. Administration has been planned and managed by local leaders, relevant agencies, and community participation. The tourists were also satisfied at a high level. 3) From the testing and evaluation of tourist routes of toddy palm learning center, the tourists were satisfied with the activities at a high level. This study found that tourists require Tham-Rong community to have the tourism routes of local community activities and products. The tourism route called “Toddy Palm's first impression of love” should be publicized, informed, and disseminated for the tourists. The selling points should have the local foods, tourist activities and souvenirs that have outstanding identity and are different from the general goods and these should be offered and distributed for the customers to buy more easily at toddy palm learning center.

Keywords: Toddy Palm Learning center, The Development of creative tourism.

5-2
Studying user satisfaction with metaverse tourism experiences and community engagement

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Abstract

Metaverse tourism emphasizes the development of a spatial virtual environment to enhance tourists' experiences of a destination. It can convert virtual engagement into tangible visits and interactions. This study aims to examine user satisfaction regarding metaverse tourism experiences and community involvement. The study employed the spatial website to create metaverse media and an online questionnaire designed according to the Technology Acceptance Model (TAM) framework. Descriptive statistics were employed to analyze data from a sample of 400 participants. This study's results indicated that users exhibited the greatest satisfaction with metaverse tourism adoption, followed by perceived enjoyment and perceived usefulness, respectively. Our findings suggest that metaverse tourism promotion and community engagement must prioritize these topics to enhance tourists' experiences and bolster the sustainability of tourism resources and communities.

Keywords: Metaverse, Tourism experiences, Community engagement, Satisfaction.

Fig. Metaverse tourism usage screen.

5-3

Developing innovations to introduce community tourist attractions in a virtual world format using metaverse technology

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Abstract

Today's changing lifestyle and behavior of tourists has led to the application of digital platform technology to tourism, making travel methods and travel planning more convenient and modern. This research aims to 1) develop innovative community tourist attraction introduction media in a virtual world format through metaverse technology and 2) assess user satisfaction with innovative community tourist attraction introduction media. The sample group consisted of 400 tourists. The research instruments included innovative media for introducing community tourist attractions in a virtual world format and a satisfaction assessment questionnaire. Data was collected online via Google Forms and analyzed using SPSS software to calculate the mean, percentage, and standard deviation.

The study results showed that the innovative media introducing community tourist attractions effectively presents information on local attractions, souvenir shops, restaurants, and cafes in a comprehensive manner. This information is displayed in a virtual world format via metaverse technology, which is easily accessible and allows for realistic interaction with the virtual environment. The results of the evaluation of tourist satisfaction with the overall presentation of information were at the highest level, with an average score ($\bar{x}$) of 4.65. The aspect with the highest satisfaction was the presentation format, with an average score ($\bar{x}$) of 4.63.

Keywords: community tourism, spatial tourism, virtual world, metaverse, tourism innovation.

5-4
Exploring Development Trends of Yunnan Coffee Shops: A Latent Dirichlet Allocation (LDA) Approach to Consumer Reviews

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Abstract

In recent years, Yunnan coffee has gained increasing recognition in Chinasspecialty coffee market, attracting widespread consumer interest and driving the growth of local coffee shops. With the rapid expansion of digital platforms, consumer-generated content has become a crucial factor in shaping market trends and influencing purchasing decisions. This study aims to 1) To analyze reviews and social media content to identify key themes and topics related to Yunnan coffee shops. 2) To investigate customer perceptions, preferences, and sentiments. 3) To explore the development trends and challenges faced by Yunnan coffee shops.

To achieve these objectives, this research employs Latent Dirichlet Allocation (LDA) topic modeling and sentiment analysis to extract and interpret data from leading digital platforms, including Douyin and Xiaohongshu. The results reveal that consumer discussions primarily revolve around four key themes: regional coffee culture and consumer experiences, coffee varieties and influencer perspectives, production and supply chain aspects, and market trends with branding strategies. Sentiment analysis indicates that 64.5% of consumer opinions are positive, while 26.0% are negative, reflecting both enthusiasm for Yunnan coffee’s unique quality and cultural identity as well as concerns regarding pricing, service inconsistencies, and brand positioning.

This study contributes to consumer behavior and eWOM research by demonstrating how digital engagement influences perceptions of regional specialty coffee. Practically, the findings offer valuable insights for coffee shop owners, marketers, and policymakers in enhancing service quality, branding, and sustainable business strategies. Despite its contributions, this study is limited by platform-specific data and the absence of longitudinal analysis, suggesting the need for future research incorporating broader datasets and comparative studies with other specialty coffee markets. Ultimately, this research provides a data-driven foundation for advancing Yunnan’s coffee industry and strengthening its position in the global specialty coffee sector..

Keywords: Yunnan coffee shops, consumer reviews, Latent Dirichlet Allocation topic modeling, sentiment analysis.

5-5

The study of the Toddy Palm Learning Center for the development and promotion of creative tourism of Tham-Rong community in Ban Lat District, Phetchaburi Province

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Abstract

This research was conducted to 1) investigate the local wisdom and creative tourism. 2) develop added value for Toddy palm learning center with tourism route. and 3) test and evaluate the tourist activities, and routes for promoting the creative tourism of Tham-Rong community. For the qualitative data, the target group purposively selected consisted of entrepreneurs, leaders, folk philosophers for 25 persons. The research instruments were in- depth interviewing and after that data was analyzed with the technique of content analysis. For the quantitative data, the participants were Thai tourists. The instruments were evaluated with the questionnaire of tourist satisfaction. The analyzed data was presented into percentage, mean, standard deviation. The results were found that: 1) The local wisdom of toddy palm learning center and creative tourism were accepted by the participants. The target group demanded the toddy palm learning center be created to suit the properties of tourist activities and tourism route to present and honor the wisdom of ancestors through activities that reflect the way of life of the toddy palm farmers in Tham-Rong community. 2) The development and added value of toddy palm learning center consisted of Attractions, which are related to local wisdom, traditional lifestyles, and occupations. Accessibility is accessible through convenient and safe to access private vehicles. Amenities, there are complete and sufficient standards. Activities can accommodate tourists for one day trips. Administration has been planned and managed by local leaders, relevant agencies, and community participation. The tourists were also satisfied at a high level. 3) From the testing and evaluation of tourist routes of toddy palm learning center, the tourists were satisfied with the activities at a high level. This study found that tourists require Tham-Rong community to have the tourism routes of local community activities and products. The tourism route called “Toddy Palm's first impression of love” should be publicized, informed, and disseminated for the tourists. The selling points should have the local foods, tourist activities and souvenirs that have outstanding identity and are different from the general goods and these should be offered and distributed for the customers to buy more easily at toddy palm learning center.

Keywords: Toddy Palm Learning center, Development of creative tourism.

Section Six

Tourism Industry

6-1
The relationship between gamers' motivation to engage with particular video game genres and their sexual orientation and gender identity

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Abstract

The hot issue in the video game industry revolves around the controversy regarding whether the customization of game avatars for diversity is appropriate for any genre of video games, particularly in motivating gameplay. Video games are a form of entertainment media that encompasses various genres for consumer enjoyment. Popular genres of mainstream video games include action games, massively multiplayer online role-playing games (MMORPG), and simulation games. This research aims to identify how video game genres are related to the motivation for sexual orientation and gender identity (SOGI) among gamers and how biological sex and gender are connected to avatar customization. Data was collected from 420 anonymous participants through an online questionnaire distributed via social media platforms such as Facebook, Line, and Discord. The results of the chi-square analysis indicate that video game genres are associated with motivations for gameplay related to entertainment, gender identity, and sexual orientation. The findings reveal that gamers who prioritize SOGI motivations are represented across all genres. Additionally, sex and gender are associated with video game genres, though the relationships differ between biological sex and gender. The gender of the avatar is also related to the gamer's sex and gender. Statistics show that female gamers are the most associated with selecting LGBTQ-related avatar genders.

Based on the patterns observed in this research, it is recommended that developers consider incorporating avatar customization features tailored to specific video game genres. Particular attention should be given to avatar gender to align with the preferences of target audiences.

Keywords: Video game, Video game genres, Avatar, SOGI

6-2
Potential of Artificial Intelligence Generated Content Technology in Character Design for Picture Books

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Abstract
In recent years, artificial intelligence-generated content technology (AIGCT) has advanced rapidly, with the potential to revolutionize modern graphic design, transform creative processes, and expand the scope of designers' work. This study leverages the Stable Diffusion (SD) platform to explore character design in picture books, offering practical guidance for creators and demonstrating its potential. We also assessed how this technology can streamline graphic design workflows, boost productivity, and enhance the creative process of crafting characters to bring stories to life. The results from using the SD platform to design characters revealed that it significantly improves efficiency while empowering creative professionals with greater diversity and imagination. This opens exciting possibilities for digital graphic designers to innovate in their craft. To evaluate the application of AI-generated image technology, five key indicators of image design acceptance for picture books were established: (1) visual appeal, (2) character characteristics, (3) emotional expression, (4) consistency and coherence, and (5) functionality of the characters. Feedback from three industry experts showed a slight difference in acceptance between male and female protagonist designs, but overall, the responses were consistently positive. The findings emphasize that, while AIGCT offers immense opportunities, retaining the unique value and creativity of human designers remains essential. To ensure their continued relevance, graphic designers are encouraged to become proficient in AI tools and strike a balance between leveraging technology and preserving artistic creativity.
Keywords: Artificial Intelligence generated content technology (AIGCT), Picture book design, Visual element, Stable diffusion platform, Image design acceptance

6-3
Video Clip: “Digital Painting from Murals of Ubosot Wat Prasat”

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Abstract

This article aims to present an analysis and interpretation of findings from the study of mural paintings in the Ubosot at Wat Prasat, Nonthaburi Province. It also evaluates audience feedback on the video clip titled 'Digital Painting from Murals of Ubosot Wat Prasat,' which was developed based on these findings.

The murals, believed to date back to the late middle Ayutthaya period, represent not only the oldest and most historically significant artworks in Nonthaburi Province but also Thailand's rich cultural and religious heritage. Unfortunately, these murals have suffered significant deterioration over time.

This study employed a digital reconstruction process to revive six selected Jataka tales: Suvanna Sama Jataka, Nemiraja Jataka, Mahosadha Jataka, Brahmanaraja Jataka, Vidhura Pandita Jataka, and Vessantara Jataka—making them more accessible and engaging for contemporary audiences. Feedback on the video clip highlighted a high level of viewer satisfaction in all aspects, with respondents recognizing its contribution to promoting Buddhist knowledge and raising awareness about the importance of preserving ancient mural art.

Keywords: Digital Painting, Video Clip, Mural Paintings, Wat Prasat.

6-4
Exploring Wartime Art and Overseas Chinese Patriotism from the Nanyang Perspective

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Abstract

This study explores the patriotic contributions of renowned Chinese artist Ong Schan-Tchow (his pseudonym also known as Yung Len-Kwui) (1900–1945) during the Second Sino-Japanese War, with a particular focus on his efforts in Nanyang (Southeast Asia), especially in Singapore and Malaya. Ong Schan-Tchow contributed his paintings to art exhibitions organized by local Overseas Chinese relief committees, raising funds for the war effort and providing crucial aid to countless Chinese victims and wounded soldiers affected by the conflict. As an artist who skillfully blended traditional Chinese and Western painting techniques, Ong not only achieved remarkable success in the art world but also utilized his art as a vital medium for fundraising during a period of national crisis. His exhibitions transcended cultural and geographical boundaries, demonstrating the unique role of art in addressing urgent social and national needs during wartime.

This study delves into the life and artistic achievements of Ong Schan-Tchow, focusing on his dual identity as both an artist and a patriot after his arrival in Nanyang. It examines how he utilized art exhibitions to mobilize social resources, inspire a sense of national identity among the Nanyang Chinese community, and raise funds for China's war effort through art exhibitions and sales organized by local Overseas Chinese relief committees. The research involves compiling and analyzing statistics on the various fundraising art exhibitions he participated in across Singapore and Malaya, assessing the number of events, their impact, and the total amount of funds raised. This study reveals the significance of Ong's use of art as a patriotic medium during wartime and his profound influence on the cultural identity and emotional solidarity of the Nanyang Chinese community.

This study uses a multidisciplinary approach, including fieldwork, literature review, archival research, and artwork analysis. It explores the connection between art and patriotism, revealing Ong Schan-Tchow's significant influence on wartime Chinese society and the Nanyang Chinese community. The study also examines how art served as a powerful force for social change during times of war and turmoil.

Keywords: Ong Schan-Tchow, Second Sino-Japanese War, art and patriotism, Malaya, Singapore, Nanyang Overseas Chinese.

6-5
Development and Production of Interactive Videos for Laboratory Safety Education in Chemistry

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Abstract

This study aims to develop and design chemistry laboratory safety videos that engage students and teach them important safety skills. The videos were produced using Adobe Premiere Pro and Adobe Photoshop and are easily accessible on YouTube via computers, tablets, and mobile phones. Quality assessments by experts in video production and a chemistry lecturer gave the videos a positive rating, with an average score of 4.40 (SD = 0.14). Additionally, 90 first-year undergraduate students enrolled in a chemistry laboratory class at Rajamangala University of Technology Rattanakosin evaluated the videos, giving an average score of 4.42 (SD = 0.41). The results indicate that the videos are feasible and ready for use after incorporating feedback from experts and students. Furthermore, the evaluations show that the interactive videos effectively improve students' awareness of safety and their preparation for laboratory work.

Keywords: learning technologies, laboratory safety, online video, chemistry laboratory

6-6
A Study of Graduate Students' Satisfaction in the Educational Administration Innovation Program Towards English Development for Academic Communication Using ChatGPT

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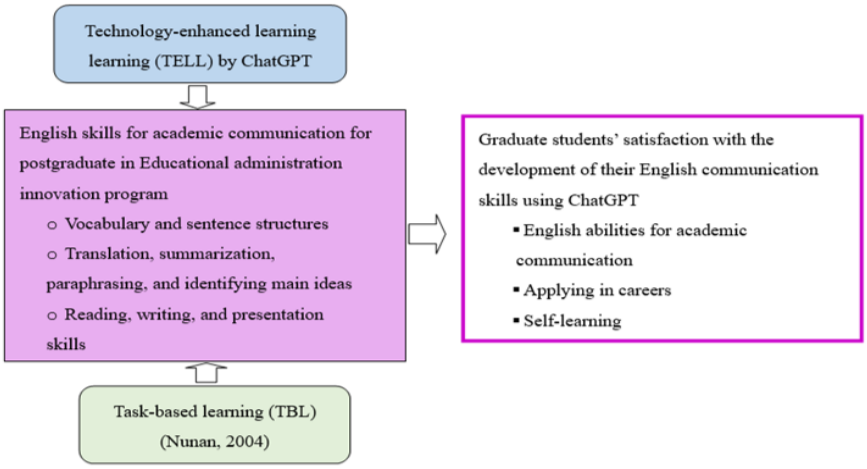
Abstract

This study examined the satisfaction of graduate students in the Educational Administration Innovation Program at RMUTR with using ChatGPT to enhance their English communication skills. Conducted with 89 participants enrolled in the Academic English for Educational Administrators (RED8002) online course during the 2024 academic year, the research utilized questionnaires and descriptive statistical analysis. The results revealed a very high overall satisfaction level, with an average score of 4.60 (91.99%) categorized into three aspects: a mean score of 4.60 (92.81%) indicated effective use of ChatGPT for self-directed learning, understanding research articles, and participating in blended learning, a mean score of 4.60 (91.82%) reported improved skills in summarizing articles, extracting research insights, expanding vocabulary, and confidently presenting research, and a mean score of 4.59 (91.35%) highlighted ChatGPT's role in advancing careers, such as excelling in English assessments and designing educational materials. The findings highlight ChatGPT's potential as a versatile and accessible tool for language learning and professional development.

Keywords: Graduate students, Educational administration innovation program, satisfaction, English development for academic communication, ChatGPT



Conceptual framework

6-7

Enhancing Lifelong Learning: A Case Study on English Reading and Vocabulary Instruction in Continuing Education

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Abstract

Lifelong learning, a core objective of the United Nations' Sustainable Development Goals (SDGs), has gained increasing attention in higher education, as evidenced by the growing enrollment in continuing education programs. (Taiwan's 2021 Adult Education Survey, 2021). However, adult learners in these programs typically represent a wide age spectrum and diverse backgrounds, posing significant challenges in addressing their heterogeneous learning needs and styles. This study examines an English Reading and Vocabulary course, with 48 participants, offered as part of a continuing education initiative at a university of science and technology in Central Taiwan. Data was collect through informative & summative assessments and survey. Grounded in the principles of andragogy, the course employed a multimodal instructional approach incorporating multimedia resources, online learning platforms, and collaborative activities to enhance engagement and learning outcomes. Central to the pedagogy was the integration of mind mapping, which facilitated the visual organization and interconnection of vocabulary and reading concepts, thereby improving reading comprehension and vocabulary retention. The curriculum emphasized essential reading strategies, including skimming, scanning, contextual inference, and visualization, to foster English literacy skills. Participants engaged in thematic reading tasks and targeted vocabulary exercises designed to promote sustainable language proficiency. The findings revealed significant improvements in students' reading competencies, persistence in learning, and application of vocabulary in diverse contexts, highlighting the efficacy of the course design in addressing the learning needs of adult learners in continuing education settings.

Keywords: Sustainable Development Goals (SDGs), Lifelong Learning, English Learning Strategies, Andragogy

6-8
Avant Garde of SDGs Practitioner in Sarah Orne Jewett's *A White Heron*

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Abstract

A meeting was held at the United Nations Headquarters in New York from September 25 to 27, 2015, to decide on new global sustainable development goals. The meeting adopted a historic decision to formulate a set of comprehensive, far-reaching, people-centered universal and transformative goals and targets, and committed to making unremitting efforts to fully implement this agenda by 2030. These goals are the SDGs.

In *A White Heron*, Sylvia, a nine-year-old girl lives with her grandmother in the peaceful and harmonious countryside when a young hunter suddenly comes into her life. The stranger wants her to reveal where he can find the white heron he wants to shoot and add to his collection. Jewett uses the contrast of a young country girl to that of a higher-class hunter in order to demonstrate the significance of living as one with nature and the human foolishness of assuming that nature exists solely for their own benefit. *A White Heron* glorifies nature and portrays wildlife as having an intrinsic value independent from that of what humans use it for.

Sarah Orne Jewett spoke up for more equal rights in her male-dominated society in late 19th century. It was time when women wanted more than domesticity, submissiveness and innocence. The late 19th century brought many new opportunities for women in the United States and Sarah Orne Jewett took advantage of them. In *A White Heron*, we can say Sylvia is simply the embodiment of Jewett.

In the proposed project, I will use SDGs theory to explore why Sylvia in Sarah Orne Jewett's *A White Heron* can be said to be the avant garde practitioner of SDGs Goal 5 and Goal 15.

Keywords: heron, gender equality, sustainable, terrestrial ecosystems, SDGs.

6-9
Taking Taiwan as an example to view the impact of the 'Decontextualized modern urban planning' paradigm

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Abstract

The mainstream urban planning theories in various countries have been based on 'modernization' and 'national development theory'. For a hundred years after industrialization in Europe and the United States, this planning theory approach has been the main guide to the development of urban planning. Even though the preservation of historic sites and cultural perspectives have gradually gotten more attention, urban planning and architectural design under the trend of modernization have always been moving toward the trend of 'decontextualization'. This not only aligns with globalization and the rise of 'world cities', but also easily integrates with 'futurization', 'low-carbon sustainability' and 'AI', which are becoming the next main waves of urban planning theory. However, while the value of 'cultural heritage' is getting more and more attention, the ongoing construction of 'planning theory' from the viewpoint of 'preservation and reuse of cultural assets' to 'perspective of historical, geographical and cultural connotation' or 'oriental cultural perspective' has not yet received enough attention. This deficiency is related to the century-old construction of 'urban planning theory' that relies on decontextualization.

This article explores the origins of the 'Athens Charter' (proposed in 1933, published in 1943), which had a decisive influence on the 'theoretical construction of modern urban planning'; and then analyzes its subsequent deep impact upon Taiwan.

Keywords: Urban planning theories, Athens Charter, Modernization, Decontextualization, Cultural heritage

6-10
The Strategic Management of University Students Volunteer Service Practices under the Perspective of Three-Complete Education in Luoyang Normal University, Henan Province

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Abstract

This study examines Luoyang Normal University in Henan Province as a case example to explore the strategic management of university student volunteer services under the perspective of the "Three-Complete Education" model. The purpose of this research is to analyze the current situation of volunteer service management, identify the challenges faced in the process, and propose feasible suggestions for improving management, thereby providing a systematic strategic management framework for university volunteer services. The paper first outlines the importance of volunteer service in higher education, emphasizing its value in cultivating students' sense of social responsibility, innovative spirit, and practical abilities. Next, through literature review, theoretical analysis, and questionnaire surveys, this study explores the theoretical foundations of strategic management in volunteer services, covering relevant theoretical frameworks such as Maslow's Hierarchy of Needs and the theory of integrating education with social practice. The research adopts a quantitative method to investigate the volunteer service participation of students at Luoyang Normal University across different grade levels. Data analysis shows that while universities have taken certain measures to promote volunteer service, there are still deficiencies in the management system, resource allocation, feedback mechanisms, and long-term planning. Based on the findings, this study proposes several suggestions for improving the management of volunteer services under the "Three-Complete Education" perspective, including strengthening resource integration, optimizing processes, and promoting full faculty involvement. These suggestions will not only enhance the educational impact of volunteer services but also contribute to social harmony and development. The results of this study hold significant theoretical and practical value for the strategic management of volunteer services in Chinese universities.

Keywords: University Students Volunteer Service Practices, Three-Complete Education, Strategic Management, Luoyang Normal University

Section Seven

Other Related Topics

7-1
Implement of Drone flight teaching by using Digital Materials and teaching aids through action research

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Abstract

Using educational instructional strategies, at the beginning of the semester, a pre-test on drone regulations was administered to the students in the class, and the first quiz was used as a post-test. The average score for the pre-test in Class C was 85.2, while in Class D, it was 78.1, indicating that the students had a preliminary understanding of drone regulations. This course included three activities: in addition to inviting professionals to deliver lectures (2nd and 4th activities), we also guided students in the indoor flight simulation as well as the indoor micro-drone flying (3rd activity), and outdoor flying. For each activity, a post-event questionnaire was provided. The test and questionnaire results are shown in the figure below. The highest scores occurred in the 3rd activity. The scores are generally increasing.

Keywords: Action research, Questionnaire Survey, Drone.

7-2

Impact of Sustainability in the Quality Improvement of Medical Device

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Abstract

There is a growing market for sustainable products and services. Environmental sustainability is not simply a matter of compliance or only risk management. More than 200,000 people died each year due to medical device errors that could be prevented. Medical devices have become extremely complex, due to the high technology era, where the use of sophisticated devices is a challenge. While beneficial to physicians and patients, the complexity comes with human cost, namely increasing the number of patient death and injury that are attribute to medical device fatalities. Devices risk reduction can be accomplished by addressing device flaws during the quality design at early development phase, with the guidelines of FDA 21 CFR 820.30 and ISO 14971 and monitor throughout life cycle of the device in development. This study analyzes medical device errors due to inappropriate quality design and solutions to detect and correct errors before market. The research implements an effective method of manufacturing and delivering safe, quality and reliable medical device to end-user by methods introduced.

Keywords: sustainability, medical device, ISO, quality, reliability, validation, health care.

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