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Proceedings of the International Conference on Emerging Trends in Business, Technology, and Sustainable Development

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Dr. Sennay Ghebreab

"International Scientific Research Conference" is a platform that thrives to support the worldwide scholarly community to analyze the role played by the multidisciplinary innovations for the betterment of human societies. It also encourages academicians, practitioners, scientists, and scholars from various disciplines to come together and share their ideas about how they can make all the disciplines interact in an innovative way and to sort out the way to minimize the effect of challenges faced by the society. All the research work presented in this conference is truly exceptional, promising, and effective. These researches are designed to target the challenges that are faced by various sub-domains of the Society for Business, Economics, Social Science & Humanities, Society for Engineering & Technology, Computer, Basic & Applied Sciences, Medical, Medicine & Health Sciences.

I would like to thank our honorable scientific and review committee for giving their precious time to the review process covering the papers presented in this conference. I am also highly obliged to the participants for being a part of our efforts to promote knowledge sharing and learning. We as scholars make an integral part of the leading educated class of the society that is responsible for benefitting the society with their knowledge. Let's get over all sorts of discrimination and take a look at the wider picture. Let's work together for the welfare of humanity for making the world a harmonious place to live and making it flourish in every aspect. Stay blessed.

Thank you.

Dr. Sennay Ghebreab
Conference Secretariat

TRACK A

BUSINESS, MANAGEMENT AND ECONOMICS STUDIES

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THE APPLICATION OF CHATBOTS IN CAMPUS MENTAL HEALTH COUNSELING: A LITERATURE REVIEW ON THE COMPATIBILITY OF DIFFERENT COUNSELING THEORIES

Ya-Ping Shih*
Division of Psychology, Department of Education, National Chengchi University, Taiwan
Corresponding Email: appleruths@gmail.com

The application of AI chatbots in campus mental health counseling has garnered attention due to their accessibility and cost-effectiveness. This paper examines the adaptability of four counseling theories in this context. Literature suggests that Cognitive Behavioral Therapy (CBT) and Solution-Focused Brief Therapy (SFBT), due to their structured nature, are well-suited for integration with AI. CBT's cognitive restructuring effectively reduces student anxiety, while SFBT's miracle question enhances stress management skills. Humanistic therapy faces limitations in AI applications due to challenges in simulating empathy. Psychodynamic and Gestalt therapies, which focus on unconscious exploration and in-the-moment dynamics, are primarily suitable for supplementary roles. Additionally, campus require AI to possess cultural adaptability and crisis intervention capabilities. Future directions include deepening the application of CBT and SFBT, exploring reflective techniques in humanistic therapy, developing supportive psychodynamic tools, enhancing multilingual support and crisis referral mechanisms, and validating efficacy through campus-specific trials. AI must collaborate with campus counseling centers to ensure privacy and therapeutic effectiveness, serving as a supplementary resource for student mental health.

Keywords: Campus Counseling, AI-based Conversation, CBT, SFBT

LEADERSHIP, MANAGEMENT, AND GOVERNANCE IN TAIWAN'S EXPERIMENTAL EDUCATION: A SYSTEMATIC REVIEW OF EMPIRICAL RESEARCH (2014-2024)

Hsu Ya-Chung[1*], Wu Ya-Fen[2], Chao Hui-Ju[3]

[1]PhD Student and Principal, Taipei Municipal Minquan Junior High School, Taiwan
[2]PhD Student and Principal, Da-Chu Elementary School, Taoyuan City, Taiwan
[3]PhD Student and Specialist, Department of Higher Education, Ministry of Education, Taiwan

Corresponding Email: 112152504@g.nccu.edu.tw

Following the implementation of Taiwan's three Experimental Education Acts in 2014, research has primarily used case studies and qualitative methods, offering insights into leadership, management, and governance. This study systematically reviews empirical research on these aspects from 2014 to 2024. Using keywords such as "experimental education," "leadership," "management," "governance," and "empirical research," 202 publications were screened with Cochrane, PRISMA, ENTREQ, and MMAT tools. Fifty-seven studies met inclusion criteria (49 qualitative, 7 quantitative, 1 mixed-methods). The review examines: development trends and research methods; key findings and recommendations; MMAT-based quality assessments; and how research topics have changed and what this means for practice, policy, and future research. Results show leadership research focuses on principals' vision and school culture; management emphasizes flexible systems, teacher communities, and curriculum integration; governance centers on stakeholder participation, decision transparency, and public governance models. Most studies are medium to high quality but require improvement in transparency, validity, reliability, and data integration. Research themes have shifted from school establishment and leadership to system design, governance, and community involvement. This reflects evolving policy and practical needs. Future efforts should adopt integrated leadership, professional support, and public governance for sustainability and quality.

Keywords: Experimental education, Systematic review

NAVIGATING GOVERNANCE IN TURBULENT TIMES: LEADERSHIP TRAITS AND COMPETENCIES OF UNIVERSITY PRESIDENTS IN TAIWAN

Sophia Shi-Huei Ho[1*], Ives Hsu-Hong Cheng[2]
[1]Professor, Graduate School of Education, Ming Chuan University, Taiwan
[2]Doctoral Candidate, Institute of Education, National Yang Ming Chiao Tung University, Taiwan
Corresponding Email: shihui@mail.mcu.edu.tw

As Taiwan's higher education system faces mounting pressures from demographic decline, intensified international competition, and institutional restructuring, university presidents must demonstrate adaptive leadership and effective governance. This study investigates the leadership traits, styles, and competencies of university presidents in Taiwan, aiming to construct a comprehensive understanding of how they respond to complex governance challenges in a rapidly changing environment. The research adopts a mixed-methods approach combining bibliometric analysis of higher education leadership literature with a nationwide survey targeting Taiwanese university presidents. The theoretical framework encompasses five core dimensions: organizational communication and influence, internal problem-solving capacity, governance difficulty and strategy, leadership development, and job satisfaction. Quantitative analyses reveal that background factors—such as age, academic discipline, appointment mechanism, and institutional type—significantly affect leadership perceptions and practices. Moreover, leadership development and communication competence strongly predict governance effectiveness and presidents' work satisfaction. The findings underscore the diversity of leadership styles among university presidents and the need for contextual adaptability in governance. The study contributes empirical insights for leadership cultivation, performance evaluation, and policy reform by exploring structural challenges and individual leadership responses. The research provides a foundation for refining presidential selection and training systems and offers comparative implications for higher education governance in East Asia.

Keywords: Communication, Higher education governance, Presidential competencies, University leadership

COLLABORATIVE GOVERNANCE IN RURAL TAIWAN: REFRAMING SCHOOL-COMMUNITY PARTNERSHIPS THROUGH FACILITATIVE LEADERSHIP

CHEN, Robin Jung Cheng*
Department of Education, National Chengchi University Taipei, Taiwan
Corresponding Email: robin@nccu.edu.tw

As Taiwan faces demographic decline and uneven regional development, rural schools are under increasing pressure to sustain enrollment and educational quality. In this context, school-community partnerships have become a strategic response to ensure institutional viability and support local revitalization. This two-year qualitative study applies a collaborative governance lens to examine how rural schools in Taiwan construct and maintain partnerships with community actors, focusing particularly on the mechanisms of facilitative leadership. Through case studies of four rural schools in different counties, the research draws on interviews, site observations, and document analysis to address three questions: (1) How do school-community partnerships respond to structural educational challenges in rural areas? (2) What forms of governance and decision-making emerge in these partnerships? (3) How do facilitative leaders influence collaborative outcomes? Findings indicate that effective partnerships move beyond informal cooperation and evolve into structured governance networks where decision-making authority is partially shared. Facilitative leaders—while often principals—also include teachers or local figures with long-standing social capital. Their influence stems not only from interpersonal skills but also from their capacity to navigate bureaucratic constraints, secure external funding, and formalize inter-organizational routines. In successful cases, schools serve as "community hubs," coordinating local services, lifelong learning programs, and cultural revitalization initiatives. The study offers several implementation pathways: (1) developing policy templates for institutionalized school-community agreements; (2) integrating partnership-building modules into principal and teacher training programs; (3) establishing interschool learning networks for rural innovation; and (4) designing governance dashboards to assess partnership performance. These findings contribute to the growing body of knowledge on sustainable rural education and inform future education governance reforms in Taiwan.

Keywords: Collaborative governance, Facilitative leadership, Rural education, School-community partnership

TRACK B

ENGINEERING, TECHNOLOGY & APPLIED SCIENCES

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ADOPTING ARTIFICIAL INTELLIGENCE, THE METHOD OF TRANSFORMER LEAKAGE FLUX ANALYSIS

Gang Seok Lee*
Bucheon University South Korea
Corresponding Email: gsuoki2001@gmail.com

In the electric industries, the power topology and electric machine needs electromagnetic analysis. To analyze the electromagnetic field, the FEM(finite-element-method) and magnetic equivalent circuit calculation are used. However, these methods need many iterative processes which take long time. The artificial intelligence(AI) models are adopted to the electric engineering. The AI are adopted to the control and modeling. Adopting the AI to the modeling, the analyzing electromagnetic time can be reduced. This paper proposed the electromagnetic field analysis method using MLP, XBoost, GLP algorithm. Using the algorithms, the number of iterative methods is reduced.

Keywords: Artificial intelligence, MLP, Xboost, GLP, Electromagnetic field

THE ROLE OF AGENT-BASED SIMULATION IN RENEWABLE ENERGY TRANSITIONS: A HOLISTIC REVIEW OF STRATEGIC PLANNING AND POLICY IMPLICATIONS

Khaled Nasser Mohammad Yousef*
University of Exeter, England
Corresponding Email: ky288@exeter.ac.uk

This review critically examines how Agent-Based Modelling (ABM) aids renewable energy (RE) transitions in decentralised and behaviour-driven systems. Traditional energy planning uses top-down models that ignore actor heterogeneity, socio-technical complexity, and dynamic feedback mechanisms in evolving energy landscapes. In renewable energy contexts, ABM can simulate individual and collective behaviours, policy interventions, and technology adoption patterns. This paper shows ABM's methodological versatility and policy relevance by reviewing global and regional ABM applications, including solar PV, battery systems, EV integration, microgrids, and global gas market dynamics. The comparison of ten influential ABM studies illuminates behavioural influence, socio-environmental dynamics, and RE diffusion's financial and policy integration. The United Arab Emirates (UAE)-focused ABM case study shows how societal heterogeneity—innovators, supporters, followers, and opponents—responds to different solar and wind technology communication strategies. The study finds that expert-led outreach and socially endorsed strategies outperform random or minimal engagement in triggering adoption across all social strata. Using deep learning for wind trend forecasting shows how ABM and predictive analytics can support long-term energy planning. Although promising, ABM research struggles with multi-scale modelling, financial mechanism integration, and regional customisation, especially in MENA. ABM's future lies in hybrid modelling approaches that integrate AI, equity analysis, and resilience frameworks to support adaptive and sustainable policy design. ABM helps policymakers test scenarios, mitigate risks, and create context-specific, resilient energy strategies as the energy sector transforms rapidly.

Keywords: Agent-Based modelling (ABM), Renewable energy transitions, Policy simulation, Strategic energy planning

BEYOND THE CHATBOT: A SYSTEMATIC SURVEY OF AUTONOMOUS EDUCATIONAL AGENTS (AEAS) AND STATEFUL ORCHESTRATION IN 2026 ECOSYSTEMS

David Ramamonjisoa*
Faculty of Software and Information Science, Iwate Prefectural University, Japan
Corresponding Email: david@iwate-pu.ac.jp

The rapid evolution of Large Language Models (LLMs) has shifted the paradigm of educational technology from passive retrieval systems to Autonomous Educational Agents (AEAs). These systems have transitioned from reactive prompting to proactive agentic workflows (AWs) capable of reflection, planning, and multi-step reasoning. This paper presents a systematic survey of the educational AI landscape as of 2026, synthesizing breakthroughs in multi-agent collaboration and learner simulation. We analyze three pivotal frameworks: Agent4Edu, which uses generative agents to simulate learner-response data; the Teaching Assistance/Student Support taxonomy, which provides a task-centric map of classroom applications; and the Multi-Agent Scoring System (MASS), which employs specialized sub-agents for objective assessment. Building on these foundations, we evaluate the shift toward stateful orchestration as a unified development paradigm. A primary focus of this survey is how graph-based architectures enable deterministic control over pedagogical paths, thereby mitigating the risk of "cognitive dependence" by enforcing Socratic scaffolding rather than direct answer generation. We further analyze the technical utility of durable state management for maintaining persistent learner profiles and educational continuity across discrete sessions. Finally, we address critical challenges, including the technical hurdles of memory pruning and the requirement for session-aware persistence. This work provides a roadmap for researchers aiming to build the next generation of transparent, agent-driven learning environments.

Keywords: Agentic AI, Educational Technology, Autonomous Agents

A SYSTEMATIC REVIEW OF PRE-TRAINED LANGUAGE MODELS FOR TEXT EMBEDDINGS IN RECOMMENDER SYSTEMS

Muhammet Ali Kadioglu*
Senior Data Scientist, Istanbul, Türkiye
Corresponding Email: kadioglumuhammetali@gmail.com

The study was undertaken to analyze the effectiveness of pre-trained language models for text embeddings in recommendation systems. It aims to answer the question of how different embedding methods, along with model customizations, impact recommendation accuracy and efficiency. It further tries to identify which pre-trained language models are most suitable for different recommendation settings. The study utilized a systematic review of recent literature, focusing on pretrained language models for text embedding methods in recommendation systems. Databases such as Scopus, Web of Science, IEEE Xplore, and ScienceDirect were searched using keywords related to text embeddings, pretrained models, and recommendation systems. Performance metrics were systematically compared, and online websites were used for efficient data extraction and analysis. The review shows that contextual embeddings, particularly those derived from models like BERT, GPT, and T5, significantly enhance recommendation accuracy. Hybrid models combining language models with additional features such as knowledge graphs and contrastive learning outperform traditional methods. Fine-tuning and model customizations additionally improve performance across various domains. The understandings from this study can be applied in diverse areas, including e-commerce, healthcare, job matching, academic research, and entertainment etc. These domains can leverage pretrained language models for embedding methods to enhance recommendation systems. It improves user experience, personalization, and decision-making processes. The richer semantic understanding offered by pre-trained language models translates into sharper recommendations. This study uniquely synthesizes the impact of pretrained language models for embeddings on recommendation systems. It highlights the transformative potential of contextual embeddings and hybrid models. It offers a comprehensive analysis of model customizations and their effects on recommendation accuracy. The study consolidates current evidence on how pretrained language models shape recommendation systems and explains how tailored customizations boost accuracy.

Keywords: Literature review, Text representation, Contextual embeddings, Pretrained language models, Recommendation systems

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